ENVIRONMENTAL ASSESSMENT

DFW CONNECTOR

STATE HIGHWAY 114

FROM BUSINESS 114L (NORTHWEST HIGHWAY) TO INTERNATIONAL PARKWAY

AND

STATE HIGHWAY 121

FROM SH 360 TO FM 2499

TARRANT AND DALLAS COUNTIES, TEXAS

CSJ: 0353-03-059, 0353-03-079, 0364-01-072, 0364-01-112, 0364-01-113, 0364-01-115

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This Environmental Assessment becomes a Federal document when evaluated, signed, and dated by the Responsible FAA official.

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Date: 4/22/2009

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

INTRODUCTION

The Federal Highway Administration (FHWA) and Texas Department of Transportation (TxDOT) propose to widen and reconstruct State Highway (SH) 114 and SH 121 in Tarrant and Dallas Counties. The general limits of the proposed improvements are along SH 114 from east of North Kimball Avenue to east of International Parkway and along SH 121 from Hall Johnson Road to FM 2499 (Grapevine Mills Parkway). The project area is located primarily within the cities of Grapevine and Southlake, just north of the Dallas/Fort Worth (DFW) International Airport (see **Appendix A Project Location Map**). The project would provide transportation improvements along approximately 14.4 miles of SH 114, SH 121 and other interconnected roadways.

Proposed improvements focus on the convergence of SH 114 and SH 121 between Main Street and International Parkway, the transportation corridor known locally as "The Funnel." Since 2006, this project has been referred to as the DFW Connector. In addition, roadway facilities proposed for improvement as part of this project include six other interconnected roadways in the project area: FM 1709, SH 26 (Ira E. Woods Avenue), SH 360, International Parkway, IH 635, and FM 2499. These roadways are referred to collectively in this document as the "DFW Connector."

The area of proposed transportation improvements is bounded by SH 360 just south of Stone Myers Road, SH 121 at Hall Johnson Road, SH 114 at North Kimball Avenue, International Parkway just south of North Airfield Drive, SH 114 at Freeport Parkway, IH 635 just east of Royal Lane, SH 121 just north of FM 2499 and FM 2499 just south of Gerault Lane. The project is located on the United States Geological Survey (U.S.G.S.) 7.5 Minute Quadrangle Map of Grapevine Texas (**Appendix B**).

The proposed improvements for the DFW Connector include a Managed Express Lanes toll facility, designed to reduce congestion by providing separate, tolled lanes for vehicles traveling along SH 114 between SH 26 on the west and International Parkway on the east. The Managed Express Lanes toll facility – the only project facility that would be tolled – would combine the mobility benefits of express lanes and high occupancy vehicle (HOV) lanes, offering greater flexibility in controlling congestion. They would accommodate both high occupancy vehicles and single occupancy vehicles (SOV) providing opportunities for congestion management through a combination of three variables: hours of operation, auto occupancy, and value/toll pricing. Additional information about the proposed Managed Express Lanes toll facility is provided in **Section III. A. Proposed Facilities**.

The estimated cost for the proposed improvements is $906,989,921, which includes preliminary engineering, construction, construction engineering, indirect costs, contingencies, right-of-way acquisition and utility relocations. TxDOT may procure the proposed improvements through a Comprehensive Development Agreement (CDA). The CDA Developer may bear some of the cost, which they would recoup through toll revenues.

The TxDOT – Fort Worth District, in cooperation with FHWA as the lead federal agency, has undertaken the preparation of this Environmental Assessment (EA) for the proposed 14.4-mile project. This EA presents the potential social, economic, and environmental impacts for the proposed project.

The FHWA has developed federal regulations for highway projects. These regulations, Title 23 of the Code of Federal Regulations, Part 771, provide instructions for assessing environmental impacts specific to federally funded transportation projects. This EA complies with the National Environmental Policy Act and allows the FHWA to determine whether an Environmental Impact Statement (EIS) is necessary. An EIS is required for projects or actions that may significantly affect the quality of the human environment. Examples of projects or actions typically requiring an EIS include (1) any new controlled access freeway; (2) any highway project of four or more lanes on a new location; (3) new construction or extension of fixed guideway systems; or (4) new construction or extension of a separate roadway for buses or high occupancy vehicles (HOVs) not located within an existing highway facility.

The DFW Connector project would acquire approximately 150 acres of new ROW from Dallas-Fort Worth (DFW) International Airport, which is a department of the both the cities of Dallas and Fort Worth. Since airport property represents federally obligated land, Federal Aviation Administration (FAA) involvement is mandatory. When land is acquired from an airport, FAA must make a federal action to release the airport property for sale. This condition applies to the proposed acquisition from the DFW International Airport for the proposed DFW Connector project.

The FAA has statutory responsibility for promoting safe flight of civil aircraft in air commerce. The purpose of FAA action in connection with the proposed construction of the DFW Connector project is to ensure that the proposed alterations to the airport do not adversely affect the safety, utility, or efficiency of the airport. FAA action is necessary in connection with proposed use of airport residual property because, pursuant to 49 USC § 47107(a)(16), the FAA Administrator (under authority delegated from the Secretary of Transportation) must approve any revision or modification to an Airport Layout Plan (ALP) before the revision or modification takes effect. The Administrator's approval includes a determination that the proposed alterations to the airport, reflected in the ALP revision or modification, do not affect adversely the safety, utility, or efficiency of the airport.

The FAA federal action requires a NEPA analysis that meets the requirements of FAA Order 5050.4B: National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects and FAA Order 1050.1E: Policies and Procedures for Considering Environmental

Impacts. Appendix A of the FAA Order 1050.1 E requires the evaluation of specific resource categories as part of an environmental assessment. Each of these impact categories has been evaluated against FAA's thresholds of significance as indicated in the order. Table 1 displays a summary of the resource categories and references page numbers for the discussion to these resource categories in this document.

Table 1 Cross Reference to Environmental Resource Categories Assessed by FAA

FAA Resource Categories	Reference Page Number
Air Quality	65-71; Appendix H
Coastal Issues	62-63
Compatible Land Use	30-31
Construction Impacts	42 (Water 61-62, Air 71, Noise 75)
4(f)	78
Farmland	56
Fish/Wildlife/Plants	45-56
Floodplains	58-59
Hazardous Material	64-65
Historical, Architectural, Archeological and Cultural Resources	75-77
Light Emissions and Visual Impacts	41
Natural Resources and Energy Supply	63
Noise	71-75
Secondary (Induced) Impacts	78-89
Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks	29-38
Water Quality	56-58; 61-62
Wetlands, jurisdictional or non-jurisdictional	59-60
Wild and Scenic Rivers	63
Public Involvement	24-25

This EA provides the public and decision makers with adequate and appropriate information regarding the social, economic, and environmental impacts associated with the proposed project. The proposed project includes improvements to SH 114, SH 121, and the project facilities. The improvements involve the addition of main lanes, a Managed Express Lanes toll facility, frontage roads, collector-distributor roadway systems, and direct connector ramps at interchanges. After completion of the project, the DFW Connector would provide more non-tolled main lanes than currently exist.

As mentioned earlier, the DFW Connector would include a Managed Express Lanes toll facility. Managed lanes increase freeway efficiency by offering motorists a predictable trip with little congestion. Lane management operations and pricing structure may be adjusted at any time to better serve modal needs. According to the FHWA study *Managed Lanes: A Cross-Cutting Study* (November 2004), managed lanes are defined as: "A limited number of lanes set aside within an expressway cross-section, where multiple operational strategies are utilized, and actively adjusted as needed, for the purpose of achieving pre-defined performance objectives. Such multiple operational strategies could include flexible pricing, vehicle eligibility, and controlled access."

Based on the potential social, economic and environmental impacts identified and presented in this EA, TxDOT does not anticipate that an EIS would be required.

I. NEED AND PURPOSE FOR PROPOSED PROJECT

SH 114 and SH 121 in northeast Tarrant County face serious transportation problems. Most immediately, these highway facilities are not able to accommodate current traffic levels, which results in several hours of severe congestion during weekday commute times. These travel delays contribute to lost economic productivity and increased air pollution. Unless the congestion problem is resolved, the effects could become much worse over the coming decades as the area's population and employment grows and travel demand increases. The following points support the need for major transportation improvements to SH 114 and SH 121:

- The annual cost of congestion in 2007 for the DFW region is $4.2 billion (Mobility 2030: The Metropolitan Transportation Plan, North Central Texas Council of Governments (NCTCOG), 2007).

- Traffic on SH 114 and SH 121 is heavily congested, with traffic demand exceeding roadway capacity and traffic flow forced or subject to breakdown (*Corridor Alternative Analysis Study*, HDR, Inc., 2003). The SH 114/SH 121 Concurrent Route area is a moderate (30-50 mph) to severe (<30 mph) recurring bottleneck location in both the morning and evening (NCTCOG, 2005).

- The existing freeway system has deficiencies related to inadequate weaving distances and mixing of local and through traffic that contribute to congestion and safety problems. Traffic weaving needs to be minimized for the highest volume traffic movements to improve mobility and safety. Local traffic that uses the DFW Connector is hindered by the heavy volumes and weaving movements of through traffic.

- Large volumes of non-daily commuter traffic to and from DFW International Airport and regional pass-through drivers unfamiliar with the highway and ramp access points contribute to congestion problems.

- The Environmental Protection Agency (EPA) has designated Tarrant County (and eight other counties in north central Texas) as nonattainment for the pollutant ozone. A major contributor to the formation of ozone in the region is vehicle pollution (mobile source) caused by traffic congestion. Even though the amount of pollution produced from vehicles is decreasing over time, traffic congestion is still a major contributor to the ozone problem.

- Forecast increases in the area's population and employment (see **Table 3.2**) provide the basis for an estimated 180,000 additional vehicles per day (vpd) by year 2025. The SH 114/SH 121 Concurrent Route currently has capacity for only about 160,000 vpd (HDR, 2003). Traffic volume on the facility was approximately 170,000 vpd in

2005, and is expected to more than double by 2025, reaching 350,000 vpd (TxDOT Transportation Planning and Programming Division, May, 2006).

- According to NCTCOG, the DFW region experienced 0.96 fatalities per 100 million vehicle miles traveled (VMT) (Spring 2005 Transportation State of the Region). The rate of fatal accidents appears to be declining even as regional VMT continues to increase. In 2007, progress continued to be made to reduce injuries and fatalities, improve overall system security, and reduce incident-clearance times on freeways and tollways (2007 Transportation State of the Region, NCTCOG). According to the *Corridor Alternative Analysis Study*, the accident rate on the existing DFW Connector is less than the statewide average freeway accident rate for urban areas. Nevertheless, crash data for the DFW Connector suggest the need to improve traffic safety in the project corridor. During the last four to five years, over 1,000 crashes resulting in 273 injuries and five fatalities occurred on the DFW Connector (**Table 1.1**).

Table 1.1 2005, 2006 and 2007 Crash Data for DFW Connector

Roadway	Fatal Crashes	Incapacitating Crashes	Non-Incapacitating Crashes	Possible Injury Crashes	Non-Injury Crashes	Total Crashes
SH 121 south of SH 114	0	1	11	13	15	41
FM 1709 NE Tarrant Co.	0	3	12	12	40	67
IH 635 (CS 2374-07, Dallas)*	1	4	10	11	15	41
IH 635 (CS 2374-06, Fort Worth)*	1	3	14	40	40	98
FM 2499	0	4	16	23	42	87
SH 360	0	2	6	8	15	32
SH 26	0	0	2	5	9	16
SH 114	2	17	94	114	208	436
SH 121 north of SH 114	1	6	35	47	95	185
Total	5	40	200	273	479	1,003

* Includes 2004 crashes.
Source: TxDOT – Fort Worth District Office

In response to the need for improvements, the purpose of proposed transportation improvements is to improve mobility and access within the rapidly developing DFW Connector. The DFW Connector is proposed to be widened and reconstructed to enhance mobility, improve access and improve operational deficiencies. Proposed improvements for achieving this purpose must address the following objectives:

- eliminate existing transportation system deficiencies in order to accommodate both local and regional traffic;
- improve safety;
- alleviate existing congestion;
- accommodate future travel demand;

- maintain and enhance accessibility to commercial centers, employment sites and other activity areas; and
- avoid, minimize or mitigate any adverse social, economic and environmental effects.

II. DESCRIPTION OF EXISTING FACILITIES

A. EXISTING FACILITIES

All existing rights-of-way for TxDOT roadways within the limits of the DFW Connector purchased after 1970 where purchased under previous TxDOT projects following the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. No advanced purchases of right-of-way have been obtained for the DFW Connector project.

The following section describes each of the DFW Connector and provides details regarding operational deficiencies. **Table 2.1** provides a summary description of these existing project facilities, including the length of each segment. The DFW Connector segment descriptions have been broken into four segments, A-D, for descriptive purposes (see **Appendix A Project Location Map**).

SEGMENT A

SH 114 (North Kimball Avenue to William D. Tate Avenue): This segment of SH 114 is located on the west side of the study area and borders portions of the cities of Grapevine and Southlake and includes two-to-three main lanes in each direction along with two frontage road lanes in each direction. The existing facility in this segment includes system interchanges at North Kimball Avenue, BU 114 (Northwest Highway), FM 1709, SH 26 and William D. Tate Avenue. The existing interchange at SH 26 includes a half-clover leaf interchange and a railroad grade separation over the Cotton Belt rail line. Operational deficiencies in this segment of SH 114 include the following:

- The existing frontage roads, which intersect SH 26 at grade, are discontinuous and are severed by the existing Cotton Belt rail line, creating operational and circulation limitations.

- The current travel patterns at the FM 1709 crossover result in a high number of turning movements during peak periods and result in frequent backups on the frontage road and the westbound SH 114 exit ramp to FM 1709.

- The existing connection from eastbound SH 114 to southbound SH 121 and from northbound SH 121 to westbound SH 114 requires traffic to use the segment of William D. Tate Avenue from SH 114 to Mustang Drive. This results in traffic congestion along William D. Tate Avenue and the frontage road signalized intersections with SH 114. This connection is also the route for emergency access to Baylor Regional Medical Center and access to SH 26.

FM 1709 (Nolan Drive to SH 114): This segment of the study area includes an arterial roadway with three lanes in each direction and a continuous left-turn lane. This arterial roadway serves to provide access to and from SH 114 and the area businesses and neighborhoods. This segment of FM 1709 includes an intersection with Gateway Drive/Commerce Street and an overpass over SH 114 that connects to Wall Street and Park Boulevard on the east side of SH 114. Operational deficiencies in this segment of FM 1709 include the following:

- Due to the fact that this segment of FM 1709 provides a key access point to and from SH 114, the existing intersection with the eastbound SH 114 frontage road as well as the five-leg intersection – Wall Street, Park Boulevard, the SH 114 westbound frontage road and FM 1709 – experiences significant operational problems during peak periods. These operational issues also include traffic backing up along the SH 114 westbound frontage road to the westbound SH 114 exit ramp to Wall Street/FM 1709, which also provides access to Park Boulevard.

- Northwest Highway (BU 114), located approximately one-quarter mile to the north, intersects FM 1709 at Gateway Drive. This contributes to congestion at the intersection.

SH 26/ Ira E. Woods Avenue (0.6 miles south of SH 114 to 0.3 miles north of SH 114): The existing SH 26 segment provides two lanes in each direction. This segment of SH 26 parallels the Cotton Belt rail line and provides access to many businesses in this area. The Baylor Regional Medical Center is located just west of Ira E. Woods Avenue, north of SH 114. This segment of SH 26 includes intersections with South Kimball Avenue, Earnest Dean Parkway, the eastbound and westbound SH 114 cloverleaf ramps and the SH 114 eastbound and westbound frontage roads. Operational deficiencies in this segment include the following:

- The SH 26 intersections with SH 114 frontage roads are becoming increasingly congested due to increased traffic related to new land development along SH 26. Three signalized intersections within one-quarter mile – eastbound SH 114 frontage road cloverleaf, westbound SH 114 frontage road cloverleaf, and Earnest Dean Parkway – contribute to congestion along SH 26/Ira E. Woods Avenue.

SEGMENT B

SH 114/SH 121 Concurrent Route (SH 114/SH 121 just west of Main Street to International Parkway): This portion of the proposed project is the convergence of five freeway facilities into one corridor. These freeway facilities include SH 121, IH 635, SH 114, SH 360 and International Parkway. This portion designated as SH 114 and SH 121, consists of four main lanes in each direction and two frontage road lanes in each direction between Main Street and Texan Trail. This portion includes system interchanges at Main Street and Texan Trail. Operational deficiencies associated with this segment of the project include the following:

- The convergence of five major highways causes the DFW Connector to operate as one super-interchange. The collection and distribution of traffic among the highways and local roads constrains the ability of the freeways to carry through-trips.
- On the east, two southbound lanes on SH 121 and three westbound lanes on SH 114 merge into four westbound lanes. Through traffic on southbound SH 121 enters on the right side and exits on the left; westbound SH 114 through traffic enters the left side and exits to the right. This existing configuration forces through traffic to change lanes (or “weave”) over a distance of 2.5 miles. Southbound traffic on SH 121 that wants to continue on southbound SH 121 must weave a minimum of two lanes. Westbound traffic on SH 114 must weave across a minimum of two lanes to exit Texan Trail; and a minimum of one lane to exit Main Street. Traffic weaving and lane imbalance exacerbate the situation and add to congestion and accidents. Mixing of local and regional traffic also contributes to congestion problems, as local traffic that uses this portion is hindered by the heavy volumes and weaving movements of regional traffic.
- On the west end, near Main Street, SH 114 merges with SH 121 from the right side and ultimately diverges from SH 121 on the left side at the east end. Two northbound SH 121 lanes merge with two eastbound SH 114 lanes to form four eastbound lanes. Through traffic on northbound SH 121 that wants to continue on northbound SH 121 must weave a minimum of two lanes. Traffic from northbound SH 121 that wants to exit Texan Trail must weave a minimum of two lanes crossing eastbound SH 114 traffic.

SH 114 (International Parkway to approximately one mile east): This segment of the project includes the extreme eastern end of the project area and currently utilizes four main lanes in the eastbound direction and three main lanes in the westbound direction with no frontage roads and a system interchange with Freeport Parkway.

SEGMENT C

SH 121 (IH 635 to just north of FM 2499): This segment of SH 121 includes a connection from westbound IH 635 to northbound SH 121 as well as direct connectors from northbound SH 121 to northbound FM 2499, from southbound FM 2499 to southbound SH 121, and a direct connector from northbound SH 26 to northbound SH 121. This segment utilizes two-to-three main lanes in each direction and includes system interchanges at Bass Pro Drive and Sandy Lake Road/Grapevine Mills Boulevard. This segment of SH 121 is the northernmost portion of the project and ties to improvements along SH 121 being developed by TxDOT in the Dallas District. Operational deficiencies in this segment of SH 121 include the following:

- The close proximity of IH 635 and the FM 2499 interchange results in weaving issues on both northbound and southbound SH 121.

- While not in the limits of this study, Sandy Lake Road and Freeport Parkway are currently at-grade signalized intersections. This transition from freeway facility to arterial facility results in traffic congestion along SH 121. FHWA and the TxDOT – Dallas District are widening SH 121 north of FM 2499 to a ten-lane freeway plus six frontage road lanes and creating grade-separated interchanges at Sandy Lake Road/ Grapevine Mills Boulevard and Freeport Parkway.

FM 2499 (SH 121 to just south of Gerault Lane): The existing FM 2499 segment of the project provides three lanes in each direction with a divided, raised median. The southern end of this segment includes direct connector ramps that connect southbound FM 2499 to southbound SH 121 and northbound SH 121 to northbound FM 2499. The existing arterial roadway includes intersections at Stars and Stripes Way and Grapevine Mills Boulevard and connects to the southbound SH 121 frontage road and to southbound SH 26. Operational deficiencies in this segment of FM 2499 include the following:

- Traffic congestion exists at the intersection of Stars and Stripes Way and Grapevine Mills Boulevard due to the traffic generated by Grapevine Mills Mall and other local businesses adjacent to the roadways.

- The close proximity of the Stars and Stripes Way intersection to the direct connector ramps to/from SH 121 creates an abrupt transition from a freeway to an arterial roadway and the stop condition at Stars and Stripes Way.

IH 635 (SH 121 to 0.5 miles east of Royal Lane): This is the easternmost terminus of the project and currently utilizes three main lanes in each direction and no frontage roads. This segment has one system interchange with Royal Lane and a railroad overpass with the Cotton Belt rail line.

SH 121 (SH 114 to IH 635): This segment of SH 121 serves not only to provide access to/from the east and west but also serves to access the main entrance into DFW International Airport. This segment of SH 121 currently utilizes two-to-five main lanes in each direction with no frontage roads. There are no system interchanges within this segment; however, one railroad grade separation exists over the existing Cotton Belt rail line. The north end of this segment includes the fully directional interchange with IH 635 and the southern end of this segment includes the fully directional interchange with SH 114. Operational deficiencies in this segment of SH 121 include the following:

- This segment of SH 121 has a significant weaving issue. Southbound SH 121 traffic destined for the SH 114/SH 121 segment to the west must weave a minimum of two lanes to the right, crossing traffic from IH 635 and Bass Pro Drive entrance ramps. Traveling northbound to IH 635, SH 121 traffic must weave a minimum one lane to the right, crossing traffic from DFW International Airport and westbound SH 114 entrance ramps to exit to eastbound IH 635. Likewise, because there is significant traffic from westbound SH 114 to northbound SH 121, traffic from westbound SH 114 must merge one lane to the left and weave a minimum of two lanes to the left to continue northbound on SH 121 crossing traffic weaving to the right from SH 121 exiting to IH 635. These major weaves result in severe congestion in this segment.

International Parkway (North Airfield Drive to SH 114): International Parkway serves as the north entrance into DFW International Airport and currently utilizes three main lanes in each direction. This section also includes auxiliary lanes from direct connectors and ramps. North Airfield Drive is the only system interchange within this segment. There is no direct access from southbound International Parkway to North Airfield Drive. Operational deficiencies in this segment of International Parkway include the following:

- The close proximity of the north DFW International Airport toll booths and North Airfield Drive to the SH 114/SH 121 fully directional interchange creates operational issues associated with weaving traffic.

- Westbound SH 114 traffic to the southbound International Parkway frontage road must weave across a minimum of four lanes of traffic, within a distance of only approximately 1,000 feet.

- Southbound SH 121 traffic to the southbound International Parkway frontage road must weave a minimum of two lanes across traffic going from eastbound SH 114 to southbound International Parkway and traffic from IH 635 to southbound International Parkway.

SEGMENT D

SH 121 (Hall Johnson Road to Mustang Drive): This segment of the project currently utilizes two-to-five main lanes in each direction and two frontage road lanes in each direction. This section includes system interchanges at Hall Johnson Road, Stone Myers Parkway and Mustang Road. In addition, the SH 121/SH 360 interchange in this segment provides directional connections from northbound SH 360 to northbound SH 121 and from southbound SH 121 to southbound SH 360. An existing flyover ramp to William D. Tate Avenue facilitates the northbound SH 121 to westbound SH 114 movement discussed previously. Operational deficiencies in this segment of SH 121 include the following:

- The close proximity of the SH 360 interchange to the SH 114 interchange results in weaving and bottleneck issues associated with existing lane drops. The current configuration of SH 121 and SH 360 requires traffic from northbound SH 360 that wants to continue northbound on SH 121 to weave a minimum of two lanes.

- As with the SH 114 section, the use of William D. Tate Avenue as the main connection from northbound SH 121 to westbound SH 114 and from eastbound SH 114 to southbound SH 121 results in traffic congestion along William D. Tate Avenue, because traffic must travel through a minimum of two signalized intersections. The current configuration of SH 121 and SH 360 requires traffic from northbound SH 121 that wants to exit William D. Tate to weave a minimum of one lane; traffic from northbound SH 121 that wants to exit Main Street must weave a minimum of two lanes.

SH 360 (Stone Myers Parkway to SH 121): This is near the southernmost terminus of the project and includes two main lanes in each direction and frontage roads with two lanes in each direction. The SH 360 main lanes were recently constructed. This segment of SH 360 includes a system interchange at Stone Myers Parkway.

A summary of the existing project facilities is provided in **Table 2.1**.

Table 2.1 Description Of Existing Project Facilities

Facility	Functional Class	Limits	Approx. Length (Miles)	Existing # of Lanes	Right-of-Way Width (Usual)
SH 114	Freeway	North Kimball Avenue to William D. Tate Avenue	1.3	▪ 2-3 main lanes in each direction ▪ 2 frontage road lanes in each direction (discontinuous at Cotton Belt rail line)	350' – 580'
FM 1709	Arterial	Nolan Drive to SH 114	0.6	▪ 3 lanes in each direction	130'
SH 26 (Ira E. Woods Avenue)	Arterial	0.6 miles south of SH 114 to 0.3 miles north of SH 114	0.9	▪ 2 lanes in each direction	115' – 125'
SH 114/SH 121 Concurrent Route	Freeway	SH 114/SH 121 just west of Main Street to International Parkway	2.3	▪ 4 main lanes in each direction ▪ 2 frontage road lanes in each direction (discontinuous east of Texan Trail)	440' – 475'
SH 114	Freeway	International Parkway to approximately 1.0 mile east	1.0	▪ 3-4 main lanes in each direction	290' – 440'
SH 121	Freeway	IH 635 to Just north of FM 2499	1.4	▪ 3 main lanes in each direction	295' – 807'
FM 2499	Arterial	SH 121 to just south of Gerault Lane	1.1	▪ 3 lanes in each direction	160'
IH 635	Freeway	SH 121 to 0.5 miles east of Royal Lane	1.9	▪ 3 main lanes in each direction	600' – 700'
SH 121	Freeway	SH 114 to IH 635	1.2	▪ 2-5 main lanes in each direction	417' – 421'
International Parkway	Freeway	North Airfield Drive to SH 114	0.6	▪ 3 main lanes each direction + auxiliary lanes	670'
SH 121	Freeway	Hall Johnson Road to Mustang Drive	2.0	▪ 2-5 main lanes in each direction ▪ 2 frontage road lanes in each direction	500' – 1,225'
SH 360	Freeway	Stone Myers Parkway to SH 121	0.6	▪ 2 main lanes in each direction ▪ 2 frontage lanes in each direction	480' – 520'

B. EXISTING LAND USE

Land uses within the Cities of Grapevine and Southlake for the year 2000 are shown in **Table 2.2**. About 14% of the land area of Grapevine was devoted to residential use and only about seven percent to industrial/commercial/institutional uses. A substantial portion of Grapevine (over 40%) consists of "infrastructure," a category that includes roads, airports and railroads. The residential character of Southlake was even more pronounced, with residential land uses accounting for 41% of the city's land area.

Table 2.2 Land Use In The Cities Of Grapevine And Southlake (2000)

Land Use	Acres in City	
	Grapevine	Southlake
Total Acres	23,020	14,377
Single Family	2,824	5,810
Multi-Family	244	1
Industrial	634	36
Commercial	653	634
Institutional	380	438
Infrastructure*	9,364	1,487
Parks and Flood Plain	2,389	481
Water	2,493	175
Under Construction	134	296
Vacant	3,819	4,923
Percent Vacant	16.6%	34.2%

Source: North Central Texas Council of Governments 2000 Land Use Inventory.
*Includes DFW International Airport Land.

The DFW Connector serve local area traffic related to employment, retail and commercial activities, as well as regional through-traffic. Employment in the project area is concentrated at DFW International Airport and the commercial and industrial complexes that surround it. In addition to DFW International Airport, major nearby trip generators within the project area include Grapevine Mills Mall, Bass Pro Shops Outdoor World, Gaylord Texan Resort & Convention Center, Baylor Regional Medical Center, and Texas Motor Speedway. In addition, the City of Dallas central business district (CBD), the City of Fort Worth CBD, the Las Colinas business district as well as other area cities add to the generation and distribution of traffic within the study area.

Most of the land abutting the DFW Connector is devoted to commercial, retail and industrial uses and is appropriately zoned by the Cities of Grapevine and Southlake. In Grapevine, these properties are zoned as community commercial, highway commercial, planned industrial development, planned commercial development, light industrial, business park and professional office. For the small portion of the westernmost project area that is within the City of Southlake, land abutting the DFW Connector is also predominantly commercial.

Southlake zoning for these properties includes general commercial, generalized and detailed site plan (mixed-use), office district, light industrial and heavy industrial. Relatively large tracts of vacant land owned by DFW International Airport are situated to the north, south, east and west of the DFW Connector.

Properties zoned for single and multi-family residential abut the DFW Connector within the City of Grapevine at the southwest end of the project and at the northwest corner of FM 2499 and Grapevine Mills Boulevard.

A wetland mitigation area owned by the DFW Airport and deed restricted to the USACE is located at the southeast corner of the intersection of SH 121 and Bethel Road.

There are two churches adjacent to the DFW Connector: Memorial Baptist Church, located to the west of SH 121 just north of Stone Myers Road, and Fellowship Church, located just east of the intersection of SH 121 and FM 2499. Other community facilities in the immediate project area include: Baylor Regional Medical Center, at the northwest corner of the SH 114 and Ira E. Woods Avenue intersection; Charter Grapevine Behavioral Health System Hospital, south of the SH 121/ SH 114 merger on the west side of the road; The Atria, an assisted living and Alzheimer's care facility located at the northeast corner of SH 121 and Hall Johnson Road; and a KinderCare Learning Center located on FM 1709 (E. Southlake Boulevard) just west of SH 114. See **Appendix D, Plates A through E**.

III. DESCRIPTION OF PROPOSED FACILITIES

A. PROPOSED FACILITIES

The DFW Connector is proposed to be reconstructed. Each segment of the project would be upgraded to enhance mobility, improve access or improve an operational deficiency. The proposed improvements address the weaving problems identified in the previous section. The following section discusses each segment of the proposed freeway facilities and key arterials within the study area. The drawings in **Appendix C, Existing and Proposed Typical Sections**, provide additional information about the existing and proposed roadway facilities. The improvements would require vertical and horizontal alignment changes to accommodate interchange enhancements and roadway widening. Approximately 192 acres of additional right-of-way would be required to accommodate the proposed improvements of which approximately 150 acres would be required from the DFW International Airport property. The following paragraphs identify important features of the proposed improvements. The DFW Connector project descriptions have been broken into four segments, A-D, for descriptive purposes (see **Appendix A Project Location Map**).

SEGMENT A

SH 114 (North Kimball Avenue to William D. Tate Avenue): The proposed improvements to this portion of the project typically include four lanes in each direction. The lanes in this segment vary from two to six lanes in each direction, due to transitions with the managed express lanes and auxiliary lanes. This segment of SH 114 includes the proposed eastbound SH 114 ingress and westbound SH 114 egress of the managed lane toll facility located just east of FM 1709. One major improvement in this segment includes the addition of arterial connectors at FM 1709 and at SH 26. The FM 1709 flyover provides direct access from the SH 114 westbound frontage road to westbound FM 1709. The SH 26 connectors are depressed and provide direct access from westbound SH 114 to southbound SH 26 and from northbound SH 26 to eastbound SH 114, thereby alleviating congestion at the SH 26 intersections with SH 114 frontage roads, and with Earnest Dean Parkway. Also included in this segment is the extension of the frontage roads at SH 26 over the Cotton Belt rail line, eliminating the discontinuous frontage roads in this area. Furthermore, the proposed improvements in this segment include the addition of direct connectors/collector distributors from eastbound SH 114 to southbound SH 121/SH 360 and from northbound SH 121/SH 360 to westbound SH 114. These connectors would alleviate the congestion along William D. Tate Avenue and provide better access to the Baylor Regional Medical Center. Frontage roads are comprised of two to five lanes in each direction.

SH 114 (At William D. Tate Avenue): The proposed configuration of SH 114 in this segment includes three main lanes in each direction due to transitions with the managed express lanes and auxiliary lanes. This location also includes two managed express lanes in each direction. U-turns would be provided at the frontage roads.

FM 1709 (Nolan Drive to SH 114): This segment of the proposed project includes the reconstruction of FM 1709. This reconstruction provides three to four westbound lanes and two to three eastbound lanes east of Nolan Drive; additional turn lanes are also needed. The continuous left-turn lane on FM 1709 would be eliminated from Nolan Drive to the SH 114 westbound frontage road. In addition, the flyover ramp from the SH 114 westbound frontage road would be grade-separated over Gateway Drive/Commerce Street and the eastbound SH 114 frontage road, and would tie to the FM 1709 westbound lanes just west of Gateway Drive/Commerce Street. FM 1709 would be re-aligned to tie to BU 114 (Northwest Highway). The five-leg signalized intersection at Wall Street, Park Boulevard, the westbound SH 114 frontage road and FM 1709 would be eliminated.

SH 26/ Ira E. Woods Avenue (0.6 miles south of SH 114 to 0.3 miles north of SH 114): This segment of the proposed project includes the reconstruction of SH 26 to include two to three lanes in each direction tying back to existing SH 26 north and south of the proposed SH 26 interchange with SH 114. In addition, this segment includes depressed connector ramps, providing direct access for northbound SH 26 to eastbound SH 114, and westbound SH 114 to southbound SH 26.

SEGMENT B

SH 114/SH 121 Concurrent Route: (SH 114/SH 121 just west of Main Street to International Parkway): The proposed improvements typically include six main lanes eastbound and seven main lanes westbound including auxiliary lanes and the addition of two managed express lanes in each direction. In addition, three-to-six frontage road lanes in each direction are proposed, including the addition of a frontage road on the north side of SH 114/SH 121 east of Texan Trail. The frontage roads would also feature U-turns at Main Street and Texan Trail. This portion would also contain a toll gantry for the managed express lanes, to be located just east of Texan Trail. In order to improve mobility within this portion, several ramps would be shifted or eliminated. Most notable are the elimination of the eastbound SH 114 entrance ramp from Texan Trail and the relocation of the westbound exit ramp to Texan Trail to the east. In addition, the westbound SH 114 entrance from Texan Trail would be eliminated in order to avoid a weave with the westbound SH 114 and southbound SH 121 diverge to the west. An additional exit ramp from northbound International Parkway to the westbound SH 114 / southbound SH 121 direct connector would be included in the design in order to provide access to Texan Trail from DFW International Airport. The proposed interchange with International Parkway provides a fully directional interchange and eliminates the lower speed cloverleaf ramps.

The SH 114/SH 121/International Parkway interchange north of DFW International Airport would be completely reconstructed. The existing low-speed clover leaf ramps (SH 121 southbound to SH 114 eastbound and International Parkway northbound to SH 114 westbound) would be replaced by higher speed direct connectors, allowing motorists to maintain higher travel speeds on all connections. In addition, a proposed collector-distributor system would provide access between IH 635 and SH 114 along SH 121. This upgrade improves mobility by minimizing traffic weaving.

Once these improvements have been made, through traffic on westbound SH 114 would enter on the right at the east end and exit to the right on the west end. Through traffic on eastbound SH 114 would enter on the right side at the west end and exit to the right at the east end. Northbound SH 121 through traffic would enter on the left side at the west end and exit to the left at the east end. Likewise, through traffic on southbound SH 121 would enter on the left at the east end and exit to the left at the west end. The reconfiguration of the main lanes would eliminate the need for SH 121 through traffic to weave across SH 114 traffic.

Managed Express Lanes Toll Facility: The proposed design for the DFW Connector, includes a Managed Express Lanes toll facility, which would reduce congestion by providing separate lanes for vehicles traveling along SH 114 between SH 26 on the west to International Parkway on the east. The Managed Express Lanes toll facility would be separated from the general purpose main lanes by concrete barriers, with ingress and egress available at two locations: just east of SH 26 on SH 114 and just east of International Parkway. These lanes provide flexibility to adjust to different levels of traffic congestion by accommodating both HOV and SOV and providing opportunities for congestion management through a combination of three variables: hours of operation, auto occupancy, and value / toll pricing. The proposed Managed Express Lanes toll facility combines the mobility benefits of express lanes and high occupancy vehicle lanes, offering greater flexibility in controlling traffic congestion. Although the Managed Express Lanes would be tolled, no tollbooths would be necessary as the facility would employ electronic toll collection. The Managed Express Lanes toll facility typically includes two lanes in each direction. An additional lane in each direction for approximately one-half mile just west of International Parkway is provided for HOV users to declare themselves as HOV users to receive a discount during peak periods (i.e., “rush hour”). The proposed facility provides for 13 non-tolled main lanes on either side of the Managed Express Lanes, an increase of five non-tolled lanes over what is currently provided.

The Managed Express Lanes toll facility is designed for regional trips providing the most reliable, time-saving commute and additional capacity in the corridor. Drivers using this facility can anticipate traffic to flow at a minimum of 50 mph. Drivers can expect to pay more for the Managed Express Lane service during peak travel times. The weekday peak period is currently defined as 6:30 a.m. to 9:00 a.m. and 3:00 p.m. to 6:30. When demand is high, such as during peak commute times, the toll rate will be established to maintain a minimum average corridor speed of 50 mile per hour. Transit vehicles will not be charged a toll. HOV vehicles of two or more occupants will receive a 50% discount during the peak period. A fixed-fee schedule will be applied during the first six months of operation; dynamic pricing will be applied thereafter. The toll rate will be set up to $0.75/mile during the fixed-schedule phase. The established rate will be evaluated and adjusted, if warranted, with Regional Transportation Council (RTC) approval. The actual toll rates for the Managed Express Lanes for the DFW Connector have not been established.

Motorists would not have to pay a toll to drive the SH 114/SH 121 Concurrent Route. They may choose between the non-tolled main lanes or the tolled Managed Express Lanes. At its widest point, this portion would include six eastbound non-toll lanes and seven westbound non-toll lanes with an auxiliary non-toll lane. This segment also includes two tolled managed express lanes with one additional auxiliary lane in each direction. The managed express lanes toll facility would be located between the eastbound and westbound general purpose lanes on SH 114, and would be expected to offer motorists a less congested, higher speed alternative to the non-tolled main lanes along SH 114.

Within this one-half mile stretch, wide shoulders have been provided for monitoring and enforcement. According to the NCTCOG, the Metropolitan Planning Organization for the Dallas/Fort Worth region, the primary purpose of managed lanes is to provide additional capacity in the corridor, provide reliability and efficiency to relieve congestion, generate revenue to provide funding for the managed facility, and generate some revenue to operate and maintain the facility over time (April 2006). While the DFW Connector project is not expected to generate enough revenue to construct, operate and maintain the managed express lane toll facility, the revenues generated by the Managed Express Lanes would provide a means to offset some of the operational and maintenance costs.

TxDOT TxTag® stickers, the North Texas Tollway Authority (NTTA) Toll Tag® (Dallas area), and the Harris County Toll Road Authority (HCTRA) EZ TAG® (Houston area) would be accepted on the SH 114/SH 121 Concurrent Route Managed Express Lanes toll facility. Toll charges could be automatically deducted from a prepaid credit account or would be mailed as a monthly statement to the driver if the video billing method is utilized. If the driver has a TxTag® or other toll transponder account, the tolls would automatically be deducted from the account when the facility is used. The account would be a prepay account which means the driver must maintain sufficient funds in his/her account to cover incurred toll charges, such as for accounts currently in use for existing toll roads in Texas.

Not maintaining a prepaid account would impact any user, including low-income users, because the cost of paying the accumulated toll charges without an account would represent a higher toll rate than toll charges affiliated with a prepaid account. Through a system known as video billing, it would still be possible to drive the SH 114/SH 121 Concurrent Route Managed Express Lanes without an electronic toll transponder or prepaid user account. The user’s license plate would be recorded and matched to the State’s vehicle registration file, and a monthly bill would be mailed to the registered owner of the vehicle for the accumulated toll charges. The toll rates for drivers without a toll transponder would include an additional percentage toll rate premium plus an incidental administrative fee commensurate with the costs related to processing the vehicle registration information. The actual amounts of the toll rate premium and administrative fee have not yet been determined. Information on the North Texas Tollway Authority (NTTA) web page (www.ntta.org) states that customers with toll tags save up to approximately 40% compared to customers who pay cash.

Cash payment options are available for each payment method. For those who choose to maintain a prepaid “cash user” account, an initial deposit of $25 would be required for the toll transponder as well as a $40 payment to establish the account. This automatic deposit is required of “credit user” accounts. The “cash user” deposit can be refunded without interest if the user returns the transponder in good condition or if the “cash user” account is converted into a “credit user” account. The prepaid “cash user” account would require the driver to maintain sufficient funds in his/her account to cover incurred toll charges. Toll rates would be the same as “credit user” account toll rates. When passing through a toll lane equipped with a traffic signal, a yellow light on the traffic signal indicates that the account balance is at or below $10. A red light indicates that the account balance is $0. Payment at one of the TollTag® locations must be made before the account reaches $0 to avoid the incurrence of toll violations.

Only those users who maintain automatic and manual pay prepaid accounts would benefit from reduced toll rates compared to the video billing policy. The toll rates for drivers without a toll transponder would include an additional percentage premium plus a processing fee. Toll rates are generally one-third more for drivers who do not have an electronic toll transponder to offset the costs related to processing the license plate information associated with video billing. Although certain toll transponder account holders are required to pay up-front fees or deposits for toll transponders ($9.65 fee per transponder for TxTag® accounts and $25 deposit for TollTag® "cash users" accounts), the toll transponder account holders would benefit from lower toll rates compared to the total toll rates associated with video billing. In other words, the up-front fees associated with toll transponders may be offset through time when considering the premium and processing fees affiliated with the video billing method of payment.

SH 114 (International Parkway to approximately one mile east): The proposed improvements in this segment of the project include the proposed westbound SH 114 ingress and the eastbound SH 114 egress on the east end of the managed express lane toll facility. In addition, this segment provides for the ultimate connection to the proposed main lanes and HOV/managed lanes along SH 114 in Dallas County (under development by the TxDOT – Dallas District).

SEGMENT C

SH 121 (SH 114 to just north of FM 2499): This segment of the proposed project typically includes eight-to-ten main lanes total. The lanes in this segment vary from three to seven northbound and three to six southbound, due to transitions with the direct connectors, collector distributors and auxiliary lanes. This portion includes two-to-three frontage road lanes in each direction north of IH 635; only three frontage road lanes continue southbound along SH 121, south of IH 635. There is no northbound frontage road from SH 114 to IH 635 along SH 121. In addition, due to the close spacing of the SH 121 interchanges with SH 114, IH 635, and FM 2499, collector-distributor systems would be used to provide good mobility through the corridor and eliminate an undesirable weaving condition. The proposed collector-distributors typically include seven-to-nine lanes. The lanes in this segment vary from three-to-four northbound lanes and two-to-six southbound lanes, including auxiliary lanes due to transitions with direct connectors. All of the existing access in this segment would be maintained; however, several ramps would be shifted in order to improve mobility. This segment also ties to improvements being made to the north of the proposed project that provide grade separations at Sandy Lake Road and Freeport Parkway (TxDOT-Dallas District project).

FM 2499 (SH 121 to south of Gerault Lane): This segment of the proposed project includes the upgrading of FM 2499 from an arterial roadway to a freeway facility. This freeway facility includes two depressed main lanes in each direction and two-to-three frontage road lanes in each direction before transitioning back to existing FM 2499 six lane arterial south of Gerault Lane. This segment of FM 2499 includes the addition of system interchanges at Stars and Stripes Way and Grapevine Mills Boulevard.

IH 635 (SH 121 to 0.5 miles east of Royal Lane): The proposed improvements to IH 635 in this segment of the project typically include four-to-five main lanes in each direction. In this segment, the project varies from three-to-six westbound and three-to-five eastbound main lanes transitioning to the existing three lanes. The improvements in this segment of the project serve to transition from the SH 121/IH 635 interchange to the existing IH 635 section to the east. This segment of the project includes the grade separation over the Cotton Belt rail line and maintains the existing access to Royal Lane. There are no existing or proposed frontage roads within this section.

International Parkway (South of North Airfield Drive to SH 114): The proposed improvements to this segment include three main lanes in each direction with auxiliary lanes transitioning into the proposed SH 114/SH 121 and International Parkway interchange. This segment of International Parkway serves as the transition from the existing International Parkway to the south and the proposed SH 114 interchange to the north. In addition, the northbound-to-eastbound direct connector includes accommodations for the connection to SH 114 main lanes and the proposed HOV/managed lanes. Traffic from westbound SH 114 to the southbound International Parkway frontage road only has to weave one lane with the new interchange configuration. Traffic on the southbound collector distributor into DFW International Airport (International Parkway) has a separate ramp from it to the southbound International Parkway frontage road. This removes weaving traffic on southbound International Parkway within the close proximity of the existing toll booths that originates from southbound SH 121 and IH 635. South of North Airfield Drive connections were relocated to maintain similar access between internal airport circulation roads and International Parkway that exist today.

SEGMENT D

SH 121 (Hall Johnson Road to Mustang Drive): This segment of SH 121 includes three main lanes with auxiliary lanes in each direction along with two-to-three frontage road lanes in each direction. In addition, collector-distributor facilities are proposed in order to reduce weaving while maintaining good mobility on the freeway facility. These collector-distributor facilities include four northbound lanes and three southbound lanes, between the SH 121 / SH 360 interchange and the SH 114 / SH 121 interchange. Ramps in this segment would be shifted but all access would remain virtually the same from the existing condition. These improvements would remove the westbound weaving problem and would provide direct connection access between SH 121/SH 360 and SH 114. U-turn access would be provided at the north side of Stone Myers Parkway.

SH 360 (South of Stone Myers Parkway to SH 121): The proposed improvements in this segment of the project include three main lanes in each direction transitioning to the existing two lanes in each direction. There are no proposed improvements to the existing frontage roads within this section. This segment of SH 360 ties to the existing freeway facility to the south and to the proposed SH 121 main lanes and collector-distributor system to the north. All local access in this segment would remain unchanged. The direct connection from northbound SH 360 to northbound SH 121 would be reconstructed. Direct access is being provided from northbound SH 360 to westbound SH 114 through the northbound collector-distributor system. Along SH 121 the direct connection from southbound SH 121 to southbound SH 360 would also be reconstructed.

Collector-Distributor Roads

Collector-distributor (C/D) roads are one-way roads parallel to the main traffic lanes providing access to or from more than one ramp. The C/D road collects traffic from on-ramps or the main lanes, and distributes traffic to off-ramps or back to the main lanes. This minimizes the number of interactions with through traffic, which can increase capacity and safety on the main lanes of the freeway. A C/D road may be short (serving two adjacent interchanges, or a single cloverleaf), or may extend for miles in congested or complicated areas. Collector-distributor roads are located within segments C & D of the proposed project. Collector-distributor roadway systems are proposed to serve local access connections as well as freeway-to-freeway connections along SH 121 between International Parkway (Spur 97), IH 635 and FM 2499, and along SH 121 between SH 360 and SH 114. In addition, SH 121 interchanges with IH 635 and FM 2499 would be reconstructed to enhance local access near the Grapevine Mills Mall. These improvements increase main lane capacity, provide for a better connection between SH 26 and FM 2499, and minimize weaving on the SH 121 main lanes. The C/D roads would not be tolled. They are proposed to reduce mainlane weaving between interchanges.

The proposed improvements are included in Mobility 2030: The Metropolitan Transportation Plan (MTP) and the 2008-2011 Transportation Improvement Program (TIP). (See **Appendix I** for TIP information). Mobility 2030 was approved by the Regional Transportation Council (RTC), the transportation policy body for the North Central Texas Council of Governments (NCTCOG), in January 2007; the 2008-2011 TIP was approved by the RTC on April 12, 2007. The U.S. Department of Transportation (USDOT) found the MTP and TIP to conform to the State Implementation Plan (SIP) on June 12, 2007. The proposed project is also found in the 2008-2011 State TIP (STIP) which was approved by FHWA and the Federal Transit Administration on October 31, 2007. **Table 3.1** shows the incorporation of various elements of the proposed improvements (locally preferred alternative) into the MTP, along with the cost estimate for each element.

Table 3.1 Proposed Improvements In The Metropolitan Transportation Plan

Location [Segment]	MTP Segment ID #	Locally Preferred Alternative	MTP	Cost	CSJ
SH 114 from SH 121 (West) to Kimball Ave **[A]**	FT1 1424 FR1 1424 HM1 8190	8 main lanes + auxiliary Lanes NB-WB and EB-SB direct connectors added 2-5 frontage lanes each direction	8 main lanes NB-WB and EB-SB direct connectors added 2-5 frontage lanes each direction	$229.9 million	0353-03-059 0353-03-079 0364-01-112

Table 3.1 Proposed Improvements In The Metropolitan Transportation Plan (cont'd.)

Location [Segment]	MTP Segment ID #	Locally Preferred Alternative	MTP	Cost	CSJ
SH 114 from International Pkwy to SH 121 (West) **[B]**	FT1 1425 FR1 1425 HM1 8190 *From Dallas District* FT1 1430 HM1 8450	13 main lanes + auxiliary lanes 2+2 managed HOV lanes* 3-6 frontage lanes each direction	13 main lanes 2+2 managed HOV lanes* 3-6 frontage lanes each direction	Cost included above.	0353-03-059 0353-03-079 0364-01-113
FM 2499 from South of Gerault Lane to SH 121 **[C]**	FT1 2720	4/6 main lanes 2-3 frontage lanes each direction	4/6 main lanes 2-3 frontage lanes each direction	$26.8 million	0364-01-072
SH 121 from IH 635 to Tarrant/Dallas County Line **[C]**	FT1 1345 FT1 1347 FT1 1505 FT1 1507 FR1 1505 FR1 1507	8/10 main lanes + auxiliary lanes 7 lanes C-D 2-3 frontage lanes each direction	8/10 main lanes 7 lanes C-D 2-3 frontage lanes each direction	$285.1 million	0364-01-072 0364-01-115
SH 121 from SH 114 to IH 635 **[C]**	FT1 1715	8/10 main lanes + auxiliary lanes 9 lanes C-D 3 SB frontage lanes only	10 main lanes 9 lanes C-D 3 SB frontage lanes only	$177.2 million	0353-03-059 0353-03-079 0364-01-113
SH 121 from SH 114 to SH 360 **[D]**	FT1 1510 FT1 1515 FR1 1510 FR1 1515 FT1 1440	6 main lanes + auxiliary lanes 7 lanes C-D 3 frontage lanes each direction	6 main lanes 7 lanes C-D 3 frontage lanes each direction	$187.9 million	0364-01-112

* Managed lanes extend from West College Street in Grapevine to the Dallas County Line along SH 114.
Source: Mobility 2030: The Metropolitan Transportation Plan, NCTCOG, 2007.

In addition to the proposed project, the MTP includes several transportation facility improvements within the proposed project area. These include:

- Future regional and future light rail.
- North Crosstown Corridor Study for rail along the full Cotton Belt Corridor, from Parker Road in Plano to DFW International Airport; and rail along the Cotton Belt Corridor from DFW International Airport with an eastern transition to light rail along the LBJ Freeway at an Addison Intermodal Center.
- Bicycle-Pedestrian Transportation District. Within all rail corridors, all existing and planned stations are bicycle and pedestrian districts.
- Recommended Veloweb route, which is a bicycle-oriented trail system.

- Dynamic Message Sign at the SH 121/SH 360 interchange area as part of Goods Movement Corridors Technology Deployment.

- Mobility Assistant Patrols, Communication Systems and Advanced Traffic Management as part of Intelligent Transportation Systems.

B. ANTICIPATED LAND USE

The Cities of Grapevine and Southlake are projected to experience moderate population and substantial employment growth between 2000 and 2030 (**Table 3.2**). Employment for the City of Southlake alone is projected to triple during this time period. The projections for the two cities combined amount to over 17,000 new residents and nearly 56,000 new employees by year 2030. One effect of this growth will be an increase in residential and commercial land use densities within the two cities.

Table 3.2 Population And Employment Growth For The Cities Of Grapevine And Southlake And Tarrant County, 2000 - 2030

Area	2000 Population	2030 Population	Percentage Increase	2000 Employment	2030 Employment	Percentage Increase
City of Grapevine	41,909*	49,484	18 %	49,565	85,475	72 %
City of Southlake	21,532*	31,433	46 %	6,125	26,094	326 %
Tarrant County	1,435,186*	2,291,723	60 %	864,360	1,388,247	61 %
Metropolitan Planning Area Boundary	4,989,750	8,503,146	70%	3,148,572	5,256,667	67%

Source: North Central Texas 2030 Demographic Forecast. All projections based on 2000 city boundaries. *NCTCOG estimate adjusted from 2000 Census count. Does not include group quarters.

According to Jerry Hodge with the City of Grapevine, the city has experienced extensive growth in commercial development and is now mostly developed. Additional land development is expected in the area north of Grapevine Mills Mall (personal communication, 2008).

According to the City of Grapevine 2007 Economic Update: "Grapevine remains one of the most dynamic communities in the Dallas/Fort Worth region. Grapevine's population increased 67% from 29,202 in 1990 to 48,744 in 2006. Grapevine's rapidly growing population is attributed to several factors, including the city's proximity to developing employment centers, high quality housing in well planned subdivisions and a school district ranking high in academic achievement. Grapevine's commercial and industrial success is reflected in its current estimated daytime population of 131,893. This estimate is projected to increase to 135,888 by 2009. Grapevine continued to experience explosive growth in development in 2006. The total for the major categories of Commercial, Industrial, Multi-Family and Single-Family was $248,645,014 million. An additional $9,270,657 was permitted for church and government uses. Of these major categories, commercial construction was approximately 73% of the total with industrial accounting for 4%, multi-family totaling 15% and single-family accounting for 8%."

DFW International Airport has been studying the possibility of developing vacant land that it owns north of the SH 114/SH 121 Concurrent Route (south of SH 26, east of Texan Trail), but to date no plans have been approved or funded. The proposed improvements would accommodate future access to this DFW International Airport property by allowing multiple new access points along the SH 121 southbound frontage road, from south of Bass Pro Drive to Texan Trail.

IV. ALTERNATIVES INCLUDING PROPOSED ACTION

A. STUDY PROCESS

The Study Team for this project, which consisted of TxDOT staff and consultants, considered a wide array of transportation alternatives for addressing the project's purpose. The *Corridor Alternative Analysis Study* report (HDR, Inc., 2003) identified a broad range of reasonable alternatives for meeting project objectives. The Team utilized a screening process for determining which alternatives would be discarded and which would be further evaluated and developed in more detail. The study was open to the public to ensure that the evaluation process reflected the community's needs and interests.

Throughout the alternatives analysis process, the Study Team met with a Technical Advisory Committee (TAC) established specifically for the project. The TAC was formed in September, 1996 to represent various local and regional stakeholder and public interests and to help facilitate public input within the region's communities. The TAC consisted of representatives from the following organizations and communities: FHWA, TxDOT, City of Colleyville, City of Coppell, City of Euless, Town of Flower Mound, City of Grapevine, City of Irving, City of Keller, City of Lewisville, City of Southlake, Dallas Area Rapid Transit, Fort Worth Transportation Authority, DFW International Airport, and NCTCOG. The Study Team worked with the TAC to define transportation problems, consider potential solutions, and determine the best method for accomplishing the project's purpose and objectives.

In addition to the TAC meetings, six public meetings were held to provide information and solicit additional public input. Information about the public meeting dates, locations, notices provided, and number of attendees is provided in **Appendix G, Public Meetings**. At the final public meeting on February 23, 2006 at the Grapevine Convention Center, verbal statements of support for the proposed project were presented on behalf of the City of Grapevine, Town of Westlake, Metroport Cities Fellowship, Grapevine Mills (Mall), Baylor Regional Medical Center, City of Colleyville, and City of Coppell. A written statement of support for the project was also submitted by the City of Southlake.

A Public Hearing was held for the proposed project on February 24, 2009 at the Grapevine Convention Center. Schematic design information was presented and engineering and environmental staff were available to answer questions from the public. A notice for the Public Hearing was published in the following newspapers on the following dates: the Dallas Morning News and the Fort Worth Star-Telegram on Sunday January 25, 2009 and Sunday February 15, 2009; the Coppell Gazette on Wednesday January 28, 2009 and Wednesday February 11, 2009; and the Grapevine Sun on Thursday January 29, 2009 and Thursday February 12, 2009. The same notice was also published in Spanish in the following newspapers: Al Dia on Saturday February 14, 2009 and Saturday February 21, 2009; La Semana on Friday February 13, 2009; and La Estrella on Saturday February 21, 2009.

B. ALTERNATIVES CONSIDERED

Each stand-alone alternative assumed that all other planned transportation facilities and programs within the Dallas-Fort Worth region – *except* for the Build Alternative – would become operational. Projects listed in the MTP were included in the background transportation network for each alternative.

No-Build Alternative – This alternative represents the case in which the proposed project is not constructed. No improvements to the DFW Connector other than normal pavement and structure maintenance and repair would occur. The No-Build Alternative is carried forward through this Environmental Assessment as a baseline for comparison against the Build Alternative.

Transportation Systems Management (TSM) – These strategies are relatively low-cost enhancements to the existing transportation network that can greatly improve operational efficiency. TSM strategies include freeway bottleneck removal, widening of arterials, intersection improvements, traffic signal improvements, signage improvements, traffic management systems and other enhancements that make it easier for traffic to flow through the transportation network. These include a variety of Intelligent Transportation System (ITS) improvements such as communication systems, mobility assistant patrols, and advanced traffic management.

Transportation Demand Management (TDM) – Demand management is aimed at reducing the volume of vehicles on the transportation network. TDM strategies include carpooling and ridesharing to combine person-trips into fewer vehicle-trips. This group of improvements also includes bicycle and pedestrian facility improvements. Demand management has the potential to greatly increase the efficiency of existing transportation facilities.

Transit Alternatives

Circulation Bus Service – This strategy considered bus service that would link people and jobs within the City of Grapevine. Buses would utilize existing roadways within the corridor for local service.

Express Bus Service – This service focused on trips originating within the project area and major destinations both inside and outside the project area. Buses would utilize existing roadways within the corridor.

Commuter Rail Service – The Commuter Rail option called for accommodating commute trips by providing new passenger rail service on the Cotton Belt rail line. Commuter rail service on the Cotton Belt rail line, which is owned by Dallas Area Rapid Transit (DART), was included in the MTP to reduce roadway trips and encourage regional non-roadway travel alternatives.

Build Alternatives

- General Purpose Lanes – This alternative would add two general-purpose lanes in each direction in the median of the existing SH 114/SH 121 section of freeway from the International Parkway to SH 114/SH 121 split on the west end of the project.

- HOV Lanes – Two HOV options were considered: adding HOV lanes to the median of the existing SH 114/SH 121 corridor from SH 114 near SH 26 to SH 114 near Freeport Parkway and from SH 121 near SH 360. Both options would add one general-purpose lane in each direction to the common SH 114/SH 121 freeway segment.

- Express Managed Lanes Facility within the Existing Corridor – Under this alternative, the SH 114/SH 121 Concurrent Route would provide six eastbound and seven westbound general purpose freeway lanes and two managed lanes in each direction throughout the day. The lanes of the managed facility would serve through travel on SH 114. The frontage roads would be reconstructed from two to three lanes. Improvements to interconnecting transportation facilities, such as SH 360, FM 1709, International Parkway, IH 635, and FM 2499, would also be made.

Additional focus on the Build Alternatives considered the possibility of a new location facility, and how best to address more specific design and operational issues, including route continuity, lane balance, interchange and ramp design, collector-distributor roads, by-pass frontage roads, managed facility, utility considerations, compatibility with light rail and commuter rail, constructability, system connections, interchanges, ramp spacing and weaving. Attention was also given to balancing the need for HOV lanes, additional general purpose lanes, and reversible managed lanes.

C. ALTERNATIVES EVALUATION

The *Corridor Alternative Analysis Study* report provides detailed assessments of all alternatives considered. Alternatives were eliminated from further consideration if they were found to have adverse environmental impacts, were not able to meet the project purpose, or encountered opposition through TAC meetings and the public involvement process.

Neither the No-Build, TSM, TDM nor Transit Alternatives were able to meet the purpose of the project. None of these low-to-moderate investment options as discussed in the *Corridor Alternative Analysis Study* – as stand alone actions – would be able to fully address project objectives. These alternatives did not eliminate existing transportation system deficiencies, did not attract enough trips to alleviate existing congestion, and were not able to adequately accommodate future travel demand. Selection of one of these alternatives would have resulted in gradually diminishing accessibility and adverse social, economic and environmental effects.

New location facilities were eliminated from further consideration because they would divide the City of Grapevine and DFW International Airport property, requiring approximately forty to sixty displacements and other adverse social, economic and environmental impacts. These options were inconsistent with local plans and were opposed by the TAC and at public meetings.

Although the General Purpose Lane Alternative allowed for operational flexibility, it did not fully resolve the weaving problems. The HOV Lane Alternative accommodated future travel demand, but it too was unable to solve the adverse weaving conditions.

D. PREFERRED ALTERNATIVE

After considering the alternatives and refining the design, the Study Team reached consensus on a preferred option, concluding that the Managed Express Lanes toll facility within the existing corridor would be the best solution to the corridor's transportation needs and would best meet the purpose of the project. The Build Alternative – Managed Express Lanes toll facility within the existing corridor – is the Proposed Action. The following points explain why:

- The managed express lanes toll facility would be utilized by vehicles making through trips on SH 114, thereby separating this heavy traffic movement from the SH 121, SH 360, International Parkway, IH 635 and local street mix. Based on the NCTCOG link analysis, approximately 45% of the traffic on SH 114 desires to simply travel through the SH 114/SH 121 Concurrent Route and remain on SH 114. The managed express toll facility will allow this express movement through the corridor by separating these trips from vehicles currently weaving across numerous lanes to maneuver between SH 121 to SH 114. Congestion levels would dramatically decrease at local intersections and for the through movements of both SH 114 and SH 121.

- The managed express lane toll facility provides flexibility to accommodate additional through-traffic flow during peak commuter times in the appropriate direction, allowing commuters to bypass the general-purpose lanes. Lane management operations can be adjusted to any changes in regional transportation goals and policies.

- Improved freeway interchanges, freeway ramps, and local street intersections with frontage roads throughout the corridor – all of which are included in the Proposed Action – would help to improve regional mobility and air quality by lessening congestion levels and increasing total average vehicle speeds. Motorists would benefit by both the large-scale and small-scale improvements proposed throughout the corridor. Local intersecting streets would benefit from design and signalization enhancements.

- Travel time for motorists driving from northbound SH 121 to westbound SH 114 and vice-versa in the western part of the corridor would dramatically decrease. Currently, to get from northbound SH 121 or SH 360 to westbound SH 114 motorists must travel through the William D. Tate Avenue - Mustang Drive intersection and the SH 114 - William D. Tate Avenue interchange. The Proposed Action provides direct connections between SH 121 or SH 360 and SH 114 in this location.

- The proposed improvements represent an innovative system to efficiently collect and distribute traffic among several major highways. The new corridor would allow five converging highways (SH 114, SH 121, SH 360, IH 635 and International Parkway) to interconnect while allowing traffic to flow smoothly.

- The Proposed Action would complement other planned transportation facilities and programs in the Dallas-Fort Worth region. The Proposed Action is included in the NCTCOG's Mobility 2030 MTP, and as such, is part of a conforming air quality plan. Other planned transportation projects within the project corridor include bus and rail transit, TSM and TDM improvements.

V. POTENTIAL ENVIRONMENTAL IMPACTS

A. SOCIAL AND ECONOMIC ISSUES

1. Economic and Business Impacts

No-Build Alternative

The No-Build Alternative would increase traffic congestion causing travel delay costs, which would be borne by roadway users and businesses that are dependent on corridor roadways for employment and commerce activities. This, in turn, may affect regional and community growth.

Build Alternative

The proposed improvements would contribute positively to the on-going economic development of this corridor by maintaining and enhancing access to commercial centers, employment sites and other activity areas that abut the DFW Connector and associated cross streets. The proposed improvements, which are partially in response to the travel demand represented by the area's anticipated population and employment growth (see **Table 3.2**), would help to meet the transportation needs of gradually increasing employment levels along the corridor. Construction of the proposed project would also have a short-term positive impact on the local construction sector.

The proposed improvements would displace 16 businesses (see **Section B. Displacements** and **Appendix D, Environmental Features**) and remove a portion of surface parking lots at approximately 22 others. These businesses would be eligible for compensation during the right-of-way acquisition process. Access to properties that are adjacent to the existing right-of-way would be modified by the proposed improvements near ramps and cross streets. Access to businesses along the corridor would be maintained during construction. The project would not alter business visibility to traffic-oriented businesses.

The types of businesses that would be displaced by the project are fairly common within the project area. They include fast-food restaurants, a gas station, convenience store, retail stores, small offices, a motel, and an automotive service shop. Most appear to be relatively small employers; exact employment figures for these businesses are not available, but none are among the area's major employers (Demographic Data for Grapevine, Major Employers, NCTCOG). The effect of these displacements on the area's overall property tax base is anticipated to be minimal, as most of the displaced businesses would be able to relocate within Grapevine or nearby (Hodge, personal communication, 2008).

New access would be provided to property owned by DFW International Airport where the proposed design would allow street and driveway connections to and from the SH 121 southbound frontage road, between Bass Pro Drive and Texan Trail. Opportunities for businesses to locate in this area would be available if and when DFW International Airport decides to develop this property.

Generally speaking, where roadway improvements occur, the value of commercial property can be enhanced (ten Siethoff and Kockelman, 2002). An increase in property valuations could potentially boost property tax revenues of local taxing jurisdictions. While businesses along the corridor may experience higher property taxes, these would presumably be offset by enhanced business opportunities resulting from the proposed transportation improvements.

2. Land Use Changes

<u>No-Build Alternative</u>
The No-Build Alternative would not require any land to be converted to transportation right-of-way.

<u>Build Alternative</u>
The Proposed Action would convert approximately 192 acres of primarily undeveloped land to transportation right-of-way. Most of the additional right-of-way is located northwest of the interchange with SH 114 and International Parkway on property owned by DFW International Airport. Additional right-of-way would be needed at other locations, resulting in 16 business displacements and the loss of surface parking spaces. Other changes in land use have been occurring along the DFW Connector as part of a continuing commercial development trend within the cities of Grapevine and Southlake.

New development could occur on property owned by DFW International Airport. The proposed design allows for access from the SH 121 southbound frontage road, from Bass Pro Drive to Texan Trail. Although not yet approved nor funded, new development could include retail, office and industrial uses (DFW Commercial Land Use Plan, 2007). Land uses adjacent to the DFW Connector would remain primarily commercial. (See **Section III.B. Anticipated Land Use**.) Greater land use densities may be possible with the improved transportation facilities, but would be subject to local zoning regulations. The project is consistent with local land use plans and zoning.

<u>Compatible Land Use</u>
FAA Order 1050.1E indicates that the compatibility of existing and planned land uses in the vicinity of an airport is associated with the extent of noise impacts related to that airport and the consistency with the local improvement plans. Noise originated from Dallas Fort Worth International Airport would not adversely affect the project, and similarly, highway noise generated from the proposed DFW Connector facility would not adversely affect the airport.

The use of the land to be acquired for the operation of the proposed roadway project would not include any buildings where the public would be received, office areas, noise sensitive areas or activities where the normal noise level is low. Therefore, the use of this land would be compatible with normal aircraft operations from the DFW International Airport and the associated aircraft noise would not interfere with the normal activities and purposes associated with the proposed roadway project. Construction of the DFW Connector would likely facilitate mobility in the vicinity of the airport. Refer to Section V.H. Noise for a summary of the traffic noise analysis for the study area.

3. Community Cohesion

No-Build Alternative

Implementation of the No-Build Alternative would not separate or isolate any distinct neighborhoods, ethnic groups or other specific groups.

Build Alternative

Within the limits of the proposed improvements, SH 114 and SH 121 currently exist as at-grade freeways with grade-separated interchanges surrounded primarily by commercial land uses and vacant tracts of land (DFW International Airport). FM 1709, SH 26 and FM 2499 exist as at-grade major arterial roadways within the project limits, and their adjacent land uses are also primarily commercial. The proposed improvements would not affect, separate, or isolate any distinct neighborhoods, ethnic groups, or other specific groups.

4. Environmental Justice

The Civil Rights Restoration Act of 1987 and Executive Order 12898 (February 1994) entitled “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 a community consists of persons classified by the U.S. Bureau of the Census as Black/African-American, Asian or Pacific Islander, American Indian, Eskimo, other non-white persons, or persons of Hispanic origin. The U.S. Census Bureau uses a poverty threshold to determine the poverty level. Every year, the U.S. Department of Health and Human Services calculates a poverty guideline to determine financial eligibility for certain programs. In 2008, the U.S. Department of Health and Human Services Federal Poverty Guideline is $21,200 for a family of four. Low-income persons can be defined as those whose median household incomes are below the U.S. Census Bureau Poverty Threshold; low-income communities can be defined as those whose poverty rates exceed the poverty rates of a geographically appropriate reference area.

No-Build Alternative

Implementation of the No-Build Alternative would not have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

Build Alternative

Minority Communities

2000 U.S. Census Bureau data were examined at the block-group level to determine the presence of minority groups within the project area. A map of the census geography is provided in **Appendix F**. **Table 5.1** shows the population, race and ethnicity of project area block groups along with that of Tarrant County, Dallas County, and the cities of Grapevine and Southlake. Eighteen percent of the project area block group population was comprised of minority persons, the same as Grapevine (18%), but greater than Southlake (8%). The project area block group minority population percentage was much less than Dallas County (58%) and Tarrant County (38%). Block Group 1 in Tract 141.12 (in Dallas County) had the highest percentage of minority persons (42%). However, census blocks within this block group that are adjacent to the project had no population.

Table 5.1 Project Area Population and Race/Ethnicity, 2000

Census Tract	Block Group	Total Population	White Alone	Hispanic or Latino	Black or African American Alone	Asian Alone	Other*	Total Minority Population	Percent Minority Population
141.12	1	740	429	68	142	80	21	311	42%
141.24	2	0	0	0	0	0	0	0	0%
141.26	4	60	55	4	1	0	0	5	8%
1136.20	1	3,631	2,911	359	144	147	70	720	20%
1137.03	1	2,879	2,331	326	101	45	76	548	19%
1137.05	1	750	592	124	13	1	20	158	21%
1137.05	3	1,394	1,238	77	35	11	33	156	11%
1137.05	4	1,463	922	332	155	18	36	541	37%
1137.06	1	1,938	1,664	73	60	113	28	274	14%
1137.07	2	1,118	1,017	60	13	17	11	101	9%
1137.08	2	5,070	4,410	336	81	152	91	660	13%
1139.07	1	1,425	1,310	57	8	38	12	115	8%
Total Project Area Block Groups		20,468	16,879	1,816	753	622	398	3,589	18%
Grapevine		42,059	34,425	4,860	952	1,062	760	7634	18%
Southlake		21,519	19,789	789	296	385	260	1,730	8%
Dallas County		2,218,899	983,317	662,729	445,716	87,495	39,642	1,235,582	56%
Tarrant County		1,446,219	895,253	285,290	182,713	52,057	30,906	550,966	38%

*Other includes American Indian and Alaska Native, Native Hawaiian and Other Pacific Islander, Some Other Race, and Population of Two or More Races.
Source: U.S. Census Bureau, Census 2000, SF1, P4.

To more precisely determine the presence of minority groups and the potential for adverse effects, census data were also examined at the block level for blocks located adjacent to the DFW Connector. None of the Dallas County blocks had anyone living in them according to the 2000 Census, and only 18 of the Tarrant County blocks had people living in them. In the 18 Tarrant County blocks, approximately 84 percent of the population was White, seven percent was Hispanic, two percent was Black, and six percent was distributed among other races. The population and racial/ethnicity data for the 18 blocks is provided in **Table 5.2**.

Table 5.2 Block Level Population and Race/Ethnicity, 2000

Census Tract	Block Group	Block	Total population	White	Hispanic or Latino	Black or African American	Other*	Total Minority Population	Percent Minority Population
1137.03	1	1007	326	258	15	18	35	68	21%
		1010	4	4	0	0	0	0	0%
		1021	13	13	0	0	0	0	0%
1137.05	1	1014	3	3	0	0	0	0	0%
		1068	112	91	20	0	1	21	19%
	3	3016	61	56	0	0	5	5	8%
		3048	171	160	6	0	5	11	6%
	4	4000	11	11	0	0	0	0	0%
		4003	31	26	0	0	5	5	16%
		4029	175	135	35	3	2	40	23%
1137.06	1	1075	2	1	0	0	1	1	50%
		1076	7	2	5	0	0	5	71%
		1095	28	15	1	5	7	13	46%
		1099	180	174	0	5	1	6	3%
1137.07	2	2005	169	156	3	3	7	13	8%
		2016	78	68	9	0	1	10	13%
1137.08	2	2033	323	248	30	9	36	75	23%
		2037	87	80	5	0	2	7	8%
18-Block Total			1,781	1,501	129	43	108	280	16%
18-Block Percent			100.00%	84%	7%	2%	6%	16%	

* Includes American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, Some Other Race, and Population of Two or More Races.
Source: U.S. Census Bureau, Census 2000, SF1, P4.

The Council on Environmental Quality (CEQ) Environmental Justice Guidance under NEPA states: "Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis…." Using the 50% threshold, only one of the blocks – Block 1076 in Tract 1137.06 – contained a minority population for purposes of this analysis. There were only five minority persons in this block, located near the southern terminus of the project area, southeast of the SH 360 interchange with SH 121. The proposed improvements in this area do not require any additional right-of-way, and no noise impacts are anticipated southeast of this interchange. Disproportionate impacts to minority populations are not anticipated to result from the proposed project.

Low-Income Communities

For purposes of this analysis, a low-income person was defined as a person whose household income is below the poverty level, as reported in the 2000 Census. Because the block group level is the lowest level available for income data, block group level data was collected. In order to identify low-income communities, the percentage of low-income persons in each block group was calculated by dividing the number of persons living below the poverty level in a block group by the total number of persons in the block group. As shown in **Table 5.3**, five percent of the project area block group population was comprised of low-income persons, again similar to Grapevine but more than Southlake. The project area block group low-income population percentage was less than Dallas County (13%) and Tarrant County (11%). All of the project area block groups had 1999 median household incomes above the 2008 U.S. Department of Health and Human Services Federal Poverty Guideline of $21,200 for a family of four.

Table 5.3 Project Area Median Household Income and Poverty Levels					
Census Tract	Block Group	Total Population	Median Household Income in 1999	Population with Income Below Poverty Level	Percent Below Poverty Level
141.12	1	740	$ 50,042	47	6%
141.24	2	0	0	0	0%
141.26	4	62	$ 26,786	0	0%
1136.20	1	3,576	$ 51,509	99	3%
1137.03	1	2,963	$ 55,085	343	12%
1137.05	1	671	$ 33,125	65	10%
1137.05	3	1,476	$ 60,125	91	6%
1137.05	4	1,483	$ 34,489	324	22%
1137.06	1	1,866	$ 104,302	0	0%
1137.07	2	1,101	$ 84,270	6	1%
1137.08	2	4,987	$ 77,428	125	3%
1139.07	1	1,489	$ 118,011	6	0%
Total Project Area Block Groups		20,414		1,106	5%
Grapevine		41,762	71,680	1,987	5%
Southlake		21,447	131,549	396	2%
Dallas County		2,183,570	43,324	293,267	13%
Tarrant County		1,421,383	46,179	150,488	11%

Source: U.S. Census Bureau, Census 2000, SF 3, P53, P87.

Census Tracts 1137.03 Block Group 1, 1137.05 Block Group 1, and 1137.05 Block Group 4 had the highest percentages of low-income persons: 12%, 10% and 22%, respectively. These concentrations of low-income persons appear to be "meaningfully greater" than the percentages found in the comparison areas (Grapevine, Southlake, Dallas County and Tarrant County). Census Tract 1137.03 Block Group 1 comprises a large portion of Grapevine that is located away from the DFW Connector, as well as two apartment complexes – Mustang Ridge and Silver Oaks at Grapevine Ridge – located immediately west of FM 2499 near Denton Creek, north of Grapevine Mills Mall (see **Appendix D Plate E – R2 and R1**). No residential relocations, business displacements or noise impacts would occur at the apartments. Census Tract 1137.05 Block Group 1 is located immediately north of the DFW Connector. No residential relocations, business displacements or noise impacts would occur at this location. Census Tract 1137.05 Block Group 4 is located south of SH 114 along the stretch from North Kimball Avenue to William D. Tate Avenue. The residential areas within this block group are located away from the DFW Connector and would not experience any adverse effects from the proposed improvements. No residential relocations or noise impacts would occur in Tract 1137.05 Block Group 4. Disproportionate impacts to low-income populations are not anticipated to result from the proposed project.

Environmental Justice Considerations Related to Tolling

The E.O. 12989 term "disproportionately high and adverse effect" considers the totality of significant individual or cumulative human health or environmental impacts on minority populations and low-income populations. In general, the economic impact of tolling is higher for low-income users because the cost of paying tolls will represent a substantially higher percentage of household income than for non-low-income users. In addition, toll collection methods, discussed in **Section III.A Proposed Facilities**, can also serve to restrict access to the facility or disproportionately burden low-income populations because of a lack of credit or the inability to maintain a prepaid account.

Origin-destination (O&D) data secured from the NCTCOG was used for further analysis of user impacts of the proposed Managed Express Lanes toll facility on low-income and minority populations. Origin-destination data can estimate travel patterns of traffic along a transportation facility during a typical day. This form of analysis is useful in assessing user impacts as the number of trips associated with specific population characteristics can be studied to provide general travel assumptions of those specific populations. Trips are defined as a one-way movement from where a person starts (origin) to where the person is going (destination). Mapping is provided in **Appendix J (Figures 11 and 12)** that illustrates Environmental Justice Traffic Survey Zones (TSZ): 2030 Daily Trips on the No Build Alternative and the Build Alternative. Please see the Environmental Justice discussion in **Section VI. B., Cumulative Impacts, Cumulative Effects of Regional Toll and Managed/HOV System**, for a complete description of the O&D analysis.

Assessing user impacts in the form of an O&D analysis is an integral component of the environmental justice analysis for the proposed project. As funding mechanisms evolve, the trend towards utilization of toll facilities in this region would, through time, create user impacts as access to highway systems becomes an issue to the economically disadvantaged. The O&D analysis estimated anticipated users and associated traffic patterns of the proposed project in 2030 and identified environmental justice populations to assess the intensity of use by those protected populations.

Based on the O&D information, it is not anticipated that there would be any disproportionate impacts to low-income or minority populations with the implementation of the proposed project due to the low distribution of trips between identified low-income and/or minority populations and the low percentage of these populations within the proposed project study area. In addition, the adjacent toll free main lanes would be available for use. The proposed Managed Express Lanes toll facility would benefit users and adjacent populations as a result of the improved system linkage and mobility within the study area and region.

Proactive public involvement, including public meetings and surveys, and coordination with local planning officials can help avoid disproportionate impacts by allowing these populations to voice their concerns and be a part of the planning process. Environmental justice populations in the study area would be impacted equally as the entire study area non-minority population. However, individual low-income persons may choose to utilize adjacent non-toll alternatives specifically for cost saving measures. Low-income individuals may be impacted as a result of difference in travel time associated with utilizing non-toll alternatives. The economic impact of managed (toll) lanes would be higher for low-income residents because the cost of paying tolls would represent a higher percentage of household income than for non-low-income households. The toll rates for the Managed Express Lanes toll facility would be consistent with other toll rates in the region.

The following is an estimated example of the cost that may be incurred by an SOV opting to use the Managed Express Lanes toll facility. If a toll rate of 14.5 cents per mile is used (i.e., the same as the proposed SH 121 Toll Road), the potential cost can be illustrated using the following scenario. For this example, it is assumed that the SOV user would make 250 round-trips per year through the Managed Express Lanes toll facility. Under this scenario, the annual cost for using the 3.3-mile Managed Express Lanes toll facility (6.6 miles per round trip) would be approximately $239 per year. An SOV user who opted to utilize the Managed Express Lanes toll facility with an annual household income equal to the median household income of Tarrant County ($31,582) would spend about 0.7 percent of their household income on tolls. Those households living at the U.S. Department of Health and Human Services (HHS) poverty guideline level of $21,200 would spend about 1.1 percent of household income on tolls.

The intensity of adverse economic impact on low-income populations that would result from implementing the Managed Express Lanes toll facility is mitigated by the project's design, which includes 13 non-toll main lanes. This design provides five more non-toll main lanes than currently exist.

There are also potential benefits associated with the proposed Managed Express Lanes toll facility that must be considered when assessing the overall impact. Benefits include improved system linkage and mobility in the corridor, the acceleration of other infrastructure improvements in the region, and the potential use of toll revenues for other transportation projects including transit.

Limited English Proficiency

Executive Order (EO) 13166, entitled "Improving Access to Services for Persons with Limited English Proficiency," mandates that Federal agencies examine the services they provide and develop and implement a system by which Limited English Proficiency (LEP) persons can meaningfully access those services consistent with, and without unduly burdening, the fundamental mission of the agency. Each agency shall also work to ensure that recipients of Federal financial assistance provide meaningful access to their LEP applicants and beneficiaries (65 Federal Register 50123, August 16, 2000). Meaningful access extends to people who cannot read or understand written materials.

<u>No-Build Alternative</u>
Implementation of the No-Build Alternative would not affect LEP populations.

<u>Build Alternative</u>
According to the 2000 Census, a portion of the population within the project area block groups spoke English "not well" or "not at all" (**Table 5.4**). Of those in the area who spoke English "not well" or "not at all," most spoke Spanish, while some spoke other Indo-European and Asian languages.

Table 5.4 Limited English Proficiency, 2000			
Census Tract	**Block Group**	**Percent Limited English Proficiency[1]**	**Percent Low-Literacy[2]**
141.12	1	3%	0%
141.24	2	0%	0%
141.26	4	0%	0%
1136.20	1	1%	0%
1137.03	1	3%	2%
1137.05	1	8%	5%
1137.05	3	2%	2%
1137.05	4	12%	8%
1137.06	1	0%	0%
1137.07	2	2%	1%
1137.08	2	2%	0%
1139.07	1	1%	0%
Grapevine		4%	1%
Southlake		2%	0%
Dallas County		11%	4%
Tarrant County		6%	3%

1 Speak English "not well" or "not at all."
2 Less than 5th grade education for the population 25 years and over.
Source: U.S. Census Bureau, Census 2000, SF3, P19, P37.

As shown in **Table 5.4**, of the total population (5 years and older) in Census Tract 1137.05 Block Group 4, 12% (or 169 persons) were of limited English proficiency. Most of the LEP population (145 people) spoke Spanish; the remainder (approximately 24 people) spoke some other Indo-European language or Asian or Pacific Island language. In Block Group 2 of Tract 1137.07, which had a LEP population of two percent, about 40% of the LEP population spoke an Asian or Pacific Island language. In Block Group 2 of Tract 1137.08, which also had a LEP population of two percent, over half of the LEP population spoke a language other than Spanish (other Indo-European or Asian or Pacific Island language).

TxDOT complies with EO 13166 by offering to meet the needs of persons requiring special communication accommodations in all public involvement activities and notices. TxDOT personnel and project consultants were available at the public meetings to assist low-literacy persons and persons with limited English proficiency. This assistance included the availability of bi-lingual (English-Spanish) project staff and extensive opportunities for individual members of the public to talk with project staff one-on-one. A Spanish language version of the Public Hearing notice was published in three different, locally circulated Spanish language newspapers and was included with the notice to property owners. The Spanish language Public Hearing Notice was published in the following newspapers on the following dates: Al Dia on Saturday February 14, 2009 and Saturday February 21, 2009; La Semana on Friday February 13, 2009; and La Estrella on Saturday February 21, 2009.

TxDOT's objective is to establish interoperable toll accounts throughout the state. Once fully implemented, a single electronic toll collection account established by motorists with state or local toll authorities would be accepted on the DFW Connector Managed Express Lanes facility. TxDOT will work with new toll authorities to ensure interoperability statewide. Currently, of all the organizations that offer electronic toll collection (TxDOT, NTTA and HCTRA), the NTTA and TxDOT are the only agencies offering bilingual (English and Spanish) information in both their websites and over the phone (Customer Service Center). The information available in English and Spanish includes account information, payment methods, instructions on how to set up on-line accounts, and how to manage toll violations among other subjects. HCTRA does not offer Spanish information on either their website or over the phone (Customer Service Center).

Summary

Based on the available data, a windshield survey of the project area, and the information provided above, no disproportionately high and adverse impacts to any minority or low-income community would result from the proposed project as per Executive Order 12898 regarding environmental justice. Based on the overall assessment of the potential effects on environmental justice populations, there does not appear to be a disproportionately high and adverse impact associated with the proposed Managed Express Lanes toll facility.

5. Children's Environmental Health and Safety Risks

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety, mandates that federal agencies identify and assess environmental health and safety risks that may disproportionately affect children as a result of the implementation of federal policies, programs, activities, and standards (62 Federal Register, April 23, 1997).

In association to the airport property acquisition for the DFW Connector project, there are no areas or lands impacted that routinely accommodate children such as schools and playgrounds. Therefore, the project is not anticipated to disproportionately affect children.

6. Pedestrian Safety

<u>No-Build Alternative</u>

The No-Build Alternative would not alter current pedestrian use.

<u>Build Alternative</u>

All cross streets that underpass, overpass or intersect the DFW Connector would be constructed with pedestrian sidewalks. Intersections would be equipped with pedestrian cross walks, safety lights, and other facilities in compliance with the Americans with Disabilities Act. Only existing sidewalks parallel to and within the right-of-way of the DFW Connector are included in the Proposed Action.

Three schools are located in the specific project area: Holy Trinity Catholic School, located north of Hall Johnson Road on the western side of SH 121 (**Appendix D, Plate B - R17**), Kindercare on FM 1709 just west of SH 114 (**Appendix D, Plate A - R9**), and Fellowship School on SH 121 North (**Appendix D, Plate E - R3**). The proposed improvements would not alter access to these schools, although Kindercare would potentially lose six parking spaces. Adequate additional parking is available in the immediate vicinity.

7. Mobility and Access Effects

No-Build Alternative

Implementation of the No-Build Alternative would adversely affect mobility and access within the DFW Connector. Without major transportation corridor improvements traffic congestion would worsen and travel delays would increase. Access to adjacent businesses and connecting roadways would be diminished.

Build Alternative

The proposed project is anticipated to improve vehicular mobility and provide better connections with the area's arterial roadway system. The proposed project is not anticipated to have any impacts on public transportation or pedestrian and bicycle access to facilities.

8. Airway/Highway Clearance

No-Build Alternative

Implementation of the No-Build Alternative would not require any approvals from the Federal Aviation Administration (FAA).

Build Alternative

DFW International Airport is immediately adjacent to SH 114 and SH 121 in the project area. A FAA Notice of Proposed Construction or Alteration form (Form AD-7460-1) will be completed during the design phase and submitted by TxDOT to the FAA for their approval prior to construction of the proposed improvements.

9. Public Facilities and Services

No-Build Alternative

The No-Build Alternative would not require displacement or relocation of any public facilities. Some community services, such as police and fire protection, may be negatively affected due to predicted increased traffic congestion resulting in reduced accessibility and increased travel time.

Build Alternative

The Build Alternative would not displace any public facilities including schools, places of worship, hospitals, police, or fire stations. The proposed improvements would provide increased accessibility to the various public facilities in the surrounding area. Emergency public services would benefit by utilizing a safer and more efficient facility. Emergency and transit vehicles would be exempt from toll charges on the proposed Managed Express Lanes toll facility. Interruptions to public facilities and services during construction of the proposed project would be minimized through the use of appropriate traffic control and sequencing procedures.

10. Other Community Impacts

Many of the potential impacts discussed in other sections of this document can be considered community impacts, such as pedestrian safety, community cohesion, noise, or air quality. Per FHWA's guidance document *Community Impact Assessment* (1996), other potential community impacts are discussed below for the following issues: social, physical, visual, and displacement.

<u>Social Impacts</u>

For many years commercial and retail businesses have been the predominant type of land use adjacent to SH 114 and SH 121 within the project area. These businesses – car dealerships, restaurants, banks, hotels/motels, large and small retail stores and offices – have relied heavily on automobile access provided by the highways. Construction of the proposed improvements would not alter the essential character of this highway commercial corridor. Most of the businesses along the DFW Connector do not belong to nor are they identified with any specific or unique commercial district. Information provided by the City of Grapevine Planning Department (2008) indicates that they tend to be associated with names of industrial parks and land subdivision surveys (such as Grapevine Industrial Park, Regency Center Addition, Autonation Ford Addition, Durant Addition, etc.). One area, known as the Crossroads of DFW Addition, located between SH 114 and SH 121 and William D. Tate Avenue, contains a relatively dense assemblage of restaurants (see **Appendix D Plate A**). Other well known local areas along the project corridor include the Baylor Regional Medical Center, located north of Ira E. Woods Avenue just east of SH 114 (see **Appendix D Plate A – R5**), and the Grapevine Mills Mall, located west of SH 121 at FM 2499 (see **Appendix D Plate E**).

Although much of the project corridor is lined by commercial land uses, there are a few residential areas. The "Austin Oaks" neighborhood is located north of SH 114, east of North Kimball Avenue (see **Appendix D Plate A – R7**). The Los Robles Estates Addition is a residential neighborhood located west of SH 121 north of the SH 360 interchange (see **Appendix D Plate B – R10, 11 and 12**). Two apartment complexes – Mustang Ridge and Silver Oaks at Grapevine Ridge – are located immediately west of FM 2499 near Denton Creek, north of Grapevine Mills Mall (see **Appendix D Plate E – R2 and R1**).

The proposed improvements would not require the relocation of any residences. The project is not anticipated to cause the redistribution or influx/loss of population in the project area. The project would not change social relationships or patterns, or separate people, because the relationship between the DFW Connector and adjacent businesses and residential areas would not be altered. The project would not cause a change in social values, as the commercial character of the project corridor has long been supported and encouraged through the zoning regulations and development approvals of the cities of Grapevine and Southlake. Quality of life may be perceived as improving because of the increased mobility afforded by the proposed improvements.

Physical Impacts

Community cohesion is addressed in **Section V.A.3.**, above. Traffic noise will increase with an increase in traffic volume, and the proposed project would result in traffic noise impacts. As discussed in **Section V.H.**, noise impacts are anticipated at two of the 14 modeled receivers. However, no noise mitigation measures were deemed reasonable and feasible. A short-term increase in dust would occur during construction of the project. The proposed direct connector ramp from southbound SH 114 to southbound SH 121/SH 360 would be constructed on new right-of-way and elevated over a portion of the parking lot of the Don Davis Classic Chevrolet car dealership, located along the SH 114 southbound frontage road between Ira E. Woods Avenue and William D. Tate Avenue. (See **Appendix D Plate A**). The elevated ramp would create shadowing effects on portions of the car dealership property. Similar shadowing effects would also be experienced by the restaurants in the Crossroads of DFW Addition, where a proposed direct connector ramp would extend from northbound SH 121/SH 360 to westbound SH 114.

Light Emissions, Visual Impacts and Aesthetics

The proposed DFW Connector project is a highway project where all lighting will face in a downward position eliminating any conflict in illumination to any aircraft and/or airport activity. Because the proposed project consists of improvements to existing roadways and interchanges, the communities' aesthetic character is not anticipated to noticeably change. The design of the improvements would be similar to the current facility. TxDOT will consider including aesthetic treatments in structural components (retaining walls, bridges, signage) and architectural details (landscaping, lighting, colors, finishes, etc.). The City of Southlake and others have requested that TxDOT incorporate such features to enhance the aesthetics of the corridor.

Addressing Impacts

The four methods for addressing impacts include avoidance, minimization, mitigation, and enhancement, which should be considered in that order (FHWA, 1996). The proposed improvements avoid and minimize impacts to community and public facilities. Mitigation in the form of relocation assistance for the displaced businesses would be available (see **Section V.B**). Community enhancement measures are not included in the proposed project per se, although many of the benefits, such as safety and mobility, would be experienced by the local communities.

11. Construction Impacts & Construction Phase Effects

Any construction activity has the potential to result in noise, air quality, and water quality construction-related impacts. No construction impacts are related to the no build alternative, as the area would remain in its present condition. All construction related impacts are expected to be temporary in nature.

The proposed improvements would entail some unavoidable disruption to traffic. To alleviate this disruption, the proposed project would be constructed in phases and a detailed traffic control plan would be developed and implemented. Disruptions would be minimized to the extent possible by the timely notification of affected residents and business owners through posted notices, personal contact, or other notification procedures. These procedures would include rerouting the traffic, barricading, using traffic cones, or any other measures deemed necessary and prudent by TxDOT and the construction contractor to comply with all local, state, and federal traffic and safety regulations.

Indirect temporary environmental impacts may occur as a result of construction activities. Primarily, these impacts would relate to noise resulting from heavy construction equipment, fugitive dust emissions, and potential impacts on water quality from runoff and soil erosion from exposed surfaces. Construction impacts alone are rarely significant. Refer to the air quality, water quality, noise section and other relevant impact categories for discussions regarding potential construction impacts.

Dry, windy weather has the potential to create dust problems in the vicinity of construction activities. The contractor would control ambient dust problems by site watering.

During the construction phase, motorists may seek alternative travel routes to avoid construction-related traffic congestion and delays. However, the proposed roadway expansion would increase mobility and safety in the area overall, which would benefit local residents and businesses as well as through-travelers.

B. DISPLACEMENTS

<u>No-Build Alternative</u>

Implementation of the No-Build Alternative would not require right-of-way acquisition, relocations or displacements. All existing rights-of-way for TxDOT roadways within the limits of the DFW Connector purchased after 1970 where purchased under previous TxDOT projects following the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. No advanced purchases of right-of-way have been obtained for the DFW Connector project.

Build Alternative

Approximately 170 parcels of land would be affected by right-of-way acquisition for the proposed improvements. Among these properties, 16 businesses would be displaced. No residential relocations would be required. Commercial property similar to that which would potentially be displaced is available within the project corridor. A review of commercial real estate listings (LoopNet.com, 2008) for Grapevine revealed at least 15 properties (buildings and land, sale and lease) that would potentially be suitable for the retail and commercial displacements shown in **Table 5.5**. **Table 5.5** lists the 16 commercial buildings that would be displaced by the proposed improvements. These locations are also referenced on the plates in **Appendix D**.

Table 5.5 Commercial Building Displacements

Map Reference #	Business	Address
D1	Sonic	3510 Grapevine Mills Parkway, Grapevine, Texas
D2	Shell Gas Station, Magic Mikes Convenience Store, and Jack in the Box	3501 Grapevine Mills Parkway, Grapevine, Texas
D3	Fairfield Inn	2050 N Highway 121, Grapevine, Texas
D4	Texas Indoor Golf	2040 N Highway 121, Grapevine, Texas
D5	Calico Corners	3110 E Southlake Boulevard, Southlake, Texas
D6	Commercial Strip Center	1203-1223 Ira E. Woods Avenue, Grapevine, Texas
	Metro Blue Line	1203 Ira E. Woods Avenue
	Cosecurity	1205 Ira E. Woods Avenue
	Allison Clinical	1207-1213 Ira E. Woods Avenue
	Designs by Kay	1215 Ira E. Woods Avenue
	Select Physical Therapy	1217 Ira E. Woods Avenue
	Vacant	1221 Ira E. Woods Avenue
	Sleepsmart	1219 Ira E. Woods Avenue
	Geomatic Resources	1223 Ira E. Woods Avenue
D7	Express Care Quick Lube	2125 Ira E. Woods Avenue, Grapevine, Texas

Businesses displaced by the proposed project would be eligible for assistance under the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Local municipalities and TxDOT may participate in right-of-way acquisition and relocation assistance.

In addition to the 16 displaced businesses, approximately 22 other businesses would lose surface parking spaces. **Table 5.6** identifies the businesses and the approximate number of surface parking spaces that would be displaced by the proposed improvements.

Table 5.6 Potential Parking Displacements

Business Name(s)	Location	Approximate Number of Existing Spaces	Number of Potential Parking Space Displacements
Public Storage	FM 1709	50	3
Supreme Golf, Carpet One	FM 1709	100	8
Bank of America	FM 1709	35	7
Kindercare	FM 1709	25	6

Table 5.6 Potential Parking Displacements (cont'd)			
Business Name(s)	**Location**	**Approximate Number of Existing Spaces**	**Number of Potential Parking Space Displacements**
First Financial Bank	FM 1709	45	10
GT Products	Industrial Boulevard	50	7
Sams Club	SH 114 SB Frontage Road	500	15
Valvoline Express Care	SH 26	20	7
Quiznos, Sport clips, Elite Nails, UPS Store, Advance America	SH 26	80	19
Academy Sports	SH 26	300	18
Don Davis Classic Chevrolet	SH 114 SB Frontage Road	1,000+	173
Carrabas	Crossroads Drive	100	11
Joes Crabshack	Main Street	170	6
Linden Air Freight	Metro Circle	120	21
Lucas Family Funeral Home	West College Street	75	16
Baylor Regional Medical Center	SH 114 NB Frontage Road	170	25
Southlake Cleaners	South Park Boulevard	75	1
Total		2,915	353

At most of the above-mentioned locations, potential parking space displacements occur in large, interconnected surface parking areas that serve multiple commercial and retail destinations; parking at these locations would still be available within close proximity to the affected businesses. Some locations are not part of a shared parking area; however, only a small portion of the parking would be displaced, and adequate parking spaces would still be available. If the loss of parking spaces would result in non-compliance with the city's off-street parking requirements, the business owner would be able to continue operating under the nonconforming use provisions of the city's zoning ordinance (Jerry Hodge, personal communication, 2008). Approximately half of the parking displacements would occur at the Don Davis Classic Chevrolet car dealership in order to accommodate a proposed direct connector ramp. An undetermined number of these spaces may still be used underneath the elevated ramp through an agreement between the property owner and TxDOT.

C. Detours

No-Build Alternative

Implementation of the No-Build Alternative would not require detours related to new construction. However, normal pavement and structure maintenance and repair would occur under this alternative. Temporary reduction of roadway capacity and detour of traffic may occur as these maintenance procedures were implemented.

Build Alternative

No off-site construction detours are planned. Staged construction would allow traffic to utilize the existing route during construction. A traffic control plan would be developed that allows for the proposed improvements to be constructed while the project facilities remain open to traffic.

D. UTILITY RELOCATIONS, ADJUSTMENTS

No-Build Alternative

Implementation of the No-Build Alternative would not require any utility relocations or adjustments.

Build Alternative

Utilities such as water lines, sewer lines, gas lines, telephone cables, electrical lines, and other subterranean and aerial utilities are present throughout the corridor and may require adjustment. Any aerial and/or underground utility adjustments would be completed at the expense of the utility company and would be conducted in a manner that minimizes any interruptions in service.

E. NATURAL RESOURCES

1. Vegetation

a) Regional Vegetation Summary

The project is located in the Eastern Cross Timbers and Prairies Natural Region of Texas as delineated by Gould (1960). The Eastern Cross Timbers and Prairies is a transitional area between the Post Oak Savannah to the west, the Blackland Prairies to the east, and the Edwards Plateau and Llano Uplift to the south. It is a complex mosaic of oak woodlands and prairies. The Eastern Cross Timbers lies between the Grand Prairie and the Texas Blackland Prairies. The region's dominant vegetation consists of species that have adapted to the nutrient-poor sandy soils. Extensive urban development occurs in this region, and rural areas are primarily utilized for livestock grazing.

According to *The Vegetation Types of Texas*, three vegetation types are present in the project area: Post Oak Woods/Forest, and Grassland Mosaic; Other Native and/or Introduced Grasses; Crops, and Urban (McMahan et. al 1984). Typical plant species of the Post Oak Woods/Forest, and Grassland Mosaic vegetation type are listed in *The Vegetation Types of Texas.*

The vegetation type designated "Other Native and/or Introduced Grasses" consists of mixed native or introduced grasses. It is often associated with the clearing of woody vegetation. Vegetation designated as crops consists of cultivated cover crops or row crops providing food and/or fiber for either man or domestic animals. This vegetation type may also portray grassland associated with crop rotations. Urban vegetation types, found within city boundaries, usually consist of a mixture of native and/or introduced grasses and ornamental plantings.

Vegetation of the project area is consistent with the Post Oak Woods/Forest, and Grassland Mosaic, Other Native and/or Introduced Grasses, and Urban mapped vegetation types. Crops were not observed within the project area. Species of the Post Oak Woods/Forest included eastern redcedar (*Juniperus virginiana*), mesquite (*Prosopis glandulosa*), sugarberry (*Celtis laevigata*), and silver bluestem (*Bothriochloa saccharoides*). Urban vegetation types consisted of a mixture of native and/or introduced grasses and ornamental plantings. These include species such as Johnsongrass (*Sorghum halepense*), silver bluestem, and crape myrtle (*Lagerstroemia indica*).

b) Vegetative Communities Found within the Study Area

General vegetation/habitat types of potential occurrence within the project area include riparian woodlands, riparian scrub/shrub vegetation, mixed oak woodlands, mesquite-juniper savannah, and urban/developed cover. The following provides a general description of the vegetative types occurring within the project area, based on field investigations and aerial photo interpretation. Estimates of trees greater than six inches diameter at breast height (dbh) in mixed oak woodlands and mesquite-juniper savannah were made using field notes and photo analysis.

Mixed oak woodlands are found in upland areas and include species such as live oak, post oak, mesquite, pecan, sugarberry, mustang grape, and giant ragweed (*Ambrosia trifida*). Representative photographs of mixed oak woodlands are found in **Appendix E**. Approximately 23.12 acres of mixed oak woodlands are found in the project area. Trees in these woodlands have a dbh ranging from approximately 2 to 15 inches, with heights up to approximately 40 feet. Density averages approximately 350 trees per acre, with an average of approximately 70 percent cover. Approximately 40 percent of trees are greater than six inches dbh. No unusual features were observed.

Mesquite-juniper savannah consists of grasslands with scattered mesquite and eastern redcedar trees. Grass species are typically a mixture of native and introduced species, and often include silver bluestem and Johnsongrass. Representative photographs of mesquite-juniper savannah are found in **Appendix E**. Approximately 22.83 acres of savannah are found in the project area. Trees in the savannah have a dbh ranging from approximately 2 to 10 inches, with heights up to approximately 15 feet. Density is approximately 85 trees per acre, with approximately 15 percent cover. Approximately 15 percent of trees are greater than six inches dbh. No unusual features were observed.

Urban/developed cover includes maintained right-of-way and ornamental plantings. Species commonly found in the maintained right-of-way are a mixture of native and introduced grasses and native wildflowers. Grass species include Johnsongrass and silver bluestem. Dominant wildflower species observed in the project area include sunflowers (*Helianthus* sp.), silver-leaf nightshade (*Solanum elaeagnifolium*), evening primrose (*Oenothera speciosa*), Indian blanket (*Gaillardia pulchella*), and Texas thistle (*Cirsium texanum*). Ornamental plantings may include various non-native plant species associated with commercial businesses adjacent to the project area. Representative photographs of maintained right-of-way vegetation and ornamental plantings are found in **Appendix E**. Approximately 812.92 acres of urban/developed cover are found within the project area.

Riparian scrub/shrub vegetation within the project area occurs alongside and within the channel of some creeks and drainages. It consists of a mixture of woody shrubs, saplings, and herbaceous species, including cattails (*Typha sp.*), black willow (*Salix nigra*), willow baccharis (*Baccharis neglecta*), ironweed (*Vernonia sp.*), rattle-bush (*Sesbania drummondii*), johnsongrass, flatsedges (*Cyperus sp*.), sedges (*Carex sp.*), cottonwood (*Populus deltoides*), cockle-bur (*Xanthium strumarium*), dallisgrass (*Paspalum dilatatum*), spurges (*Euphorbia sp.*), amaranth (*Amaranthus sp.*), and balloonvine (*Cardiospermum halicacabum*). Mature woody vegetation is generally lacking or represented by only a few isolated individuals. Approximately 4.87 acres of riparian scrub/shrub vegetation is found within the project area. No unusual features were observed.

Riparian woodlands occur along Cottonwood Branch, Denton Creek, Bear Creek, Farris Branch, and Grapevine Creek. Representative photographs of riparian woodland habitat are found in **Appendix E** and the following paragraphs describe woodlands at each crossing.

The Cottonwood Branch riparian woodlands of the project area consist of a fairly young but continuous overstory dominated by sugarberry and boxelder (Acer negundo) with saplings of those species and, to a lesser extent, honey locust (Gleditsia triacanthos), bois 'd arc (Maclura pomifera), black willow, and eastern redcedar scattered in both the overstory and understory. Typical shrub and vine species include coral berry (Symphoricarpos orbiculatus), rattle-bush, dewberry (Rubus trivialis), and poison ivy (Toxicodendron radicans). Common herbaceous species of the woodland floor included Canada wild-rye (Elymus Canadensis), flatsedges (Cyperus spp.), beggars lice (Torilis arvensis), and goldenrod (Solidago sp.). The majority of the individual trees ranged in dbh (diameter at breast height) from 4-12 inches with a few larger individuals closer to the channel in the 12-18 inches range. Average tree heights ranged from 20-30 feet with a few larger individuals extending to 50 feet and canopy coverage was fairly continuous at 85-95 percent. In general, the Cottonwood Branch riparian woodland appeared to have been cleared in the past, perhaps for agricultural purposes, and in a state of re-growth.

Riparian woodlands at the Denton Creek crossing vicinity were generally more mature and diverse than those described above for Cottonwood Creek. Overstory dominants included American elm (Ulmus americana), cedar elm (Ulmus crassifolia), sugarberry, green ash (Fraxinus pennsylvannica), bois d'arc, and chinaberry (Melia azedarach). In addition, a few mature bur oak (Quercus macrocarpa) and cottonwood individuals were scattered in lower densities throughout the overstory. Typical understory tree, shrub and vine species included saplings of the species already mentioned as well as elderberry (Sambucus canadensis), willow baccharis, green briar (Smilax bonanox), and poison ivy. Typical herbaceous species observed on the woodland floor include giant ragweed, (Ambrosia trifida), crotons (Croton sp.), and perennial ryegrass (Lolium perenne). This woodland, while fairly mature where remaining, has been impacted by residential development and utility infrastructure on both north and south sides. Average dbh for the overstory trees ranges from 8-14 inches with larger isolated individuals up to the 24-26 inches range. Canopy coverage is fairly continuous at 85-95 percent and ranges in average height from 25-40 feet with outliers at 15 feet and 60 feet.

The stretch of Bear Creek in the project area is heavily shaded by both tree canopy and existing overpass structures and is impacted by stormwater runoff from upstream urbanized areas, adjacent roadways and concrete hike and bike trails. Consequently, the streambed and banks appear to be fairly dynamic in nature and dominated by a debris-ridden, shifting sand substrate. The riparian woodland overstory in the immediate project area is dominated by fairly large individual trees which are able to withstand the dynamic flow regime; however, a relatively low species diversity represented by boxelder, black willow, American elm, sugarberry and green ash. The understory is fairly sparse, compared to the other crossings, however has saplings of the previously mentioned trees as well as herbaceous and vine dominants such as Canada wildrye, inland sea-oats (Chasmanthium latifolium), giant ragweed, ironweed, frostweed (Verbesina virginica), sedges (Carex spp.), grapevines (Vitis spp.), and poison ivy. Average dbh ranges from 10-18 inches and average height is 25-40 feet with a few larger individual black willows up to 24-38 inches dbh and 40 feet- 80 feet in height.

The creek channel in the project vicinity at Farris Branch has been previously realigned and channelized in support of the construction of an office complex entry, parking lot and stormwater detention pond. The remnant and re-growth riparian woodland community at Farris Branch is dominated by sugarberry, bois d' arc and cedar elm ranging in size from 6-24 inches in dbh and 15-60 feet in height. Shrub, vine and herbaceous species common in the woodlands along Farris Branch include sapling cedar elm, sugarberry and pecan, coralberry, greenbriar, grapevine, and giant ragweed. Sapling black willow, sycamore and American elm are also found close to the water's edge along with beggar's lice and annual water aster (Aster subulatus).

The primarily re-growth woodland community along Grapevine Creek adjacent to the project area appears to have been disturbed within the last 15-20 years and consists of scattered boxelder, black willow, red mulberry (Morus rubra), bois d' arc, American elm, honey locust, and sugarberry trees ranging in size from 6-16 inches dbh and 25-35 feet in height. This woodland is a bit more open than the others with canopy coverage of approximately 75-85 percent near the roadway. Common understory, shrub and herbaceous species include saplings of the trees mentioned, coral berry, creek plum (Prunus rivularis), poison ivy, balloonvine, cockle-bur, sump weed (Iva annua), Johnsongrass, goldenrod and swamp smartweed (Polygonum hydropiperoides).

In summary, all riparian woodlands observed in the project area were fairly disturbed and in various stages of succession. No unique or unusual features were noted within or adjacent to proposed construction areas. A total of approximately 4.48 acres of riparian woodlands occur within the project area.

c) Vegetation Impacts

No-Build Alternative

Implementation of the No-Build Alternative would not impact vegetation within the project area.

Build Alternative

Impacts of the proposed project on the vegetation types within the project area are reported in **Table 5.7**. These impacts are associated with clearing of existing vegetation cover as required for the travel lanes, ramps, safety clear zone, and bridges. The impacts are summarized separately for areas within the new right-of-way and for areas within existing right-of-way.

Aerial photographs were examined to determine the extent of remaining vegetation beyond the proposed right-of-way. Each of the vegetation types described in this section (riparian woodland, riparian scrub/shrub vegetation, mixed oak woodland, and mesquite-juniper savannah) extend well beyond the proposed right-of-way. Only small areas of each vegetation type will be removed for construction of the proposed project, relative to the total amount of vegetation occurring in the general vicinity. Undisturbed areas near the proposed project area could provide suitable habitat for any displaced species.

In accordance with Provision (4) (A) (i) of the TxDOT – Texas Parks and Wildlife Department (TPWD) Memorandum of Understanding (MOU), unusual vegetation features and special habitat features must be identified for the proposed project. Unusual vegetation features include:

- unmaintained vegetation,
- trees or shrubs along a fenceline adjacent to a field (fencerow vegetation),
- riparian vegetation (particularly where fields/cropland extends up to or abuts the vegetation associated with the riparian corridor),
- trees that are unusually larger than other trees in the area, and
- unusual stands or islands (isolated) of vegetation.

Table 5.7 Vegetation Impacts

Vegetation Type		Approximate Acres within Proposed Right-of-Way	Approximate Acres within Existing Right-of-Way	Total Acreage	Percent of Total Acres Impacted
Riparian Woodlands	Cottonwood Branch	3.86	0.25	4.11	
	Denton Creek	0.01	0.01	0.02	
	Bear Creek	0	0.24	0.24	
	Farris Branch	0.01	0	0.01	
	Grapevine Creek	0.07	0.04	0.11	
	Total	3.96	0.53	4.48	0.52%
Riparian Scrub/Shrub Vegetation		0.22	4.65	4.87	0.56%
Mixed Oak Woodlands		22.50	0.63	23.12	2.66%
Mesquite-juniper savannah		22.77	0.06	22.83	2.63%
Urban/Developed		131.04	681.88	812.92	93.63%
Total		180.48	687.74	868.23	100%

Special habitat features include:

- bottomland hardwoods,
- caves,
- cliffs and bluffs,
- native prairies (particularly those with climax species of native grasses and forbs),
- ponds (temporary and permanent, natural and man-made),
- seeps and springs,
- snags (dead trees) or groups of snags,
- water bodies (creeks, streams, rivers, lakes, etc.), and
- existing bridges with known or easily observed bird or bat colonies.

Vegetation impacts are anticipated to be permanent, as earthwork may extend to the edge of the proposed right-of-way. Within the project area, riparian vegetation constitutes unusual vegetation. In accordance with the TxDOT - TPWD Memorandum of Understanding/Memorandum of Agreement (MOU/MOA), compensatory mitigation must be considered for impacted riparian vegetation by the TxDOT - Fort Worth District. As described above, up to approximately 4.5 acres of riparian vegetation exist within the proposed project with minor impacts; therefore, mitigation is not proposed, as current design plans indicate that either the streams in the project area are to be spanned and existing vegetation under bridge structures will be left in place as much as is practicable or the improvements would be limited to extensions of existing culverts; therefore, impacts to riparian vegetation would be minimized. Mitigation is not proposed for upland vegetation impacted by construction of the project because no rare or unusual upland vegetation features would be affected. Special habitat features within the project area include water bodies, which are discussed in detail in **Section E.6.c.**, **Wetlands and Waters of the U.S.**

d) Invasive Species and Beneficial Landscaping

A mix of native and introduced grasses and forbs would be used to re-vegetate the right-of-way. Additionally, disturbed areas would be restored and reseeded according to the TxDOT specifications. This would be performed in accordance with TxDOT's "Seeding for Erosion Control," Executive Order 13112 on Invasive Species, and the Executive Memorandum on Beneficial Landscaping.

2. Wildlife

a) Regional Wildlife Summary

The project area is located in the Texan Biotic Province (Blair 1950). Mammal species typical of the Texan Biotic Province include Virginia Opossum (*Didelphis virginiana*), Eastern Mole (*Scalopus aquaticus*), Fox Squirrel (*Sciurus niger*), Fulvous Harvest Mouse (*Reithrodontomys fulvescens*), Hispid Cotton Rat (*Sigmodon hispidus*), Deer Mouse (*Peromyscus maniculatus*), Eastern Cottontail (*Sylvilagus floridanus*), Swamp Rabbit (*S. aquaticus*), and Black-tailed Jackrabbit (*Lepus californicus*). Reptiles of the province include Ornate Box Turtle (*Terrapene ornata*), Eastern Box Turtle (*T. carolina*), Green Anole (*Anolis carolinensis*), Fence Lizard (*Sceloporus undulatus*), Eastern Racer (*Coluber constrictor*), Coachwhip (*Masticophus flagellum*), Eastern Rat Snake (*Elaphe obsoleta*), Common Kingsnake (*Lampropeltis getula*), Cottonmouth (*Agkistrodon piscivorus*), and Western Diamondback Rattlesnake (*Crotalus atrox*). Typical anuran species include Hurter's Spadefoot Toad (*Scaphiopus hurterii*), Gulf Coast Toad (*Bufo valliceps*), Woodhouse's Toad (*B. woodhousii*), Northern Cricket Frog (*Acris crepitans*), Strecker's Chorus Frog (*Pseudacris streckeri*), Gray Treefrog (*Hyla versicolor*), Green Treefrog (*H. cinerea*), Bullfrog (*Rana catesbiana*), and Rio Grande Leopard Frog (*R. berlandieri*).

b) Project Area Wildlife

Project area wildlife utilizes all of the vegetative communities described in Section E.1.b to varying extents. The various woodland and riparian communities would be most important for wildlife due to the density, vegetative diversity, and potential for mast production (e.g., acorns, berries).

3. Threatened and Endangered Species

<u>No-Build Alternative</u>

Implementation of the No-Build Alternative would have no effect on threatened and endangered species.

Build Alternative

The following section addresses the potential for the proposed project to affect federally- or state-listed threatened or endangered species of potential occurrence in Tarrant and Dallas County. **Table 5.8** includes a listing of threatened, endangered, or otherwise rare species or subspecies that may potentially occur in Tarrant and Dallas County, the listing status of these taxa, a determination of whether appropriate habitat occurs in the project area, and expected project impacts.

The TPWD's Natural Diversity Database (NDD) maintains a database of observations of tracked species and assemblages throughout the state. The NDD identified several federal and state-listed threatened, endangered and rare species that have historically occurred within Tarrant & Dallas Counties. The NDD database was searched in February 2008 for elements of occurrence of the listed species within the project vicinity. None of the species were recorded within 1.5 mile radius of the proposed project. The database did determine the proposed project is adjacent to the Grapevine Lake managed area. The proposed project is not acquiring any additional right-of-way from this managed area, therefore; the proposed project would not impact the Grapevine Lake managed area. None of the species listed in the following table were observed during the on-site reconnaissance.

Table 5.8 Federal and State-Listed Threatened/Endangered Species of Potential Occurrence in Tarrant and Dallas Counties

Species	Federal Status	State Status	Description of Suitable Habitat	Habitat Present	Species Effect	Pertinent Project Information
Birds						
American Peregrine Falcon *Falco peregrinus anatum*	DL	E	Potential migrant. Nests in the Trans-Pecos region of west Texas; nests on high cliffs, often near water where prey species are most common.	N	N	Rare to uncommon migrant only. Project area does not contain suitable nesting habitat.
Birds						
Arctic Peregrine Falcon *Falco peregrinus tundrius*	DL	T	Potential migrant. Nests in tundra regions; winter inhabitant of coastlines and mountains from Florida to South America. Open areas, usually near water.	N	N	Rare to uncommon migrant only. Project area does not contain suitable nesting or winter coastal habitat.
Bald Eagle *Haliaeetus leucocephalus*	DL	T	Nests and winters near rivers, lakes and along coasts; nests in tall trees or on cliffs near large bodies of water.	N	N	Project is located in a maintained urban area.
Black-capped Vireo *Vireo atricapillus*	E	E	Oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching ground level for nesting cover; return to same territory, or one nearby annually; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than present of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer.	N	N	Oak-juniper woodlands with required structure are not present within the project area.

Table 5.8 Federal and State-Listed Threatened/Endangered Species of Potential Occurrence in Tarrant and Dallas Counties (cont'd.)

Species	Federal Status	State Status	Description of Suitable Habitat	Habitat Present	Species Effect	Pertinent Project Information
Birds						
Golden-cheeked Warbler *Dendroica chrysoparia*	E	E	Woodlands with tall Ashe juniper (colloquially "cedar"), oaks, and other hardwood trees.	N	N	Woodlands with mature Ashe juniper are not present within the project area.
Henslow's Sparrow *Ammodramus henslowii*	—	—	Wintering individuals (not flocks) found in weedy fields or cut-over areas with lots of bunch grasses along with vines and brambles; a key component is bare ground for running/walking; likely to occur, but few records within this county.	N	N	Few recorded occurrences in this county. No abundance of dense groundcover or bunch grasses.
Interior Least Tern *Sterna anitllarum athalassos*	LE	E	Nests along sand and gravel bars within braided streams and rivers; also known to nest on man-made structures.	N	N	No sparsely vegetated sand gravel bars in project area streams.
Piping Plover *Charadrius melodus*	T,E	T	Sandy beaches and lakeshores.	N	N	No sandy beaches on lakeshores are present within the project area.
Western Burrowing Owl *Anthene cunicularia hypugaea*	—	—	Prairies, pastures, agricultural areas, savannas, open areas, vacant lots near human habitation.	Y	N	Maintained urban area. No prairie, pasture, or agricultural areas. The species was not detected in the project area.
White-faced Ibis *Plegadis Chihi*	––	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.	N	N	No marshes sloughs, irrigated rice fields, brackish or saltwater habitats are present within the project area.
Whooping Crane *Grus americana*	LE	E	Potential migrant; winters in and around Aransas National Wildlife Refuge and migrates to Canada for breeding.	N	N	Maintained urban area. No estuaries, marshes, savannah, grasslands, cropland, or pastures.
Wood Stork *Mycteria americana*	––	T	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, inhabits mud flats and other wetlands.	N	N	No prairie ponds, shallow standing water, mud flats, or wetlands are present within the project area.
Mollusks						
Fawns foot *Truncilla donaciformis*	––	––	Small and large rivers especially on sand, mud, rocky mud, and sand and gravel, also silt and cobble bottoms in still to swiftly flowing waters; Red (historic), Cypress (historic), Sabine (historic), Neches, Trinity, and San Jacinto River basins.	N	N	No rivers occur within the project area.
Little spectaclecase *Villosa lienosa*	–––	–––	Creeks, rivers, and reservoirs, sandy substrates in slight to moderate current, usually along the banks in slower currents; east Texas, Cypress through San Jacinto River basins.	N	N	No rivers or reservoirs are present within the project area. Project area creeks do not have sandy substrates.

Table 5.8 Federal and State-Listed Threatened/Endangered Species of Potential Occurrence in Tarrant and Dallas Counties (cont'd.)

Species	Federal Status	State Status	Description of Suitable Habitat	Habitat Present	Species Effect	Pertinent Project Information
Louisiana Pigtoe *Pleurobema riddellii*	–––	–––	Streams and moderate-size rivers, usually flowing water on substrates of mud, sand, and gravel; not generally known from impoundments; Sabine, Neches, and Trinity (historic) River basins.	N	N	No rivers of flowing streams with preferred substrate types occur within the project area.
Pistolgrip *Tritogonia verruscosa*	–––	–––	Stable substrate, rock, hard mud, silt, and soft bottoms, often buried deeply; east and central Texas, Red through San Antonio River basins.	N	N	No rivers with preferred substrate occur within project area.
Rock pocketbook *Arcidens confragosus*	–––	–––	Mud, sand and gravel substrates of medium to large rivers in standing or slow flowing water, may tolerate moderate currents and some reservoirs, east Texas, Red through Guadalupe River basins.	N	N	No rivers occur within the project area.
Sandbank pocketbook *Lampsilis satura*	––	––	Small to large rivers with moderate flows and swift current on gravel, gravel-sand, and sand bottoms; east Texas, Sulfur south though San Jacinto River basins; Neches River.	N	N	No rivers occur within the project area.
Texas heelsplitter *Potamilus amphichaenus*	––	––	Quiet waters in mud or sand and also in reservoirs. Sabine, Neches, and Trinity River basins.	N	N	No reservoirs or quiet waters with mud or sand substrates occur within the project area.
Mammals						
Gray Wolf *Canis lupis*	LE	E	Extirpated; formerly known throughout the western two-thirds of state in forests, brushlands, or grasslands.	N	N	Maintained urban area. No forests, brushlands, or grasslands.
Plains Spotted Skunk *Spilogale putorius interrupta*	—	—	Open fields, prairies, croplands, fencerows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie.	Y	N	Maintained urban area. No prairies, croplands, farmyards, or tallgrass prairie. The species was not detected in the project area.
Red Wolf *Canis rufus*	LE	E	Extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairie.	N	N	Maintained urban area. No brushy or forested areas, or coastal prairie.

Table 5.8 Federal and State-Listed Threatened/Endangered Species of Potential Occurrence in Tarrant and Dallas Counties (cont'd.)

Species	Federal Status	State Status	Description of Suitable Habitat	Habitat Present	Species Effect	Pertinent Project Information
Reptiles						
Alligator Snapping Turtle *Macrochelys temminckii*	–––	T	Perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; usually in water with mud bottom and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October.	Y	N	No rivers, canals, lakes, oxbows, swamps or bayous are present within project area. Project area streams generally lack abundant aquatic vegetation. Maintained urban areas alongside streams are not conducive to species occurrence.
Texas Garter Snake *Thamnophis sirtalis annectens*	—	—	Wet/moist microhabitats are conducive to species occurrence, but species not restricted to them; hibernates underground or in/under surface cover; breeds March-August.	Y	N	Maintained urban area. The species was not detected in the project area.
Texas Horned Lizard *Phrynosoma cornutum*	—	T	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; sandy to rocky soil.	N	N	Maintained urban area. No open, arid and semi-arid regions with sparse vegetation observed in the project area.
Timber/Canebrake Rattlesnake *Crotalus horridus*	—	T	Swamps, floodplains, upland woodlands, riparian zones, abandoned farmland; prefers dense ground cover, i.e. grapevines or palmetto.	Y	N	Maintained urban area. The species was not detected in the project area.
Vascular Plants						
Glen Rose yucca *Yucca necopina*	—	—	Grasslands on sandy soils; also found in limestone bedrock, clayey soil on top of limestone, and gravelly limestone alluvium. Flowering April-June.	N	N	Maintained urban area. No grasslands or the required soils in the project area.

LE, LT - Federally Listed Endangered/Threatened PT, C1 - Federally Proposed Threatened, or Candidate Species DL, PDL - Federally Delisted/Proposed Delisted E, T - State Endangered/Threatened " — " – Rare or Species of Concern, but no regulatory listing status	Data Sources: Texas Parks and Wildlife Department, Wildlife Diversity, Diversity and Habitat Assessment programs. County Lists of Texas' Special Species. Tarrant County (last revision 8/8/2007). http://gis.tpwd.state.tx.us/TpwEndangeredSpecies/DesktopDefault.aspx accessed 12/31/2007. U.S. Fish and Wildlife Service. 2007. www.fws.gov/ifw2es/endangeredspecies/lists/ Endangered Species List for Tarrant County, accessed 12/31/2007.

Portions of the project area that coincide with existing road rights-of-way have experienced modification to the extent that very little native vegetation remains within or adjacent to the right-of-way. Much of the project area that is not already in existing transportation use consists of commercial businesses, isolated woodlands, and small fields of maintained grasses. Based on lack of suitable habitat and the degree of previous land modification (for transportation rights-of-way), the project would have no effect upon threatened or endangered species.

4. Migratory Birds

No-Build Alternative

Implementation of the No-Build Alternative would have no effect on migratory birds, their nests, eggs or young.

Build Alternative

The Migratory Bird Treaty Act of 1918 protects migratory birds, their nests, and eggs. Observations of migratory birds could potentially occur in the project area, but the majority of the migratory bird occurrences would be transitory. The migration patterns of these species would not be affected by this project. During the field visit, swallow nests were observed on some bridge structures just outside of the project area at the entrance to DFW International Airport; however these nests did not appear to be active, even though the field visit was conducted during the nesting season. 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 between September 1st and the end of February from any structure where work will be done. In addition, the contractor would avoid or minimize clearing vegetation within the project area between March 1 and August 31.

5. Farmland

No-Build Alternative

Implementation of the No-Build Alternative would require no displacement, relocation or division of farmland or farm operations.

Build Alternative

Implementation of the Build Alternative would require no displacement, relocation or division of farmland or farm operations. Additional right-of-way required for the proposed improvements is developed, urbanized, or zoned for urban use; therefore, the proposed project is exempt from the requirements of the Farmland Protection Policy Act (FPPA) and requires no coordination with the Natural Resources Conservation Service (NRCS).

6. Water Quality

No-Build Alternative

Implementation of the No-Build Alternative would have no effect on lakes, rivers, and streams, existing water quality, threatened and impaired waters, floodplains, and wetlands. This alternative would have no channel impacts. No additional permitting would be required.

<u>Build Alternative</u>

The effect of implementing the Build Alternative with regard to lakes, rivers, and streams, existing water quality, threatened and impaired waters, floodplains, wetlands, channel impacts, and permitting is presented below.

a) Watershed/Basin Information

Tarrant County is located in the Trinity River Basin. The Trinity River originates in four separate forks: the East Fork in Grayson County, the Elm Fork in Montague County, the West Fork in Archer County, and the Clear Fork in Parker County. The Clear Fork joins the West Fork in the city of Fort Worth, and the Elm Forks joins these in the city of Dallas. The East Fork joins the Trinity just south of Dallas County, on the border of Ellis and Kaufman Counties. From there, it flows south to Trinity Bay, the northernmost part of Galveston Bay. The length of the Trinity River is 715 miles, and the total basin drainage is 17,969 square miles. For the purpose of water quality monitoring, the Texas Commission on Environmental Quality (TCEQ) has divided the Trinity River Basin into 57 classification segments, including 32 stream segments encompassing 1,224.5 stream miles and 25 reservoirs encompassing 321,761 acres (TCEQ 2004).

Historically, water quality in the Trinity River has been poor due to contamination originating from the heavily populated Fort-Worth-Dallas metroplex area. In the past few decades, however, water quality has improved slightly. Primary water quality concerns throughout the basin include elevated fecal coliform levels, depressed dissolved oxygen concentrations, and chemical contamination (TCEQ 2004). Chemical contaminants include Chlordane, DDT, DDD, DDE, organochlorine insecticides, Dieldrin, and PCBs. Water quality monitoring is ongoing in the Trinity River.

The local governments along the Trinity River established a common watershed management program whereby all proposed developments within the Trinity River Corridor Development Regulatory Zone (essentially the 100-year floodplain) must apply for a Corridor Development Certificate (CDC). The project is not within the Trinity River Corridor Development Regulatory Zone; therefore, a CDC permit would not be required.

Creeks in the project area include Big Bear Creek, Denton Creek, Grapevine Creek and their tributaries, as well as a tributary to Jones Branch. Creek locations are identified on **Plates F through J** in **Appendix D**. Photographs of creeks in the project area are found in **Appendix E**. Big Bear Creek crosses SH 121 in the southwestern portion of the project area. The Cottonwood Branch of Denton Creek crosses SH 121 in the northern portion of the project area. Farris Branch of Denton Creek crosses SH 114 in the northeastern portion of the project area, and Grapevine Creek crosses SH 114 in the southeastern portion of the project area. Creeks in the project are crossed by both bridges and culverts.

A wetland mitigation area owned by the DFW Airport and deed restricted to the USACE is located at the southeast corner of the intersection of SH 121 and Bethel Road. Cottonwood

Branch of Denton Creek flows through this property. Although it is located immediately adjacent to the proposed project, no right-of-way would be required from the mitigation bank and no direct impacts to the wetland mitigation area would occur. A retaining wall is proposed in this area eliminating the need of any additional right of way from the wetland mitigation area; therefore, illustrating avoidance efforts to minimize any impact to the wetland mitigation area. However, water runoff from the project area has the potential to indirectly affect the mitigation bank.

Grapevine Lake, managed by the U.S. Army Crops of Engineers, is located on Denton Creek just north of the City of Grapevine. The lake is depicted on **Appendix B USGS Topographic Map**. The lake is upstream from the project area, therefore water runoff from the project area would not result in any impacts to the lake.

Based on the TCEQ's 2004 and draft 2006 Clean Water Act Section 303(d) lists, the project does not cross a threatened or impaired water segment nor is the project within five miles upstream of an impaired or threatened segment. Therefore, coordination with the TCEQ is not required for total maximum daily loads. The water quality of wetlands and waters in the state shall be maintained in accordance with all applicable provisions of the Texas Surface Water Quality Standards including the General Narrative and Numerical Criteria.

The General Bridge Act of 1946 (formerly Section 9 of the Rivers and Harbors Act of l899) empowers United States Coast Guard to regulate the construction of bridges and causeways within or across waterways defined as navigable by that agency. Section 10 of the Rivers and Harbors Act of 1899 empowers the USACE to regulate all work on structures in or affecting the course, condition, or capacity of the navigable waters of the United States. Navigable waters of the U. S. are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. There are no navigable waterways crossed by the project facilities within the proposed area of improvements.

b) Federal Emergency Management Agency (FEMA) Floodplain Information

The project corridor was investigated for encroachments into the 100-year floodplain. Information was obtained from the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps for Tarrant County (Flood Map Panel Numbers 48439C0205H, 4805980205H, 4805980210H, 4805980215H, 4805980220H, 4801800015A, 4801800005A, 4801700010E). Approximately 53 acres of floodplain occur within the project's existing and proposed right-of-way.

The hydraulic design practices for this project would be in accordance with current TxDOT design policy and standards. The highway facility would permit conveyance of the 100-year flood levels, inundation of the roadway being acceptable, without causing significant damage to the highway, stream or other property. Tarrant County is a participant in the National Flood Insurance Program. The proposed project would not increase the base flood elevation to a level that would violate the applicable floodplain regulations or ordinances; therefore, no coordination with either FEMA or the local floodplain administrator is required.

c) Wetlands and Waters of the U.S.

Waters of the U.S. are protected under Section 404 of the Clean Water Act, as administered by the U.S. Army Corps of Engineers (USACE). Wetlands are transitional areas between terrestrial and aquatic ecological systems and are defined by three criteria: 1) the presence of hydrophytic vegetation; 2) hydric soil characteristics; and 3) wetland hydrology. Wetlands are protected under the Clean Water Act, and are regulated by the USACE. Wetlands may provide and/or promote the following functions: groundwater recharge, groundwater discharge, flood flow attenuation, sediment stabilization, sediment and toxicant retention, nutrient removal and/or transformation, production export, and the promotion of habitat and wildlife diversity and abundance. Wetlands are also valued for their recreational uses and uniqueness as ecological and physiographic zones.

In addition to the jurisdictional wetlands defined above, the Clean Water Act regulates impacts to other waters of the United States. The term “waters of the United States” has broad meaning and incorporates both deepwater aquatic habitats and special aquatic sites, including wetlands, as listed below:

- The territorial seas with respect to the discharge of fill material.
- Coastal and inland waters, lakes, rivers and streams that are navigable waters of the United States, including their adjacent wetlands.
- Tributaries to navigable waters of the United States, including adjacent wetlands.
- Interstate waters and their tributaries, including adjacent wetlands.
- All other waters of the United States not identified above, such as lakes, intermittent streams, prairie potholes, and other waters that are not a part of a tributary system to interstate waters or navigable waters of the United States, the degradation or destruction of which could affect interstate commerce.

Determination of the presence or absence of waters of the U.S. within the project area was accomplished using National Wetlands Inventory (NWI) maps produced by the U.S. Fish and Wildlife Service, aerial photographs, USGS topographic maps, FEMA floodplain maps, and onsite verification during the field wetland determination on June 6, 2006.

A jurisdictional wetland determination was conducted within the existing right-of-way to identify waters of the United States, which are regulated by the USACE pursuant to Section 404, subsection 330.5(a)(21) of the Clean Water Act. Procedures in the Field Guide for Wetland Delineation – 1987 Corps of Engineers Manual (Wetland Training Institute, 1991) were utilized within the project area. One jurisdictional wetland was identified within the proposed project limits.

Twelve jurisdictional waters of the U.S. were identified within the project area (see **Table 5.9**). These include Big Bear Creek, Denton Creek, Grapevine Creek, Farris Branch, and Cottonwood Branch, their associated tributaries, as well as tributaries to Jones Branch and Denton Creek. The proposed project would have only minor impacts at these jurisdictional waters, since they would either be spanned by the proposed improvements or the improvements would be limited to extensions of existing culverts.

Table 5.9 Jurisdictional Waters Within the Project Area

Water Feature*	Approximate Station #	Name	OHWM[1] (feet)	Impacts (acres)	Permit	PCN?	US waters spanned
1	520 + 00	Big Bear Creek	20	< 0.1	NWP 14	No	Yes
2	1010 + 00	Tributary to Big Bear Creek	6	< 0.1	NWP 14	No	No
5	310 + 00	Tributary to Jones Branch	3	< 0.1	NWP 14	No	No
6	305 + 00	Tributary to Jones Branch	2	< 0.1	NWP 14	No	No
7	585 + 00	Grapevine Creek	40	<0.1	NWP 14	No	Yes
8	2885 + 00	Cottonwood Branch	75	< 0.1	NWP 14	No	No
9	2885 + 00	Tributary to Cottonwood Branch	4	< 0.1	NWP 14	No	Yes
10	2890 + 00	Tributary to Cottonwood Branch	4	< 0.1	NWP 14	No	No
14	1870 + 00	Cottonwood Branch	25	< 0.1	NWP 14	No	Yes
15	2850 + 00	Wetland near Cottonwood Branch	-	None	None	No	Yes
17	505 + 00	Denton Creek	35	< 0.1	NWP 14	No	Yes
18	349 + 00	Farris Branch	15	< 0.1	NWP 14	No	No

* Features 3, 4, 11, 12 and 13 were deleted because they were determined to be located outside of the project area. Feature 16 was determined not jurisdictional.
[1] Ordinary High Water Mark - the ordinary high water level is an elevation delineating the highest water level that has been maintained for a sufficient period of time to leave evidence upon the landscape, commonly the point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial.

d) Permits

The proposed improvements would result in the placement of minor amounts of fill into waters of the U.S., and the project would be covered under a U.S. Army Corps of Engineers (USACE) Nationwide Permit 14. Pre-construction notification (PCN) to the USACE would not be required for any crossing since no impacts would be greater than the 0.10 acre threshold for PCN. Although the wetland at Cottonwood Branch is a special aquatic site, PCN would not be required for the wetland near Cottonwood Branch because it would not be impacted during construction. Specifically, no impacts to the wetland near Cottonwood Branch are expected since the area would be bridged; however, a commitment to TPWD has been made to establish fencing around the area to make aware that the area is not to be disturbed. The waters are not navigable; therefore, neither a U.S. Coast Guard Section 9 Permit nor a USACE Section 10 Permit would be required.

e) TCEQ Section 401 Best Management Practice Statement

Should impacts to waters of the U.S. be associated with the construction of this project, Erosion Control, Sedimentation Control, and Post Construction Total Suspended Solids (TSS) Control devices from the TCEQ Section 401 Best Management Practices (BMP) List would be required. **Table 5.10** shows the approved BMPs for each category. At least one device from each category would be utilized. Erosion Control devices would be implemented and maintained until construction is complete. Sedimentation Control devices would be maintained and remain in place until completion of the project. Post-Construction TSS Control devices would be implemented upon completion of the project.

Table 5.10 Best Management Practices

Erosion Control	Sedimentation Control	Post Construction TSS
Temporary Vegetation	Sand Bag Berm	Retention/Irrigation
Blankets/Mulch/Matting	Silt Fence	Vegetative Filter Strip
Mulch	Triangular Filter Dike	Constructed Wetlands
Sod	Rock Berm	Wet Basins
Interceptor Swale	Hay Bale Dike	Vegetation Lined Drainage Ditches
Diversion Dikes	Brush Berm	Grassy Swales
Erosion Control Compost	Stone Outlet Sediment Trap	Sand Filter Systems
Mulch Filter Berms/Socks	Sediment Basin	Extended Detention Basins
Compost Filter Berms/Socks	Erosion Control Compost	Erosion Control Compost
	Mulch Filter Berms/Socks	Mulch Filter Berms/Socks
	Compost Filter Berms/Socks	Compost Filter Berms/Socks

f) Texas Pollutant Discharge Elimination System (TPDES)

Because this project would disturb more than one acre, TxDOT would be required to comply with the TCEQ – Texas Pollutant Discharge Elimination System General Permit for Construction Activity. The project would disturb more than five acres; therefore, a Notice of Intent would be filed to comply with TCEQ regulations and TxDOT would have a Storm Water Pollution Prevention Plan (SW3P) in place during construction of the proposed project. This “SW3P” utilizes the temporary control measures as outlined in the TxDOT manual “Standard Specifications for the Construction of Highways, Streets, and Bridges”. Impacts would be minimized by avoiding work by construction equipment directly in the stream channels and/or adjacent areas. No long-term water quality impacts are expected as a result of the proposed project.

g) Storm Water Pollution Prevention Plan (SW3P)

To minimize impacts to water quality during construction, the proposed project would utilize temporary erosion and sedimentation control practices (i.e., silt fences, rock berms, and drainage swales) from TxDOT's manual "Standard Specifications for the Construction of Highways, Streets, and Bridges". These temporary erosion and sedimentation control devices would be in place prior to the initiation of construction and would be maintained throughout the duration of the construction. Clearing of vegetation would be limited and/or phased in order to maintain a natural water quality buffer and minimize the amount of erodible earth exposed at any one time. Upon completion of the earthwork operations, disturbed areas would be restored and reseeded according to TxDOT's specifications for "Seeding for Erosion Control".

The contractor would take appropriate measures to prevent, minimize, and control the spill of fuels, lubricants, and hazardous materials in the construction staging area. All spills, including those of less than 25 gallons shall be cleaned immediately and any contaminated soil shall be immediately removed from the site and be disposed of properly. Designated areas shall be identified materials storage. These areas shall be protected from run-on and run-off. The use of construction equipment within stream channels is not anticipated for this project. However, if work within a watercourse or wetland is unavoidable, heavy equipment shall be placed on mats, if necessary, to protect the substrate from gouging and rutting. All construction equipment and materials used within stream channels and immediate vicinity would be removed as soon as the work schedule permits and/or when not in use and shall be stored in an area protected from run-on and run-off. All materials being removed and/or disposed of by the contractor would be done in accordance with state and federal laws and by the approval of the Project Engineer. Any changes to ambient water quality during construction of the proposed project shall be prohibited, may result in additional water quality control measures, and shall be mitigated as soon as possible. The contractor would practice "good housekeeping" measures, as well as, "grade management" techniques to help ensure that proper precautions are in place throughout construction of the proposed project. There are no public water supply intakes within the project limits or adjacent areas. No adverse effects to water quality are expected.

h) Coastal Issues

Federal activities involving or affecting coastal resources are governed by the Coastal Barriers Resources Act (CBRA), the Coastal Zone Management Act (CZMA), and Executive Order 13089, Coral Reef Protection. The CBRA prohibits, with some exceptions, federal financial assistance for development within the Coastal Barrier Resource System that contains undeveloped coastal barriers along the Atlantic and Gulf coasts and the Great Lakes. The CMZA and the National Oceanic and Atmospheric Administration (NOAA) implementing regulations (15 CFR Part 930) provide procedures for ensuring that a proposed action is consistent with approved coastal zone management programs. Executive Order 13089 requires federal agencies to ensure any actions that they authorize, fund, or carry out will not degrade the conditions of coral reef ecosystems. These plans/programs are intended to preserve, protect, and enhance designated coastal areas. No specific impact thresholds have been established for this resource category.

No direct or indirect impacts to coastal resources would occur with implementation of the proposed action or no action alternatives as none are present within the project area. The proposed project is not located within the Texas Coastal Zone Boundary or the Coastal Barrier Resource System; therefore, the project is not anticipated to adversely affect coastal resources and no mitigation measures are required.

i) Wild and Scenic Rivers

The Wild and Scenic Rivers Act, as amended, describes those rivers or segments of rivers which are listed, or eligible for listing, in the Wild and Scenic Rivers System. These rivers are free-flowing and possess outstanding remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values (PL 90-542 as amended by PL 96-487). The National Park Service (NPS) maintains a Nationwide River Inventory (NRI) of river segments which appear to qualify for inclusion in the National Wild and Scenic River System, but which have not been designated as a Wild and Scenic River or studied under a Congressional-authorized study. The President's 1979 Environmental Message Directive on Wild and Scenic Rivers directs federal agencies to avoid or mitigate adverse effects on rivers identified in the NRI as having the potential for designation under the Wild and Scenic Rivers Act.

No specific impact thresholds have been established for this resource category. No existing or eligible wild and scenic rivers are located within the project area; therefore, the proposed action and no action alternatives would not result in any direct, indirect, or cumulative impacts to these resources. No mitigation measures are required.

7. Natural Resources and Energy Supply

The effects of the project on the energy supply typically relate to the amount of energy required for illumination and the movement of vehicles. The impacts of roadway projects on natural resources are typically related to the basic materials (e.g., gravel, fill dirt, etc.) that are required for construction.

There would be no significant long-term changes in energy consumption as a result of the project. There would be short-term expenditures of fuel during construction activities, but these expenditures would be temporary and would not adversely impact local fuel supplies. Any increased energy expenditures would not be significant and would be accommodated by the fuel and electricity sources available locally. Construction of the DFW Connector project would require the use of natural resources such as gravel, fill dirt, and asphalt. There are adequate supplies of these materials available locally. Neither the No-Build Alternative nor Build Alternative would result in significant, long-term impacts to energy supplies or natural resources.

F. HAZARDOUS MATERIALS

No-Build Alternative

Implementation of the No-Build Alternative would have no effect on or from hazardous material sites within the proposed project area.

Build Alternative

The area 500 feet on either side of the project area was visually surveyed. The site investigation concluded that additional information and a search of applicable databases was warranted. The database search report is on file at the TxDOT – Fort Worth District for reference. Of the over 70 potential hazardous materials sites that were identified in the database search, approximately 13 may have the potential for being impacted by the proposed project. These include older (greater than 10 years) single wall fuel tanks, sites with violations and/or spills, directly impacted hazardous materials sites and hazardous materials sites with products other than petroleum compounds. Above ground tanks sites, sites with newer and/or double walled underground tanks, and small quantity generators are not listed unless they met the above criteria. Unmappable orphan sites, while listed in the database were also not included in the below table. **Table 5.11** identifies these potential hazardous materials sites that are located adjacent to the existing right-of-way or within the proposed right-of-way. Site ID numbers are referenced on the plates included in **Appendix D**. The table includes sites that were or are contaminated, or potentially contaminated, and are within or adjacent to the proposed right-of-way expansion. Some of these are categorized as "high risk." An example "high risk" site would be a leaking underground tank that has impacted shallow groundwater where excavation during construction may occur, or an underground storage tank associated with a building that would be displaced by the proposed improvements. Some sites are categorized as "low risk" if available information indicates that some contamination potential may exist, but the site is not likely to pose a contamination issue for roadway construction. The other sites are believed to be a "medium risk", where contamination potential may exist and construction activities may have an effect on or from the site. Below is a summary of the facilities that may be considered a high, medium or low risk, based on available information and the field survey results.

Table 5.11 Recorded Potential Hazardous Materials Sites in the Study Area

Map ID #	Facility Name	Facility Type	Address	Status/Risk
1	RaceTrac 524	Fuel station	2151 Ira E. Woods Avenue	3 double-walled underground storage tanks installed 1995. Potentially displaced by Proposed Action. HIGH
3*	3211 William D Tate Ave	Asphalt	3211 William D. Tate Avenue	Release of 1,000 gallons of liquid asphalt to groundwater table 3/26/87. MEDIUM
4	Hansom Hanks	Fuel station	2101 Hall Johnson Road	Single wall gasoline underground tank installed 1989. LOW
5	Payton Wright Ford	Car dealership	440 W. Highway 114	Steel hydraulic lift underground oil tank installed 1978. Also leaking underground gasoline tank removed 12/98. Case closed. LOW

Table 5.11 Recorded Potential Hazardous Materials Sites in the Study Area (cont'd)

Map ID #	Facility Name	Facility Type	Address	Status/Risk
6	TETCO	Fuel station	1401 William D. Tate Avenue	Single wall gasoline underground tank installed 1988. LOW
7	Best Mart	Fuel station	2636 William D. Tate Avenue	Single wall gasoline underground tank installed 1975. MEDIUM
8	4 Seasons Standard Motors	Car sales and repairs	500 Industrial Park Drive	4 TCEQ violations for hazardous waste generation in 1998. LOW
9	Craig's Collision	Paint and auto shop	2078 West Highway 114	Paint waste and solvents. LOW
10	Switzer 315	Fuel station	2362 Highway 114	Leaking underground gasoline tank removed in 9/96. Case closed. LOW
11	Fina Mart	Fuel station	1400 William D Tate Avenue	Leaking underground gasoline tank removed in 8/05. Case closed. LOW
12	TETCO 452	Fuel station	101 E Highway 114	Leaking underground tank in 4/93. Currently monitoring groundwater. MEDIUM
13	Dry Clean Super Center	Dry cleaner	2200 Hall Johnson Road	Use of perchlor compounds. LOW
14	Shell Gas Station and Mini Mall	Strip mall with fuel station	3501 Grapevine Mills Parkway	Fuel tank to be potentially displaced by Proposed Action. HIGH

Source: Data search by Environmental Data Resources, Inc. and field observations by TxDOT Study Team, June 2006. *ID #2 not used.

Additional investigation would be necessary if contamination is discovered during construction, or if additional information becomes available regarding hazardous materials sites, or if changes are made to the proposed right-of-way. If contamination were to be confirmed, TxDOT would develop appropriate soils and/or groundwater management plans for activities within these areas.

G. Air Quality Assessment

No-Build Alternative

Implementation of the No-Build Alternative would lead to increased traffic congestion and decreased mobility within the DFW Connector, resulting in decreased vehicular speed and increased stop-and-go traffic. This, in turn, would likely increase vehicle idling emissions.

Build Alternative

The proposed North Central Texas project is located in Tarrant and Dallas County, which is part of the U.S. Environmental Protection Agency (EPA) designated nine-county nonattainment area for the eight-hour standard for the pollutant ozone; therefore, the transportation conformity rule applies. The proposed action is consistent with the area's financially constrained Metropolitan Transportation Plan Mobility 2030 (MTP) and the 2008-2011 Transportation Improvement Program (TIP), as revised, as proposed by the NCTCOG. The U.S. Department of Transportation (FHWA/FTA) found the MTP to conform to the State Implementation Plan on June 12, 2007, and the 2008-20011 TIP was found 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 federal guidelines in Section 450, of Title 23 CFR and Section 613.200, Subpart B, of Title 49 CFR. Energy, environment, air quality, cost, and mobility considerations are addressed in the programming of the TIP.

1. Ozone and Carbon Monoxide

The primary pollutants from motor vehicles are volatile organic compounds (VOCs), carbon monoxide (CO,) and nitrogen oxides (NOx). Volatile organic compounds and nitrogen oxides can combine under the right conditions in a series of photochemical reactions to form ozone (O3). Because these reactions take place over a period of several hours, maximum concentrations of ozone are often found far downwind of the precursor sources. Thus, ozone is a regional problem and not a localized condition.

The modeling procedures of ozone require long term meteorological data and detailed area wide emission rates for all potential sources (industry, business, and transportation) and are normally too complex to be performed within the scope of an environmental analysis for a highway project. However, concentrations for carbon monoxide are readily modeled for highway projects and are required by federal regulations.

Topography and meteorology of the area in which the project is located will not seriously restrict dispersion of the air pollutants. The traffic data used in the analysis was obtained from the TxDOT Transportation Planning and Programming (TPP) Division. Of all the roadways that comprise the project facilities proposed for improvement as part of the DFW Connector project (i.e., portions of SH 114, SH 121, FM 1709, Ira E. Woods Avenue, SH 360, International Parkway, IH 635, and FM 2499), the stretch between Main Street and Texan Trail where SH 114 and SH 121 converge is forecasted to have the highest amount of traffic. The Estimated Time of Completion (ETC, 2010) maximum Average Annual Daily Traffic (AADT) at this location is estimated to be approximately 243,000 and the 2030 (ETC+20) design year maximum AADT is estimated to be approximately 366,400.

Each leg of the corridor was not modeled for CO because the only variables would be the designed hourly volumes (DHV) and the right of way width differences that could alter the outcome of what is the worst case scenario. The DHV for the SH 114 leg on the eastern side of the corridor comes closest to the worst case DHV for the mid-section that was modeled and has the narrowest ROW of the legs for SH 114, SH 360, IH 635, and SH 114. This segment has approximately 1/3 less traffic than the segment modeled and the ROW difference is approximately 25% less than the section modeled. It can be assumed that because there is a greater decrease in traffic than in ROW width for dispersion of CO, than the scenario modeled is still worst case and the CO modeling would still represent the worst case scenario for any segment of the corridor.

Carbon monoxide concentrations for the Proposed Action were modeled using the worst case scenario (adverse meteorological conditions and sensitive receptors at the right-of-way line) in accordance with the TxDOT Air Quality Guidelines. The FHWA and TxDOT-preferred

CALINE3 roadway air quality computer model and MOBILE6 emission factors provided by TxDOT were used in the analysis. Local concentrations of carbon monoxide are not expected to exceed National Ambient Air Quality Standards (NAAQS) at any time. The following table summarizes the results of the analysis:

Table 5.12 Project Carbon Monoxide Concentrations

Year	One-Hour Standard*			Eight-Hour Standard*		
	Concentration (ppm)	NAAQS (ppm)	Percent of NAAQS	Concentration (ppm)	NAAQS (ppm)	Percent of NAAQS
2010	7.3	35.5	20.6%	4.5	9.5	47.4%
2030	8.5	35.5	23.9%	5.2	9.5	54.7%

* Analysis includes a one hour background concentration of 2.8 ppm and an 8-hour background concentration of 1.8 ppm.

2. Congestion Management Process

The proposed action is consistent with the NCTCOG adopted Congestion Management Process (CMP), a systematic process for managing congestion. It 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. This project was developed from NCTCOG's operational CMP, which meets all requirements of 23 CFR Highways, Parts 450 and 500.

Operational improvements 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; they are included in the financially constrained Metropolitan Transportation Plan (MTP), and future resources are reserved for their implementation. The CMP element of the plan carries 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 programming stage, travel demand reduction strategies and commitments will be added to the regional Transportation Improvement Program (TIP) or included in the construction plans. The regional TIP provides for programming of these projects at the appropriate time with respect to single-occupant vehicle (SOV) facility implementation and project specific elements. Projects included in the regional CMP will be managed under the Congestion Mitigation and Air Quality (CMAQ) program. In an effort to reduce congestion and the need for SOV lanes in the region, TxDOT and the NCTCOG will continue to promote appropriate congestion reduction strategies through the CMAQ program, the CMP, and the MTP. According to the NCTCOG, the congestion reduction strategies considered for this project will help alleviate congestion in the study area, but will not eliminate it. Therefore, the proposed improvements are justified. Specific CMP project commitments in the vicinity of the proposed project are listed in **Table 5.13**.

Table 5.13 CMP Project Commitments				
Street / Name	**City**	**County**	**Project Type**	**Year Of Implementation**
AIRFIELD DRIVE (5 LOCATIONS)	DFW INTERNATIONAL AIRPORT	DALLAS	INTERSECTION IMPROVEMENT	2005
CS AT BALL STREET AND WALL STREET	GRAPEVINE	TARRANT	INTERSECTION IMPROVEMENT	2002
BUS 114L (NW HWY)	GRAPEVINE	TARRANT	INTERSECTION IMPROVEMENT	1997
FM 1709 DECEL LANES AT DIAMOND/BYRON NELSON INTERSECTION	SOUTHLAKE	TARRANT	INTERSECTION IMPROVEMENT	2005
FM 1709 FROM JELLICO WEST TO BANK STREET	SOUTHLAKE	TARRANT	INTERSECTION IMPROVEMENT	2005
SH 26 AT MUSTANG DR	GRAPEVINE / COLLEYVILLE	TARRANT	INTERSECTION IMPROVEMENT	2000
MAIN ST	GRAPEVINE	TARRANT	TRAFFIC SIGNAL IMPROVEMENT	1995
TRAFFIC SIGNAL RADIO COMMUNICATION	GRAPEVINE / SOUTHLAKE / COPPELL	TARRANT	TRAFFIC SIGNAL IMPROVEMENT	2002
SH 360 SB FR AT MIDWAY,	VARIOUS / GRAPEVINE / BEDFORD	TARRANT	TRAFFIC SIGNAL IMPROVEMENT	2000
FM 1709 AT NOLEN	SOUTHLAKE	TARRANT	TRAFFIC SIGNAL IMPROVEMENT	2002
SH 121 AT WILLIAM D TATE EXIT	GRAPEVINE	TARRANT	BOTTLENECK REMOVAL	2002
SH 114 AT FM 1709	SOUTHLAKE	TARRANT	BOTTLENECK REMOVAL	2007
CS FROM SOUTHLAKE HWY 26 TO COTTON BELT TRAIL PRJ	SOUTHLAKE	TARRANT	BIKE/PEDESTRIAN	2004
GRAPEVINE/SOUTHLAKE BIKE TRAIL	GRAPEVINE	TARRANT	BIKE/PEDESTRIAN	1996
COTTON BELT TRAILWAY/(1) GRAPEVINE; (2) COLLEYVILLE; (3) HURST	COLLEYVILLE / GRAPEVINE / HURST	TARRANT	BIKE/PEDESTRIAN	2005
VA FROM EXISTING TRAILHEAD, PR1 AND PR2 TO NEAR DOVE LOOP EAST, IN GRAPEVINE	GRAPEVINE	TARRANT	BIKE/PEDESTRIAN	2005
VARIOUS LOCATIONS - DEVELOPMENT AND INTEGRATION OF	VARIOUS	DALLAS	ITS	2003
DALLAS CO-US 75 & IH 635	DALLAS /MESQUITE /VARIOUS	DALLAS /VARIOUS	ITS	2000
CCTV, DMS, DETECTION-NE TARRANT COUNTY - REGIONAL SCOPE	VARIOUS / GRAPEVINE / SOUTHLAKE	TARRANT / DENTON	ITS	2004
MOBILITY ASSISTANCE PATROL	VARIOUS /DALLAS /VARIOUS	TARRANT /VARIOUS	ITS	2002
VA FROM NW END OF BEAR CREEK PARK, IN GRAPEVINE TO POOL ROAD VIA PARR PARK	GRAPEVINE	TARRANT	ENHANCEMENT	2003
SH 121 FROM DENTON CREEK TO DALLAS NORTH TOLLWAY	LEWISVILLE /HEBRON /VARIOUS	DENTON /VARIOUS	ADDITION OF LANES	2004

Table 5.13 CMP Project Commitments (cont'd)

Street / Name	City	County	Project Type	Year Of Implementation
SH 121 FROM DALLAS COUNTY LINE TO FM 2499	TARRANT CO	TARRANT	ADDITION OF LANES	2007
BUS 114L (NW HWY) FROM SH 114 TO SH 26 (E INT)	GRAPEVINE	TARRANT	ADDITION OF LANES	1997
SH 121 FROM SH 114 TO 0.3 MI S/O IH 635	GRAPEVINE	TARRANT	ADDITION OF LANES	1993
SH 26 FROM CHEEK SPARGER TO GRAPEVINE CITY LIMITS	COLLEYVILLE / GRAPEVINE	TARRANT	ADDITION OF LANES	2006
EULESS-GRAPEVINE RD, WESTPORT PKWY, STONE MYERS PKWY & MUSTANG DR FROM SH 360 TO SH 121/WILLIAM D TATE AVE	GRAPEVINE	TARRANT	ADDITION OF LANES	2005
BUS 114L FROM SH 26/WALL ST (EAST INTERSECTION TO SH 114 (E)	GRAPEVINE	TARRANT	ADDITION OF LANES	2005
SH 121 FROM TARRANT COUNTY LINE TO DENTON C/L NEAR DENTON CREEK	GRAPEVINE	DENTON	ADDITION OF LANES	2007
DOVE LOOP RD FROM DOVE RD AT DOVE LOOP RD TO RUTH WALL / LOOP 382	GRAPEVINE	TARRANT	ADDITION OF LANES	2003
GLADE RD FROM SH 121 TO SH 360	GRAPEVINE	TARRANT	ADDITION OF LANES	2003
FM 1709 FROM US 377 TO KELLER CITY LIMITS	KELLER / SOUTHLAKE	TARRANT	ADDITION OF LANES	1994
SH 121 FROM SH 114 TO 0.3 MI S/O IH 635	GRAPEVINE	TARRANT	ADDITION OF LANES	1993
SH 360 FROM SH 121 IN GRAPEVINE TO MID-CITIES BLVD IN EULESS	VARIOUS	TARRANT	NEW ROADWAY	2003
SEAMLESS AVIATION CONNECTIONS, WESTERN SUBREGION	VARIOUS	TARRANT	RAIL TRANSIT	2010

Source: North Central Texas Council of Governments, TIPINS, September 2006.

3. Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, EPA also regulates air toxics. Air toxics are pollutants known or suspected to cause cancer or other serious health or environmental effects. A full report on Mobile Source Air Toxics (MSAT) was prepared for the DFW Connector Environmental Assessment and is included in **Appendix H, Mobile Source Air Toxic Analysis**.

FHWA has completed a review of several studies that have attempted to address how MSAT concentration levels may behave based on the distance from a roadway. FHWA notes that both models and experimental data predict short-term concentrations of air toxics can be elevated for receptors downwind of and very near roadways. The tendency for pollutant levels to drop off substantially as the distance from the roadway increases is well documented. The distance where the highest decrease in concentration starts to occur is approximately 328 feet (100 meters). By 1,640 feet (500 meters), most studies have found difficulty distinguishing between background levels of a given pollutant and the elevated levels that may have been found directly adjacent to the roadway. Finally, wind direction and speed, vehicle traffic levels, and roadway design can further increase or decrease the distance at which elevated levels of any given pollutant can be distinguished as directly associated with a roadway.

Sensitive receptors are defined as schools both public and private, licensed day care facilities, hospitals, and senior citizen care facilities. The Study Team identified and mapped twenty (20) sensitive receptors within the SH 114/121 study area, (Tables 2 & 3 and Exhibits 2-3). Two of these sensitive receptors, Baylor Medical Center and Cook Children's Pediatric are within 100 meters (328 feet) of the study area, with the remaining eighteen (18) falling within 500 meters (1,640 feet).

The ability to discern differences in MSAT emissions among transportation alternatives is difficult given the uncertainties associated with forecasting travel activity and air emissions 23 years or more into the future. The main analytical tool for predicting emissions from on-road motor vehicles is the EPA's MOBILE6.2 model. The MOBILE6.2 model is regional in scope and has limited applicability to a project-level analysis. However, the effects of a major transportation project extend beyond its corridor and an evaluation within the context of an affected transportation network can be accomplished.

When evaluating the future options for upgrading a transportation corridor, the major mitigating factor in reducing MSAT emissions is the implementation of the EPA's new motor vehicle emission control standards. The results of the quantitative MSAT analysis for this project indicate substantial decreases in MSAT emissions will be realized from a current base year (2007) through an estimated time of completion for a planned project and its design year some 23 years in the future. Accounting for anticipated increases in VMT and varying degrees of efficiency of vehicle operation, total MSAT emissions were predicted to decline approximately 57 percent from 2007 to 2030. While benzene emissions were predicted to decline more than 43 percent, emissions of DPM were predicted to decline even more (i.e., 88 percent).

MSATs, especially benzene, have dropped dramatically since 1995, and are expected to continue dropping. The introduction of reformulated gasoline has lead to a substantial part of this improvement. In addition, Tier II automobiles introduced in model year 2004 will continue to help reduce MSATs. Diesel exhaust emissions have been falling since the early 1990s with the passage of the Clean Air Act Amendments (CAAA). The CAAA provided for improvement in diesel fuel through reductions in sulfur and other diesel fuel improvements. In addition, the EPA has further reduced the sulfur level in diesel fuel, which took effect in 2006. The EPA also has called for dramatic reductions in NOx emissions, and PM from on-road and off-road diesel engines. MSATs as in relation to SH 114/121 are not expected to increase overall air toxics in the Dallas/Fort Worth area in the future years investigated.

During the construction phase of this project there can be temporary increases in air pollutant emissions from construction activities, equipment, and related vehicles. The primary construction related emissions are particulate matter (fugitive dust) from site preparation and construction and non-road mobile source air toxics (MSAT) from construction equipment and vehicles. The primary MSAT emission related to construction is diesel particulate matter from diesel powered construction equipment and vehicles.

These emissions are temporary in nature (only occurring during actual construction) and it is not reasonably possible to estimate impacts from these emissions due to limitations of the existing models. However, the potential impacts of particulate matter emissions will be minimized by using fugitive dust control measures such as covering or treating disturbed areas with dust suppression techniques, sprinkling, covering loaded trucks, and other dust abatement controls, as appropriate. The MSAT emissions will be minimized by measures to encourage use of EPA required cleaner diesel fuels, limits on idling, increasing use of cleaner burning diesel engines, and other emission limitation techniques, as appropriate.

However, considering the temporary and transient nature of construction related emissions as well as the mitigation actions to be utilized, it is not anticipated that emissions from construction of this project will have any significant impact on air quality in the area.

H. NOISE

No-Build Alternative

Highway traffic is the dominant source of noise in developed areas adjacent to the DFW Connector. The predicted increase in future traffic volumes on the DFW Connector would likely increase future ambient noise levels.

Build Alternative

This analysis was accomplished in accordance with TxDOT's (FHWA approved) 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 "Leq."

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) for various land use activity areas that are used as one of two means to determine when a traffic noise impact would occur (**Table 5.14**):

Table 5.14 FHWA Noise Abatement Criteria (NAC)

Activity Category	dBA L_{eq}	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 exterior areas (Category A, B or C) where frequent human activity occurs. However, interior areas (Category E) are used if these 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 Model 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 5.15** and **Appendix D, Environmental Features**) that represent the land use activity areas adjacent to the proposed project that might be impacted by traffic noise and potentially benefit from feasible and reasonable noise abatement.

Table 5.15 Traffic Noise Levels, L_{eq} (dBA)

Rec. No.	Receiver Description	NAC Category	NAC Level	Existing	Predicted 2030	Change (+/-)	Noise Impact
R1	Apartment	E	52	41	46	+5	No
R2	Apartment	E	52	43	47	+4	No
R3	School	B	67	59	63	+4	No
R4	Hotel	E	52	39	45	+6	No
R5	Hospital	E	52	37	43	+6	No
R7	Residence	B	67	62	65	+3	No
R9	Preschool	E	52	39	43	+4	No
R10	Apartment	E	52	41	46	+5	No
R11	Residence	B	67	63	64	+1	No
R12	Residence	B	67	68	70	+2	Yes
R13	Park/Hike & Bike	B	67	64	67	+3	Yes
R14	Apartment	E	52	44	45	+1	No
R16	Adult Care	E	52	47	48	+1	No
R17	School	E	52	46	48	+2	No

Note: Receivers # 6, 8 and 15 are not used.

As indicated in **Table 5.15**, the proposed project would result in traffic noise impacts and the following noise abatement measures were considered: traffic management, alteration of horizontal and/or vertical alignments, acquisition of undeveloped property to act as a buffer zone and the construction of noise barriers.

Before any abatement measure can be proposed for incorporation into the project, it must be both feasible and reasonable. In order to be "feasible," the abatement measure must be able to reduce the noise level at an impacted receiver by at least five dBA; and to be "reasonable," it must not exceed the cost-effectiveness criterion of $25,000 for each receiver that would benefit by a reduction of at least five dBA.

Traffic management: control devices could be used to reduce the speed of the traffic; however, the minor benefit of one dBA per five mph reduction in speed does not outweigh the associated increase in congestion and air pollution. Other measures such as time or use restrictions for certain vehicles are prohibited on state highways.

Alteration of horizontal and/or vertical alignments: any alteration of the existing alignment would displace existing businesses and residences, require additional right-of-way and not be cost effective/reasonable.

Buffer zone: the acquisition of undeveloped property to act as a buffer zone is designed to avoid rather than abate traffic noise impacts and, therefore, is not feasible.

Noise barriers: this is the most commonly used noise abatement measure. Noise barriers were evaluated for each of the impacted receiver locations with the following results:

R12: this receiver represents a total of two residences located at the west SH 121 right-of-way at Los Robles Drive. A noise barrier study was conducted for the impacted residential locations. A continuous noise barrier would restrict access to these residences. Therefore, two barrier segments were evaluated, one for each residence on either side of Los Robles Drive. The length of each segment was limited to the property line of each residence and the required sight/stopping distance at Los Robles. The cost of the noise barrier segments would be $321,120, which would exceed the reasonable, cost-effectiveness criterion of $25,000 per benefited receiver. The barrier segments are, therefore, not proposed for incorporation into the project.

R13: this receiver represents the Bear Creek Park hike and bike trail and is considered as a separate, individual receiver. A noise barrier that would achieve the minimum reduction of five dBA at this receiver would cost $288,000, which would exceed the reasonable, cost-effectiveness criterion of $25,000.

None of the above noise abatement measures would be both feasible and reasonable; therefore, no abatement measures are proposed for this project.

Land use activity areas adjacent to the proposed project consist primarily of a mixture of commercial properties and undeveloped land (NAC Categories C and D). There is no NAC for undeveloped land; however, to avoid noise impacts that may result from future development of properties adjacent to the proposed project, local officials responsible for land use control programs should ensure, to the maximum extent possible, that no new activities are planned or constructed along or within the following predicted (2030) noise impact contours.

Table 5.16 Year 2030 Predicted Noise Impact Contours

Undeveloped Area	Land Use	Impact Contour	Distance From Right-Of-Way
DFW Connector	Residential	66 dBA	550 feet
SH 114 West of DFW Connector	Residential	66 dBA	265 feet
SH 121 South of DFW Connector	Residential	66 dBA	200 feet
FM 2499	Residential	66 dBA	280 feet

The proposed project will neither increase nor decrease aircraft noise at the DFW International Airport. Therefore, no noise impacts will occur due to airport operations.

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 will 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 will be available to local officials. 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.

I. CULTURAL RESOURCES

No-Build Alternative

Implementation of the No-Build Alterative would have no effect on existing cultural resources in the proposed project area.

Build Alternative

The National Environmental Policy Act (NEPA) requires consideration of important historic, cultural, and natural aspects of our national heritage. Important aspects of our national heritage that may be present in the project corridor will be considered under Section 106 of the National Historic Preservation Act of 1966, as amended. This act requires federal agencies to “take into account” the “effect” that an undertaking will have on “historic properties”. Historic properties are those included in or eligible for listing in the National Register of Historic Places (NRHP) and may include structures, buildings/districts, objects, cemeteries, and archeological sites. In accordance with the Advisory Council on Historic Preservation (ACHP) regulations pertaining to the protection of historic properties (36 CFR

800.4), federal agencies are required to locate, evaluate, and assess the effects that the undertaking will have on such properties. These steps shall be completed under terms of the First Amended Programmatic Agreement among the Federal Highway Administration, the Texas Department of Transportation, the Texas State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the Implementation of Transportation Undertakings (PA-TU), as well as the Memorandum of Understanding (MOU) between the Texas Historical Commission and TxDOT.

This project also falls under the purview of the Texas Antiquities Code (TAC), because it may involve lands owned or controlled by the State of Texas or any city, county, or local municipality thereof. As the project would involve state purchase of right-of-way, or lands belonging to local municipalities and counties, under jurisdiction of the Texas Antiquities Code, historic properties will also be considered under provisions of the Memorandum of Understanding (MOU) between the SHPO and TxDOT. The TAC allows for all such properties to be considered as State Archeological Landmarks (SALs) and requires that each be examined in terms of possible “significance”. Significance standards for the code are clearly outlined under Chapter 26 of the Texas Historical Commission (THC)’s Rules of Practice and Procedure for the TAC and closely follow those of the U.S. Secretary of Interior’s Standards and guidelines.

1. Archeology

A TxDOT archeologist evaluated the potential for the proposed undertaking to affect archeological historic properties (36 CFR 800.16(l)) or State Archeological Landmarks (13 TAC 26.12) in the area of potential effects (APE). Although the total APE for this project is 192 acres, three previous archeological investigations and initial assessments of land use, topography, and soils within the overall APE significantly reduced the APE covered in this survey. Therefore, the APE for this survey comprises the existing right-of-way (ROW) within the project limits and approximately 34 acres of additional right-of-way. The APE extends to a maximum depth of 10 feet below the modern ground surface. Section 106 review and consultation proceeded in accordance with the First Amended Programmatic Agreement among the Federal Highway Administration, the Texas Department of Transportation, the Texas State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the Implementation of Transportation Undertakings (PA-TU), as well as the Memorandum of Understanding (MOU) between the Texas Historical Commission and TxDOT. The following documentation presents TxDOTs findings and explains the basis for those findings.

An intensive archeological survey of the APE was conducted by TxDOT archeologists in February 2008. This survey revealed no archeological deposits or historic properties within the proposed undertaking’s APE. A review of the Texas Archeological Sites Atlas revealed that only one site (41TR214) has been recorded within one kilometer of the current survey area. The Hackberry House Site (41TR214) is a mid-twentieth century farmstead consisting of a historic house, well pad, and water tank built between 1953 and 1959. This site was recorded in April 2007 by AR Consultants in conjunction with a survey conducted for the FAA. This site is approximately 500m north of the APE for the proposed project on the other side of Cottonwood Branch. ARC concluded that this site was not eligible for inclusion in the National Register of Historic Places (NRHP) or as a State Archeological Landmark (SAL) and that no further investigation was warranted. A previous survey conducted by Geomarine (GMI) in January 2001 approximately 4 km east of the current survey area identified and recorded several early-twentieth century farmsteads (41TR176, 41TR177, 41TR179, 41TR180, 41TR181, and 41TR214). However, none of these sites were recommended for inclusion

The results of this investigation indicate that virtually the entire project is located in an upland (erosional) setting and/or adjacent to heavily urbanized (developed) areas which were previously under intensive cultivation for approximately 100 years. Thus, the potential for buried intact cultural deposits to occur within the APE is low. Moreover, subsurface excavations (backhoe trenching) confined to portions of the APE where intact cultural deposits were most likely to occur (i.e. adjacent to, or on, floodplains or bottomlands [depositional settings] containing buried intact alluvial sediments) and in areas that were not covered by previous surveys failed to identify any cultural deposits and/or archeological historic properties.

TxDOT completed its review on 2/13/08. Section 106 consultation with federally recognized Native American tribes with a demonstrated historic interest in the area was initiated on 1/8/08. No objections or expressions of concern were received within the comment period.

Pursuant to Stipulation VI of the PA-TU, TxDOT finds that the APE does not contain archeological historic properties (36 CFR 800.16(l)), and thus the proposed undertaking would not affect archeological historic properties. The project does not merit further field investigations. Project planning can also proceed, in compliance with 13 TAC 26.20(2) and 43 TAC 2.24(f)(1)(C) of the MOU. If unanticipated archeological deposits are encountered during construction, work in the immediate area will cease, and TxDOT archeological staff will be contacted to initiate post-review discovery procedures under the provisions of the PA and MOU.

2. Standing Structures

A review of the National Register of Historic Places (NRHP), the list of State Archeological Landmarks (SAL), and the list of Recorded Texas Historic Landmarks (RTHL) indicated that no historically significant resources have been previously documented within the area of potential effects (APE). It has been determined through consultation with the State Historic Preservation Officer (SHPO) that the APE for the proposed project is 150 feet from the project right-of-way (ROW) for existing alignment and 300 feet from the project ROW for new alignment. A site visit revealed that there are three historic-age resources (built prior to 1964), located within the project area of potential effects. TxDOT determined that none of the historic-age resources are NRHP eligible. There is one Official Texas Historical Marker commemorating the *Thomas Easter Cemetery* in the APE. The marker would not need relocation for the project as proposed and would not be affected during construction of the project.

Pursuant to Stipulation VI *Undertakings with Potential to Cause Effects* of the First Amended Statewide Programmatic Agreement for Transportation Undertakings (PA-TU) between the Federal Highway Administration (FHWA), the Texas State Historic Preservation Officer (SHPO), the Advisory Council on Historic Preservation, and the Texas Department of Transportation (TxDOT) and the Memorandum of Understanding (MOU), ENV historians determined that none of the historic-age resources are eligible for listing in the National Register of Historic Places. Since the properties are not NRHP eligible, the project would have no effects to historic properties and individual project coordination with SHPO is not required.

J. SECTION 4(F) PROPERTIES

The proposed project would not require the use of any publicly owned land from a public park, recreation area, wildlife/waterfowl refuge or any historic sites of national, state or local significance.

Bear Creek Park Trail, a hike-and-bike trail owned by the City of Grapevine, consists of 1.25 miles of a 10-foot concrete trail connecting Bear Creek Park, east of SH 121, and Wall-Farrar Park, west of SH 121. The trail runs alongside the southern right-of-way of SH 360 immediately east of SH 121 near the project corridor's southeast terminus, loops through the SH 360/SH 121 interchange, then runs northerly along the western edge of SH 121. At this location, the trail is located partially on two acres of City-owned property and partially within the existing right-of-way of SH 121 and SH 360. The trail was funded by federal transportation funds and the City entered into an agreement with the State for use of the TxDOT right-of-way. The trail was a joint development and the proposed project will not result in a use. The preliminary design for proposed transportation improvements in this area shows no additional right-of-way would be required. The Bear Creek Park Trail would remain within TxDOT right-of-way and its location with respect to the adjacent highways would remain unchanged. An existing sidewalk would be extended along the southbound SH 121 frontage road to provide safe access to the trail.

Another City of Grapevine trail is located just west of FM 2499 along Denton Creek. The trail would not be affected by the proposed improvement to FM 2499. There will be no use of the trail as a result of the proposed project. The City plans to some day extend the trail eastward along the creek as it crosses under the FM 2499 bridge at this location. The City of Grapevine is interested in coordinating with TxDOT during the design phase for opportunities to enhance trail safety through the SH 360 and SH 121 interchange and to arrange adequate horizontal and vertical clearances for the proposed trail extension at the FM 2499 crossing of Denton Creek (personal communication, Joe Moore, June and September 2006).

VI. INDIRECT AND CUMULATIVE IMPACTS

A. INDIRECT IMPACTS

Federal law defines indirect effects as effects "which are caused by the 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).

Principal guidance for this section issues from Council on Environmental Quality (CEQ) regulations and the 2002 National Cooperative Highway Research Program Report entitled: NCHRP Report 466: Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects hereafter referred to as NCHRP 466 and cited as (NCHRP, 2002). The following eight-step process issues from NCHRP 466 and provides a method to assess the potential indirect impacts of transportation projects:

1. Initial scoping for indirect effects analysis
2. Identify study area directions and goals
3. Inventory notable features
4. Identify impact-causing activities
5. Identify potentially significant effects for analysis
6. Analyze indirect effects
7. Evaluate analysis results
8. Assess the consequences and develop appropriate mitigation and enhancement strategies

Step 1 – Initial scoping for indirect effects analysis

The initial scoping step of the indirect effects analysis considers the following questions:

a. Does the project purpose and need have an explicit economic development purpose?
b. Would the project conflict with local plans?
c. Is the project planned to serve specific land development?
d. Is the project likely to stimulate land development having complementary functions?
e. Is the project likely to influence intraregional land development location decisions?
f. Are notable features present in the impact area?
g. Are notable features significantly impacted?

An affirmative answer to questions a) through e) requires a detailed analysis of induced growth effects, while an affirmative answer to questions f) and g) calls for a detailed analysis of encroachment-alteration effects. The discussion below addresses each of these questions.

a. Explicit economic development purpose

The proposed project includes an economic development objective: to maintain and enhance accessibility to commercial centers, employment sites and other activity areas. The purpose of the project is to improve mobility and access within the rapidly developing SH 114/SH 121 corridor.

b. Conflict with local plans

The proposed improvements are consistent with plans and actions of the cities of Grapevine and Southlake. The proposed improvements are included in NCTCOG's Mobility 2030 MTP and TxDOT's Statewide Transportation Improvement Program (STIP). It is considered one of four priority projects in Tarrant County.

c. Planned to serve specific land development

The proposed project is not planned to serve specific development. The proposed project involves widening segments of existing roadways to improve safety and relieve congestion.

d. Likely to stimulate land development

The proposed project is likely to stimulate some land development having complementary functions (highway-oriented businesses such as gas stations, restaurants and hotels) as well as other industrial and retail development. While the majority of the proposed project would not provide new access to areas that do not have access already, the proposed new southbound frontage road along SH 121 from Bass Pro Drive to Texan Trail would provide new access to existing DFW Airport property. According to the DFW Airport Master Plan (1997), "based on real estate analyses and econometric studies, strong demand exists for retail, office and industrial developments on existing airport property." The DFW Commercial Land Use Plan (2007) indicates a variety of potential land uses at this location, including hotel, entertainment, local retail, big box retail, garden office, restaurant, warehouse, distribution, technology, light assembly, and open space.

e. Likely to influence land development location decisions

The proposed project is likely to have a small influence on intraregional land development location decisions. While an effect on overall travel patterns would be unlikely, a more obvious effect upon safety and travel time through the corridor could be expected. Transportation improvements often reduce the time-cost of travel, enhancing the attractiveness of surrounding land to developers and consumers. In accordance with the proposed action's need and purpose, the proposed action would affect the time-cost of travel by relieving congestion. As such, the project could influence intraregional land development decisions by offering a more efficient time-cost of travel through the corridor.

f. Presence of notable features

Notable features within the study area include riparian vegetation, water bodies, floodplains, air quality, and community. These were identified as notable features based primarily upon regulatory guidance and constraints mapping.

g. Notable features significantly impacted?

Sections V.A through J of this report discuss the potential direct effects of the proposed improvements upon all social-economic or natural resources in the study area, with detailed consideration of potential consequences upon notable features including riparian vegetation, water bodies, floodplains, air quality and community. None of the notable features are significantly impacted by direct effects of the proposed project.

Step 2 – Identify study area directions and goals

An "area of influence" (AOI) was delineated for the indirect effects analysis. The NCHRP 466 (2002) states "if the conditions for development are generally favorable in a region, that is, the region is undergoing urbanization, highway and transit projects can become one of the major factors that influence where development will occur," and that development effects are most often found up to one mile around a freeway interchange, and up to two to five miles along major feeder roadways. The report goes on to say, however, that the influence of highway projects "diminishes with successive improvements because each new improvement brings a successively smaller increase in accessibility." Thus, the two- to five-mile boundary serves as a guideline, and individual projects are analyzed case-by-case.

Based on a review of the project corridor, it was determined that a one-mile radius around the DFW Connector was appropriate for the assessment of indirect impacts. This is the distance that was considered reasonable to expect any induced development, and thus further indirect effects to other resources, that could be attributed to the proposed project. The one-mile radius encompasses DFW International Airport's vacant land, which is considered the most likely area to experience induced land development (see **Appendix D**, **Plates C and D**). Beyond one mile, travel patterns and access are less likely to be influenced by the proposed project due to the long-standing presence of the DFW Connector and the existence of a well-developed, system-wide transportation network within a heavily urbanized, metropolitan setting. The pattern and location of growth within Grapevine, Southlake and surrounding communities has largely already been determined by other transportation facilities, including DFW International Airport.

The DFW Connector has served as a major transportation corridor for nearly 70 years. Built originally as SH 114 in 1939, the corridor has developed over the years with land uses such as retail, commercial, industrial and residential. The future land use plans for the Cities of Grapevine, Southlake and DFW International Airport depict continuation of current land use patterns and, especially on airport property, an increasing proportion of commercial land use. The NCHRP 466 (2002) suggests that transportation investments result in major land use changes only in the presence of other factors. These typically include supportive local land use policies, local development incentives, availability of developable land, and a good investment climate. Land within the AOI in Grapevine is currently zoned for commercial/retail, industrial and residential use. The City of Southlake's future land use along the project corridor calls for regional retail, office, commercial, and mixed use. DFW International Airport's Ultimate Airport Land Use Plan (1997 Airport Development Plan) includes office, industrial and retail uses on currently vacant airport-owned land along the corridor. DFW International Airport is currently preparing an update to their future land use plan, which is expected to add residential and mixed-use projects.

Step 3 – Inventory notable features

As discussed above in Step 1, through constraints mapping performed at the inception of the project, coordination with resource agencies, input from the public at public meetings, and information from **Section V.A** through **J**, five notable features have been identified: riparian vegetation, water bodies, floodplains, air quality, and community. Direct and indirect impacts to all resources are summarized in **Table 6.3**.

a. <u>Riparian vegetation</u> - Riparian woodlands occur along Big Bear Creek, Jones Branch, Farris Branch, Morehead Branch, Grapevine Creek, Cottonwood Branch, Denton Creek, and their associated tributaries and floodplains within the AOI. Riparian woodlands occurring outside of the project area, but within the AOI, are similar in type and composition to those within the project area (see **Appendix D, Plates F through J**).
b. <u>Water bodies</u> - Jurisdictional waters of the U.S. occur within the AOI, including Big Bear Creek, Jones Branch, Farris Branch, Morehead Branch, Grapevine Creek, Cottonwood Branch, Denton Creek, and their associated tributaries (see **Appendix D, Plates F through J**). In addition, a wetland mitigation bank is located along Cottonwood Branch, adjacent to the project area.
c. <u>Floodplains</u> – Floodplains within the AOI occur primarily in conjunction with streams and tributaries (see **Appendix D, Plates F through J**).
d. <u>Air quality</u> – The AOI occurs in a nonattainment area for the eight-hour standard for the pollutant ozone.
e. <u>Community</u> – The AOI includes densely developed commercial, retail, and residential areas within the cities of Grapevine, Southlake, Coppell, Irving and Colleyville, featuring numerous schools, places of worship, parks and recreational facilities (see **Appendix D, Plates A through E**).

Step 4 – Identify impact-causing activities

Understanding the project design features, the activities the project would entail that could affect notable features and the range of impacts that may be caused is the first step toward identifying encroachment/alteration effects. In some ways, this step essentially "deconstructs" the overall project into its component actions. The Project Impact-causing Activities Checklist provided in NCHRP 466 (2002) was used to identify component actions/activities that the project will entail. There are 10 general categories of project impact-causing activities. Each is reviewed below along with example actions, and DFW Connector project-specific actions that fit into each category.

Modification of Regime – includes alteration of habitat, flora, hydrology and other features. Ground cover within the DFW Connector right-of-way would be removed as necessary for construction. Surface drainage would be altered due to roadway widening and construction within the right-of-way. Structural water quality treatment devices would be located at the road's primary runoff points. Noise and vibration would result from construction equipment trenching, excavation, backfilling, grading, and pavement laying activities. This category and several others below, involve exposure of erodible materials to surface runoff.

Land Transformation and Construction – includes construction elements, methods, ancillary elements (such as utilities), barriers, and drainage feature modifications. An existing transportation facility would be expanded, which would necessitate cut and fill activities throughout the project limits. Erosion Control devices would be implemented and maintained until construction is complete. Sedimentation Control devices would be maintained and remain in place until completion of the project. Post-Construction TSS Control devices would be implemented upon completion of the project.

Resource Extraction - excavation and dredging. Surface and subsurface excavation would be performed throughout the project limits, primarily along the edges of the existing road as it is widened.

Processing - storage of supplies. Temporary storage facilities are usually required during the construction. Stored materials typically include aggregate, concrete sewer pipes, traffic control barricades, steel rebar, road signs, etc. These are commonly co-located with temporary construction office trailers. These are equipped with temporary utility service including some means of sanitary waste disposal. These are commonly located in the TxDOT right-of-way in the project limits.

Land Alteration - landscaping, erosion control. These would be among the soil disturbing activities that would occur throughout the project right-of-way with the same risks discussed under previous categories related to Modification of Regime and Land Transformation and Construction.

Resource Renewal - remediation, reforestation. The project would not involve these activities, although disturbed soils would be reseeded or sodded.

Changes in Traffic (including adjoining facilities) - traffic patterns on project and adjoining facilities. Automobile and truck traffic would temporarily be disrupted during the construction phase. The project would not require any detours off of the existing route.

However, potential delays during construction may prompt some travelers to find alternate routes until construction is complete.

Waste Emplacement and Treatment - landfill, waste discharge. The project would generally not involve these activities.

Chemical Treatment - fertilization, deicing. When used, fertilizers are only used during the re-vegetative phase of TxDOT construction, but the use of fertilizers in the right-of-way is then discontinued. TxDOT principally uses inert sand materials for ice control, and these are only applied on bridges and culverts.

Access Alteration - changes in access, circulation patterns, travel times to major attractors. The project is intended to reduce congestion and support the overall goals of improved safety and traffic operations. The changes would be minor in comparison to the access changes associated with a new location roadway; however, improved traffic flow could increase the attractiveness of the area for development.

Step 5 - Identify potentially significant indirect effects for analysis

Table 6.1 compares the list of project impact-causing activities from Step 4 to the notable features to explore potential cause and effect relationships and establish which effects are potentially significant and merit subsequent detailed analysis (or conversely, which effects are not potentially significant and require no further assessment).

Table 6.1 Impact Evaluation for Notable Features

Impact Causing Activity	Notable Features				
	Riparian Vegetation	Water Bodies	Floodplains	Air Quality	Community
Modification of Regime	Direct effect	Increased erosion and sedimentation; pollutant runoff from construction equipment	None	None	None
Land Transformation and Construction	Direct effect	Increased erosion and sedimentation; pollutant runoff from construction equipment	None	Dry, windy weather could create dust problems in the vicinity of construction activities.	None
Resource Extraction	Direct effect	Increased erosion and sedimentation; pollutant runoff from construction equipment	None	None	None
Processing	None	None	None	None	None
Land Alteration	Direct effect	Increased erosion and sedimentation; pollutant runoff from construction equipment	None	None	None
Resource Renewal	Planted vegetation would likely differ from original vegetation.	Re-vegetation and BMPs would reduce erosion, sedimentation, and pollutant runoff.	None	None	None

Table 6.1 Impact Evaluation for Notable Features (cont'd.)

Impact Causing Activity	Notable Features				
	Riparian Vegetation	Water Bodies	Floodplains	Air Quality	Community
Changes in Traffic	None	None	None	Construction may divert traffic to neighborhood roads, increasing air pollutants in residential areas. Traffic delays during construction could lead to more cars idling and producing greater emissions.	Construction may divert traffic to neighborhood roads, reducing safety and increasing congestion.
Waste Emplacement and Treatment	None	None	None	None	None
Chemical Treatment	May be positively or negatively impacted.	Increased pollutant runoff.	None	None	None
Access Alteration	Induced development could further reduce riparian vegetation.	Induced development could increase impervious cover and pollutant runoff.	None	Induced development could result in more air pollutants from both mobile and non-mobile sources. The project is included in the MTP and the TIP. The MTP and TIP conform to the SIP; CO not expected to exceed NAAQS. Total MSATs as in relation to the project are not expected to increase in the future years investigated.	Induced development could create more traffic, reducing safety and increasing congestion.

Step 6 - Analyze Indirect Effects

Potential indirect effects (both encroachment/alteration and induced development effects) to the notable features are discussed below.

Some induced land development is expected as the proposed project would create new access along a new SH 121 southbound frontage road. Without the proposed project, land development in this area would not be as feasible due to limited access points. Land uses adjacent to the DFW Connector would likely remain primarily commercial (see **Section III.B. Anticipated Land Use**). Greater land use densities may be possible with the improved transportation facilities, but would be subject to local zoning regulations.

The AOI for induced land development exhibits a persistent growth trend despite ever-worsening travel delays along the DFW Connector. The travel time-cost improvement expected to result from the proposed project could be viewed by prospective land developers as an additional incentive, since the decision to locate/develop in this area appears to be influenced by other factors favorable to growth.

Riparian Vegetation

Planted vegetation after construction would likely be different from original vegetation. Any fertilizer or other chemical use may negatively or positively impact surrounding vegetation. Any induced development would further reduce vegetation and would further fragment habitat.

Water Bodies

Land modification and construction activities would expose soil and increase erosion and sedimentation. Pollutant runoff may occur from construction equipment in the short term, while increased capacity roadways may increase pollutant runoff in the long term. Induced development may increase impervious cover in the AOI, with similar effects.

Floodplains

No indirect effects to floodplains would occur as a result of the proposed improvements. Induced land development within the AOI would be subject to local floodplain regulations or ordinances.

Air Quality

Increased traffic on the DFW Connector and adjacent roadways in the AOI may increase ambient air pollution; improved mobility, however, may reduce vehicle emissions. Induced development may generate more traffic and reduce local vegetation, which would have a negative impact on air quality in the region. Induced development may also generate additional air emissions (e.g., area sources such as dry cleaners or bakeries).

Community

Minimal property value and tax base impacts are anticipated because the displaced businesses are anticipated to be able to relocate nearby. The proposed improvements may increase the value of adjacent commercial property (ten Siethoff and Kockelman, 2002). One potential effect of higher property valuations would be an increase in the property tax base of local taxing jurisdictions.

During construction, some traffic may divert to neighborhood roads, increasing traffic in residential areas. While the proposed project may bring the roadway closer to existing facilities such as schools, day cares, and parks, the proposed extended and improved sidewalks and ADA-accessible facilities at crosswalks may improve access to Bear Creek Park Hike and Bike Trail as well as nearby facilities for pedestrians, making it safer especially for children and disabled persons.

Step 7 – Evaluate Analysis Results

The potential indirect effects of the proposed project on notable features in the AOI summarized in **Table 6.1** indicate potential encroachment/alteration impacts to water quality and induced land development impacts to all the notable features except floodplains. The quality of water bodies within the AOI for induced land development would be subject to increased erosion and sedimentation and pollutant runoff from construction activities. In addition, induced land development may further reduce riparian vegetation, increase impervious cover and pollutant runoff, create traffic conflicts and increase air emissions.

Water quality impacts are regulated by the TCEQ, which requires certain actions to minimize soil erosion and sedimentation (discussed in Step 8), impacts to water resources are regulated by the USACE, and local jurisdictions hold responsibility for regulating land use. As noted previously, induced land development as a result of this project is anticipated to occur within the area along the southbound frontage road of SH 121 where new access would be created. As discussed in Step 1 (g), none of the indirect effects of the proposed project would be significant.

Step 8 - Assess the consequences and develop appropriate mitigation and enhancement strategies

State and local regulations are already in place to minimize indirect and cumulative effects, particularly for water quality. Impacts to water quality would be minimized by implementing storm water BMPs to control the discharge of pollutants as required by the CWA and federal and state storm water regulations. These measures include compliance with Section 401 and Section 404 permit requirements, TPDES requirements, and the preparation and implementation of a Storm Water Pollution Prevention Plan (see **Section V.E.6**).

Any land development projects within the Cities of Grapevine and Southlake would be subject to zoning codes and development regulations. It appears that due to project design and existing regulations, indirect effects of the proposed project would be minimized.

Indirect Effects of Regional Toll and Managed/HOV System

The current regional network for roadways, priced facilities (i.e., toll, HOV/managed), and passenger rail is expected to increase by 2030. **Figures 1 through 3 (Appendix J)** obtained from the 2030 MTP show the proposed roadway, priced facilities, and passenger rail for the region in 2030. For the roadway system, the 2007 transportation network for DFW (calculated in mainlane lane-miles) consist of 4,397 lane-miles. Of the total system, 434 of the lane-miles are tolled (approximately 11 percent). The anticipated 2030 transportation network for DFW would consist of approximately 8,569 mainlane lane-miles, which 30 percent (approximately 2,542 lane-miles) are tolled. **Table 6.2** lists the priced facilities included in the 2030 MTP and when they are expected to be open to traffic. These projects include the construction of new location toll roads, the addition of managed HOV lanes, and the expansion of existing toll facilities. **Figures 4 through 6 (Appendix J)** show the priced facility system listed in **Table 6.2** for the projected years of 2015, 2025, and 2030.

Table 6.2 Future Toll Road and Managed HOV lane Projects

Roadway	Location	Responsible Agency	Work Planned
Open to Traffic by 2015			
Dallas North Tollway	Parker Road to Royal Lane	NTTA	Expand existing toll road
IH 30 – Dallas County	SH 161 to IH 35E	TxDOT-Dallas	Add managed HOV lanes
IH 30 – Tarrant County	Cooper Street to Ballpark Way	TxDOT-Fort Worth	Add managed HOV lanes
IH 35E	IH 635 to Loop 12	TxDOT-Dallas	Add managed HOV lanes
IH 35E – "Northern Link"	FM 407 to PGBT	TxDOT-Dallas	Add managed HOV lanes
IH 35W	SH 170 to IH 30	TxDOT-Fort Worth	Add managed HOV lanes
IH 635	Luna Road to US 75	TxDOT-Dallas	Add managed HOV lanes
IH 820	SH 121/SH 183 to SH 121/SH 10	TxDOT-Fort Worth	Add managed HOV lanes
Loop 9	US 287/Outer Loop to IH 20/SH 190	TxDOT-Dallas	New toll road
Loop 12	IH 35E to SH 183	TxDOT-Dallas	Add managed HOV lanes
President George Bush Turnpike	IH 35E to SH 78	NTTA	Expand existing toll road
President George Bush Turnpike (Eastern Extension)	SH 78 to IH 30	NTTA	New toll road
SH 114	SH 121 (West) to International Parkway	TxDOT-Fort Worth	Add managed HOV lanes
SH 121	IH 820 to Minnis Road	TxDOT-Fort Worth	Add managed HOV lanes
SH 121	SH 183 to IH 820	TxDOT-Fort Worth	Add managed HOV lanes
SH 121	IH 30 to US 67	NTTA	New toll road
SH 121 – Collin County	US 75 to Hillcrest Road	TxDOT-Dallas	New toll road
SH 161	SH 183 to IH 20	TxDOT-Dallas	New toll road
SH 161/SH 360 Toll Connector	SH 161 to Sublett Road (SH 360)	TxDOT-Dallas & TxDOT-Fort Worth	New toll road
SH 170	SH 114 to US 81/US 287	NTTA	New toll road
SH 183	SH 121 to SH 161	TxDOT-Fort Worth	Add managed HOV lanes
SH 360 (toll road)	Sublett Road to US 287	NTTA	New toll road
Trinity Parkway	IH 35E to IH 45/US 175	NTTA	New toll road
US 75 – Collin/Dallas County	SH 121 (South) to Exchange Parkway	TxDOT-Dallas	Add managed HOV lanes
US 75 – North Collin County	SH 121 (North) to SH 121 (South)	TxDOT-Dallas	Add managed HOV lanes
Open to Traffic by 2025			
Dallas North Tollway	FM 121 to US 380	NTTA	New toll road
IH 20/US 287	IH 820 to Sublett Road (US 287)	TxDOT-Fort Worth	Add managed HOV lanes
IH 30	IH 35E to Bobtown Road	TxDOT-Dallas	Add managed HOV lanes
IH 30 – Tarrant County	IH 820 to Cooper Street	TxDOT-Fort Worth	Add managed HOV lanes
IH 30 – Tarrant County	Ballpark Way to SH 161	TxDOT-Fort Worth	Add managed HOV lanes
IH 35	Outer Loop (FM 156) to IH 35E/IH 35W	TxDOT-Dallas	Add managed HOV lanes
IH 35E	SH 183 to IH 20	TxDOT-Dallas	Add managed HOV lanes

Table 6.2 Future Toll Road and Managed HOV lane Projects (cont'd.)

Roadway	Location	Responsible Agency	Work Planned
Open to Traffic by 2025			
IH 35E "Northern Link"	FM 2181 to FM 407	TxDOT-Dallas	Add managed HOV lanes
IH 35E "Northern Link"	PGBT to IH 635	TxDOT-Dallas	Add managed HOV lanes
IH 35W	IH 35/IH 35E to SH 170	TxDOT-Dallas	Add managed HOV lanes
IH 635	US 75 to IH 30	TxDOT-Dallas	Add managed HOV lanes
IH 820/US 287	US 287 to IH 820 (US 287)	TxDOT-Fort Worth	Add managed HOV lanes
Loop 12	SH 183 to Spur 408	TxDOT-Dallas	Add managed HOV lanes
Outer Loop (Eastern Subregion)	IH 20/Loop 9 to IH 30	TxDOT-Dallas	New toll road
Outer Loop (Eastern Subregion)	US 75 to IH 35	TxDOT-Dallas	New toll road
President George Bush Turnpike	Belt Line Road to IH 635	NTTA	Expand existing toll road
SH 114 – Dallas County	SH 121 to SH 183	TxDOT-Dallas	Add managed HOV lanes
SH 170	SH 199/Outer Loop to US 67	NTTA	New toll road
SH 183	SH 161 to IH 35E	TxDOT-Dallas	Add managed HOV lanes
SH 190	IH 30/PGBT to IH 20/Loop 9	NTTA	New toll road
SH 360	Outer Loop to FM 2258	TxDOT-Dallas	New toll road
SH 360 (toll road)	US 287 to Outer Loop/Loop 9	NTTA	New toll road
US 67	IH 35E to FM 1382	TxDOT-Dallas	Add managed HOV lanes
US 67 – Dallas/Ellis County	FM 1382 to Loop 9	TxDOT-Dallas	Add managed HOV lanes
US 80	IH 30 to Belt Line Road	TxDOT-Dallas	Add managed HOV lanes
Open to Traffic by 2030			
IH 635	US 80 to IH 20	TxDOT-Dallas	Add managed HOV lanes
Outer Loop (Eastern Subregion)	IH 30 to US 75	TxDOT-Dallas	New toll road
Outer Loop (Western Subregion)	SH 199 to US 287/Loop 9	TxDOT-Fort Worth	New toll road

The expanding roadway network, including priced facilities, would cause indirect and/or cumulative impacts to the region. Because of the regional nature of these impacts, the proposed impacts would be better discussed at the regional level. The discussion of the expansion of the priced facility component of the system is discussed in the cumulative impacts section.

B. 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 effects can result from individually minor but collectively significant actions taking place over a period of time" (NEPA, Section 1508.7).

While direct and indirect effects are discussed in terms of the impact the proposed project has on specific resources, cumulative effects are analyzed in terms of what the effect means from the perspective of the specific resource being affected. The goal is to determine whether the proposed action's direct and indirect effects, in combination with other past, present, and reasonably foreseeable future actions, would result in substantial degradation of the resource.

This section discusses the resources analyzed for cumulative effects according to TxDOT's eight-step process (TxDOT, 2006). These steps include:

1. Identify the resources to consider in the analysis
2. Define the study area for each affected resource
3. Describe the current health and historical context for each resource
4. Identify direct and indirect impacts of the Proposed Action
5. Identify other reasonably foreseeable future actions that may affect resources
6. Assess potential cumulative effects to each resource
7. Report the results
8. Assess and discuss mitigation issues for all adverse impacts

Step 1 – Identify the resources to consider in the analysis

This cumulative effects analysis focuses on: "(1) the resources substantially impacted by the project, and (2) the resources currently in poor or declining health or at risk, even if the project impacts are relatively small" (TxDOT, 2006). **Table 6.3** summarizes the direct and indirect effects for each resource discussed above and whether that resource was further analyzed in a cumulative effects analysis. Cumulative effects of the regional toll and managed/HOV system are presented separately at the end of this section.

Table 6.3 Resources Analyzed for Cumulative Effects

Resource	Direct Impacts	Indirect Impacts	Analyzed for Cumulative Effects?	Reason for Not Including in Analysis
Riparian Vegetation	Approximately 4.5 acres of riparian woodland vegetation potentially impacted by the proposed project.	Induced land development within the AOI, particularly within DFW International Airport's undeveloped tracts, may result in the loss of additional riparian woodlands. However, the DFW Commercial Land Use Plan (2007) designates the Cottonwood Branch riparian area for open space.	No.	Minor direct and indirect impacts anticipated.
Water Bodies	Minor impacts at 11 of 12 jurisdictional waters.	Increased impervious cover increases flow of stormwater, erosion, sedimentation, and reduces water quality. Induced development may increase impervious cover in the AOI.	Yes	N/A

Table 6.3 Resources Analyzed for Cumulative Effects (cont'd.)				
Resource	**Direct Impacts**	**Indirect Impacts**	**Analyzed for Cumulative Effects?**	**Reason for Not Including in Analysis**
Floodplains	53 acres of floodplain occur within the project's existing and proposed right-of-way. Facility would permit conveyance of 100-year flood levels without causing significant damage to the highway, stream or other property. Proposed project would not increase the base flood elevation to a level that would violate applicable floodplain regulations.	No indirect effects to floodplains would occur as a result of the proposed improvements. Any impacts due to induced land development within the AOI would be subject to local floodplain regulations or ordinances.	No	Minimal direct and indirect impacts anticipated.
Air Quality	Project included in the MTP and TIP. MTP and TIP conform to the SIP; CO not expected to exceed NAAQS. MSATs as in relation to this SH 114/121 project are not expected to increase overall air toxics in the Dallas/Fort Worth area in the future years investigated.	Reduced congestion may improve air quality; increased capacity may lead to increased vehicle miles traveled, while any induced development could reduce vegetation and generate traffic and other air emission sources; both may reduce air quality.	Yes	N/A
Community	Short-term positive economic impact to construction sector; displacement of 16 businesses and parking affected at 22 businesses; access modified by improvements to ramps and cross streets; improved pedestrian access and ADA-accessible facilities; noise impacts at 2 of 14 modeled receivers.	Minimal property value and tax base impacts because displaced businesses anticipated to relocate nearby; improvements may increase value of adjacent commercial properties. Some induced development, most likely on vacant DFW International Airport land.	Yes	N/A

Step 2 – Define the resource study area for each resource

The geographic resource study area (RSA) for each resource is summarized in **Table 6.4**. The temporal RSA for each resource is 1970 to 2030. These dates were chosen because the Dallas-Fort Worth International Airport, the most notable land use feature in the vicinity of the proposed project, opened in the early 1970s; 2030 was chosen as the future boundary because it includes the City of Southlake's planning timeframe (2025) and coincides with NCTCOG's MTP timeframe.

Table 6.4 Resource Study Areas	
Resource	**RSA**
Water Bodies	Trinity River Basin
Air Quality, including MSATs	Dallas-Fort Worth Non-attainment Area (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall and Tarrant Counties)
Community	Cities of Grapevine and Southlake

Step 3 – Describe the current health and historical context for each resource

Water Bodies

According to the TCEQ Water Quality Inventory, water runoff from the vicinity of the proposed project flows to stream segments 825 and 826. Neither of these segments is classified as threatened or impaired on the 2004 or Draft 2006 Section 303(d) lists.

According to the Texas State Almanac (1995), interior wetlands which include bottomland hardwood forest, riparian vegetation, inland freshwater marshes, and the playa lakes of West Texas account for 80 percent of the total wetland acreage in Texas and the vast majority are located on private property. In the last 200 years, Texas has lost over 60 percent of these inland wetlands due to agriculture, timber production, reservoir construction and urban and industrial development. Within the RSA, development and urbanization have resulted in channelization, excavation, and filling of many of the area's natural streams and wetlands.

According to the USACE–Fort Worth District Office, a total of 770 projects were authorized in the upper Trinity River basin during the period from December 1, 1999 through September 1, 2002 (most recent available). Of these, 55 were individual permits and 570 were nationwide general permits. The nationwide permit authorizations resulted in 93.85 acres of impacts to waters of the U.S. However, 198.66 acres of compensatory mitigation was provided to offset these impacts.

Notably, during the years 2001 and 2002 a total of 1,427 acres of wetlands, waters, and riparian habitat were restored or protected through USFWS/USACE coordination on individual mitigation plans located within the area of jurisdiction administered by the USFWS–Texas Ecological Field Office in Arlington, Texas. The USFWS is also coordinating with the USACE to restore and/or protect an additional 2,669 acres of wetlands, waters, and riparian zones enabled in large part to the 2,185 acres in the Trinity River, Big Woods on the Trinity, and West Mineola "mitigation banks." These banks have been designed to restore and enhance forested and emergent wetlands, while providing compensation for a variety of adverse impacts to the aquatic environment resulting from rapidly expanding development in this region of Texas. Strategically located, the banks provide crucial habitat for a variety of migratory and resident wildlife species, such as neo-tropical songbirds, shorebirds, and waterfowl, as well as provide significant hydrological and water quality benefits. One such mitigation bank is located immediately adjacent to the project area, at the intersection of SH 121 and Bethel Road.

Air Quality

At ground-level, ozone is created by a chemical reaction between oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of sunlight. According to NCTCOG, in 2005, on-road vehicles contribute approximately 51 percent of NOx emissions and approximately 30 percent of VOC emissions in the non-attainment area (NCTCOG, 2005).

The DFW metropolitan area has historically experienced significant population growth and the trend is for that growth to continue. With population growth comes increased land development, an increase in vehicles, and an increase in daily vehicle miles traveled on the area's transportation systems. Traffic congestion on the transportation system has become one of the greatest challenges facing the DFW metropolitan area, and it is a primary contributor to the degradation of regional air quality.

Over the last several decades, multiple regional and local initiatives have been planned and implemented in an effort to reduce dispersion of pollutants into the air. Several of these initiatives specific to the area's transportation system included increased capacity highways and roadways (through construction of additional travel lanes and bottleneck improvements), Intelligent Transportation System (ITS) improvements, construction of HOV lanes, and the promoting of alternative transportation (e.g., hike and bike, bus, light rail).

The EPA establishes limits on atmospheric pollutant concentrations through enactment of the NAAQS for six principal "criteria" pollutants. The EPA designated nine counties in North Central Texas as "nonattainment" for the eight-hour ozone standard in accordance with the NAAQS. Additionally, as shown in **Table 5.12**, carbon monoxide (CO) was shown not to exceed the NAAQS standards for neither the one-hour standard nor the eight-hour standard. The analysis included a one hour background concentration of 2.8 ppm and an eight-hour background concentration of 1.8 ppm. The DFW region, which includes Dallas and Tarrant Counties, is currently in "attainment" for all criteria pollutants including CO with the exception of ozone.

Even though the number of daily exceedances of the federal standards for ozone has decreased within the past decade, the DFW region remains in "non-attainment" for ozone. Although there have been year-to-year fluctuations, the ozone trend continues to show improvement. The trend of improving air quality in the DFW region 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.

MSATs, especially benzene, have dropped dramatically since 1995, and are expected to continue dropping. The introduction of reformulated gasoline has lead to a substantial part of this improvement. In addition, Tier II automobiles introduced in model year 2004 will continue to help reduce MSATs. Diesel exhaust emissions have been falling since the early 1990s with the passage of the Clean Air Act Amendments (CAAA). The CAAA provided for improvement in diesel fuel through reductions in sulfur and other diesel fuel improvements.

In addition, the EPA has further reduced the sulfur level in diesel fuel, which took effect in 2006. The EPA also has called for dramatic reductions in NOx emissions, and PM from on-road and off-road diesel engines. MSATs as in relation to this SH 114/121 project are not expected to increase overall air toxics in the Dallas/Fort Worth area in the future years investigated.

Planned improvements to the region's transportation system (i.e., *Mobility 2030*) would not cause any cumulative impacts to air quality. Additional travel capacity to the roadway network would allow a greater flow of traffic throughout the region, decreasing the amount of cars traveling at lower speeds or idling conditions. This would result in less fuel combustion and lower emissions including MSATs, CO, and ozone. EPA's vehicle and fuel regulations, coupled with fleet turnover, are expected to result in substantial reductions of on-road emissions, including MSATs, CO and ozone precursors.

Community

The Dallas-Fort Worth International Airport opened in 1974 at the southeastern limits of Grapevine. In 1970, its population was 7,023; and in 1980, 11,801. By 1990 Grapevine had 29,202 residents. By 2000 the population reached 42,059. Grapevine Lake, a major recreational center, is nearby.

People moving from cities to the rural atmosphere of Southlake caused phenomenal growth in the 1980s and 1990s, when the population grew from 2,808 in 1980 to 7,065 in 1990. By 1990, six manufacturers in the community produced engines, concrete products, and food packaging. Southlake had become the third largest community in Tarrant County, after Fort Worth and Arlington. The population tripled in the 1990's, reaching 21,519 by 2000.

Both Grapevine and Southlake have fairly homogeneous populations composed primarily of White persons between the ages of 18 and 64 with a high educational attainment. Grapevine and Southlake have higher median household incomes and lower poverty rates than the DFW region as a whole. The City of Grapevine considers itself not only the geographic center of the DFW region, but also the hub for shopping, dining, sports, and wine tasting. According to the Southlake 2025 Plan (adopted in 2004), the city sees itself as a "desirable, attractive, safe, healthy, fiscally sound community with quality neighborhoods."

Table 2.2 summarized land uses in the Cities of Grapevine and Southlake. Approximately 41 percent of land in Grapevine is dedicated to infrastructure (primarily the DFW Airport). Residential use comprises approximately 14 percent, commercial land comprises almost three percent, and vacant land is almost 17 percent. In Southlake, residential uses comprise approximately 41 percent of land, commercial uses include three percent, and vacant land is about 34 percent. The DFW Connector is urbanized and developed with land uses such as retail, commercial, industrial, and residential, and there is a limited amount of land that is currently undeveloped or not already planned for development (see **Appendix**

D, Plates A-E). Given that the population in Grapevine and Southlake is predicted to grow 49 percent and 124 percent, respectively, from 2000 to 2030, the trend of converting available vacant and undeveloped land to urban uses is expected to continue.

Step 4 – Identify direct and indirect impacts of the proposed action

The potential direct effects are discussed in **Sections V.A through J**; indirect effects are analyzed in **Section VI.A.** above. Potential direct and indirect effects of the proposed project on each resource are summarized in **Table 6.3**.

Step 5 – Identify other reasonably foreseeable future actions that may affect the resources

Other Transportation Projects

Mobility 2030: The Metropolitan Transportation Plan for the Dallas-Fort Worth Area is the defining vision for transportation systems and services in the Dallas-Fort Worth Metropolitan Area. Serving as a guide for the expenditure of State and federal funds through the year 2030, the Plan addresses regional transportation needs that are identified through forecasting current and future travel demand, developing and evaluating system alternatives, and selecting those options which best meet the mobility needs of the region.

The Transportation Improvement Program (TIP) is a staged, multiyear program of projects proposed for funding by federal, State, and local sources within the Dallas-Fort Worth Metropolitan Area. This area includes Collin, Dallas, Denton, Rockwall and Tarrant Counties, as well as portions of Ellis, Johnson, Kaufman and Parker counties. The 2008-2011 TIP for the Fort Worth District lists three additional lane projects and three intersection improvement or congestion management projects in Grapevine. The TIP also lists two intersection improvement or congestion management projects in Southlake.

In addition to the DFW Connector, the following transportation improvement projects are included in NCTCOG's Mobility 2030 Plan. A detailed assessment of cumulative effects of the regional toll and managed/HOV system is included at the end of this section.

SH 114. The SH 114 Corridor in Dallas County extends from the SH 121/International Parkway interchange north of Dallas/Fort Worth International Airport to SH 183 in Irving). Between SH 121/International Parkway and Loop 12, the SH 114 corridor will be reconstructed to accommodate eight general purpose lanes (plus auxiliary lanes) and four concurrent HOV/Managed lanes. The corridor will also feature four continuous frontage road lanes (plus auxiliary lanes near ramp locations and cross-streets), except in the section between SH 121/International Parkway and Freeport Parkway. Two direct connector ramps will be built at the SH 114/President George Bush Turnpike (PGBT) interchange for the northbound-eastbound and westbound-southbound movements. The four concurrent HOV/Managed lanes will be built to transition directly into the HOV/Managed facility proposed for this SH 114/SH 121 project through Grapevine, and direct access is planned at the following locations: (1) SH 121/International Parkway, (2) Belt Line Road, (3) MacArthur Boulevard, (4) Spur 348 (Northwest Highway), and (5) the Loop 12 HOV/Managed facility (to/from the south). The short section of SH 114 between Loop 12 and SH 183 (adjacent to Texas Stadium) will be reconstructed for six general purpose lanes (plus auxiliary lanes), four concurrent HOV/Managed lanes, and four lanes of continuous frontage roads (plus auxiliary lanes near ramp locations and cross-streets). The 4 concurrent HOV/Managed lanes will be designed to merge directly into the proposed SH 183 HOV/Managed facility. To facilitate improved connections to/from SH 114, as well as provide access to/from the expanding Las Colinas Town Center and proposed rail stations along Dallas Area Rapid Transit's Orange Line (anticipated opening in 2012), a short section of Spur 348 will be upgraded in stages to a freeway facility. The roadway will have six general purpose lanes (plus auxiliary lanes) with grade separations at Las Colinas Boulevard, Riverside Drive (formerly O'Connor Boulevard), and Luna Road. Also, four frontage road lanes (plus auxiliary lanes near ramp locations and cross-streets) will be provided west of Riverside Drive. All improvements are expected to be completed by 2025. The Texas Department of Transportation – Dallas District is the responsible agency for this project.

SH 121. The SH 121 corridor in Denton County travels through the cities of Carrollton, Coppell, Frisco, Lewisville, Plano, and The Colony. Once planned as a freeway facility, the Collin and Denton County portions of the SH 121 corridor are now being developed through the Texas Department of Transportation's Comprehensive Development Agreement procurement process as a new toll road. This will greatly accelerate the construction of a new limited-access facility. Also, per an SH 121 Memorandum of Understanding adopted by the Regional Transportation Council, Denton County, and the cities along the SH 121 corridor in 2004, gas-tax funds originally assigned to building the corridor as freeway are now re-distributed to other important roadway projects for expedited construction, including IH 35E in Lewisville. This project extends from the west end of Business SH 121 in Lewisville to the Dallas North Tollway (DNT) in Plano and Frisco. The project will reconstruct SH 121 to accommodate six general purpose toll lanes (plus auxiliary lanes) and six frontage road lanes (plus auxiliary lanes near ramp locations and cross-streets). A major interchange with four flyover ramps was recently completed at IH 35E in Lewisville. The toll road will feature all-electronic toll collection with no additional right-of-way needed for cash/change booth lanes. The Texas Department of Transportation – Dallas District is the responsible agency for this project.

The SH 121 corridor in Collin County travels through several of the most rapidly developing communities in the State of Texas: Allen, Frisco, Plano, and McKinney. This project extends from the DNT in Plano and Frisco to US 75 in McKinney. The project will reconstruct SH 121 to accommodate six general purpose toll lanes (plus auxiliary lanes) and six frontage road lanes (plus auxiliary lanes near ramp locations and cross-streets). This project will also construct major interchanges at the DNT (with eight high-speed flyover ramps) and US 75 (with six high-speed flyover ramps), as well as a three-level interchange at SH 289 (Preston

Road) that will allow north-south SH 289 traffic to bypass traffic signals at the SH 121 frontage roads. The toll road will feature all-electronic toll collection with no additional right-of-way needed for cash/change booth lanes. The Texas Department of Transportation – Dallas District is the responsible agency for this project.

DFW Passenger Rail Service. The Fort Worth Transportation Authority (also known as The T) is developing plans for a rail line in the Southwest-to-Northeast Rail Corridor — sw2neRAIL — across Tarrant County. The proposed commuter route follows existing rail lines from Fort Worth's Granbury Road/South Hulen area, through downtown Fort Worth, northeast to downtown Grapevine and then into the north entrance of DFW Airport, a distance of approximately 26 miles. This proposed passenger rail line follows the old Cottonbelt right-of-way, and would include service to Grapevine as well as numerous other cities throughout the corridor. Rail passenger stations would be constructed in the vicinity of Main Street in Grapevine, on airport property between Grapevine and DFW Airport, and at DFW Terminal A/B. Grapevine recently approved a 3/8-cent increase in their local sales tax to fund rail service.

Dallas Area Rapid Transit (DART) is planning a 14-mile "Orange Line" as a key component of a regional rail expansion that will lead to the doubling of DART's rail network to more than 90 miles by 2013. The Orange Line will run parallel through Downtown Dallas to Bachman Station in Northwest Dallas. From Bachman Station, the Orange Line heads northwest to the Las Colinas Urban Center in 2011 and would enter DFW International Airport from the north in 2013.

Land Development

Retail, commercial, industrial and residential development can reasonably be expected to occur along and near the corridor in those areas that are currently vacant and undeveloped, including more than 2,300 acres of undeveloped land owned by DFW International Airport.

Step 6 – Assess potential cumulative effects to each resource

Cumulative impacts were evaluated using the following factors: the historical context of each resource, current condition and trend, future land use and zoning plans, and the pertinent regulations and standards associated with each resource. These factors capture the influences that have shaped and are shaping the amount and quality of each resource, and which would continue to shape the resources into the future. Implicit in the approach to predicting the future condition of resources are several key assumptions:

- All reasonably foreseeable actions would be completed as currently planned.
- The relationships between the resources, ecosystems, and human communities that have been identified from historical experience would continue into the future.

- The sponsors of government and private projects would abide by relevant federal, state, and local laws designed to protect each resource, and that regulatory agencies would perform their duties in accordance with legal requirements and internal guidelines.

- Of particular importance is the assumption concerning compliance with relevant environmental laws designed to ensure the sustainability of resources. Over the past several decades federal, state, and local lawmaking bodies have enacted statutes, regulations, and ordinances designed to preserve and enhance the abundance and quality of natural resources by requiring project sponsors to avoid, minimize, and mitigate the environmental impacts of their projects or actions. Cumulative impacts analysis focuses on the "net effects" on each resource that remain after full compliance with the regulatory requirements at all levels.

Step 7 – Report results

Water Bodies

As previously discussed, the proposed project's potential direct impacts to water quality would be minimized by implementing storm water BMPs to control the discharge of pollutants as required by the CWA and federal and state storm water regulations. These measures include compliance with Section 401 and Section 404 permit requirements, TPDES requirements, and the preparation and implementation of a Storm Water Pollution Prevention Plan.

Similarly, the cumulative impact of reasonably foreseeable private development projects to water quality would be minimized by enforcement of applicable federal and state storm water regulations as required by the CWA. These include EPA/TCEQ regulation of large-scale construction activities under the TPDES permit program. TCEQ provides water quality certification under Section 401 of the CWA, which is mandatory for all projects requiring Section 404 permits.

The proposed project would have minimal direct impacts to waters of the U.S., including wetlands. Water quality trends in the RSA would be expected to continue to decline since the area is developing. For the reasonably foreseeable transportation and private development projects within the RSA, information was either unavailable or not yet prepared with regard to waters of the U.S. The cumulative impact of reasonably foreseeable future actions to waters of the U.S. would be minimized by enforcement of applicable USACE, USFWS, TPWD, and USCG regulations for projects subject to state and federal jurisdiction. Assuming appropriate implementation of regulation control strategies and policies, future potential impacts to the area's waters of the U.S., including wetlands, could be expected to be reduced, or at a minimum have no net loss.

Air Quality

The cumulative impact on air quality from the proposed project and other reasonably foreseeable transportation projects is addressed at the regional level by analyzing the air quality impacts of transportation projects in Mobility 2030: The Metropolitan Transportation Plan and the 2008-2011 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 State Implementation Plan. The project-level carbon monoxide analysis demonstrated that the proposed project would not cause or contribute to localized carbon monoxide violations. Planned transportation improvements are intended to cumulatively reduce congestion on a regional scale, with a resultant decrease in pollutant emissions. Therefore, the proposed transportation improvements within the RSA are not anticipated to adversely affect the ozone standard.

EPA's vehicle and fuel regulations, coupled with fleet turnover, are expected to result in substantial reductions of on-road emissions, including MSATs. MSATs as in relation to SH 114/121 are not expected to increase overall air toxics in the Dallas/Fort Worth area in the future years investigated.

The DFW region is expected to continue to experience substantial population growth, urbanization and economic development. The cumulative impact of reasonably foreseeable future growth and urbanization on air quality would be minimized by enforcement of federal and state regulations, including the EPA and TCEQ, which are mandated to ensure that such growth and urbanization would not prevent compliance with the ozone standard or threaten the maintenance of the other air quality standards. EPA's vehicle and fuel regulations, coupled with fleet turnover, are expected to result in substantial reductions of on-road emissions, including MSATs, CO and ozone precursors.

Community

Recent (and predicted future) rapid growth in the Cities of Grapevine and Southlake appear to indicate that these communities are considered desirable places to live. The proposed project, in combination with other roadway, transit, and land development actions may provide increased housing, economic, and recreational opportunities for residents. The proposed project would not contribute to significant adverse cumulative effects to communities within the RSA.

The economic impact of tolling would be higher for low-income residents since the cost of paying tolls would represent a higher percentage of household income than for non-low-income households. Non-toll alternatives would be available to all motorists, including low-income populations, via non-toll mainlanes. All motorists would benefit from the congestion relief provided by the proposed improvements. A complete consideration of the impacts of tolls on EJ communities is provided in the Environmental Justice discussion under **Cumulative Effects of Regional Toll and Managed / HOV System** later in this section.

The future land use plans for the City of Grapevine, the City of Southlake, and DFW International Airport anticipate the continuation of established retail, commercial, industrial, and residential land use patterns. Except for the new access to land along the southbound frontage road of SH 121 that would be created by the proposed project, this planned future growth and urbanization within the RSA would most likely occur with or without implementation of the proposed project. The proposed project would not change existing or future planned land use and development patterns and would not result in substantial induced changes in the pattern of land use, population density or growth rate within the RSA. Assuming appropriate implementation of applicable land use planning regulations and control strategies, related effects on air and water and other natural systems, including ecosystems would be avoided and/or minimized. The proposed project would not contribute to significant cumulative impacts to the anticipated urbanization in the RSA.

Step 8 – Assess and discuss mitigation issues for adverse impacts

Water Bodies

Under Section 401 of the CWA, the TCEQ is authorized to certify that federally issued permits will meet the state's water quality standards. The TCEQ regulates this section under the USACE permit programs and requires the installation of temporary and permanent storm water best management practices (BMPs). Under Section 404 of the CWA, the USACE regulates impacts to jurisdictional waters and wetlands though implementation of their permitting process. Projects that disturb more than one acre are required to comply with the TPDES permit requirements.

Controlling storm water pollution in urban areas and from industrial activity runoff is viewed by the EPA as a key to maintaining and improving the quality of the nation's waterways. NCTCOG was designated as the area-wide water quality management planning agency for the urbanizing portion of the region. NCTCOG'S water quality management plan includes regulatory and non-regulatory programs, activities, and BMPs to control pollution to achieve water quality goals.

Waters of the U.S. are regulated by the USACE under authority of Section 404 of the CWA. Section 404 of the CWA authorizes the USACE to issue permits for the discharge of dredged or fill material into waters of the U.S., including wetlands. The intent of this law is to protect the nation's waters from the indiscriminate discharge of material capable of causing pollution, and to restore and maintain their chemical, physical, and biological integrity. Any discharge into waters of the U.S. must be in accordance with Section 404(b)(1) guidelines developed by the EPA in conjunction with the USACE. In the Section 404 permit process, permit applications are reviewed by the TCEQ for compliance with Section 401 of the CWA.

In 1991, Texas adopted state goals for "no net loss" of acreage or aquatic function of wetlands. These goals reflect the regulatory program in the CWA legislation that prohibits the discharge of soil into waters of the U.S. unless authorized by a permit issued under CWA Section 404. The USACE has authority over such actions and may require the permittee to restore, create, enhance, or preserve nearby aquatic features as compensation to offset unavoidable adverse impacts to the aquatic environment. This means of compensatory mitigation is intended to comply with the general goals of the CWA and the specific goal of "no net loss" of aquatic functions. Several regulations have been enacted on a federal, state, and local level to achieve these goals.

Future trends in the regulation of waters of the U.S., including wetlands, are likely to focus on compensatory mitigation requirements. Regulatory agencies are expected to develop procedures to track the success and completion of mitigation efforts as the focus moves toward replacement of specific aquatic functions, rather than replacement of total area. Research of regulatory publications indicates that mitigation banking is becoming a more favored means of mitigating loss of aquatic function. Consequently, regulatory controls are expected to continue the trend of stabilizing the amount of existing waters of the U.S, including wetlands, through vigorous application of mitigation requirements under the CWA.

The protection of floodplains and floodways is required by Executive Order (EO) 11988 Floodplain Management and is implemented by the FHWA through 23 CFR 650 Subpart A Location and Hydraulic Design of Encroachments on Floodplains. At the local level, floodplain regulations are contained in the cities land development code (zoning and land use regulations). The intent of the regulations is to avoid or minimize highway encroachments within base floodplains, where practicable, and to avoid land use development that is incompatible with floodplain values. To comply with EO 11988, the action must be designed to avoid floodplain impacts, when practicable, and to adequately mitigate unavoidable impacts.

In addition to EO 11988 and the other regulatory requirements described above, there are important regional policies and programs developed since the mid-1980s that are specifically intended to reduce adverse cumulative effects to floodplains within the watershed. The Trinity Regional Environmental Impact Statement (TREIS) was prepared by the USACE in the mid-1980s to address extensive floodplain development that was occurring along the Trinity River within the region. The TREIS focused on actions requiring permits under Section 10 of the River and Harbors Act and Section 404 of the CWA, as amended, with emphasis on addressing the cumulative impacts of granting multiple permits. The TREIS Record of Decision also established guidelines for mitigation of habitat losses caused by projects in floodplain areas covered by the TREIS. The TREIS raised awareness that large areas of floodplain lands within the Upper Trinity River Basin could be developed outside the jurisdiction of the USACE and that if developed following only FEMA requirements, significant increases in flooding frequency and extent would continue to occur in adjacent and downstream areas. Subsequently, the Corridor Development Certificate (CDC) process was established as a means to address those floodplain actions that were not within the jurisdictional areas administered by the USACE.

The Cities of Grapevine and Southlake, TCEQ, USACE, and FEMA have the regulatory authority to control encroachment upon floodways and floodplains, and provide compensatory mitigation as required. The applicable resource agencies enforce a policy of "no net loss" of floodplains through the CDC permit review process. The CDC process does not prohibit floodplain development, but ensures that any development that does occur in the floodplain will not raise flood water levels or reduce flood storage. Under the CDC process, local governments retain ultimate control over the floodplain permitting decisions.

Air Quality

A variety of federal, state, and local regulatory controls as well as local plans and projects have had a beneficial impact on regional air quality. The CAA, as amended, provides the framework for federal, state, tribal, and local rules and regulations to protect air quality. The CAA required the EPA to establish NAAQS for pollutants considered harmful to public health and the environment. In Texas, the TCEQ has the legal authority to implement, maintain and enforce the NAAQS. The TCEQ establishes the level of quality to be maintained in the State's air and to control the quality of the State's air by preparing and developing a general, comprehensive plan. Authorization in the Texas Clean Air Act (TCAA) allows the TCEQ to collect information and develop an inventory of emissions; conduct research and investigations; prescribe monitoring requirements; institute enforcement; formulate rules; establish air quality control regions; encourage cooperation with citizens' groups and other agencies and political subdivisions of the State as well as with industries and the federal government; and to establish and operate a system of permits for construction or modification of facilities. Local governments having some of the same powers as the TCEQ can make recommendations to the Commission concerning any action of the TCEQ that may affect their territorial jurisdiction, and can execute cooperative agreements with the TCEQ or other local governments. In addition, a city or town may enact and enforce ordinances for the control and abatement of air pollution not inconsistent with the provisions of the TCAA or the rules or orders of the TCEQ.

The CAA also requires states with areas that fail to meet the NAAQS prescribed for criteria pollutants to develop a State Implementation Plan (SIP). The SIP describes how the state will reduce and maintain air pollution emissions in order to comply with the federal standards. Important components of a SIP include emission inventories, motor vehicle emission budgets, control strategies, and an attainment demonstration. The TCEQ develops the Texas SIP for submittal to the EPA. One SIP is created for each state, but portions of the plan are specifically written to address each of the non-attainment areas. These regulatory controls, as well as other local transportation and development initiatives implemented throughout the DFW metropolitan area by local governments (and others) provide the framework for growth throughout the area consistent with air quality goals.

The major factor in reducing MSAT emissions is the implementation of the EPA's new motor vehicle emission control standards. No adverse impacts requiring mitigation were identified in the analysis.

Community

Many aspects of social and community quality of life can be influenced to varying degrees by local government regulation. For example, zoning and subdivision regulations, noise ordinances, and floodplain management are all ways cities guide development and affect the desirability of a place to live. Comprehensive plans (such as the Southlake 2025 Plan) are tools cities use to ensure different aspects of the community—such as housing, public facilities, and transportation—are coordinated, and that the vision of their community is realized.

Local city and county governments have the authority to avoid, minimize and mitigate the impacts of development and urbanization through local zoning controls and comprehensive land use planning. Land use within the RSA is regulated by the Cities of Grapevine and Southlake land use plans and zoning ordinances designed to minimize the adverse effects of growth and urbanization. The municipal zoning and land use regulations control the intensity and type of development and control where land should be developed and where land should be preserved.

Cumulative Effects of Regional Toll and Managed / HOV System

The indirect impact section identified the need to study the impacts from the regional toll and managed/HOV lane network as it expands for the 2030 proposed transportation system. Each cumulative resource is studied from a regional perspective and addresses the impacts the proposed priced facility network would have on each resource. Because of the accessibility of data resources supplied by the NCTCOG, the RSA for the regional study is the Metropolitan Planning Area (MPA).

Land Use

Metropolitan areas have come under intense pressure to respond to federal mandates to link planning of land use, transportation, and environmental quality from persons concerned about managing the side effects of growth such as sprawl, congestion, housing affordability, and loss of open space. The planning models used by MPOs were not designed to address these questions, creating a gap in the ability of planners to systematically assess these issues.

The relationships between land use, transportation, and the environment are at the heart of growth management. The emerging concern that construction of new suburban highways induces additional travel, vehicle emissions, and land development, making it implausible to “build our way out” of congestion has reshaped the policy context for metropolitan transportation planning. Recognizing the effects of transportation on land use and the environment, the CAA and the Intermodal Surface Transportation Efficiency Act (ISTEA) mandated the MPOs integrate metropolitan land use and transportation planning. Later, the

Transportation Equity Act for the 21st Century (TEA-21) succeeded the ISTEA to refine this process.

The NCTCOG is promoting sustainable development as a specific objective of *Mobility 2030* because of the direct link between land use, transportation, and air quality. NCTCOG has defined sustainable development as:

- Land use and transportation practices that promote economic development while using limited resources in an efficient manner.
- Transportation decision making based on impacts on land use, congestion, VMT, and the viability of alternative transportation modes.
- Planning efforts which seek to balance access, finance, mobility, affordability, community cohesion, and environmental quality.

The essence of sustainable development is the wise use of scarce resources so that future generations may enjoy them. At the regional level, the key to maintaining sustainable patterns of development is to allow cities the option to present a variety of land use, zoning, mobility, and service packages to the development market and residents. This can be accomplished by providing planning support for a diverse range of mobility options such as rail, automobiles, bicycling, transit, and walking.

The DFW MPA is forecasted to grow to almost 8.5 million people and 5.3 million jobs by the year 2030, producing nearly a 63 percent increase in population and a 64 percent increase in employment. If not planned for and implemented in a responsible way, this type of rapid growth would have negative impacts on the region. If development continues to grow away from the urban core, the VMT would substantially rise per household, per person, and per employee. Higher densities, mixed-land uses, and increased transportation alternatives, which are characteristics of the urban core, reduce overall VMT. This leads to lower emissions of VOC and NOx, improving air quality. NCTCOG's analysis of travel patterns showed that mixing land uses has a similar beneficial impact on travel as density. There are five types that categorize all land in the DFW MPA: employment dominant, employment leaning, mixed, household leaning, and household dominant. The localized mixing and integration of land uses occur at a variety of densities in urban, suburban, and rural settings in the region.

The MTP land development policies were created by combining regional expectations with local city plans, including anticipated population growth and land use. NCTCOG relies on the information provided by cities as a basis for their land development policies. By understanding the cities' expectations, NCTCOG is better able to educate the public and municipalities on the best alternatives for regional land development. NCTCOG conducted a series of demographic sensitivity analyses scenarios to quantitatively assess the potential impacts of alternative growth scenarios on the region between 2010 and 2030. Historically, the DFW area has grown outward with new developments turning rural areas into suburban cities. Within the alternative growth scenarios presented by NCTCOG, households and employment locations were redistributed throughout the region to simulate alternative market assumptions; however the control numbers for population and employment remained the same. **Table 6.5** presents the statistics produced through the analysis of each scenario. Brief descriptions of each scenario are:

- Rail Scenario: NCTCOG redistributed population and employment growth occurring between 2010 and 2030, while maintaining the population and employment control totals for the region. Growth was taken from rural areas of the region and added primarily to passenger rail station areas.
- Infill Scenario: NCTCOG redistributed population and employment growth occurring between 2010 and 2030, while maintaining the population and employment control totals for the region. Growth was taken from rural areas of the region and added primarily to infill areas along existing freeways/tollways.
- Rail with County Control Totals (RCCT) Scenario: NCTCOG redistributed population and employment growth occurring between 2010 and 2030, while maintaining the population and employment control totals for the region and each individual county. Growth was taken from rural areas of the region and added primarily to passenger rail-oriented areas.
- Vision North Texas (VNT) Scenario: NCTCOG redistributed population and employment growth occurring between 2010 and 2030, while maintaining the population and employment control totals for the region. Growth was distributed based on overall VNT participant feedback.
- Forward Dallas Scenario: Created for the City of Dallas, NCTCOG redistributed population and employment growth occurring between 2010 and 2030 based on the final alternative demographic dataset created during the Forward Dallas! Comprehensive Plan process.

Table 6.5 Alternative Growth Scenarios Compared to Historical Growth Model

Data of Interest	Rail Scenario	Infill Scenario	RCCT Scenario	VNT Scenario	Forward Dallas!
MPA Average of Trip Length	- 8%	+ 3%	- 0.01%	- 10.85%	- 2.9%
MPA Rail Transit Boardings	+ 52%	+ 9%	+ 8%	+ 11.13%	+ 7.4%
MPA Non-Rail Transit Boardings	+ 29%	+ 11%	+ 5%	+ 15.98%	+ 11%
MPA Vehicle Miles Traveled	- 6%	- 5%	- 1.2%	- 9.43%	- 2.2%
MPA Vehicle Hours Traveled	- 9%	- 7%	- 1.7%	- 14.31%	- 5.7%
Total Vehicle Hours of Delay	- 24.0%	- 19.0%	- 4.0%	- 32.5%	- 14.5%
Lane Miles Needs	- 13.0%	- 10.0%	- 13.3%	- 30.90%	- 32.1%
Financial Needs (billions)	- $9.5	- $6.7	- $2.9	- $15.6	- $7.0
Roadway Pavement Needs	- 8.3 sq. mi.	- 6.5 sq. mi	- 0.7 sq. mi.	- 19.8 sq. mi.	- 1.6 sq. mi.
NOx Emissions	- 4.1%	- 3.9%	- 1.2%	- 8.47%	- 2.4%
VOC Emissions	- 5.3%	- 5.2%	- 1.5%	- 11.02%	- 3.0%

The results of the analysis show a strong correlation between passenger rail and VNT scenarios, both reducing the greatest amount of ozone emissions and the amount of MPA vehicle miles traveled and hours of delay.

Mobility 2030 does not pick, favor, or choose any regional land use scenario. This data is provided by NCTCOG as an educational guide for the cities and municipalities that comprise the Dallas/Fort Worth metropolitan area. The alternative growth scenarios area presented as suggested alternatives the municipalities could incorporate into their land use policies in order to improve regional transportation and environmental issues. Because NCTCOG has no power to control regional growth and land development, the MTP provides these alternatives as guidance to city planers and developers as the most efficient way to grow. By presenting these options, NCTCOG's transportation goals are better served.

The 2030 MTP does not utilize any of these alternative growth scenarios as a basis for development since these regional scenarios cannot be realistically implemented. The proposed roadway system (include priced facilities) developed by the MTP is based on projected growth and land use changes that are predicted to occur in the future. The MTP growth model takes each municipality's land use growth projections as a basis for the 2030 MTP. Each municipality has its own method of addressing development within their boundaries depending on the growth they are experiencing. This growth includes mixed use, redevelopment, new development, industrial, commercial, high density, low density, transit oriented, rural growth, etc. The 2030 MTP was modeled using each cities growth projections and combining them with future growth patterns extrapolated from existing patterns for the region. These patterns do not follow, support, or conform to any regional scenarios presented in the 2030 MTP and the scenarios are used only as a guide for future consideration for growth and land use development.

The RTC is an independent transportation policy body of the MPO and is comprised of elected officials representing the region's counties and municipalities as well as the region's transportations providers (DART, TxDOT, NTTA, etc.). The RTC is responsible for overseeing the 2030 MTP as it relates to transportation and creates policies for regional transportation including toll policies, managed lane policies, CDA policies, and other transportation related issues.

The RTC has taken a proactive approach to improving regional traffic congestion and air quality through its Sustainable Development Policy adopted in 2001. The RTC established basic policy directions which serve as strategies to meet finance constraints, diversify mobility, and improved air quality. The objectives of these practices are to:

- Respond to local initiatives for town centers, mixed-use growth centers, transit-oriented developments, infill/brownfield developments, and pedestrian-oriented projects.
- Complement rail investments with coordinated investments in park-and-ride, bicycle, and pedestrian facilities.
- Reduce the growth in VMT per person.

Although the 2030 MTP and the RTC states these practices should be followed, the local municipalities have direct jurisdiction over land use and public agencies such as DART, TxDOT, and NTTA have jurisdiction over the regional transportation system. These agencies and municipalities would need to work with the NCTCOG and the RTC to implement these sustainable development policies. These policies represent an important new trend in local development patterns that are based an increased desire for a greater variety of transportation options, mixed-use developments, and unique communities with a sense of place. This trend contributes to the region's increasing emphasis on sustainable development and the ability to attain federal air quality attainment.

This sustainable land use is one tool the NCTCOG uses to reduce the need for new infrastructure (utilities, transportation, emergency response, government facilities, water, etc.). This ability for sustainable land use helps reduce the need for new infrastructure, such as priced facilities, for the region. Without sustainable land use, the addition cost of new infrastructure items would increase beyond the current cost.

Sustainable land use is a tool for the NCTCOG, but it is only one part of the solution. The cost of implementation of a full sustainable land use plan is expensive and only municipalities have the power in the state of Texas to affect and implement land use zoning, codes, and enforcement. Furthermore, no government entity has the authority or power to force developers or people where to develop or live.

The current future roadway facility outlined in the 2030 MTP is in support of the predicted land use changes and growth in the region. To meet the demand of the expansive growth and changes to land use from development, the 2030 transportation network would supply the transportation portion of infrastructure requirements for the expanding growth and development. Current and future predicted available funds from the federal government for transportation will not meet the demands for the transportation infrastructure needed to support the predicted land use changes. Toll roads and managed lanes are the methods that the MTP employs to ensure the transportation demands from future growth are met based on limited transportation funds.

The development of a managed lane/toll system is consistent with the land use policies discussed in the MTP. One component of the managed lane system is planned access to high density development areas. As more mixed-use development centers are planned in the region, managed lane facilities would continue to connect to these centers, allowing HOV and transit vehicles access to the transportation system. This would help remove SOV users from the main lanes and increase mobility, efficiency and reliability on all traffic facilities.

The proposed 2030 priced facility network may affect land use within the MPA boundaries by helping to enhance land development opportunities. However, priced facility network is only one factor in creating favorable land development conditions; other prerequisites for growth in the region include demand for new development, favorable local and regional economic conditions, adequate utilities, and supportive local land development regulations and policies.

Environmental Justice

Mobility 2030 presents a system of transportation improvements needed to maintain mobility in the DFW area over the next 20 plus years and serves as a guide for the expenditure of state and federal funds for the region. Its development was coordinated among local governments, transit authorities, TxDOT, FHWA, and FTA. The plan is based on regional transportation needs through the process of forecasting future travel demand, evaluating system scenarios, and selecting those options which best meet the mobility needs of the region. It also serves as a guide for the implementation of multi-modal transportation improvements, policies, and programs through the year 2030.

As part of the development of *Mobility 2030*, the current MTP, the NCTCOG conducted an environmental justice study for the existing transportation facilities compared to the 2030 proposed transportation system in the MTP. NCTCOG concluded that the *Mobility 2030* transportation improvements and recommendations for the NCTCOG region would not cause adverse impacts to environmental justice populations. However, it did not account for the impact of tolls on environmental justice populations.

To further analyze the effects of expansion of toll roads and managed lanes in the NCTCOG region, a regional study was performed for environmental justice populations comparing regional build and no build scenarios. The regional no build scenario utilized the existing roadway network in 2009 with 2030 population demographics. The regional build scenario used the proposed MTP roadway network in 2030 with 2030 population demographics.

Regional traffic analysis performance reports and regional origin-destination studies were conducted for the NCTCOG's MPA transportation network for the regional build and no build regional toll/managed lane scenarios. The analysis was conducted to investigate the possible cumulative impacts from the construction of toll roads and managed lanes to environmental justice populations and to determine if there would be disproportionately high and adverse cumulative impacts to these populations.

Traffic Analysis Performance Reports

Traffic analysis performance reports were developed for the regional build and no build scenarios for the entire MPA transportation network. The average daily vehicle trips for both scenarios are 24,912,520.

A comparison of the average loaded speed per roadway classification is shown in **Table 6.6**. Average loaded speed, based on the NCTCOG's performance reports, is defined as "the average speed on roadways with traffic on the road; it is the volume-weighted average of loaded speed." The average loaded speed is the average speed a vehicle is traveling along a specific roadway classification during traffic. This is calculated using the miles traveled divided by the time it took to travel a fixed distance. This calculation illustrates the usage of the roadway system by roadway classification. The results show that the regional build scenario would result in an increase in roadway speed for all roadway classifications.

Table 6.6 2030 Average Loaded Speed (mph)

Roadway Classification	Build Scenario			No Build Scenario			Percent Change		
	AM	PM	Daily	AM	PM	Daily	AM	PM	Daily
Freeways (includes toll roads)	52.88	54.16	57.11	38.92	44.49	50.10	26.40%	17.85%	12.27%
Major Arterials	27.14	28.83	31.82	20.69	22.00	26.52	23.77%	23.69%	16.66%
Minor Arterials	24.01	25.55	27.38	20.45	22.09	25.21	14.83%	13.54%	7.93%
Collectors	20.14	21.62	23.00	17.54	18.93	21.22	12.91%	12.44%	7.74%
Frontage Roads	25.65	27.48	29.61	19.63	21.22	24.67	23.47%	22.78%	16.68%
HOV Lanes (includes managed lanes)	49.73	51.78	52.81	44.37	47.72	50.37	10.78%	7.84%	4.62%

Source: NCTCOG TransCAD® data for 2030 regional build and no build scenarios (April 2008 Performance Reports)

In addition, an evaluation of the regional no build scenario versus the regional build scenario was conducted for the MPA using LOS per lane mile by roadway classification. The results are shown in **Table 6.7**. The regional no build scenario shows an increase in roadway miles in LOS F for all roadway classifications with the exception of HOV/managed lanes.

Table 6.7 Level of Service for the Traffic Study Area (2030)

Roadway Classification	Build Scenario		No Build Scenario	
	Lane-Miles	LOS	Lane-Miles	LOS
Freeways (includes toll roads)	7,602	A-B-C (3,826 lane-miles) 50%	4,486	A-B-C (890 lane-miles) 20%
		D-E (2,264 lane-miles) 30%		D-E (1,220 lane-miles) 27%
		F (1,512 lane-miles) 20%		F (2,376 lane-miles) 53%
Major Arterials	8,739	A-B-C (4,793 lane-miles) 55%	4,085	A-B-C (1,120 lane-miles) 17%
		D-E (1,848 lane-miles) 21%		D-E (640 lane-miles) 16%
		F (2,098 lane-miles) 24%		F (2,325 lane-miles) 57%
Minor Arterials	7,568	A-B-C (5,407 lane-miles) 71%	9,282	A-B-C (3,654 lane-miles) 39%
		D-E (829 lane-miles) 11%		D-E (1,574 lane-miles) 17%
		F (1,332 lane-miles) 18%		F (4,054 lane-miles) 44%
Collectors	9,007	A-B-C (6,992 lane-miles) 78%	8,217	A-B-C (4,568 lane-miles) 56%
		D-E (724 lane-miles) 8%		D-E (914 lane-miles) 11%
		F (1,291 lane-miles) 14%		F (2,735 lane-miles) 33%
Frontage Roads	4,152	A-B-C (3,182 lane-miles) 76%	2,622	A-B-C (1,254 lane-miles) 48%
		D-E (402 lane-miles) 10%		D-E (375 lane-miles) 14%
		F (568 lane-miles) 14%		F (993 lane-miles) 38%
HOV Lanes (includes managed lanes)	898	A-B-C (612 lane-miles) 68%	182	A-B-C (76 lane-miles) 42%
		D-E (190 lane-miles) 21%		D-E (45 lane-miles) 25%
		F (96 lane-miles) 11%		F (61 lane-miles) 33%

Source: NCTCOG TransCAD® data for 2030 regional build and no build scenarios (April 2008 Performance Reports)

Regional Origin-Destination Study

An origin-destination study was conducted by NCTCOG for the MPA toll road/managed lane network for environmental justice populations. To clarify the intent of the O&D analysis, the analysis does not attempt to identify specific users (low-income and minority populations) but instead compares the origins and intensity origins of trips based on collective socio-economic characteristics at the TSZ level for both the toll and non-toll scenarios. In other words, the O&D analysis predicts the potential users of the Managed Express Lanes toll facility in 2030 by correlating the general socio-economic characteristics of the future users based on Census 2000 data to the intensity of use quantified by the number of trips per TSZ generated by TransCAD®. NCTCOG conducted a "select-link analysis" based on 2030 AM peak period traffic. The model distinguishes between the toll and the non-toll scenarios by identifying the "toll links." These "toll links" are assigned a cost per mile for the toll scenario and no cost per mile for the non-toll scenario. The model then assigns vehicle trips based on user cost, trip distance, time of day, and other factors to achieve system equilibrium in the network. For trip assignment purposes, if a facility has only tolled lanes and no free mainlanes, then the trip assignment is only for the toll facility. If the facility has existing free mainlanes and the project is adding managed toll lanes, then the trip assignment data is for both the managed toll and free mainlanes. The correlation of Census 2000 and TransCAD® data is the best available method to identify which TSZs would originate trips anticipated to utilize the Managed Express Lanes toll facility and the general demographics of the population associated with those TSZs. However, the vehicle trip assignment process does not consider relative income differences or the differences in relative costs to potential users in the population when making trip assignments. Because no definitive data exists on the future users of this facility or similar type facilities, the O&D analysis cannot predict the specific race, ethnicity, or economic status associated with the predicted trips on toll or non-toll facilities. However, the O&D analysis can identify a potential difference in trip intensity by comparing toll and non-toll scenario TSZ trip percentages.

Figures 7 and 8 (Appendix J) show the basis of the NCTCOG analysis and the identified TSZs that contain environmental justice populations (i.e. TSZs that contain greater than 50 percent minority and low-income populations) and the existing and future toll roads and managed lanes used in the origin-destination analysis. The figure shows the majority of environmental justice communities within IH 635 and IH 820 loops in Dallas and Fort Worth and in the southern section of MPA.

The entire MPA was evaluated for the existing and future toll network. The total TSZs that comprise the origin-destination study area within the MPA is 4,813. A total of 1,542 of these are considered environmental justice TSZs.

For the regional no build scenario, 4,720 TSZs are anticipated to regularly utilize the existing toll roads or facilities with a mix of free mainlanes and toll lanes in the MPA in 2030 (originating at least one trip per day); this represents 98.1 percent of the totally TSZs in the MPA. Under the regional no build scenario, 1,530 environmental justice TSZs are anticipated to regularly utilize the existing toll facilities (originating at least one trip per day); this represents 99.2 percent of the environmental justice TSZs in the MPA. Data analysis indicates that from the 246,462 total trips which originated from all of the TSZs that would utilize the existing toll facilities in the MPA, approximately 14.8 percent (36,400 trips) of the total trips originated from environmental justice TSZs.

The Build scenario is anticipated to contain 4,770 TSZs that would regularly utilize the future toll facilities in the MPA in 2030 (originating at least one trip per day); this represents 99.1 percent of the total TSZs in the MPA. From the total environmental justice TSZs identified in the MPA, 1,541 are anticipated to regularly utilize the proposed toll facilities in 2030 (originating at least one trip per day) for the Build scenario; this represents 99.9 percent of the total TSZs in the MPA. Data analysis indicates that from the 516,988 total trips which originated from TSZs that would utilize the future proposed toll roads, approximately 16.4 percent (85,011 trips) originate from environmental justice TSZs.

Table 6.8 outlines the origin-destination results for the MPA study area. The analysis was divided into three networks, the No Build scenario which is the existing toll facilities in 2009, the Build scenario which is the future toll facilities that would be built, and the total toll network which is the existing network plus the future network that would be built.

Table 6.8 Origin-Destination Results

	2030 No Build Scenario (existing toll facilities)	2030 Build Scenario (future toll facilities)
Total TSZs in the MPA	4,813	4,813
Total environmental justice TSZs in the MPA	1,542	1,542
TSZs utilizing toll facilities	4,720 (98.1%)	4,770 (99.1%)
Environmental justice TSZs utilizing toll facilities	1,530 (99.2%)	1,541 (99.9%)
Trips from TSZs utilizing toll facilities	246,462	516,988
Trips from environmental justice TSZs utilizing toll facilities	36,400 (14.8% of total trips)	85,011 (16.4% of total trips)

Source: NCTCOG TransCAD® data for 2030 regional build and no build scenarios (April 2008 Origin-Destination data)

Results and Conclusions

The origin-destination results show an increase in usage for toll roads from the 2030 No Build scenario and the 2030 Build scenario for the NCTCOG MPA region. Both the Build and No Build scenarios showed trips generated from the majority of the TSZs in the MPA (98.1 to 99.1 percent), including the majority of environmental justice TSZs (99.2 to 99.9 percent).

Trips for future proposed toll facilities in the Build scenario would experience an increase of 110 percent from the current toll road facilities. Environmental justice TSZ trips would increase 134 percent. Because of the increase in trips generated by environmental justice populations, these populations would receive cumulative impacts by the regional increase in toll facilities because low-income populations would use a greater amount of their income for toll road and managed lane usage. As shown in **Figures 9 and 10** (**Appendix J**) existing toll roads and managed lanes are not adjacent to the majority of environmental justice TSZs, but future proposed toll roads and managed lane facilities would be built nearer environmental justice populations.

Results from the performance reports conducted for the MPA showed an increased in roadway speed and an improvement in LOS for the majority of the roadway classifications in the Build scenario in comparison to the No Build scenario. The Build scenario for the MPA would create a cumulative improvement for roadway conditions throughout the NCTCOG region by increasing roadway speed and improving the LOS on the roadway network.

Although environmental justice populations would see an increase in spending for toll facilities, the entire MPA region would also see an increase in spending and usage as the toll road and managed lane system expands. The majority of environmental justice populations were identified by the NCTCOG travel demand model to potentially make trips along existing and future toll facilities. In addition, for populations (including environmental justice populations) who would opt to use non-toll options, the Build scenario for 2030 (which includes all proposed toll facilities and managed lanes) would provide a roadway network that would operate at better traffic conditions (greater speeds and an improved LOS) than the No Build scenario and would provide an increased benefit for these users over the No Build scenario.

Based on the previous discussion and analysis, the Build scenario for the NCTCOG MPA would not cause cumulative disproportionately high and adverse effects on any minority or low-income populations as per Executive Order 12898 regarding environmental justice.

As discussed, the analysis does not show any disproportionately high and adverse impacts to environmental justice populations; therefore, no project-specific mitigation measures are appropriate for cumulative impacts in this document. However, NCTCOG will continue its efforts to work with all communities in the planning process to identify transportation challenges and explore and develop the appropriate strategies to respond to the issues. Examples include programs and projects to improve availability and accessibility to alternate transportation options including discounted transit fares and tolls, HOV discounts on toll roads and managed lanes, better accessibility to regional transportation systems, and community level congestion management. Specific strategies and projects will be developed through discussions with local governments and community representatives.

Air Quality

The NCTCOG serves as the MPO for transportation for the Dallas-Fort Worth area. It serves a 16-county metropolitan region centered on Dallas and Fort Worth. Since the early 1970s, MPOs have had the responsibility of developing and maintaining a MTP. The MTP is federally mandated; it serves to identify transportation needs; and guides federal, state, and local transportation expenditures.

ISTEA strengthened the role of the MTP and made it the central mechanism for the decision-making process regarding transportation investments. The passage of the TEA-21 in 1998 continued this emphasis. The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was signed into law on August 10, 2005. SAFETEA-LU addresses the challenges on our transportation system such as improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment. Both SAFETEA-LU and the CAAA impose certain requirements on an urbanized area's long-range transportation plan.

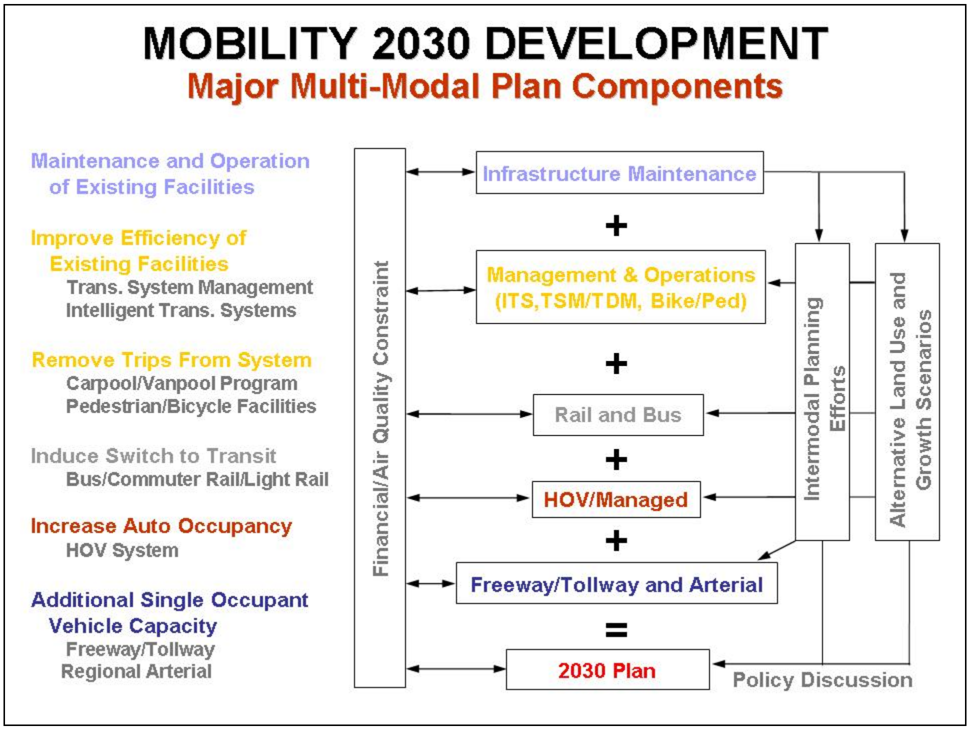
Transportation plans such as *Mobility 2030*, according to SAFETEA-LU metropolitan planning regulations, must be "fiscally constrained," that is, based on reasonable assumptions about future transportation funding levels. Because the Dallas-Fort Worth area is designated as a nonattainment area for the eight-hour ozone standard, the CAAA require the transportation plan to be in conformity with the SIP for air quality to demonstrate that projects in the MTP meet air quality goals. *Mobility 2030* specifically addresses regional ozone in addition to its studies of general regional air quality and the final result showed that the regional roadway network (including toll roads and managed lanes) would show a decrease in nitrogen oxides and emissions of volatile organic compounds.

Transportation conformity is a process which ensures federal funding and approval goes to transportation activities that are consistent with air quality goals. Transportation activities that do not conform to state air quality plans cannot be approved or funded.

The CAAA established specific criteria which must be met for air quality non-attainment areas. The criteria are based on the severity of the air pollution problem. Transportation conformity is a CAAA requirement that calls for the EPA, U.S. Department of Transportation (U.S. DOT), and various regional, state, and local government agencies to integrate air quality and transportation planning development processes. Transportation conformity supports the development of transportation plans, programs, and projects that enable areas to meet and maintain national air quality standards for ozone, PM, and CO, which impact human health and the environment. Through the SIP, the air quality planning process ties transportation planning to the conformity provisions of the CAAA. This ensures that transportation investments are consistent with state and local air quality objectives. The NCTCOG is responsible for the conformity analysis in the Dallas-Fort Worth area. If the criteria are not met, EPA can then impose sanctions on all or part of the state. Sanctions include stricter industrial controls and the withholding of federal highway and transit funds.

Tarrant County has been designated as part of a nine-county nonattainment area for eight-hour ozone by the EPA. In accordance with the metropolitan planning regulations, *Mobility 2030* must include a CMP to systematically address congestion. The evaluation of additional transportation system improvements beyond the committed system began with a detailed assessment of transportation improvements that would not require building additional facilities for SOV. Various improvements/modes including congestion management strategies, bicycle and pedestrian facilities, rail facilities, HOV lanes, managed lanes, and toll road facilities were investigated prior to determining the need for additional freeway capacity improvements. The following diagram shows the implementation of these resources and how they are integrated into the MTP.

Mobility 2030 Transportation Plan Components



Transportation system performance information was developed as a product of the Dallas-Fort Worth Regional Transportation Model (DFWRTM) travel model throughout the MTP development process. This information guided development of the system alternatives and indicated the impact of various improvements. The improvements recommended in *Mobility 2030* include regional congestion management strategies, bicycle and pedestrian facilities, managed HOV lanes, light/commuter rail and bus transit improvements, ITS technology, freeway and tollway lanes, and improvements to the regional arterial and local thoroughfare system such as intersection improvements and signal timing. Because *Mobility 2030* is financially and air quality constrained, other more cost effective methods are reviewed before SOV lanes (freeways and toll roads) are added into the roadway system. ITS, mass transit, and Managed/HOV lanes are ways to meet regional transportation demands under the financially constrained MTP while improving regional air quality.

The additional introduction of priced facilities into the existing roadway network would not cause any cumulative impacts to air quality. The regional priced facility system would provide additional travel capacity to the roadway network which would allow a greater flow of traffic throughout the region, decreasing the amount of cars traveling at lower speeds or idling conditions. This would result in less fuel combustion and lower emissions including MSATs, CO, and ozone. As noted in the direct and indirect discussions, EPA's vehicle and fuel regulations, coupled with fleet turnover, are expected to result in substantial reductions of on-road emissions, including MSATs, CO and ozone precursors.

Water Quality

Water quality is regulated on the state level by TCEQ. TCEQ monitors all major water bodies (rivers, lakes and streams) and reports the conditions of these streams in a biennial Texas Water Body Inventory report. Section 303(d) of this report details those water bodies TCEQ has identified as impaired due to water contamination.

The 303(d) list identifies five major water systems as impaired with pollutants and bacteria in the MPA. These major water bodies are the Upper Trinity River, the West Fork Trinity River, the East Fork Trinity River, the Elm Fork Trinity River, and the Clear Fork Trinity River. The construction of the proposed priced facility system would cross and impact these water bodies at multiple locations and could cause water quality impacts.

As stated previously, TCEQ regulates water quality through SW3P, MS4, and BMPs. All construction of these priced facilities would follow these water quality permits that would prevent further pollution to these impaired waters and to waters that are not impaired. Additionally any indirect land use development that would occur from the construction of these facilities would follow TCEQ's regulations for water quality through SW3P and MS4. Therefore, the regional priced facility network would not have a cumulative impact to water quality.

Waters of the U.S.

The USACE regulates waters of the U.S. in the state of Texas. The MPA is under the jurisdiction of the Forth Worth District of the USACE. Fill of any jurisdictional waters of the U.S. is required to be permitted through the USACE.

While the USACE has specific guidelines for identifying waters of the U.S., several methods exist to preliminary identify these waters. USGS topography maps and TCEQ's Water Quality Inventory database provides information for the location of larger rivers and streams that would fall under the USACE jurisdiction. The National Wetlands Inventory maps created and maintained by the USFWS attempts to identify potential wetlands through the use of infrared aerial photography (Digital Ortho Quarter Quads). The current status for the National Wetland Inventory maps for the MPA consist digital formats and hard copy formats; some areas are currently not mapped.

Although this data is incomplete, it only serves as a background for the identification of waters of the U.S. Government and private developments must permit any fill into waters of the U.S. and the identification of these waters of the U.S. is completed at the project level with field surveys.

From the available data, the regional priced facility system would impact and cause fill to waters of the U.S., both streams and potential wetlands. These roadway projects would be required to comply with permitting and mitigation for the fill of these waters of the U.S. Any land use change or development that would occur from this regional priced facility system would also be required to permit and mitigation for fill and loss of waters of the U.S.

Through the permitting and mitigation process the USACE has implemented a “no net loss” policy for permanent impacts to wetlands and waters of the U.S. This ensures that loss of these waters would require mitigation that is equal or greater than the loss. Because the USACE would regulate and require mitigation for loss of these waters of the U.S., the priced facility network would not cause a cumulative impact to waters of the U.S.

Vegetation

An inventory of regional vegetation is not available for the MPA. General vegetation descriptions identifying regions and ecological areas are available from many resources. These resources (e.g. the *Vegetation Types of Texas*, etc.) vary in description of areas of regions and do not update their descriptions from the original publications. Project specific vegetation descriptions are the best method to map the vegetation that would be affected by a project.

Currently, the MPA lies in the Blackland Prairies and Cross Timbers and Prairies ecological regions identified by TPWD. The construction of most of the proposed priced facility system would occur in areas already developed and contain urban type vegetation. The projects outside the urban areas could impact natural vegetation and the changes in land use and development that may be caused by these facilities would impact vegetation surrounding these projects.

The NCTCOG does not address impacts to vegetation or mitigation for loss of vegetation in the MTP. TxDOT districts can mitigate for loss of vegetation based on the MOU and MOA with TPWD, which focuses on special habitat types of wildlife and protected species. Wetlands are under the jurisdiction of the USACE and mitigation for the loss of these wetlands (which includes the vegetation) would occur through the permitting process. The USFWS can regulate and require mitigation for loss of vegetation that is designated habitat for a threatened or endangered species. Finally, cities can implement ordinances to protect trees, natural land, or open green spaces.

Although impacts to vegetation would occur from the priced facility system, these impacts would be regulated at the project level for each individual roadway project. Because of this project mitigation, there would be no cumulative impacts to vegetation from the priced facility system.

Conclusion

The regional priced facility system would cause minor impacts to some of the identified resources in this section. Regional mitigation for some of these resources would be addressed by the NCTCOG. *Mobility 2030* addresses issues related to air quality and environmental justice populations. The Transportation Planning Process, at a regional level, provides ways to mitigate for any potential impacts that could occur. The priced facility projects would conform to the STIP/TIP and be included in the MTP. This assurance addresses each project is in compliance with the MTP for air quality and environmental justice.

Land use impacts cannot be mitigated at a regional level, but at a municipality level because these entities have direct control over land use. These municipalities would work with NCTCOG to address regional infrastructure changes in their comprehensive plans. Other state and federal agencies would have direct control over the natural resources and would be responsible for mitigation from the direct impacts to these resources by the proposed priced facility network.

Finally as required by NEPA, mitigation for impacts would occur at the project level. Because of these potential mitigation measures, the regional proposed priced facility system would not have a cumulative impact to these resources.

Summary of Cumulative Effects

All resources analyzed in this section are expected to remain stable, including the slight decline to water quality that occurs in urbanizing areas, assuming that current regulatory mechanisms are followed and remain in place to protect resources potentially affected by development.

VII. CONCLUSION

A. IDENTIFICATION & RATIONALE FOR THE PREFERRED ALTERNATIVE

1. Proposed Action

TxDOT recommends the Build Alternative as the Proposed Action.

2. Support Rationale

The Managed Express Lanes toll facility would be utilized by vehicles making through trips on SH 114, thereby separating this heavy traffic movement from the SH 121, SH 360, International Parkway, IH 635 and local street mix. Based on the NCTCOG link analysis, approximately 45% of the traffic on SH 114 desires to simply travel through the DFW

Connector and remain on SH 114. The Managed Express Lanes toll facility will allow this express movement through the corridor by separating these trips from vehicles currently weaving across numerous lanes to maneuver between SH 121 to SH 114.

The Managed Express Lanes toll facility provides flexibility to accommodate additional through-traffic flow during peak commuter times in the appropriate direction, allowing commuters to bypass the general-purpose lanes. Lane management operations can be adjusted to any changes in regional transportation goals and policies.

Improved freeway interchanges, freeway ramps, and local street intersections with frontage roads throughout the corridor – all of which are included in the Proposed Action – would help to improve regional mobility by lessening congestion levels and increasing total average vehicle speeds. The Proposed Action is consistent with the SIP. Motorists would benefit by both the large-scale and small-scale improvements proposed throughout the corridor. Local intersecting streets would benefit from design and signalization enhancements.

The proposed improvements represent an innovative system to efficiently collect and distribute traffic among several major highways. The new corridor would allow five converging highways (SH 114, SH 121, SH 360, IH 635 and International Parkway) to interconnect while allowing traffic to flow smoothly.

The Proposed Action would complement other planned transportation facilities and programs in the Dallas-Fort Worth region. The Proposed Action is included in the NCTCOG's Mobility 2030 MTP, which has been found to conform to the SIP. Other planned transportation projects within the project corridor include bus and rail transit, TSM and TDM improvements. The following table summarizes the alternatives' ability to satisfy the project objectives.

Table 7.1 Summary Comparison of the Build and No-Build Alternatives' Ability to Satisfy Project Objectives

Project Objective	Build Alternative	No-Build Alternative
Eliminate existing transportation system deficiencies in order to accommodate both local and regional traffic	High probability	Very low probability
Improve safety	High probability	Very low probability
Alleviate existing congestion	High probability	Very low probability
Accommodate future travel demand	High probability	Very low probability
Maintain and enhance accessibility to commercial centers, employment sites and other activity areas	High probability	Low probability
Avoid, minimize or mitigate adverse social, economic and environmental effects	High probability	Low probability

3. Summary of Environmental Mitigation and Monitoring Commitments

The following table provides a list and brief explanation of the mitigation measures that are part of the Proposed Action.

Table 7.2 Environmental Mitigation and Monitoring Commitments

Project Issues and Resources	Type of Impact	Mitigation and Monitoring Commitments
Business Displacements	16 businesses would be displaced.	Displaced businesses are eligible for assistance under the requirements of the Federal Uniform Relocation Act.
Loss of Surface Parking Spaces	Approximately 350 parking spaces would be lost.	If the loss of parking spaces for any individual business would result in non-compliance with the city's off-street parking requirements, the business would be able to continue operating under the nonconforming use provisions of the local zoning ordinance. Approximately half of the parking displacements would occur at the Don Davis Classic Chevrolet car dealership in order to accommodate a proposed direct connector ramp. An undetermined number of these spaces may still be used underneath the elevated ramp through an agreement between the property owner and TxDOT.
Parkland/Section 4(f)	None	The City of Grapevine is interested in coordinating with TxDOT during the design phase for opportunities to enhance safety for the Bear Creek Trail through the SH 360 and SH 121 interchange. The City also would like to arrange adequate horizontal and vertical clearances for a proposed trail extension at the FM 2499 crossing of Denton Creek.
Pedestrians	Beneficial	All cross streets that underpass, overpass or intersect the DFW Connector would be constructed with pedestrian sidewalks. Intersections would be equipped with pedestrian cross walks, safety lights, and other facilities in compliance with the Americans with Disabilities Act.
Environmental Justice	No disproportionately high and adverse impacts	NCTCOG will continue its efforts to work with all communities in the planning process to identify transportation challenges and explore and develop the appropriate strategies to respond to the issues. Examples include programs and projects to improve availability and accessibility to alternate transportation options including discounted transit fares and tolls, HOV discounts on toll roads and managed lanes, better accessibility to regional transportation systems, and community level congestion management. Spanish language versions of the Public Hearing notice were published in three different locally circulated Spanish language newspapers and were included with the notice to property owners. TxDOT will offer bilingual (English and Spanish) tolling information in both their websites and over the phone (Customer Service Center).
Aesthetic Quality	Beneficial	TxDOT will consider including aesthetic treatments in structural components (retaining walls, bridges, signage) and architectural details (landscaping, lighting, colors, finishes, etc.). The City of Southlake and others have requested that TxDOT incorporate such features to enhance the aesthetics of the corridor. The implementation of some design elements would require participation and cost-sharing to fund the aesthetic improvements from local jurisdictions, property owners or community-based organizations.
Access	Entrance and Exit Ramp Modifications, Some Driveway Closures	All properties located along the DFW Connector and currently having access to and from the freeways would continue to have access after the proposed improvements are constructed. Access to businesses would be maintained during construction.
Air Quality	None	The project is subject to a regional air quality analysis. The NCTCOG is responsible for the conformity analysis in the Dallas-Fort Worth area.

Table 7.2 Environmental Mitigation and Monitoring Commitments (cont'd.)		
Project Issues and Resources	**Type of Impact**	**Mitigation and Monitoring Commitments**
Noise	Traffic noise levels would exceed the FHWA Noise Abatement Criteria at two receivers.	No noise mitigation measures were deemed reasonable and feasible; therefore, no abatement measures are proposed for this project.
Hazardous Materials	Approximately 13 sites may have the potential for being impacted by the proposed project.	Additional investigation would be necessary if contamination is discovered during construction, or if additional information becomes available regarding hazardous materials sites, or if changes are made to the proposed right-of-way. If contamination were to be confirmed, TxDOT would develop appropriate soils and/or groundwater management plans for activities within these areas.
Archeological Resources	Accidental Disturbance of Buried Cultural Deposits during Construction	If unanticipated archeological deposits are encountered during construction, work in the immediate area will cease, and TxDOT archeological staff will be contacted to initiate post-review discovery procedures under the provisions of the PA and MOU.
Historic Resources	None	There is one Official Texas Historical Marker commemorating the Thomas Easter Cemetery in the APE. The marker would not need relocation for the project as proposed and would not be affected during construction of the project.
Migratory Birds	Migration patterns would not be affected. Swallow nests were observed on some bridge structures near the project area; however these nests did not appear to be active, even though the field visit was conducted during the nesting season.	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 between September 1st and the end of February from any structure where work will be done. In addition, the contractor would avoid or minimize clearing vegetation within the project area between March 1 and August 31.
Riparian Vegetation	Up to approximately 4.5 acres of riparian vegetation would be impacted.	Mitigation is not proposed, as current design plans indicate that either the streams in the project area are to be spanned and existing vegetation under bridge structures will be left in place as much as is practicable or the improvements would be limited to extensions of existing culverts; therefore, impacts to riparian vegetation would be minimized. The riparian area associated with Cottonwood Branch would be primarily bridged and should experience minor impacts. A commitment has been made to TPWD that clearing activities in this area be limited to that necessary to build the supporting elements of the proposed structure.

Table 7.2 Environmental Mitigation and Monitoring Commitments (cont'd.)		
Project Issues and Resources	**Type of Impact**	**Mitigation and Monitoring Commitments**
Wetlands and Waters of the U.S.	Proposed improvements would result in the placement of minor amounts of fill into waters of the U.S. The waters are not navigable; therefore, neither a U.S. Coast Guard Section 9 Permit nor a USACE Section 10 Permit would be required.	The project would be covered under a U.S. Army Corps of Engineers (USACE) Nationwide Permit 14. All Section 404 permitting would be coordinated with the Regulatory Branch, Fort Worth District of the USACE. The TCEQ issues Section 401 water quality certifications for projects prior to approval of the Section 404 permit from the USACE. Section 401 of the CWA requires states to certify that a proposed CWA Section 404 permit would not violate water quality standards. The design and construction of the proposed improvements must include construction and post-construction Best Management Practices (BMPs) to manage stormwater runoff and control sediments. No impacts to the wetland near Cottonwood Branch are expected since the area would be bridged; however, a commitment to TPWD has been made to establish fencing around the area to make aware that the area is not to be disturbed. A wetland mitigation area owned by the DFW Airport and deed restricted to the USACE is located at the southeast corner of the intersection of SH 121 and Bethel Road. A retaining wall is proposed in this area eliminating the need for any additional right of way from the wetland mitigation area.
Water Quality	Stormwater Runoff from Construction	The water quality of wetlands and waters in the State shall be maintained in accordance with all applicable provisions of the Texas Surface Water Quality Standards including the General, Narrative and Numerical Criteria. BMPs will be implemented in accordance with the Storm Water Pollution Prevention Plan (SW3P). The contractor would take appropriate measures to prevent, minimize, and control the spill of fuels, lubricants, and hazardous materials in the construction staging area. All spills, including those of less than 25 gallons shall be cleaned immediately and any contaminated soil shall be immediately removed from the site and be disposed of properly. Designated areas shall be identified materials storage. These areas shall be protected from run-on and run-off. The use of construction equipment within stream channels is not anticipated for this project. However, if work within a watercourse or wetland is unavoidable, heavy equipment shall be placed on mats, if necessary, to protect the substrate from gouging and rutting. All construction equipment and materials used within stream channels and immediate vicinity would be removed as soon as the work schedule permits and/or when not in use and shall be stored in an area protected from run-on and run-off. All materials being removed and/or disposed of by the contractor would be done in accordance with state and federal laws and by the approval of the Project Engineer. Any changes to ambient water quality during construction of the proposed project shall be prohibited, may result in additional water quality control measures, and shall be mitigated as soon as possible. The contractor would practice "good housekeeping" measures, as well as, "grade management" techniques to help ensure that proper precautions are in place throughout construction of the proposed project.

Table 7.2 Environmental Mitigation and Monitoring Commitments (cont'd.)		
Project Issues and Resources	**Type of Impact**	**Mitigation and Monitoring Commitments**
Texas Pollutant Discharge Elimination System	No Long-Term Water Quality Impacts	TxDOT would be required to comply with TCEQ - Texas Pollutant Discharge Elimination System General Permit for Construction Activity. The project would disturb more than one acre; therefore, a Notice of Intent would be filed to comply with TCEQ stating that TxDOT would have a SW3P in place during construction of the proposed project. The project would also disturb more than five acres, thus requiring a Large Construction Permit. Should impacts to waters of the U.S. be associated with the construction of this project, Erosion Control, Sedimentation Control, and Post Construction Total Suspended Solids (TSS) Control devices from the TCEQ Section 401 Best Management Practices (BMP) List would be required. Erosion Control devices would be implemented and maintained until construction is complete. Sedimentation Control devices would be maintained and remain in place until completion of the project. Post-Construction TSS Control devices would be implemented upon completion of the project.
Invasive Species and Beneficial Landscaping	Beneficial	An Executive Memorandum dated August 9, 1994 directed that on all federally assisted projects, agencies "shall wherever cost-effective and to the extent practicable": (1) use regionally native plants for landscaping; (2) design, use or promote construction practices that minimize adverse effects on the natural habitat; (3) seek to prevent pollution by, among other things, reducing fertilizer and pesticide use; and (4) implement water-efficient and runoff reduction practices. The landscaping included with this project would be in compliance with the Executive Memorandum and the guidelines for environmentally and economically beneficial landscape practices. In accordance with Executive Order 13112, which addresses invasive species, and the Executive Memorandum on beneficial landscaping, landscaping would be limited to seeding and replanting of the right-of-way with native and introduced species of plants where possible. Where project construction has removed existing grasses, the States approved seeding specification or similar mix would be used to re-vegetate the right-of-way and for re-vegetation of trees and/or shrubs native replacements are needed. Soil disturbance would be minimized to avoid the introduction or spread of invasive species as a result of the proposed project.
Airway/Highway Clearance	None	A FAA Notice of Proposed Construction or Alteration form (Form AD-7460-1) will be completed during the design phase and submitted by TxDOT to the FAA for their approval prior to construction of the proposed improvements.

Table 7.2 Environmental Mitigation and Monitoring Commitments (cont'd.)		
Project Issues and Resources	**Type of Impact**	**Mitigation and Monitoring Commitments**
Construction	Access, Traffic Control, Temporary Noise and Dust, etc.	Plans to ensure safe and efficient traffic flow during construction would be developed as part of the detailed construction plans for the proposed improvements. Interruptions to public facilities and services during construction would be minimized through the use of appropriate traffic control and sequencing procedures. Other construction-related impacts (such as temporary air and noise effects) would be addressed in compliance with standard TxDOT policies and procedures. To minimize impacts to water quality during construction, the proposed project would utilize temporary erosion and sedimentation control practices (i.e., silt fences, rock berms, and drainage swales) from TxDOT's manual "Standard Specifications for the Construction of Highways, Streets, and Bridges". Provisions will 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. Access to businesses along the corridor would be maintained during construction. Any aerial and/or underground utility adjustments would be completed at the expense of the utility company and would be conducted in a manner that minimizes any interruptions in service.

4. Recommendation for Alternative Selection and for a FONSI

TxDOT recommends implementation of the Build Alternative based on the information in this EA.

The engineering, social, economic, and environmental investigations conducted thus far on this proposed project indicate that it would not result in significant impacts on the quality of the human environment. A Finding of No Significant Impact (FONSI) is anticipated.

VIII. REFERENCES

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ten Siethoff, B. and Kockelman, K.M., "Property Values and Highway Expansion: Timing, Size, Location, and Use Effects," *Transportation Research Record*, Transportation Research Board, 2002.

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APPENDIX A

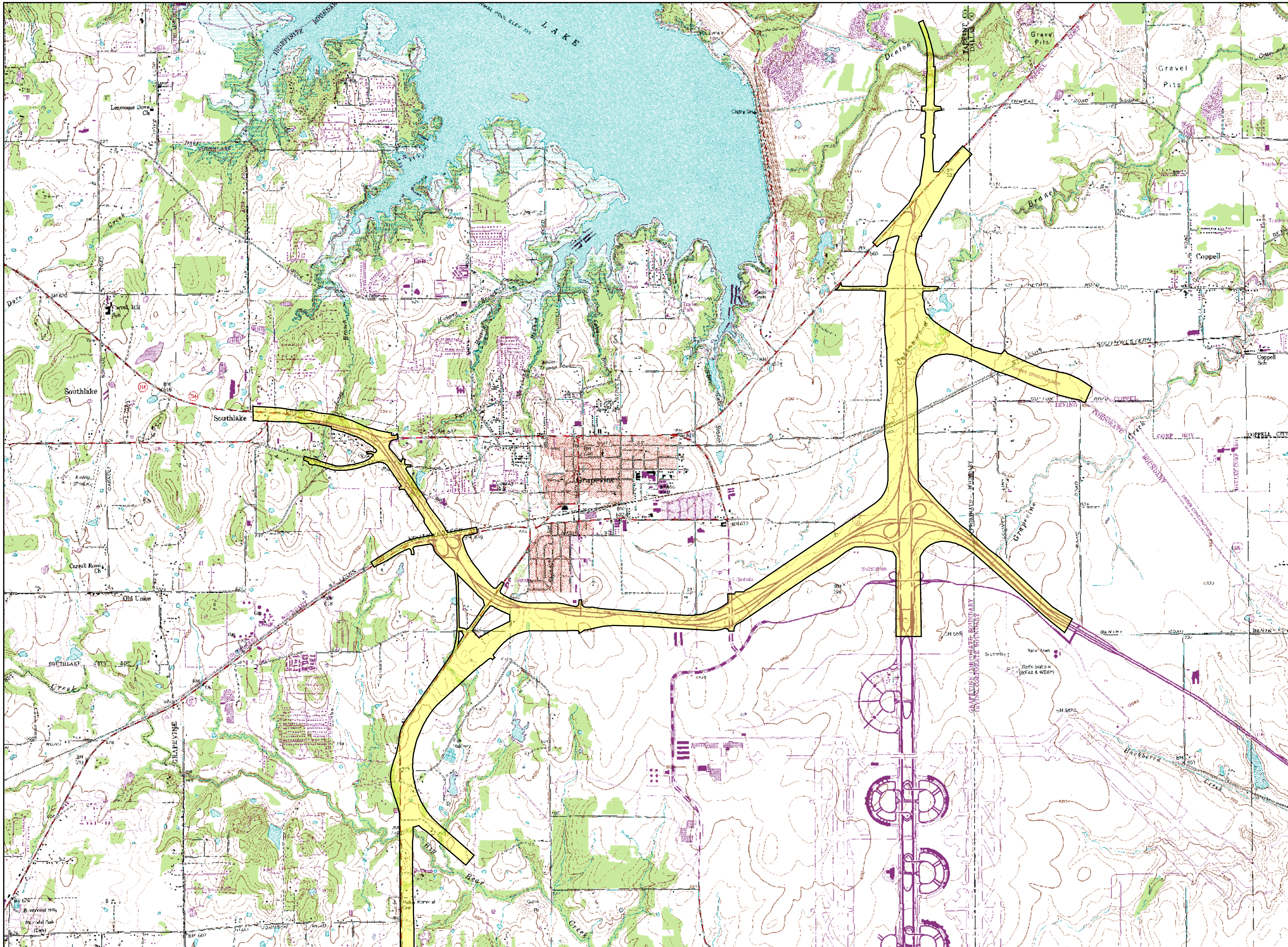
PROJECT LOCATION MAP

DFW Connector Appendix A Project Location

APPENDIX B

USGS TOPOGRAPHIC MAP

DFW Connector
Appendix B
USGS Topographic Map



Area of Proposed Improvements

0 1,600 3,200
Feet

USGS Topographic Quadrangle:
Grapevine, Texas

APPENDIX C

EXISTING AND PROPOSED TYPICAL SECTIONS

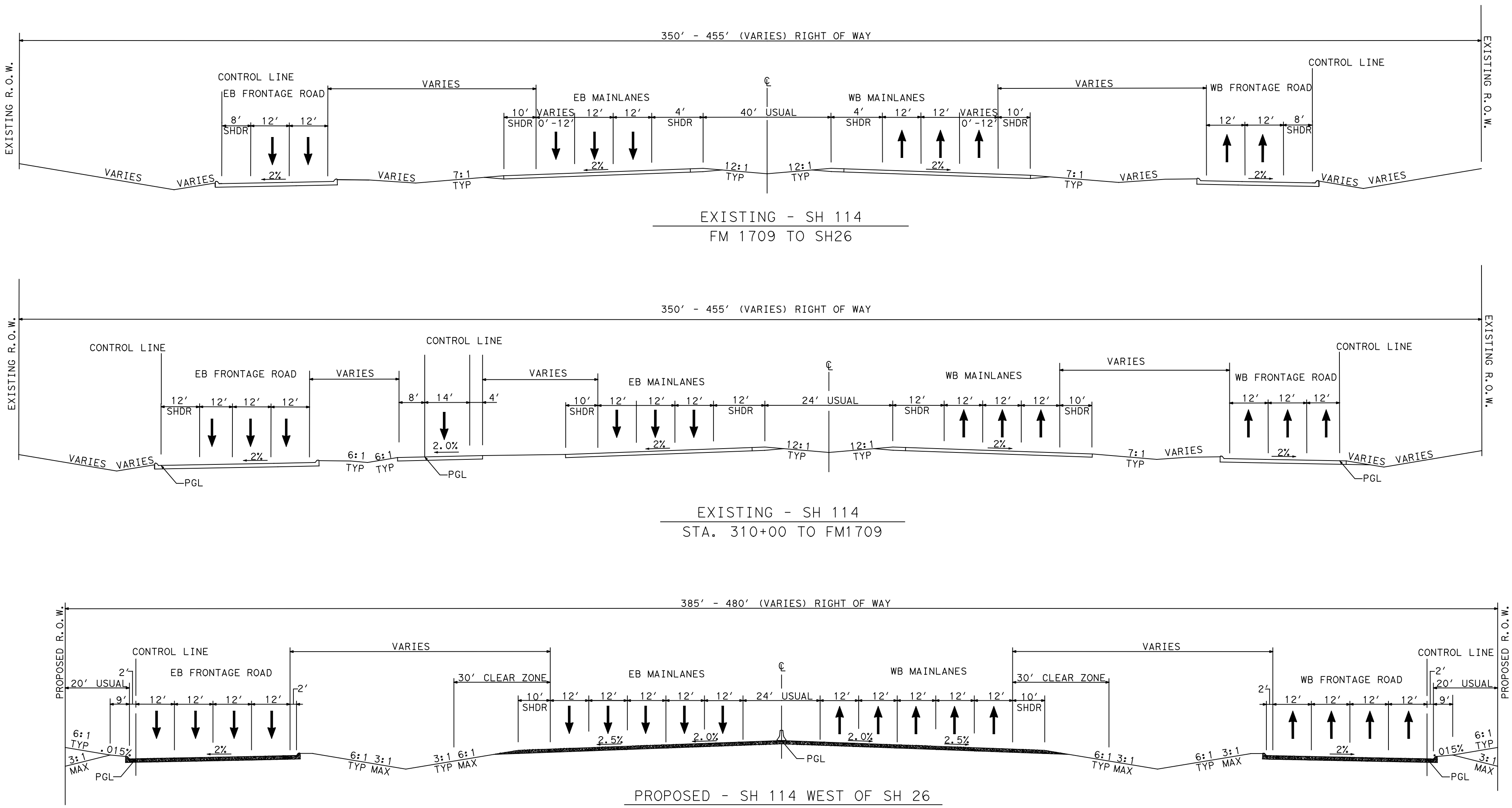
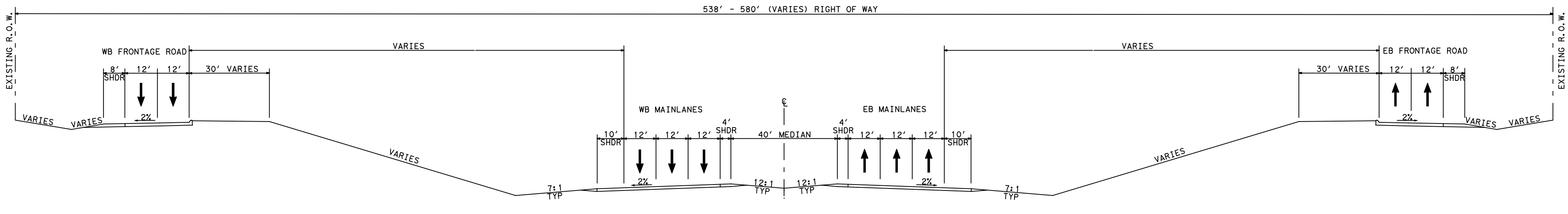
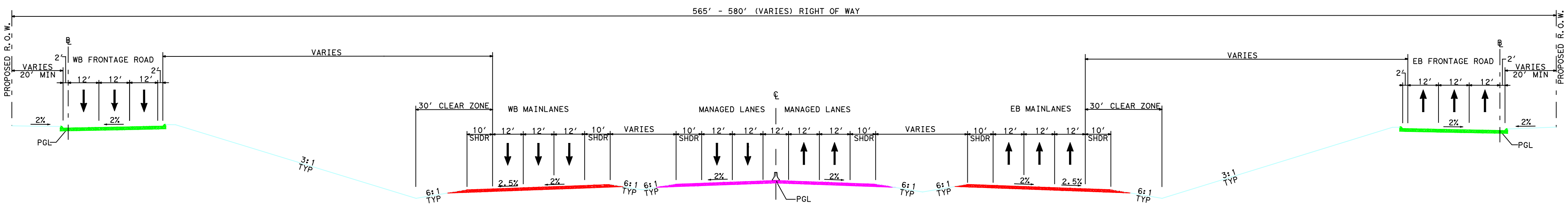

350' - 455' (VARIES) RIGHT OF WAY
EXISTING R.O.W.
CONTROL LINE
EB FRONTAGE ROAD
VARIES
EB MAINLANES
WB MAINLANES
WB FRONTAGE ROAD
40' USUAL
SHDR
7:1 TYP
12:1 TYP
EXISTING - SH 114
FM 1709 TO SH26
EXISTING - SH 114
STA. 310+00 TO FM1709
PGL
24' USUAL
385' - 480' (VARIES) RIGHT OF WAY
PROPOSED R.O.W.
20' USUAL
30' CLEAR ZONE
PROPOSED - SH 114 WEST OF SH 26

Figure C-1

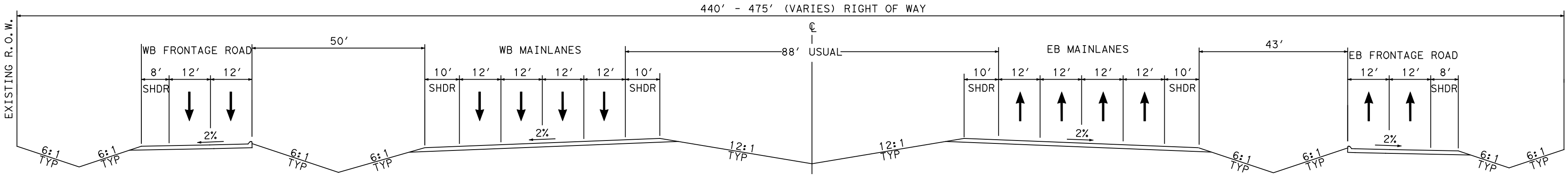


EXISTING - SH 114 AT WM D TATE



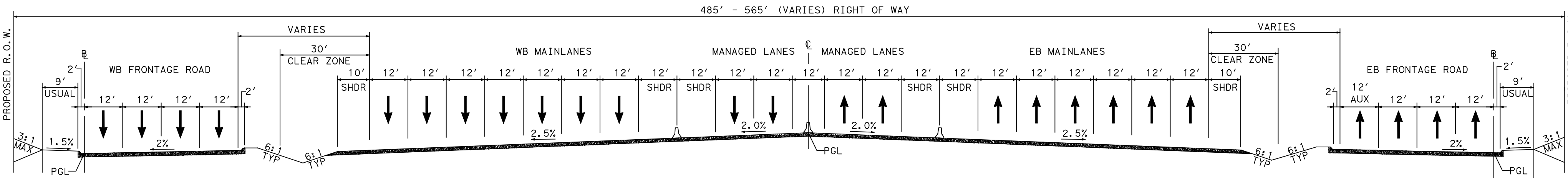
PROPOSED - SH 114 AT WM D TATE

Figure C - 2



EXISTING SH 114/SH 121 BETWEEN MAIN STREET AND TEXAN TRAIL

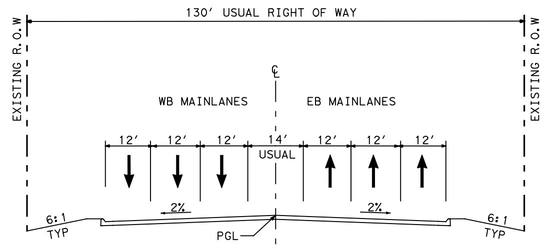
NTS



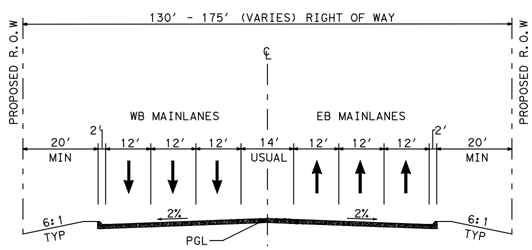
PROPOSED SH 114/SH 121 BETWEEN MAIN STREET AND TEXAN TRAIL

NTS

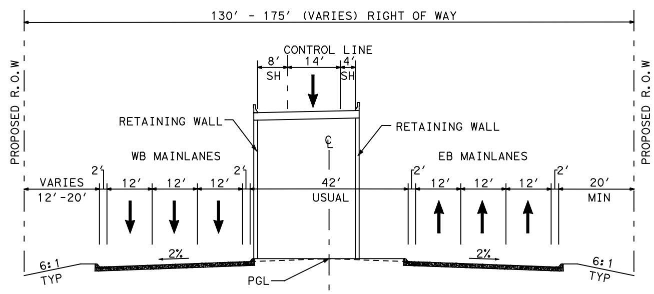
Figure C - 3



EXISTING - FM 1709

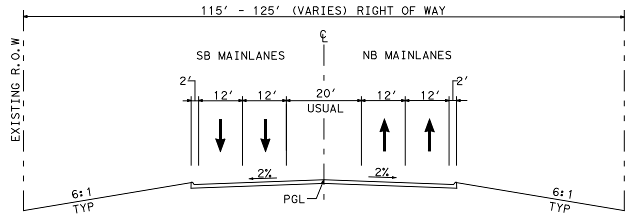


PROPOSED - FM 1709

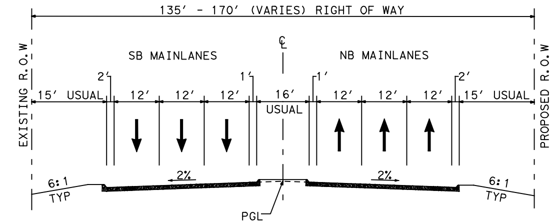


PROPOSED - FM 1709 W/ DC

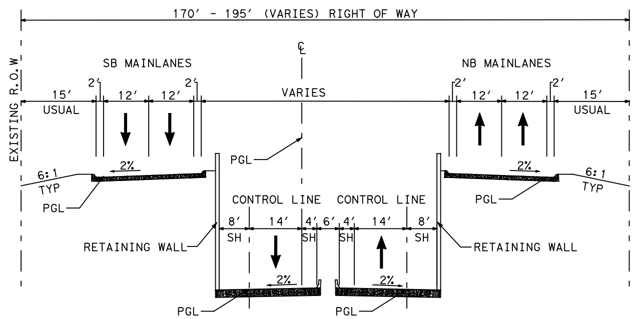
Figure C - 4



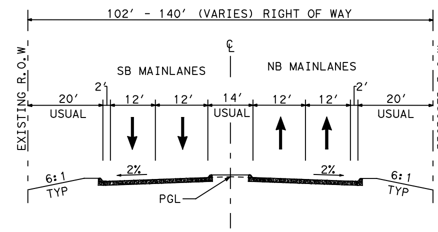
EXISTING - SH 26 SOUTH OF SH 114



EXISTING / PROPOSED - SH 26 SOUTH SIDE OF SH 114

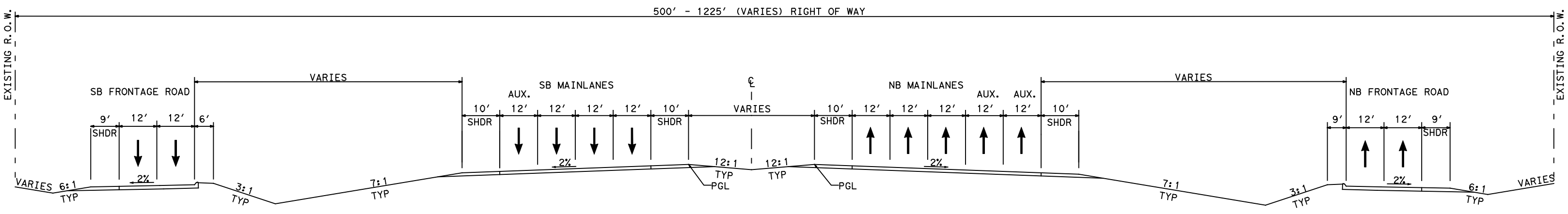


PROPOSED - SH 26 W/ DC SOUTH SIDE OF SH 114

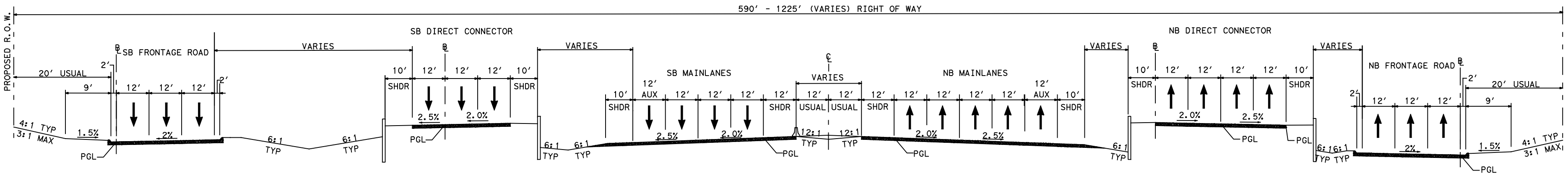


PROPOSED - SH 26 NORTH SIDE OF SH 114

Figure C - 5

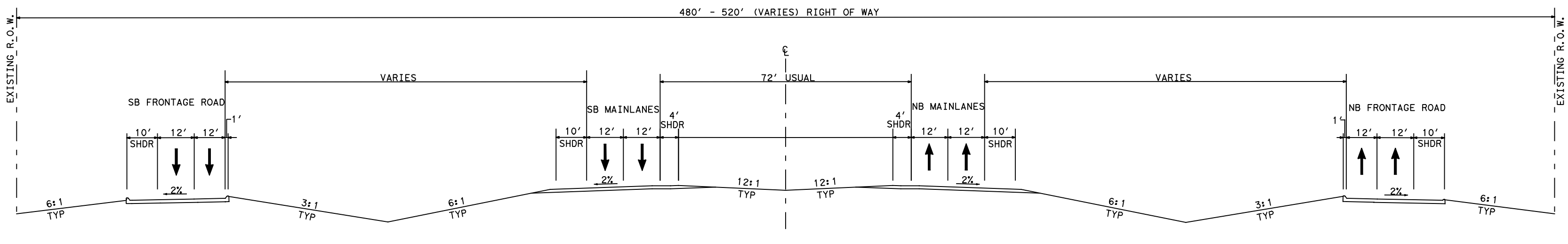


EXISTING - SH 121 SOUTH OF MUSTANG DR

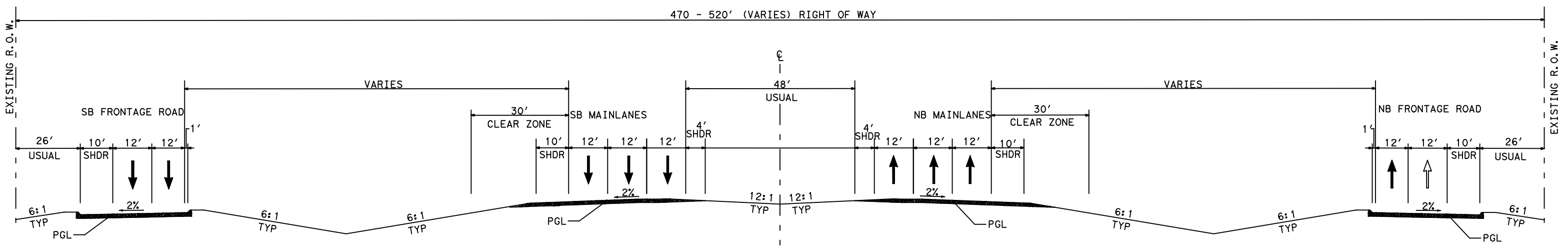


PROPOSED - SH 121 SOUTH OF MUSTANG DR

Figure C - 6

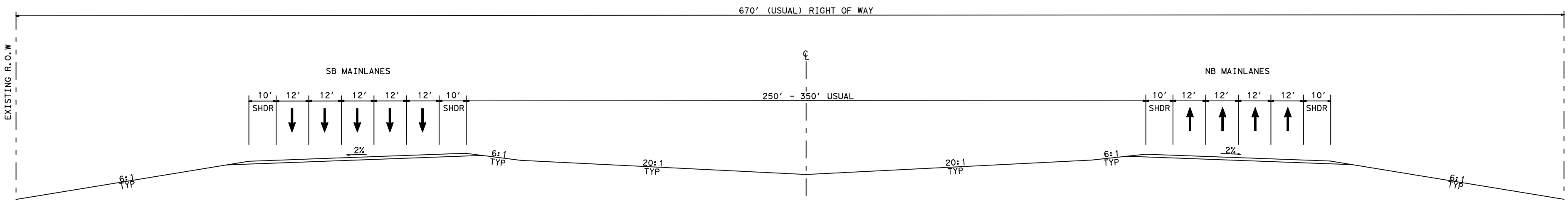


EXISTING - SH 360 NEAR STONE MEYERS PKWY

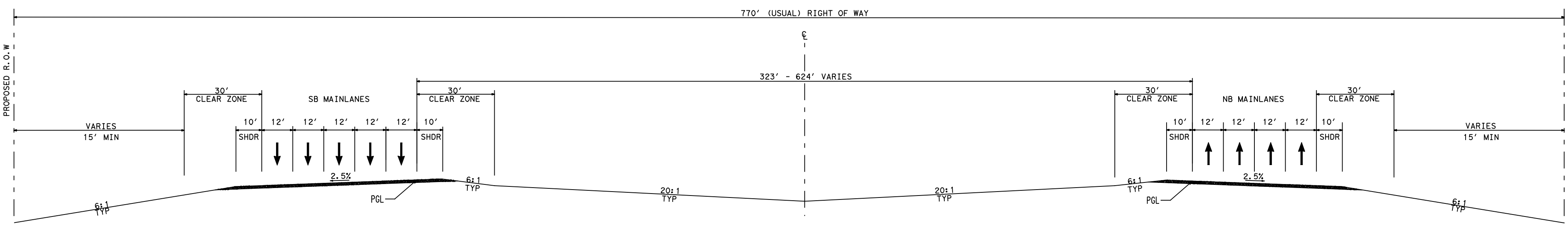


PROPOSED - SH 360 NEAR STONE MEYERS PKWY

Figure C - 7

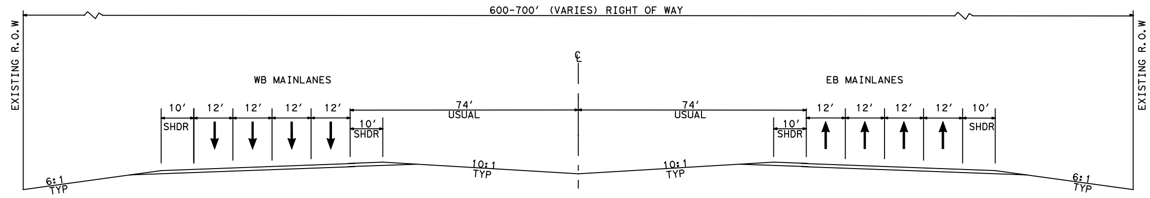


EXISTING - INTERNATIONAL PKWY

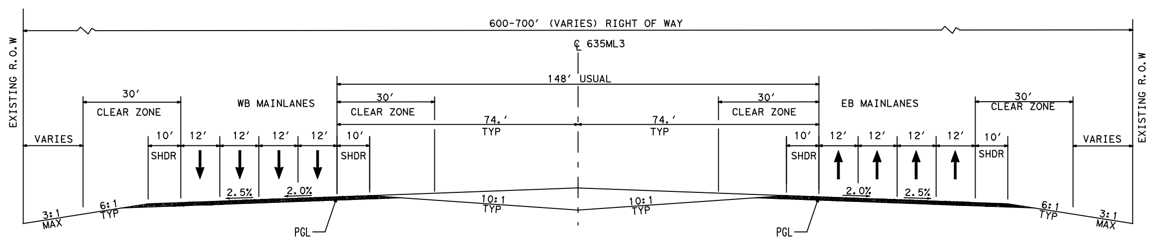


PROPOSED - INTERNATIONAL PKWY

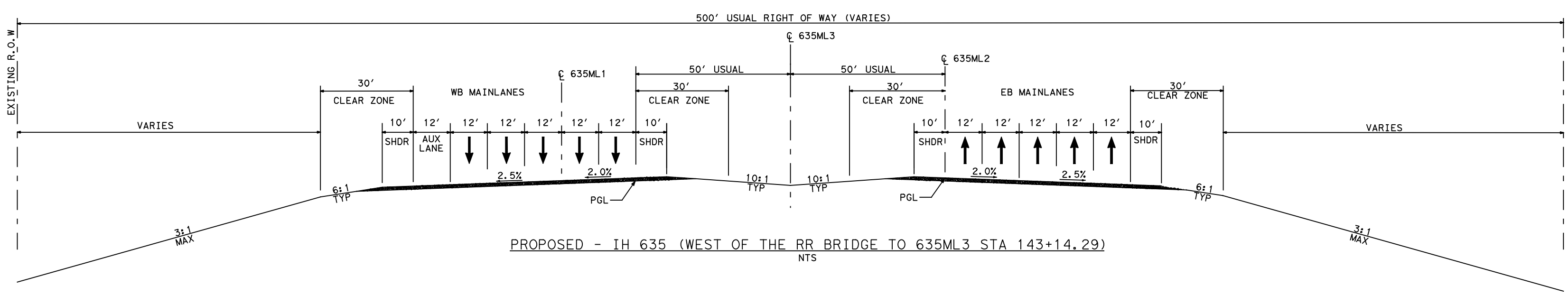
Figure C - 8



EXISTING - IH 635
NTS

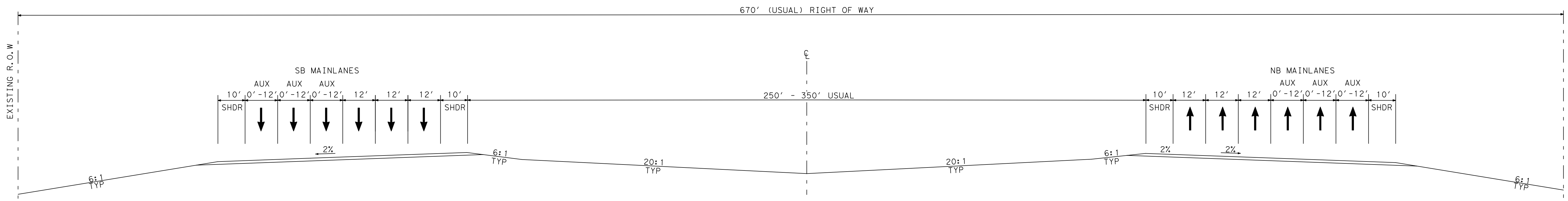


PROPOSED - IH 635 (EAST OF THE RR BRIDGE)
(635ML3) STA 143+14.29 TO STA 170+00.00
NTS

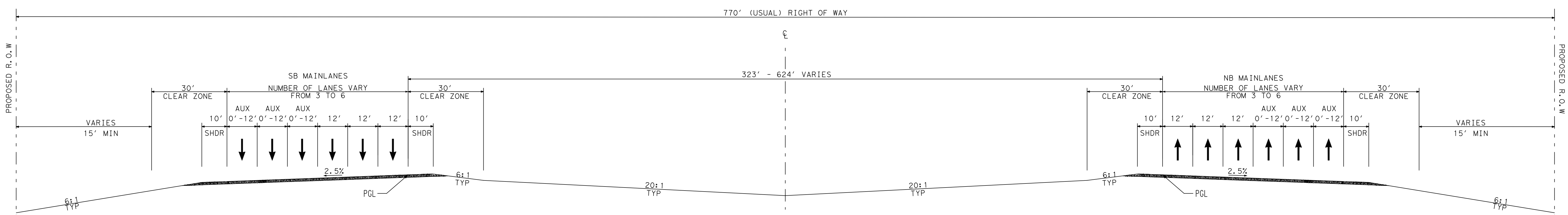


PROPOSED - IH 635 (WEST OF THE RR BRIDGE TO 635ML3 STA 143+14.29)
NTS

Figure C - 9

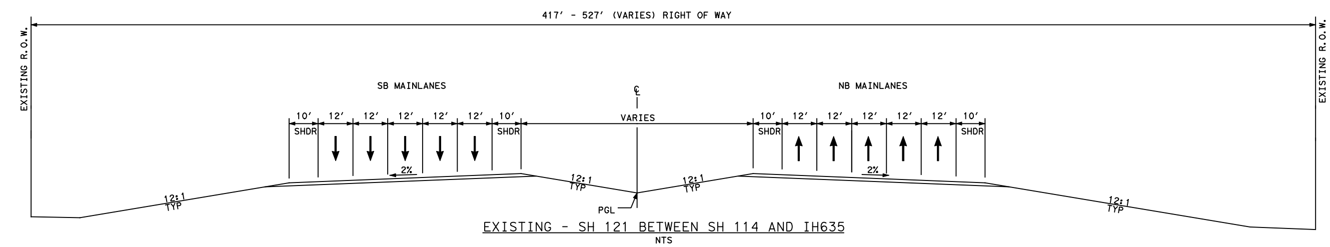


EXISTING - INTERNATIONAL PKWY



PROPOSED - INTERNATIONAL PKWY
(FROM SOUTH OF NORTH AIRFIELD DRIVE TO SH 114)

Figure C - 10


417' - 527' (VARIES) RIGHT OF WAY
EXISTING R.O.W.
SB MAINLANES
NB MAINLANES
VARIES
SHDR
2%
12:1 TYP
PGL
EXISTING - SH 121 BETWEEN SH 114 AND IH635
NTS

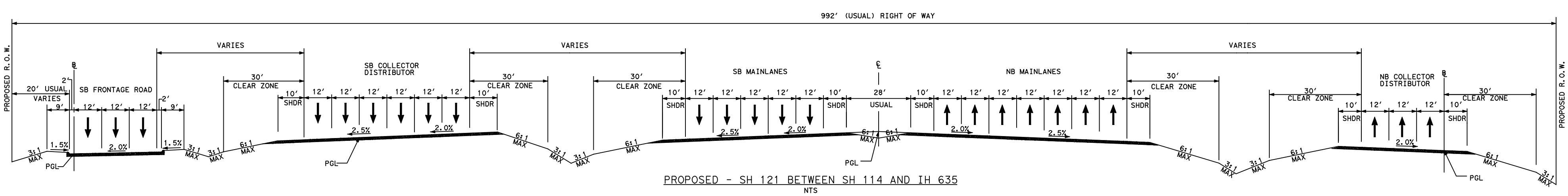
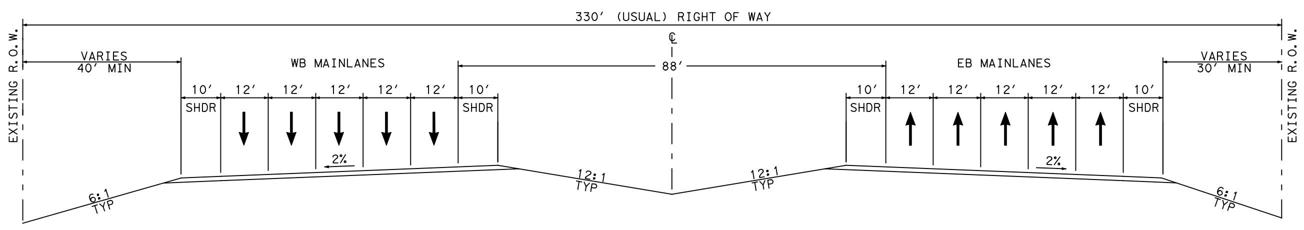
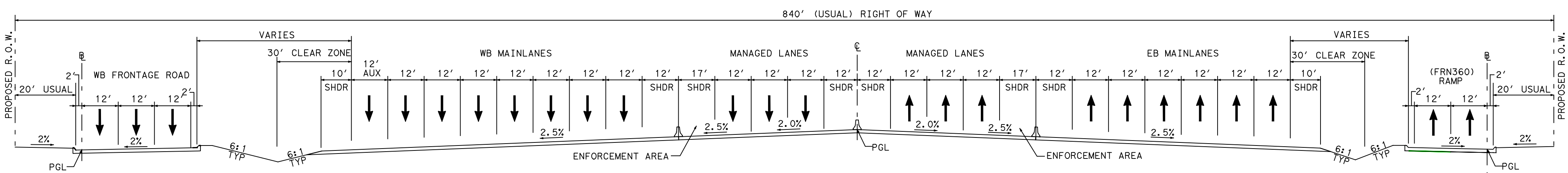

992' (USUAL) RIGHT OF WAY
PROPOSED R.O.W.
SB FRONTAGE ROAD
SB COLLECTOR DISTRIBUTOR
SB MAINLANES
NB MAINLANES
NB COLLECTOR DISTRIBUTOR
VARIES
30' CLEAR ZONE
20' USUAL VARIES
28' USUAL
SHDR
2.0%
2.5%
1.5%
3:1 MAX
6:1 MAX
PGL
PROPOSED - SH 121 BETWEEN SH 114 AND IH 635
NTS

Figure C - 11

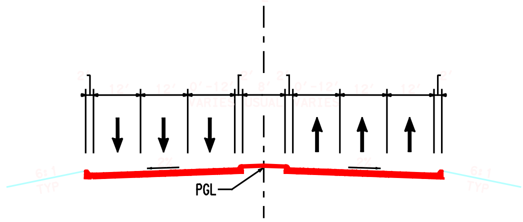


EXISTING - SH 114/SH 121 AT EAST OF TEXAN TRAIL
NTS

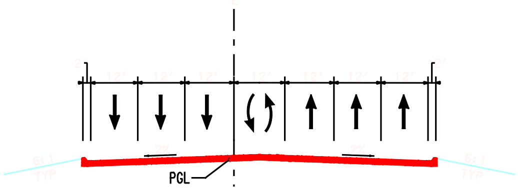


PROPOSED - SH 114/SH 121 AT TOLL GANTRY
NTS

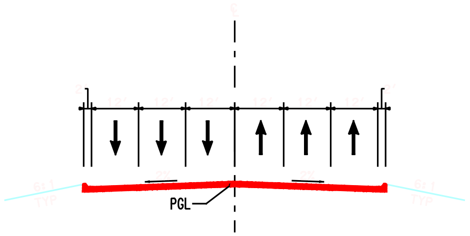
Figure C - 12



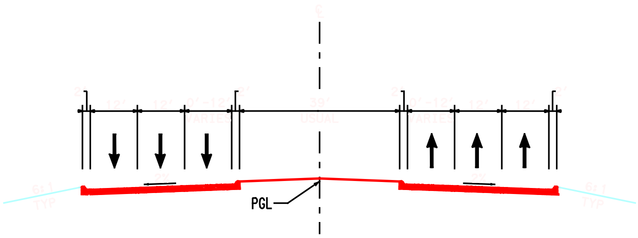
PROPOSED - MUSTANG DRIVE



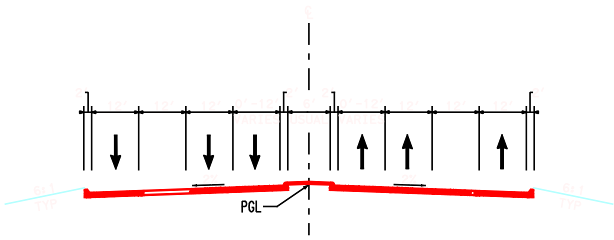
PROPOSED - WILLIAM D. TATE AVE.



PROPOSED - MAIN STREET



PROPOSED - TEXAN TRAIN



PROPOSED - BASS PRO DRIVE

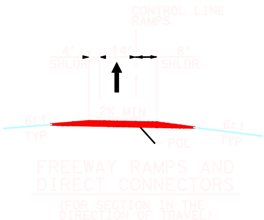


Figure C - 13

APPENDIX D

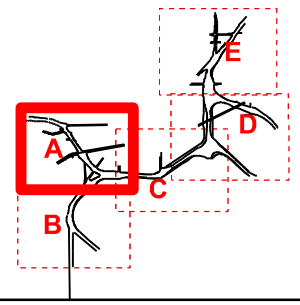
ENVIRONMENTAL FEATURES

DFW CONNECTOR

APPENDIX D

HUMAN ENVIRONMENT

Location Diagram



- Proposed ROW
- Existing ROW
- D Potential Building Displacement
- R Noise Receiver
- Photo Locations
- Hazardous Materials Site
- Construction Easement
- DFW International Airport Land

N

0 250 500 1,000
Feet

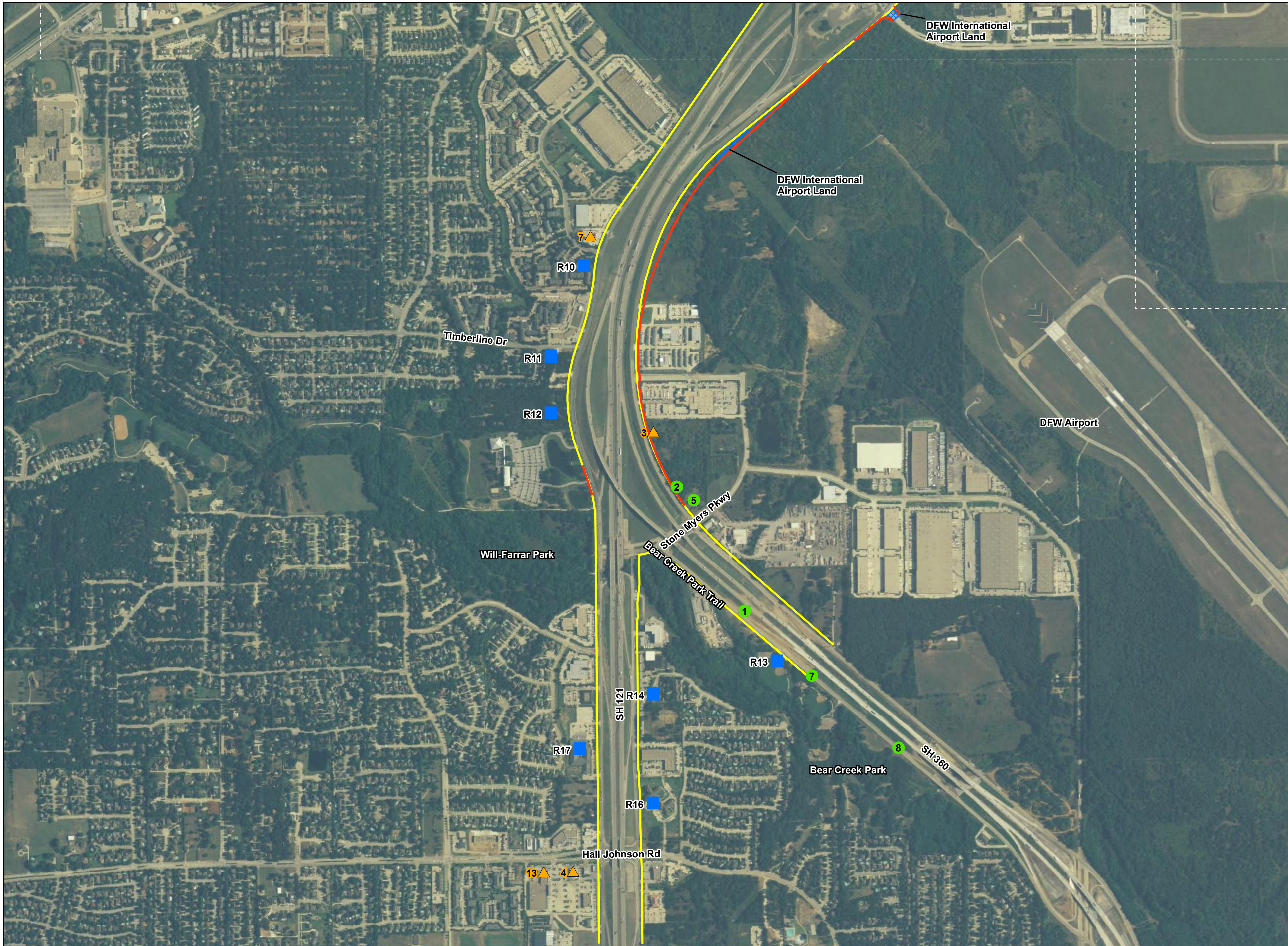
One Inch Equals 1000 Feet

Plate A

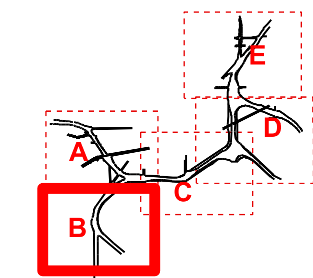
DFW CONNECTOR

APPENDIX D

HUMAN ENVIRONMENT



Location Diagram



Proposed ROW

Existing ROW

D Potential Building Displacement

R Noise Receiver

Photo Locations

Hazardous Materials Site

Construction Easement

DFW International Airport Land

N

0 250 500 1,000

Feet

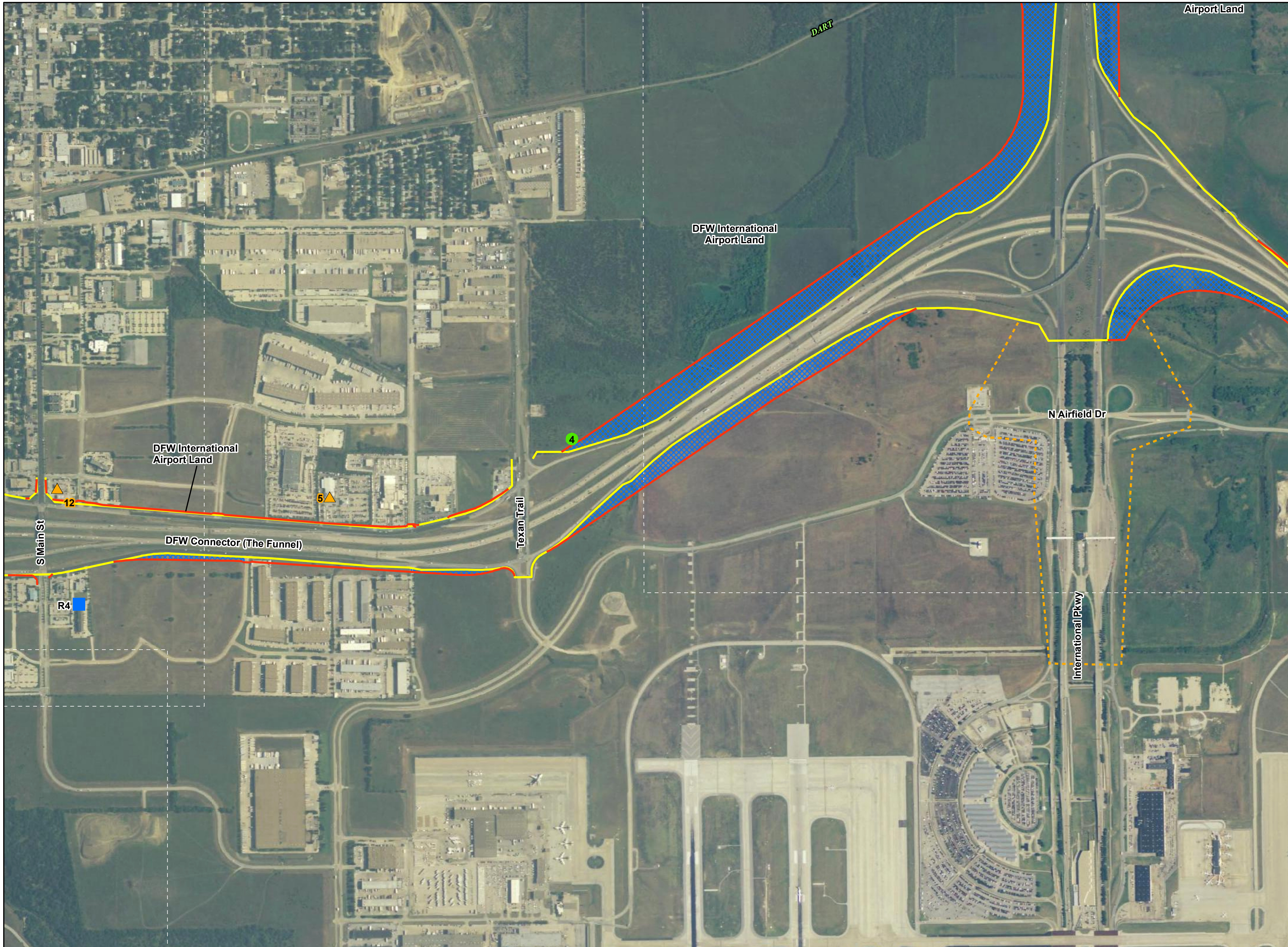
One Inch Equals 1000 Feet

Plate B

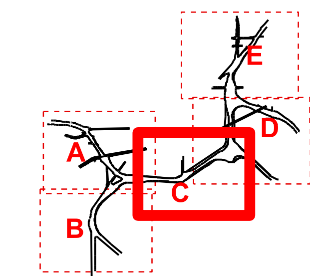
DFW CONNECTOR

APPENDIX D

HUMAN ENVIRONMENT



Location Diagram



- Hazardous Materials Site
- Potential Building Displacement
- D Photo Locations
- R Noise Receiver
- Proposed ROW
- Existing ROW
- Construction Easement
- DFW International Airport Land

N

0 250 500 1,000

Feet

One Inch Equals 1000 Feet

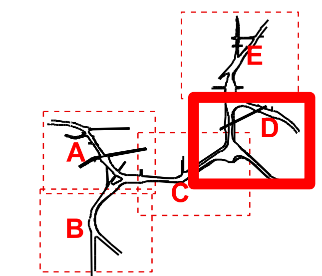
Plate C

DFW CONNECTOR

APPENDIX D

HUMAN ENVIRONMENT

Location Diagram



Proposed ROW

Existing ROW

D Potential Building Displacement

R Noise Receiver

Photo Locations

Hazardous Materials Site

Construction Easement

DFW International Airport Land

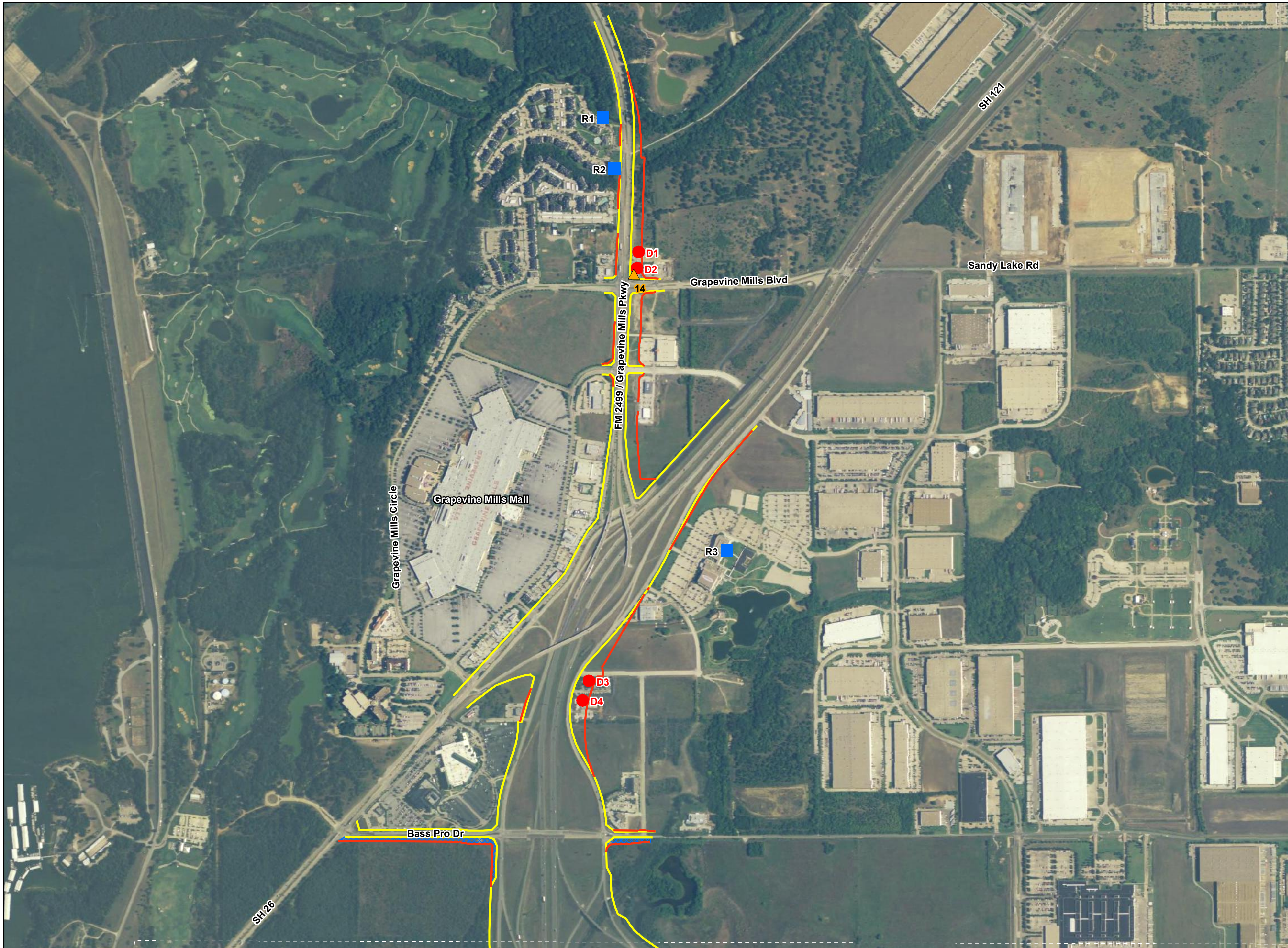
N

0 250 500 1,000

Feet

One Inch Equals 1000 Feet

Plate D

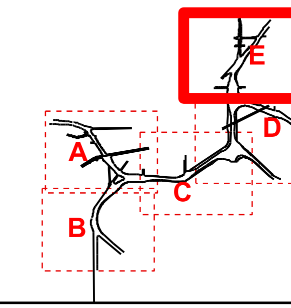


DFW CONNECTOR

APPENDIX D

HUMAN ENVIRONMENT

Location Diagram



- Proposed ROW
- Existing ROW
- D Potential Building Displacement
- R Noise Receiver
- Photo Locations
- Hazardous Materials Site
- Construction Easement
- DFW International Airport Land

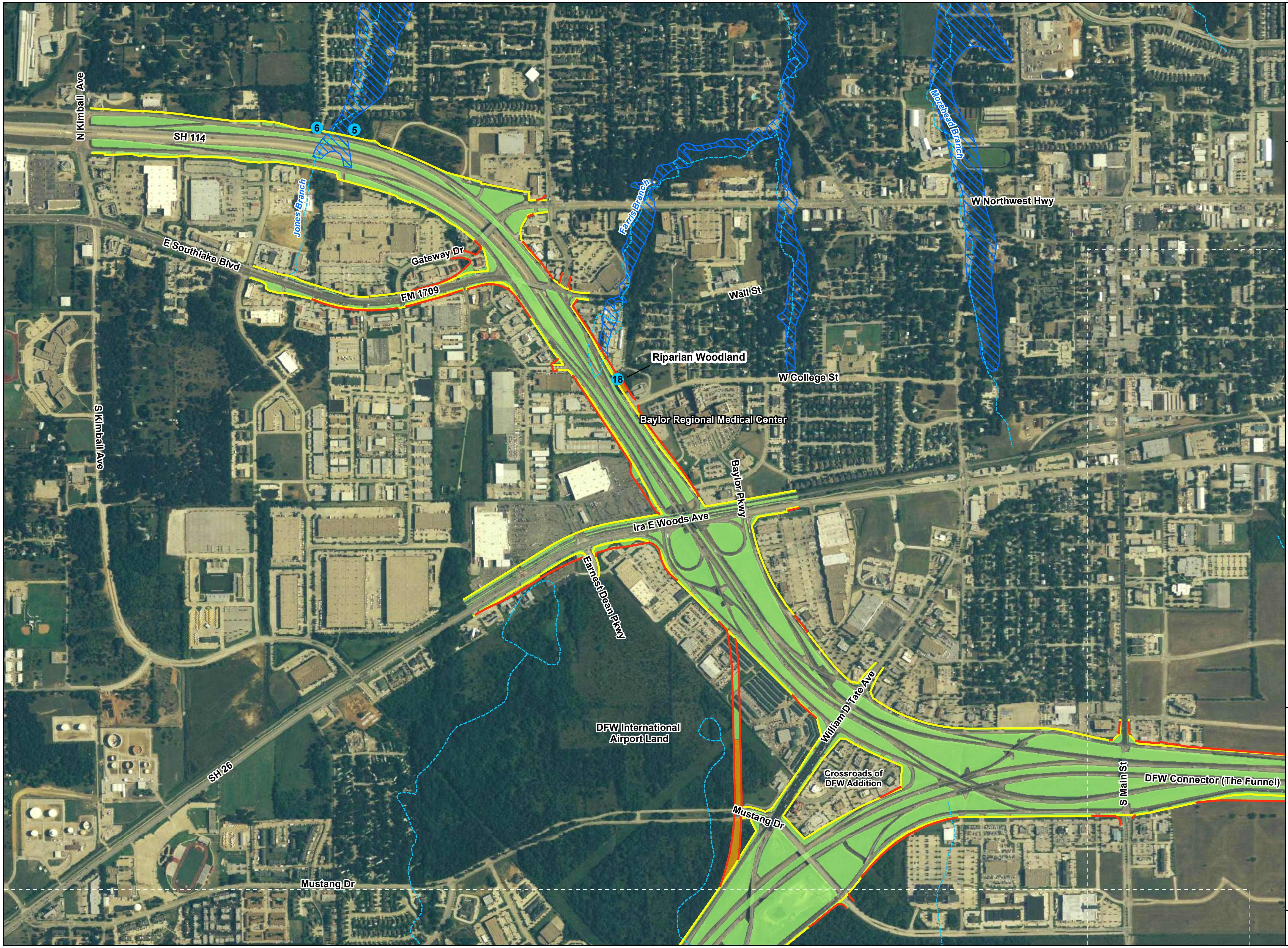
N

0 250 500 1,000

Feet

One Inch Equals 1000 Feet

Plate E

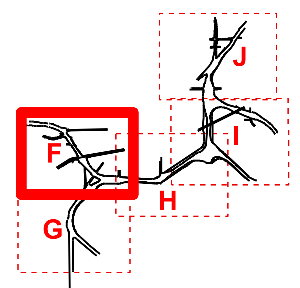


DFW CONNECTOR

APPENDIX D

NATURAL ENVIRONMENT

Location Diagram



- Proposed ROW
- Existing ROW
- Stream / Creek
- FEMA 100 Year Floodplain
- Wetland Mitigation Area
- Construction Easement
- Grassland
- Mesquite Juniper Savannah
- Mixed Oak Woodland
- Riparian Woodland
- Riparian Scrub/Shrub Vegetation
- Water Features

N

0 250 500 1,000

Feet

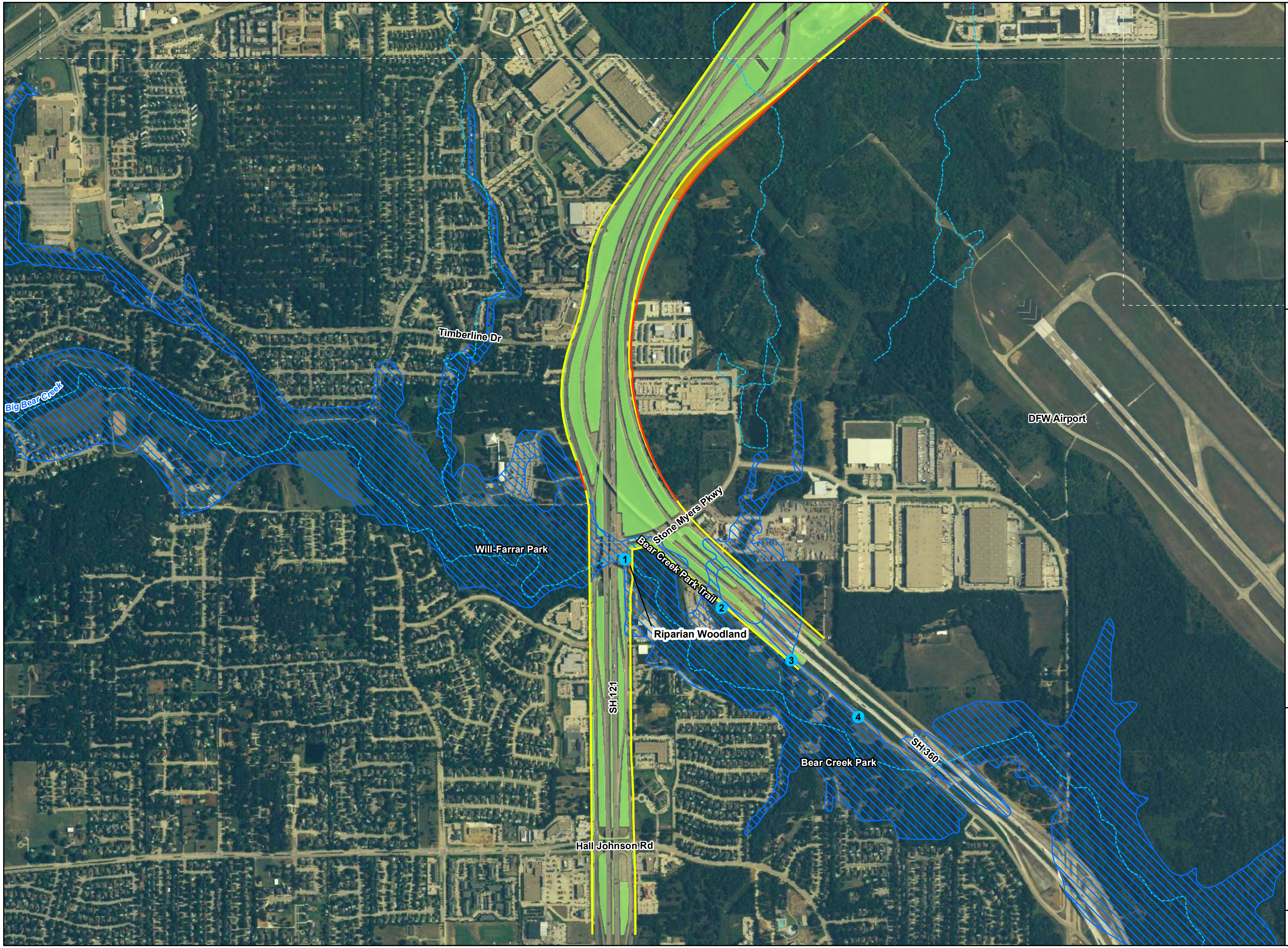
One Inch Equals 1000 Feet

Plate F

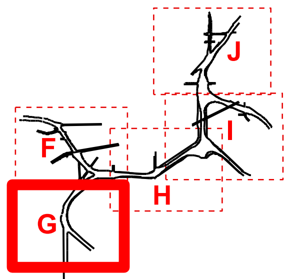
DFW CONNECTOR

APPENDIX D

NATURAL ENVIRONMENT



Location Diagram



Proposed ROW
Existing ROW
Stream / Creek
FEMA 100 Year Floodplain
Wetland Mitigation Area
Construction Easement
Grassland
Mesquite Juniper Savannah
Mixed Oak Woodland
Riparian Woodland
Riparian Scrub/Shrub Vegetation
Water Features

N

0 250 500 1,000
Feet

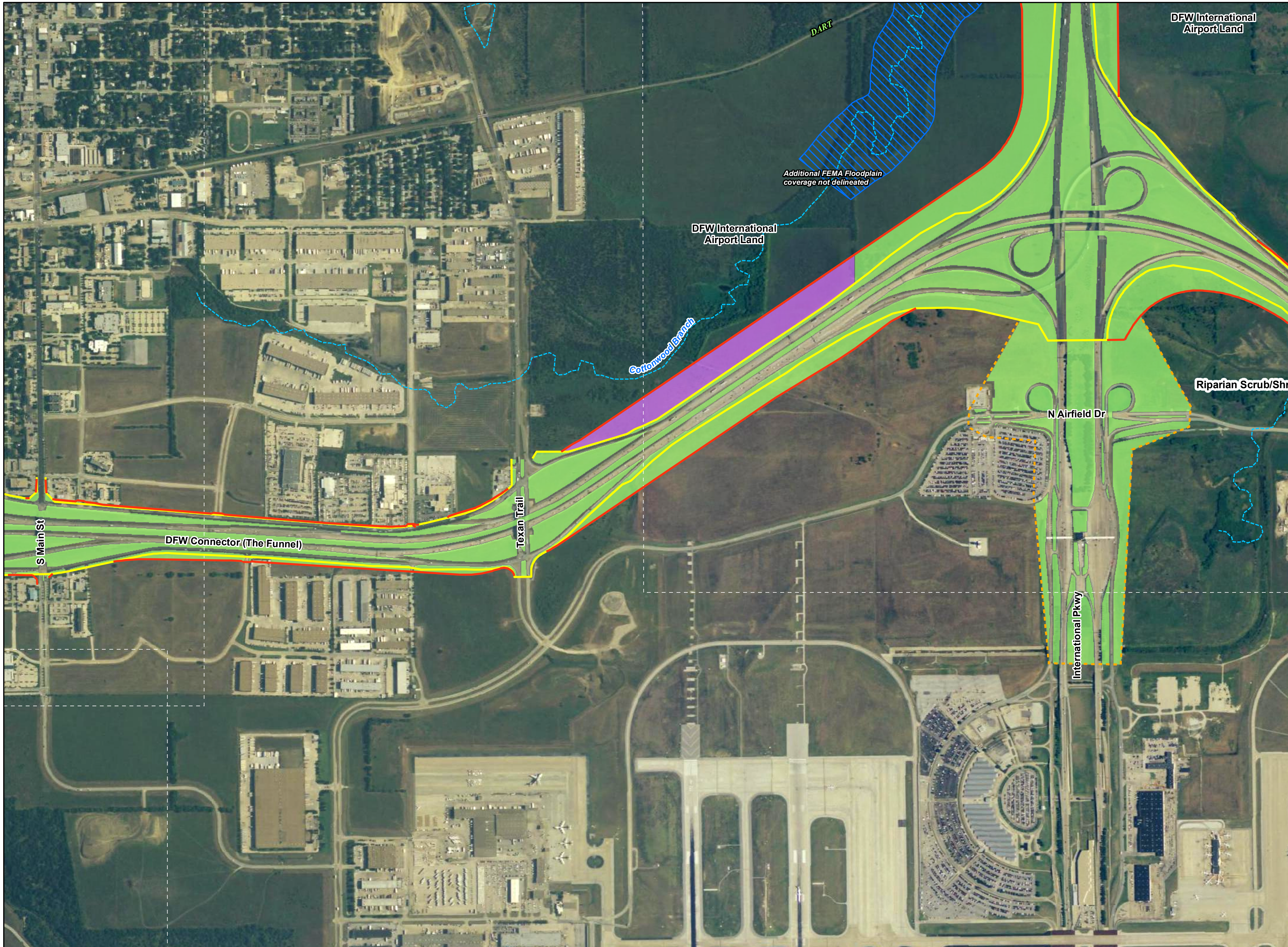
One Inch Equals 1000 Feet

Plate G

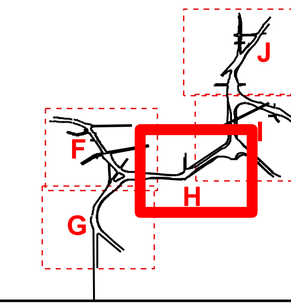
DFW CONNECTOR

APPENDIX D

NATURAL ENVIRONMENT



Location Diagram



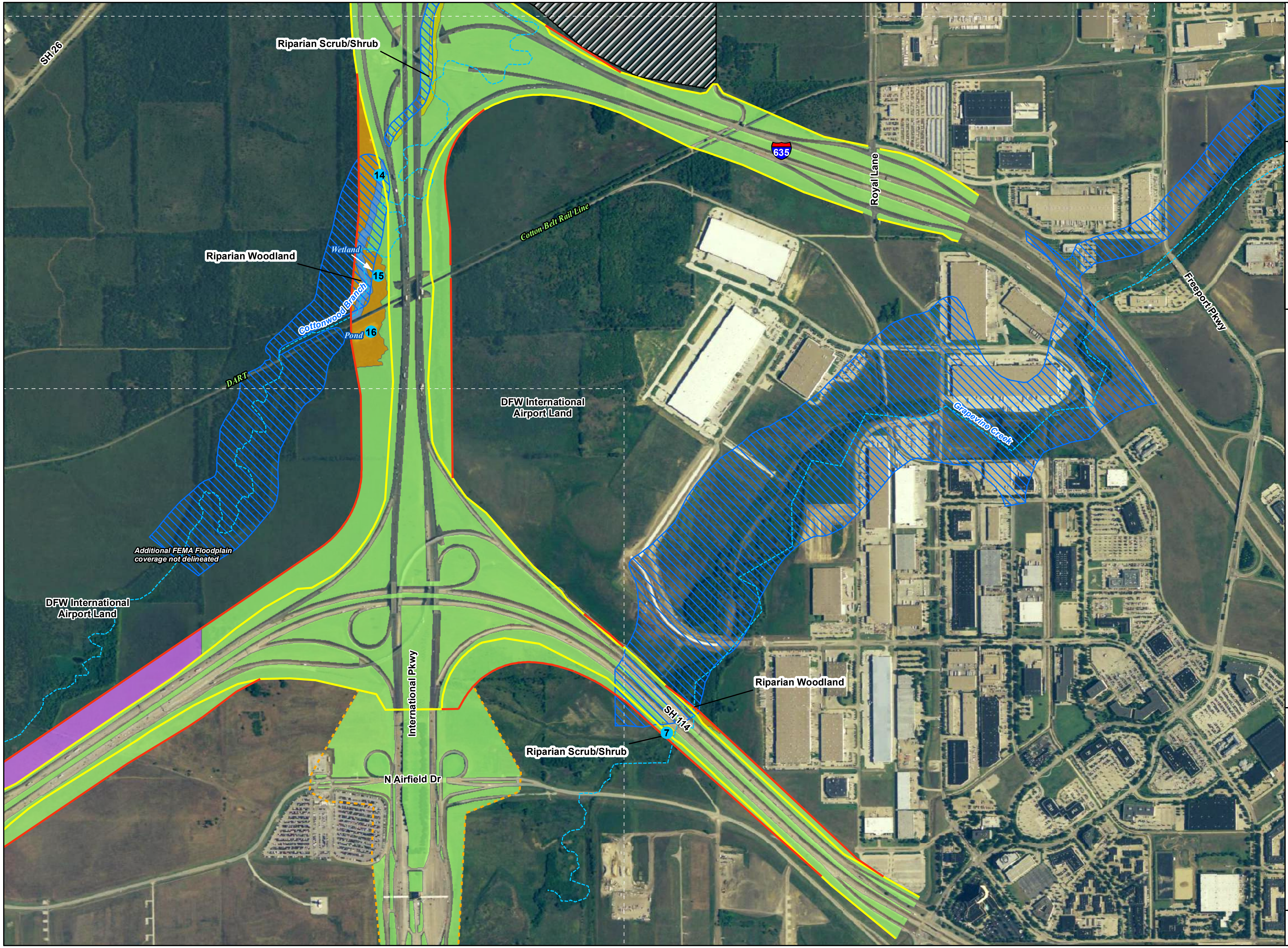
- Proposed ROW
- Existing ROW
- Stream / Creek
- FEMA 100 Year Floodplain
- Wetland Mitigation Area
- Construction Easement
- Grassland
- Mesquite Juniper Savannah
- Mixed Oak Woodland
- Riparian Woodland
- Riparian Scrub/Shrub Vegetation
- Water Features

N

0 250 500 1,000
Feet

One Inch Equals 1000 Feet

Plate H

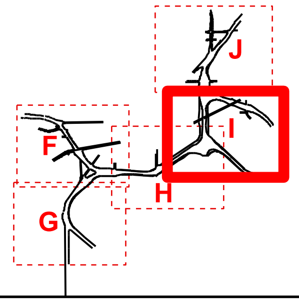


DFW CONNECTOR

APPENDIX D

NATURAL ENVIRONMENT

Location Diagram



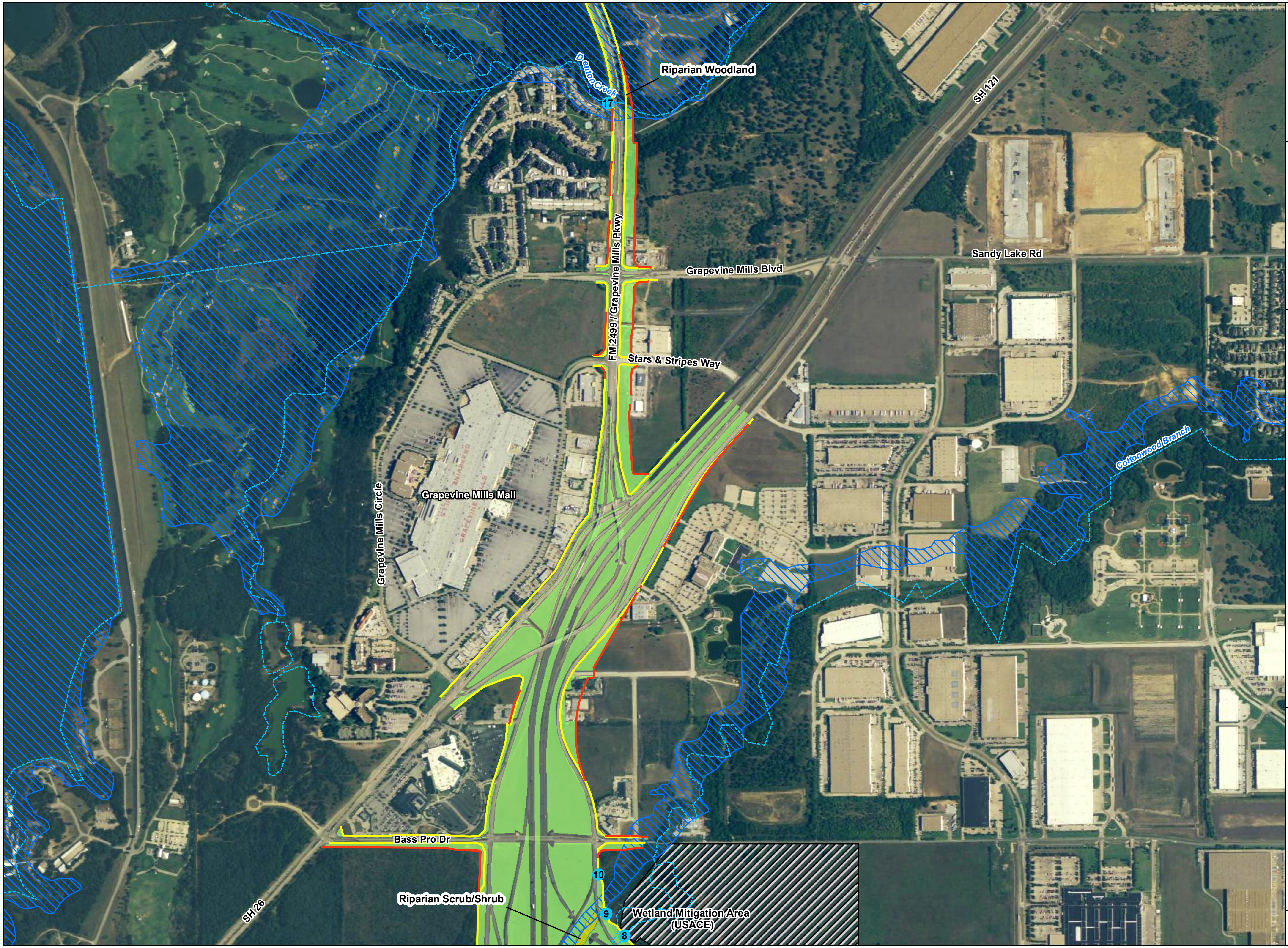
- Proposed ROW
- Existing ROW
- Stream / Creek
- FEMA 100 Year Floodplain
- Wetland Mitigation Area
- Construction Easement
- Grassland
- Mesquite Juniper Savannah
- Mixed Oak Woodland
- Riparian Woodland
- Riparian Scrub/Shrub Vegetation
- Water Features

N

0 250 500 1,000
Feet

One Inch Equals 1000 Feet

Plate I

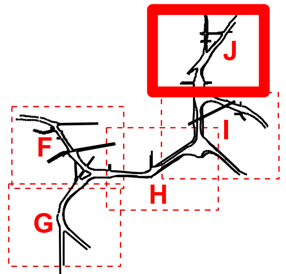


DFW CONNECTOR

APPENDIX D

NATURAL ENVIRONMENT

Location Diagram



- Proposed ROW
- Existing ROW
- Stream / Creek
- FEMA 100 Year Floodplain
- Wetland Mitigation Area
- Construction Easement
- Grassland
- Mesquite Juniper Savannah
- Mixed Oak Woodland
- Riparian Woodland
- Riparian Scrub/Shrub Vegetation
- Water Features

N

0 250 500 1,000
Feet

One Inch Equals 1000 Feet

Plate J

APPENDIX E

PHOTOGRAPHS

APPENDIX E

PHOTOGRAPHS

Photo 1. Riparian woodland at a tributary to Big Bear Creek.

Photo 2. Mixed oak woodland adjacent to existing Hwy 360 right-of-way.

Photo 3. Mixed oak woodland adjacent to existing SH 114 right-of-way.

Photo 4. Mesquite-juniper savannah adjacent to existing SH 114-121 right-of-way.


Photo 5. Maintained grasses in the existing Hwy 360 right-of-way.

Photo 6. Ornamental vegetation at a commercial site along William D. Tate Avenue.

Photo 7. Tributary of Big Bear Creek, viewing upstream.

Photo 8. SH 360 eastbound frontage road, looking west at interchange with SH 121.

Photo 9. SH 114, eastbound, just east of Ira E. Woods Avenue.

Photo 10. SH 121, northbound, just east of William D. Tate Avenue.

APPENDIX F

CENSUS TRACT AND BLOCK GROUP MAP

DFW Connector
Appendix F
Census Tract Boundaries

Area of Proposed Improvements
Block Group Boundary
Census Tract Boundary

N

0 1,600 3,200
Feet

APPENDIX G

PUBLIC MEETINGS

APPENDIX G

PUBLIC MEETINGS

Meeting Date	Location	Notice Provided	Number of Attendees
May 21, 1997	Grapevine Convention Center	Newspaper Advertisement	58
September 3, 1998	Grapevine City Council Chambers	Newspaper Advertisement and direct mail Newsletter	23
December 10, 1998	Grapevine City Council Chambers	Newspaper Advertisement and direct mail Newsletter	32
April 27, 1999	Grapevine City Council Chambers	Newspaper Advertisement and direct mail Newsletter	71
July 15, 1999	Grapevine City Council Chambers	Newspaper Advertisement and direct mail Newsletter	57
February 23, 2006	Grapevine Convention Center	Newspaper Advertisement and direct mail Newsletter	339

APPENDIX H

MOBILE SOURCE AIR TOXIC ANALYSIS

SH 114/SH 121
From BS114L in Grapevine
to the
Dallas County Line
CSJ: 0353-03-059&097
Final Mobile Source Air Toxic Analysis
NEPA Document

SECTION 1: AFFECTED ENVIRONMENT

1.1 AIR QUALITY

1.1.1 Air Toxics Background

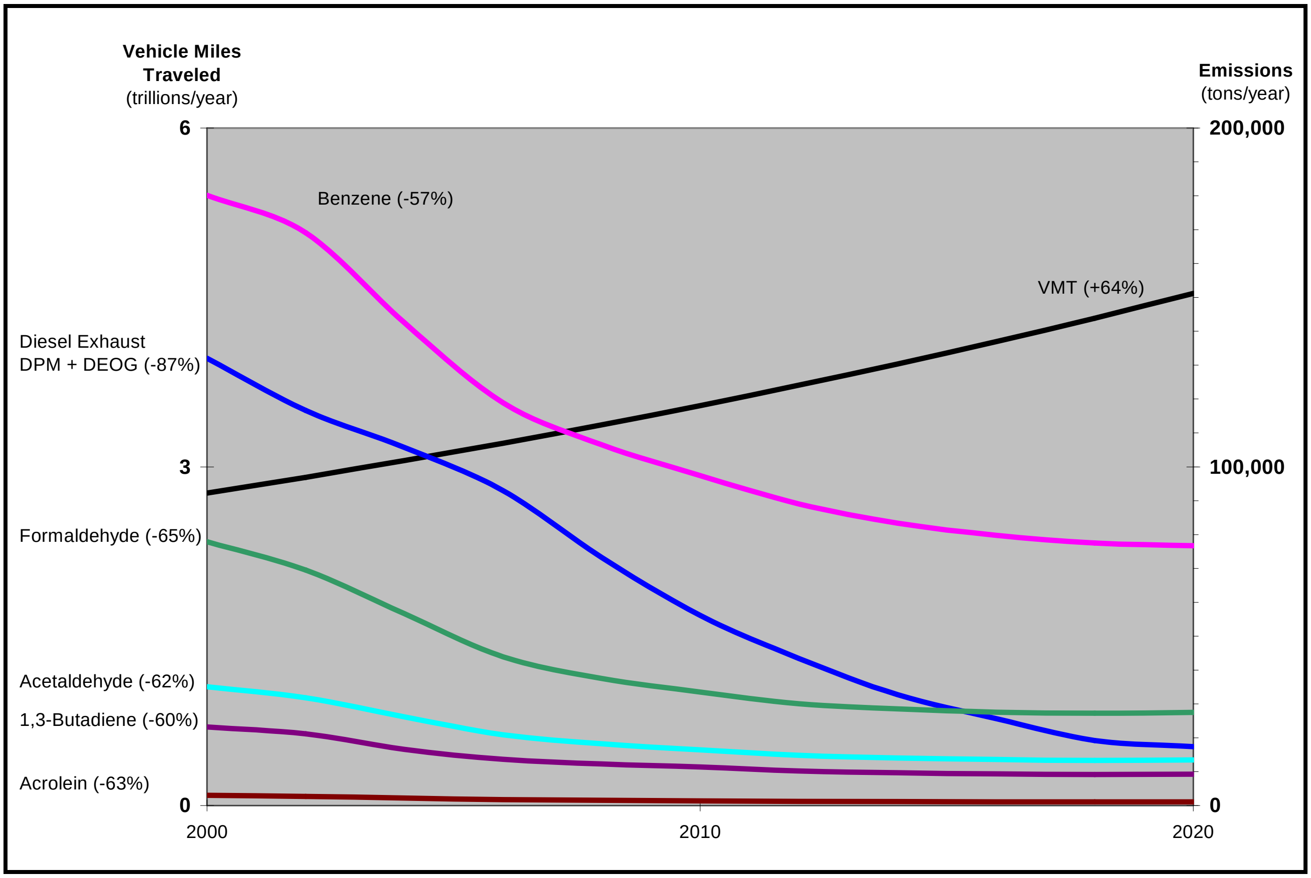
In addition to the criteria air pollutants for which there are National Ambient Air Quality Standards (NAAQS), EPA also regulates air toxics. Air toxics are pollutants known or suspected to cause cancer or other serious health or environmental effects. Most air toxics originate from human-made sources, including on-road mobile sources (cars, light trucks, motorcycles, and 18-wheelers), non-road mobile sources (e.g., bulldozers, locomotives, aircraft, boats, etc.) area sources (e.g., dry cleaners, gas stations), and stationary/point sources (e.g., electric utilities, petrochemical refining, and other industry).

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. 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 (see EPA420-R-00-023 [EPA, 2000a] for more details on MSATs). Studies have found up to 50 percent of the monitored amounts of formaldehyde and acetaldehyde in the atmosphere are not directly emitted by mobile sources but are formed secondarily in the atmosphere (South Coast Air Quality Management District [SCAQMD], 2000).

In 2006, the Federal Highway Administration (FHWA), and the Texas Department of Transportation (TxDOT) issued new guidance on completing Mobile Source Air Toxic (MSAT) assessments of highway projects. Quantitative assessments of MSATs can provide some information on the quantity of MSATs emitted from passenger cars, light trucks, and heavy trucks. However, simple quantification of the emissions, coupled with other considerable uncertainties associated with the existing estimates of toxicity of the various MSATs, would not give enough information to reach meaningful conclusions about project-specific health impacts.

The EPA is the lead federal agency for administering the Clean Air Act and has certain responsibilities regarding the health effects of MSATs. 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-road 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-road emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57 percent to 65 percent, and will reduce on-road diesel PM emissions by 87 percent, as shown in Figure 1.

FIGURE 1
VEHICLE MILES TRAVELED (VMT) VS. MOBILE SOURCE AIR TOXICS EMISSIONS, 2000-2020



Notes: For on-road mobile sources. Emissions factors were generated using MOBILE6.2. MTBE proportion of market for oxygenates is held constant, at 50%. Gasoline RVP and oxygenate content are held constant. VMT: Highway Statistics 2000, Table VM-2 for 2000, analysis assumes annual growth rate of 2.5%. "DPM + DEOG" is based on MOBILE6.2-generated factors for elemental carbon, organic carbon and SO4 from diesel-powered vehicles, with the particle size cutoff set at 10.0 microns.
Source: FHWA 2006

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 are effective on 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 evaporative emissions that permeate through portable fuel containers; and (3) reducing non-methane hydrocarbon (NMHC) exhaust emissions from passenger vehicles operated at cold temperatures (under 75 degrees Fahrenheit).

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 gasoline, nationwide. This would be a 38 percent reduction from 2007. EPA standards to reduce NMHC exhaust emissions from new gasoline-fueled passenger vehicles will become effective in phases. Standards for light-duty vehicles and trucks (≤ 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. The 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), more than one million tons of volatile organic compounds, and more than 19,000 tons of PM2.5.

1.1.2 TCEQ Monitor Data

The TCEQ monitors for the criteria pollutants and air toxics. Not all monitors measure for all criteria pollutants and air toxics. The closest monitors are within five miles of SH 114/121 (Table 1). The closest HAP monitor is approximately 1.75 miles from SH 114/121. The official data from these monitors are found on the EPA's maintained web site, not all monitors sample for the same pollutants, and various monitors do not have one year of complete data to compile an annual average. It usually takes several months after a complete year of data is collected for that data to be quality controlled and quality assured.

TABLE 1
LOCAL MONITOR DATA

Monitor ID	2006 Annual Average 1-Hour $PM_{2.5}$	2006 Peak 24-Hour Annual Average					Distance from SH 114/121
		Benzene	1,3 Butadiene	Formaldehyde	Acetaldehyde	Acrolein	
CAMS 13	11.07 ug/m3	4.96 ug/m3	0.20 ug/m3	2.97 ug/m3	3.06 ug/m3	0.32 ug/m3	16.11 miles
CAMS 401 (aka CAMS 60)	11.54 ug/m3	4.76 ug/m3	0.24 ug/m3	3.48 ug/m3	3.44 ug/m3	0.33 ug/m3	12.65 miles
CAMS 70	N/A	3.58 ug/m3	0.13 ug/m3	N/A	N/A	N/A	1.75 miles
CAMS 63	N/A	N/A	N/A	N/A	N/A	N/A	13.10 miles
CAMS 17	N/A	N/A	N/A	N/A	N/A	N/A	10.42 miles

Notes: EPA disclaimer regarding these data: "Readers are cautioned not to infer a qualitative ranking order of geographic areas based on AirData reports. Air pollution levels measured in the vicinity of a particular monitoring site may not be representative of the prevailing air quality of a county or urban area. Pollutants emitted from a particular source may have little impact on the immediate geographic area, and the amount of pollutants emitted does not indicate whether the source is complying with applicable regulations." Source: EPA, 2007-2008

1.1.3 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 health effects of this project (see "Unavailable Information for Project Specific MSAT Impact Analysis" section within this Appendix for more information). However, it is possible to quantitatively assess the "relative" levels of future MSAT emissions for the build and no build project alternatives. Although a quantitative 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 assessment presented below is based on project specifics as well as derived in part from a study conducted by the FHWA titled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*, found at:

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

The Federal Highway Administration (FHWA) and Texas Department of Transportation (TxDOT) propose to widen and reconstruct State Highway (SH) 114 and SH 121 in Tarrant and Dallas Counties. The general limits of the proposed improvements are along SH 114 from east of North Kimball Avenue to east of International Parkway and along SH 121 from Hall Johnson Road to FM 2499 (Grapevine Mills Parkway). The project area is located primarily within the cities of Grapevine and Southlake, just north of the Dallas/Fort Worth (DFW) International Airport. The project would provide transportation improvements along approximately 14.4 miles of SH 114, SH 121 and other interconnected roadways.

Proposed improvements focus on the convergence of SH 114 and SH 121 between Main Street and International Parkway, the transportation corridor known locally as "The Funnel." Since 2006, this project has been referred to as the DFW Connector. In addition, roadway facilities proposed for improvement as part of this project include six other interconnected roadways in the project area: FM 1709, SH 26 (Ira E. Woods Avenue), SH 360, International Parkway, IH 635, and FM 2499. These roadways are referred to collectively in this document as the "DFW Connector."

The area of proposed transportation improvements is bounded by SH 360 just south of Stone Myers Road, SH 121 at Hall Johnson Road, SH 114 at North Kimball Avenue, International Parkway just south of North Airfield Drive, SH 114 at Freeport Parkway, IH 635 just east of Royal Lane, SH 121 just north of FM 2499 and FM 2499 just south of Gerault Lane.

For each alternative, the amount of MSATs emitted would be proportional to the vehicle miles traveled (VMT) assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for each of the Build Alternatives is slightly higher than that for the No Build Alternatives, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions for the action alternative along the highway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOBILE6 emission model, emissions of all the priority

MSATs except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emissions decrease will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models.

Regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce 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, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The additional travel lanes contemplated as part of the project alternatives will have the effect of moving some traffic closer to nearby homes, schools and businesses; therefore, there may be localized areas where ambient concentrations of MSATs could be higher under the Build Alternative than under the No Build Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the expanded roadway sections of the project (See the EA Section III: Proposed Project Description for further details). However, as discussed previously, 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 highway 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 cause region-wide MSAT levels to be significantly lower than today in almost all cases.

1.1.4 Sensitive Receptors within Study Area

FHWA has completed a review of several studies that have attempted to address how MSAT concentration levels may behave based on the distance from a roadway. FHWA notes that both models and experimental data predict short-term concentrations of air toxics can be elevated for receptors downwind of and very near roadways. The tendency for pollutant levels to drop off substantially as the distance from the roadway increases is well documented. The distance where the highest decrease in concentration starts to occur is approximately 328 feet (100 meters). By 1,640 feet (500 meters), most studies have found difficulty distinguishing between background levels of a given pollutant and the elevated levels that may have been found directly adjacent to the roadway. Finally, wind direction and speed, vehicle traffic levels, and roadway design can further increase or decrease the distance at which elevated levels of any given pollutant can be distinguished as directly associated with a roadway.

Sensitive receptors are defined as schools both public and private, licensed day care facilities, hospitals, and senior citizen care facilities. The Study Team identified and mapped twenty (20) sensitive receptors within the SH 114/121 study area, (Tables 2 & 3). Two of these sensitive receptors, Baylor Medical Center and Cook Children's Pediatric are within 100 meters (328 feet) of the study area, with the remaining eighteen (18) falling within 500 meters (1,640 feet).

TABLE 2
SH 114/121 SENSITIVE RECEPTORS IN THE STUDY AREA

Location	Address	Distance to Centerline
Fellowship Church	2450 Highway 121 North	917 ft (279m)
Baylor Medical Center	1650 W College Street	288 ft (88m)
Care Now	2355 E Grapevine Mills Circle	465 ft (142m)
Comprehensive Family Medical	1280 S Main Street	1512 ft (461m)
Winfree Academy Charter School	1250 William D. Tate Ave #100	1268 ft (386m)
Baylor Regional Medical Center at Grapevine	1650 W College St.	820 ft (250m)
Health South Sports Medicine & Rehabilitation Ctr.	1217 Ira E Woods Ave.	1295 ft (395m)
Living Word Lutheran Preschool	2031 W Northwest Highway	820 ft (250m)
All-Star Orthopedics & Sports Medicine	2020 W State Highway 114	492 ft (150m)
Trophy Club Medical Center	2850 E Highway 114	541 ft (165m)
Gymboree	2960 E Southlake Blvd	984 ft (300m)
Kindercare Learning Center	3115 E Southlake Blvd	610 ft (186m)
Church at the Cross Memorial Baptist Church	3000 William D. Tate Ave	1112 ft (339m)
Premier Pediatrics	3600 William D. Tate Ave.	393 ft (120m)
Texas Regional Asthma & Allergy Center	3600 William D. Tate Ave.	393 ft (120m)
Holy Trinity	3750 William D. Tate Ave.	360 ft (110m)
La Petite Academy	2301 Hall Johnson Road	967 ft (295m)
Primrose School of Hall-Johnson	2300 Hall Johnson Road	1131 ft (345m)
Colleyville Heritage High School	5401 Heritage Ave.	1512 ft (461m)
Cook Children's Pediatric	3801 William D Tate Ave	278 ft (85m)

Source: Study Team 2007-2008

Exhibit 1
Grapevine Funnel SH114/SH121 Sensitive Receptors

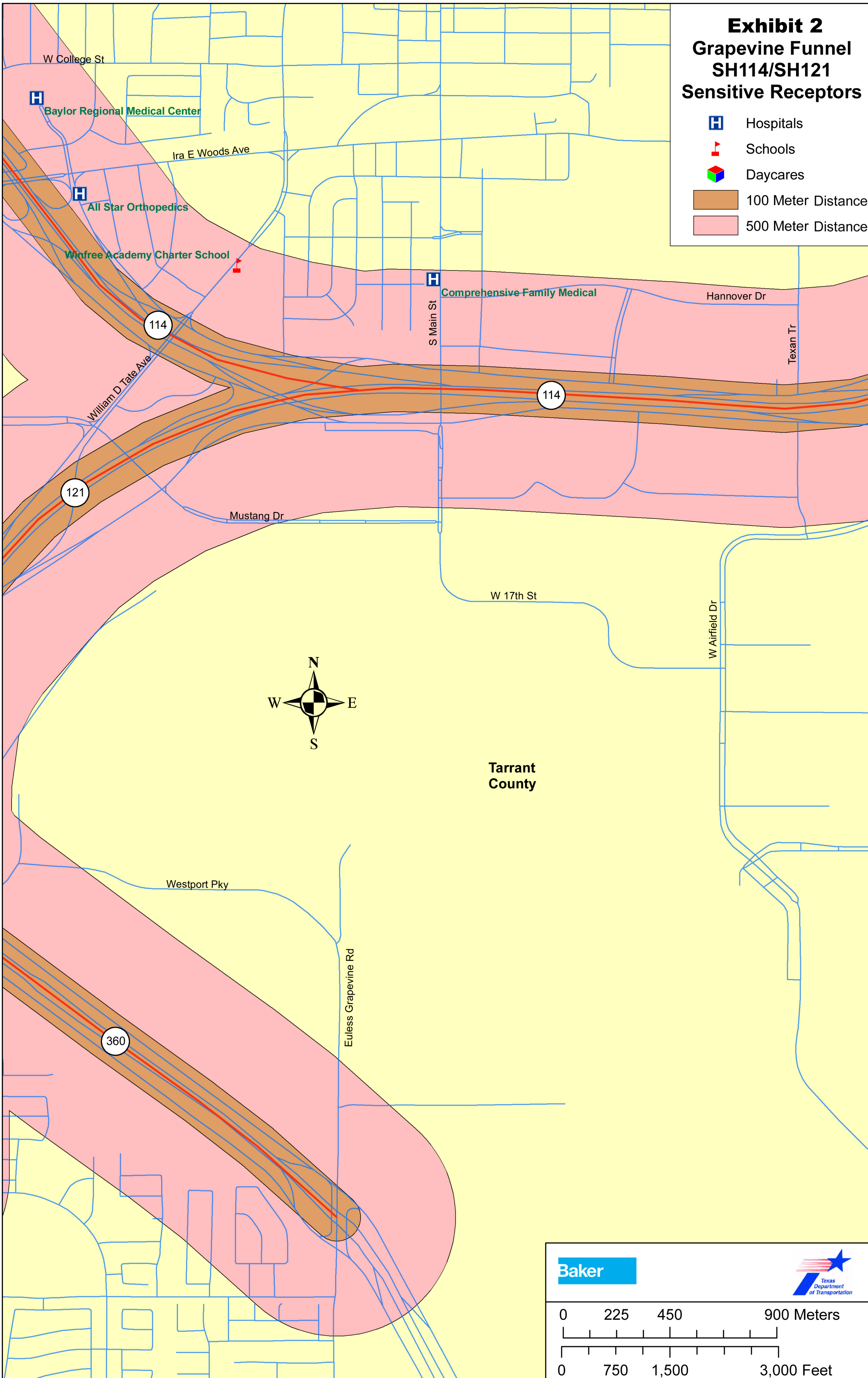


Exhibit 2
Grapevine Funnel
SH114/SH121
Sensitive Receptors
Hospitals
Schools
Daycares
100 Meter Distance
500 Meter Distance
W College St
Baylor Regional Medical Center
Ira E Woods Ave
All Star Orthopedics
Winfree Academy Charter School
Comprehensive Family Medical
Hannover Dr
S Main St
Texan Tr
114
114
121
William D Tate Ave
Mustang Dr
W 17th St
W Airfield Dr
N
W
E
S
Tarrant
County
Westport Pky
Euless Grapevine Rd
360
Baker
Texas Department of Transportation
0
225
450
900 Meters
0
750
1,500
3,000 Feet

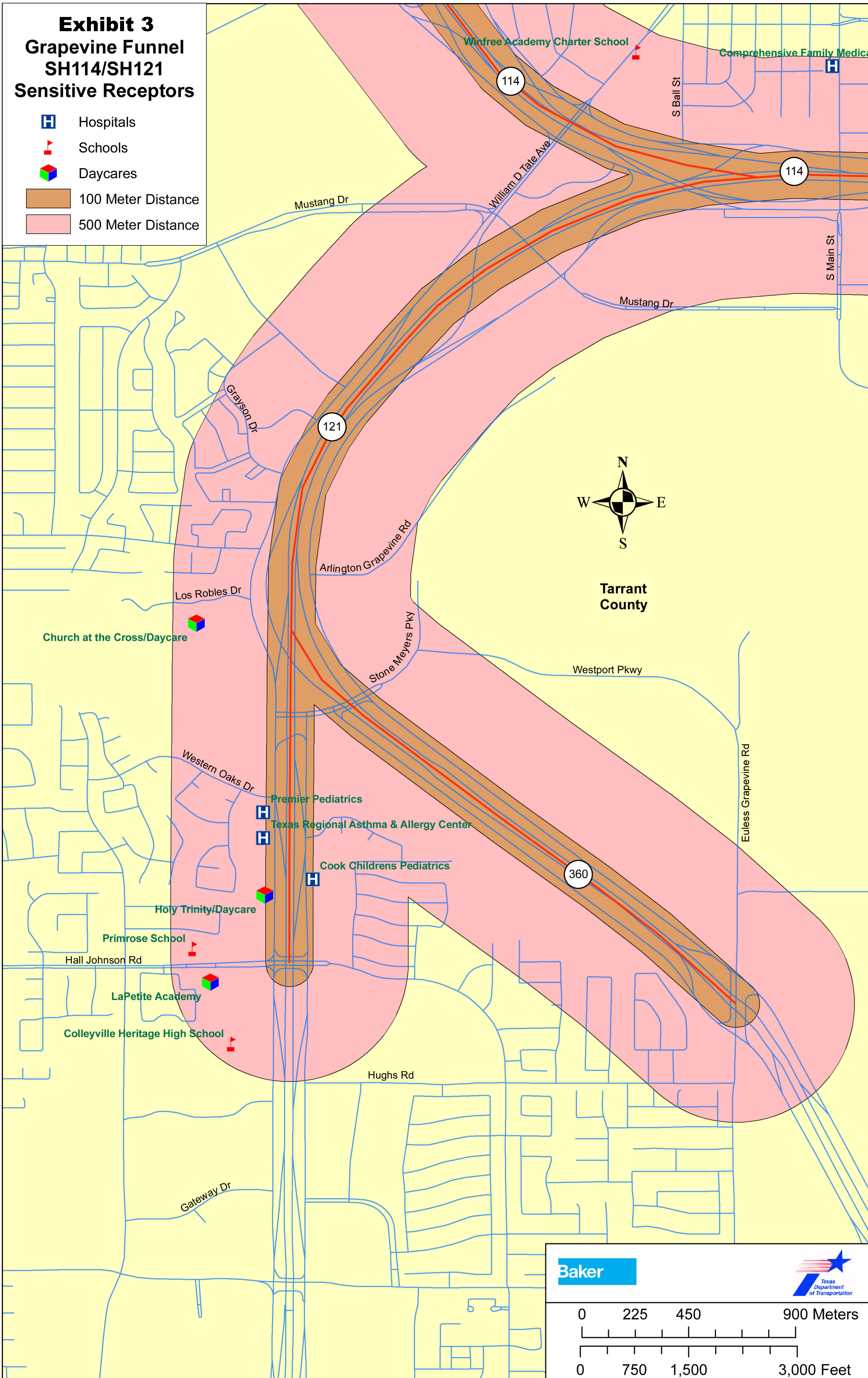


Exhibit 3
Grapevine Funnel
SH114/SH121
Sensitive Receptors
Hospitals
Schools
Daycares
100 Meter Distance
500 Meter Distance
Winfree Academy Charter School
Comprehensive Family Medical
114
121
360
S Ball St
S Main St
William D Tate Ave
Mustang Dr
Grayson Dr
Arlington Grapevine Rd
Los Robles Dr
Church at the Cross/Daycare
Stone Meyers Pky
Westport Pkwy
Western Oaks Dr
Premier Pediatrics
Texas Regional Asthma & Allergy Center
Cook Childrens Pediatrics
Holy Trinity/Daycare
Primrose School
Hall Johnson Rd
LaPetite Academy
Colleyville Heritage High School
Hughs Rd
Euless Grapevine Rd
Gateway Dr
N
S
E
W
Tarrant County
Baker
Texas Department of Transportation
0 225 450 900 Meters
0 750 1,500 3,000 Feet

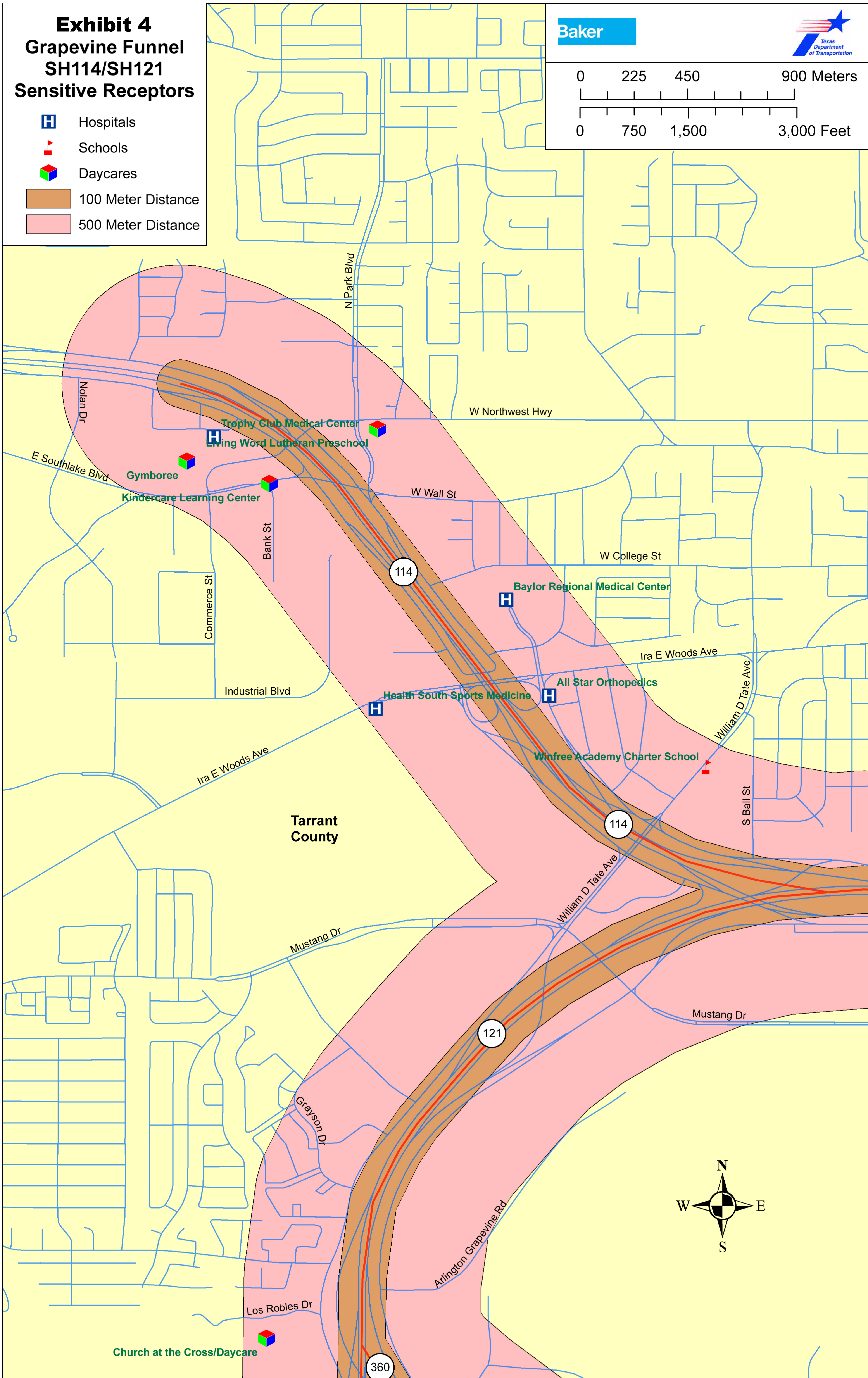


Exhibit 4
Grapevine Funnel
SH114/SH121
Sensitive Receptors
Hospitals
Schools
Daycares
100 Meter Distance
500 Meter Distance
Baker
Texas Department of Transportation
0 225 450 900 Meters
0 750 1,500 3,000 Feet
N
W
E
S
W Northwest Hwy
Trophy Club Medical Center
Living Word Lutheran Preschool
Gymboree
Kindercare Learning Center
E Southlake Blvd
Nolan Dr
N Park Blvd
W Wall St
Bank St
Commerce St
W College St
Baylor Regional Medical Center
Ira E Woods Ave
All Star Orthopedics
Health South Sports Medicine
Industrial Blvd
Winfree Academy Charter School
William D Tate Ave
S Ball St
Tarrant County
114
121
360
Mustang Dr
Grayson Dr
Arlington Grapevine Rd
Los Robles Dr
Church at the Cross/Daycare

TABLE 3
SH 114/121 SENSITIVE RECEPTORS BY DISTANCE

Scenario	Number of Receivers within:	
	328 feet (100 meters)	1640 feet (500 meters)
Build	2	18

Source: Study Team 2007-2008

1.1.4.1 Unavailable Information for Project Specific MSAT Impact Analysis

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

1.1.4.2 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 MOBILE6.2 is used to predict emissions at a regional level, it has limited applicability at the project level. MOBILE6.2 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 MOBILE6.2 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, MOBILE6.2 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 emission 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 discussion 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 MOBILE6.2 to estimate MSAT emissions. MOBILE 6.2 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. However, MOBILE6.2 is currently the only available tool for use by FHWA/TxDOT and may function adequately for larger scale projects for comparison of alternatives.

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 near 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 emission 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.

1.1.4.3 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 emission 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://ww.epa.gov/iris. The following toxicity information for the six prioritized MSATs was taken from the IRIS database Weight of Evidence Characterization summaries and represents the Agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- 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
- 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
- Benzene: Benzene is characterized as a known human carcinogen
- 1,3 Butadiene: 1,3-butadiene is characterized as carcinogenic to humans by inhalation.
- 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 exposure may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.
- Formaldehyde: is a probable human carcinogen, based on limited evidence in humans; and sufficient evidence in animals

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 problems. 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 the project.

The technical shortcomings and recent studies previously discussed in this document were further summarized by EPA in the preamble to the 2007 MSAT rule, with the following statement:

> "Significant scientific uncertainties remain in our understanding of the relationship between adverse health effects and near-road exposure, including the exposures of greatest concern, the importance of

chronic versus acute exposures, the role of fuel type (e.g., diesel or gasoline) and composition (e.g., % aromatics), relevant traffic patterns, the role of co-stressors including noise and socioeconomic status, and the role of differential susceptibility within the "exposed" populations."(*Citation: Volume 73 Federal Register Page 8441 (February 26, 2007) Control of Hazardous Air Pollutants from Mobile Sources*)

1.1.4.4 Relevance of Unavailable or Incomplete Information

While available tools do allow the reasonable prediction of emission changes between alternatives for larger projects, the amount of MSAT emissions from each of the project alternatives and MSAT concentrations or exposures created by each of the project alternatives cannot be predicted with enough accuracy to be useful in estimating health impacts. 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."

1.1.5 Mobile Source Air Toxics (MSATs)

The approach used in the analysis of MSATs within the SH 114/121 study area considers the on-road sources for the six priority MSATs (i.e., acetaldehyde, acrolein, benzene, 1,3 butadiene, DPM, and formaldehyde). This analysis is based on existing or base year (2007) and future volumes of traffic (2015 and 2030) that have been projected by the North Central Texas Council of Governments (NCTCOG) travel model. An affected transportation network was derived from the 2030 No-Build Scenario compared to the 2030 Build Scenario to determine which roadway links in the model achieve a ± 5 % volume change. The affected transportation network was then compared to the 2007 and 2015 models in order to extrapolate the baseline and interim year model. Speeds were modeled as average speeds and weighted by both the type of roadway and by the amount of total VMT that occur at that speed.

This analysis uses MOBILE6.2 inputs that are appropriate to the Dallas-Fort Worth Urban Area. These inputs are consistent with those used for other modeling activities in the area (e.g., State Implementation Plan [SIP] inventories, conformity analyses).

1.1.5.1 MSAT Results

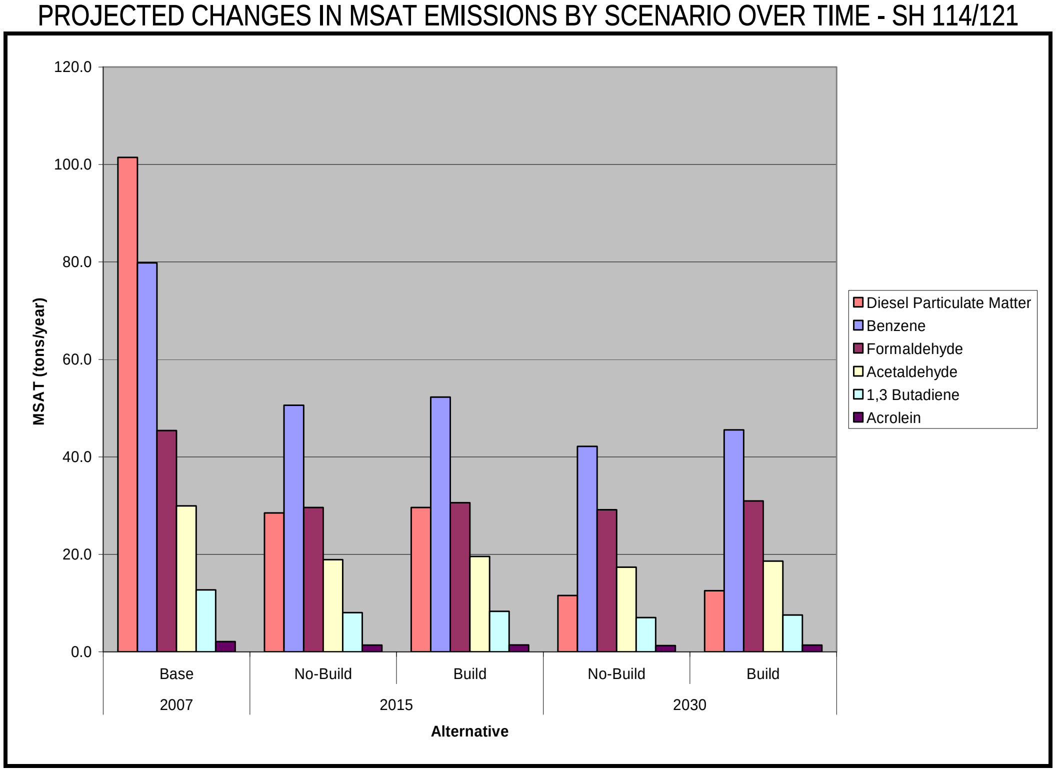
The resulting emission inventory for the six priority MSATs was compiled as summarized in Table 4 and Figure 2 for the Base Year (2007), an interim year (2015), and the 2030 design year. Both the 2015 and 2030 had two scenarios, the No-Build and the Build for the project.

TABLE 4
MSAT EMISSIONS SH 114/121 BY SCENARIO (TONS/YEAR)

Compound	Year / Scenario					% Difference	
	2007	2015	2015	2030	2030	2007 to 2030	2007 to 2030
	Base	No-Build	Build	No-Build	Build	No-Build	Build
Acetaldehyde	29.9	18.9	19.6	17.4	18.6	-42%	-38%
Acrolein	2.1	1.4	1.4	1.3	1.4	-39%	-35%
Benzene	79.8	50.6	52.3	42.2	45.5	-47%	-43%
Butadiene	12.7	8.1	8.3	7.0	7.6	-45%	-41%
Formaldehyde	45.4	29.6	30.6	29.2	31.0	-36%	-32%
Diesel Particulate Matter	101.5	28.5	29.6	11.5	12.6	-89%	-88%
Total MSAT	271.5	137.1	141.9	108.6	116.6	-60%	-57%
Total VMT (Miles/Year)	13,234,245	17,876,117	18,572,622	22,619,353	24,611,158	71%	86%

Source: Study Team 2007-2008

FIGURE 2
PROJECTED CHANGES IN MSAT EMISSIONS BY SCENARIO OVER TIME - SH 114/121

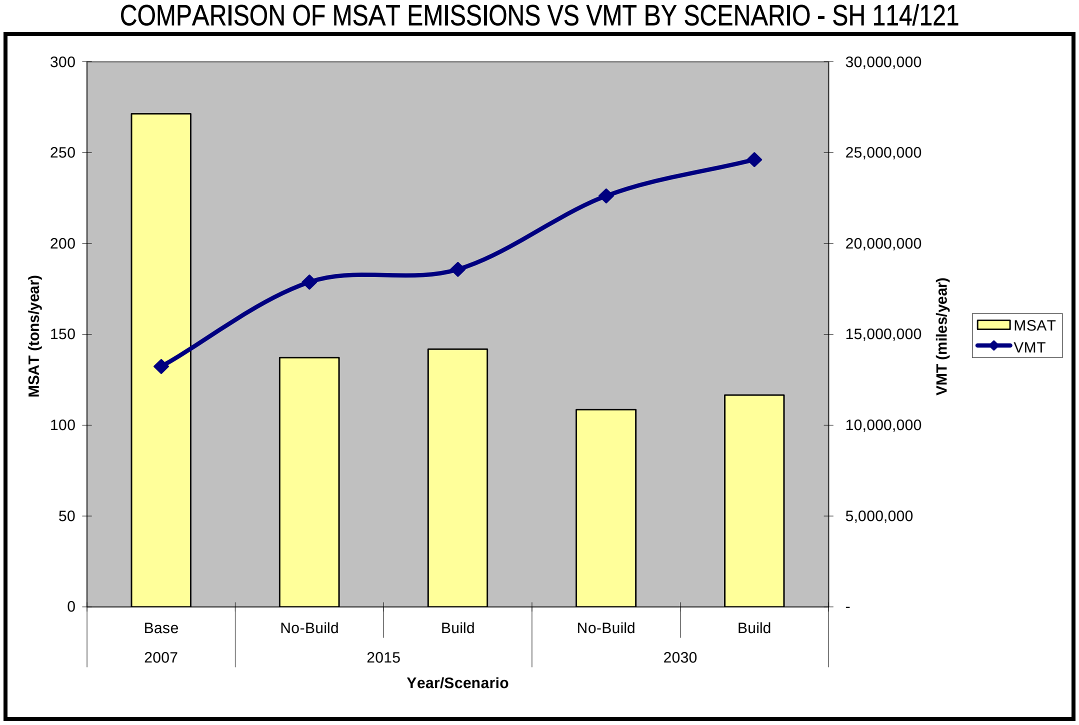


Source: Study Team 2007-2008

The analysis indicates a substantial decrease in MSAT emissions can be expected for both the Build and No-Build Scenarios (2030) versus the base year (2007). Emissions of total MSATs are predicted to decrease by approximately 57 percent in 2030 Build Scenario compared with 2007 levels. If emissions are plotted over time, a substantially decreasing level of MSAT can be seen, (Figure 3) however, overall VMT continues to rise. Differences in total MSAT emissions between the No-Build and Build Scenarios were found. The 2030 Build Scenario is expected to generate a 9 percent increase in VMT as compared to the 2030 No-Build, and a corresponding 7 percent increase in MSATs.

Of the six priority MSAT compounds, benzene and DPM contribute the most to the emissions total in 2007 (see Table 4 and Figure 2). The amount of DPM emitted in 2007 is higher than the amount of benzene emitted. In future years a substantial decline in benzene is anticipated (43 percent reduction in benzene from 2007 to 2030, Build Scenario), and an even larger reduction in DPM emissions is predicted (about an 88 percent decrease from 2007 to 2030, Build Scenario).

FIGURE 3
COMPARISON OF MSAT EMISSIONS VS VMT BY SCENARIO - SH 114/121



Source: Study Team 2007-2008

These emission levels are for all the MSATs evaluated and are mostly a reflection of the total VMT. The reasons for these dramatic improvements are two fold, a change in vehicle fuels, both gasoline and diesel fuel, and a change in emission standards that both light-duty and heavy-duty on-road motor vehicles must meet. The EPA predicts substantial future air emission reductions as the agency's new light-duty and heavy-duty on-road fuel and vehicle rules come into effect (Tier II, light-duty vehicle standard, Heavy-Duty Diesel Vehicle and (HDDV) standards and low sulfur diesel fuel, and the EPA's proposed Off-Road Diesel Engine and Fuel Standard). These projected air emission reductions will be realized even with the predicted continued growth in VMT. See EPA's Tier II Regulatory Impact Analysis (RIA) and EPA's HDDV RIA; Regulatory Impact Analysis (EPA, 2001; EPA, 1999).

Growth in the Dallas/Fort Worth area is expected to remain robust through 2030. Population is expected to increase 80 percent and employment growth is expected to increase by 72 percent from 2000 through 2030 (NCTCOG, 2003) Increased roadway usage, which will occur either under the No-Build or Build Scenarios, will not necessarily lead to increases in harmful emissions (NOx, VOCs, PM, or MSATs). Such emissions from vehicles are expected to continue the current dramatic pattern of decrease, even with continuing increases in VMT. Technology is improving at a pace that exceeds the effect of increased VMT. SH 114/121 is estimated to emit the following total amounts of the six priority air toxics as seen in Table 4.

1.1.6 MSAT Conclusions

The ability to discern differences in MSAT emissions among transportation alternatives is difficult given the uncertainties associated with forecasting travel activity and air emissions 23 years or more into the future. The main analytical tool for predicting emissions from on-road motor vehicles is the EPA's MOBILE6.2 model. The MOBILE6.2 model is regional in scope and has limited applicability to a project-level analysis. However, the effects of a major transportation project extend beyond its corridor and an evaluation within the context of an affected transportation network can be accomplished.

When evaluating the future options for upgrading a transportation corridor, the major mitigating factor in reducing MSAT emissions is the implementation of the EPA's new motor vehicle emission control standards. Substantial decreases in MSAT emissions will be realized from a current base year (2007) through an estimated time of completion for a planned project and its design year some 23 years in the future. Accounting for anticipated increases in VMT and varying degrees of efficiency of vehicle operation, total MSAT emissions were predicted to decline approximately 57 percent from 2007 to 2030. While benzene emissions were predicted to decline more than 43 percent, emissions of DPM were predicted to decline even more (i.e., 88 percent).

MSATs, especially benzene, have dropped dramatically since 1995, and are expected to continue dropping. The introduction of reformulated gasoline has lead to a substantial part of this improvement. In addition, Tier II automobiles introduced in model year 2004 will continue to help reduce MSATs. Diesel exhaust emissions have been falling since the early 1990s with the passage of the Clean Air Act Amendments (CAAA). The CAAA provided for improvement in diesel fuel through reductions in sulfur and other diesel fuel improvements. In addition, the EPA has further reduced the sulfur level in diesel fuel, which took effect in 2006. The EPA also has called for dramatic reductions in NOx emissions, and PM from on-road and off-road diesel engines. MSATs as in relation to SH 114/121 are not expected to increase overall air toxics in the Dallas/Fort Worth area in the future years investigated.

APPENDIX I

INFORMATION REGARDING PROJECT FACILITIES IN THE 2008-2011 TRANSPORTATION IMPROVEMENT PLAN

DISTRICT	COUNTY	CSJ	HWY	LET DATE	PHASE	CITY	MPO PROJ ID	YOE COST
FORT WORTH	TARRANT	0172-09-031	US 287	04/2009	C	MANSFIELD	11704	**$4,659,200**

LIMITS FROM: WALNUT CREEK DRIVE
LIMITS TO: BROAD STREET; IN MANSFIELD
TIP DESCRIPTION: CONSTRUCT 2 LANE FRONTAGE ROADS IN EACH DIRECTION INCLUDING 2 BRIDGES OVER WALNUT CREEK
REMARKS: MANSFIELD IS THE SOURCE OF THE LOCAL CONTRIBUTION

REV DATE: 09/2007
GROUPED PROJECT CSJ: N/A
FUNDING CATEGORY: 1,7,LC
MTP REFERENCE: FR1 1407

Total Project Cost Information:		Cost of Approved Phases:
Preliminary Engineering:	$237,433	
Right Of Way:	$0	
Construction:	$4,659,200	**$4,659,200**
Construction Engineering:	$290,734	
Contingencies:	$339,190	
Indirects:	$237,433	
Bond Financing:	$0	
Total Project Cost (YOE):	**$5,763,990**	

Authorized Funding by Category:	
Category 1:	$1,120,000
Category 7:	$1,866,666
Local Contribution:	$1,672,534
Total Category Funding:	**$4,659,200**

Authorized Funding by Share:	
Federal Funds:	$2,389,333
State Funds:	$597,333
Local Funds:	$0
Local Contribution:	$1,672,534
Total Funding:	**$4,659,200**

DISTRICT	COUNTY	CSJ	HWY	LET DATE	PHASE	CITY	MPO PROJ ID	YOE COST
FORT WORTH	TARRANT	0353-03-079	SH 114	06/2009	C,E	GRAPEVINE		**$46,772,728**

LIMITS FROM: W COLLEGE, IN GRAPEVINE
LIMITS TO: DALLAS COUNTY LINE (MANAGED FACILITY)
TIP DESCRIPTION: CONSTRUCT 4 LANE SEPARATE FREEWAY (MANAGED FACILITY)
REMARKS: CDA PARTNER IS THE SOURCE OF THE LOCAL CONTRIBUTION

REV DATE: 09/2008
GROUPED PROJECT CSJ: N/A
FUNDING CATEGORY: 2,12,LC
MTP REFERENCE: HM1 8190

Total Project Cost Information:		Cost of Approved Phases:
Preliminary Engineering:	$2,184,808	
Right Of Way:	$0	
Construction:	$44,587,920	**$46,772,728**
Construction Engineering:	$1,783,517	
Contingencies:	$2,675,275	
Indirects:	$2,184,808	
Bond Financing:	$0	
Total Project Cost (YOE):	**$53,416,328**	

Authorized Funding by Category:	
Category 2:	$12,806,715
Category 12:	$30,066,285
Local Contribution:	$1,714,920
State PE/ROW:	$2,184,808
Total Category Funding:	**$46,772,728**

Authorized Funding by Share:	
Federal Funds:	$34,298,400
State Funds:	$10,759,408
Local Funds:	$0
Local Contribution:	$1,714,920
Total Funding:	**$46,772,728**

***State Paying for PE and/or ROW Costs**

DISTRICT	COUNTY	CSJ	HWY	LET DATE	PHASE	CITY	MPO PROJ ID	YOE COST
FORT WORTH	TARRANT	0364-01-072	SH 121	08/2009	C,E,R	TARRANT		**$23,724,153**

LIMITS FROM: DALLAS COUNTY LINE
LIMITS TO: FM 2499
TIP DESCRIPTION: RECONSTRUCT FROM 4 TO 10 LANE FREEWAY W/ AUXILIARY, RAMPS AND FR RDS
REMARKS: CDA PARTNER IS THE SOURCE OF THE LOCAL CONTRIBUTION

REV DATE: 09/2007
GROUPED PROJECT CSJ: N/A
FUNDING CATEGORY: 2,10,LC
MTP REFERENCE: FT1 1505, FR1 1505

Total Project Cost Information:		Cost of Approved Phases:
Preliminary Engineering:	$891,209	
Right Of Way:	$4,645,000	
Construction:	$18,187,943	**$23,724,153**
Construction Engineering:	$909,397	
Contingencies:	$1,273,156	
Indirects:	$891,209	
Bond Financing:	$0	
Total Project Cost (YOE):	**$26,797,915**	

Authorized Funding by Category:	
Category 2:	$12,823,776
Category 10:	$3,992,000
Local Contribution:	$1,372,168
State PE/ROW:	$5,536,209
Total Category Funding:	**$23,724,153**

Authorized Funding by Share:	
Federal Funds:	$13,452,622
State Funds:	$8,899,363
Local Funds:	$0
Local Contribution:	$1,372,168
Total Funding:	**$23,724,153**

***State Paying for PE and/or ROW Costs**

DISTRICT	COUNTY	CSJ	HWY	LET DATE	PHASE	CITY	MPO PROJ ID	YOE COST
FORT WORTH	TARRANT	0364-01-115	SH 121	08/2009	C,E,R	GRAPEVINE		**$255,493,415**

LIMITS FROM: FM 2499
LIMITS TO: SOUTH OF IH 635 INTERCHANGE
TIP DESCRIPTION: RECONST FRWY 4 TO 8 LN W/AUX LNS,FR RDS & RAMPS & COLLECTOR FACILITY (7) & INTERCHANGE W/ FM 2499 & IH 635
REMARKS: CDA PARTNER IS THE SOURCE OF THE LOCAL CONTRIBUTION

REV DATE: 09/2007
GROUPED PROJECT CSJ: N/A
FUNDING CATEGORY: 2,12,LC
MTP REFERENCE: FT1 1507

Total Project Cost Information:		Cost of Approved Phases:
Preliminary Engineering:	$9,748,394	
Right Of Way:	$54,450,000	
Construction:	$191,295,021	**$255,493,415**
Construction Engineering:	$7,957,873	
Contingencies:	$11,936,809	
Indirects:	$9,748,394	
Bond Financing:	$0	
Total Project Cost (YOE):	**$285,136,492**	

Authorized Funding by Category:	
Category 2:	$52,829,843
Category 12:	$124,033,157
Local Contribution:	$14,432,021
State PE/ROW:	$64,198,394
Total Category Funding:	**$255,493,415**

Authorized Funding by Share:	
Federal Funds:	$141,490,400
State Funds:	$99,570,994
Local Funds:	$0
Local Contribution:	$14,432,021
Total Funding:	**$255,493,415**

***State Paying for PE and/or ROW Costs**

DISTRICT	COUNTY	CSJ	HWY	LET DATE	PHASE	CITY	MPO PROJ ID	YOE COST
FORT WORTH	TARRANT	0081-12-920	IH 35W	06/2010	E	FORT WORTH		**$2,209,143**

LIMITS FROM: US 81/287
LIMITS TO: SH 170
TIP DESCRIPTION: ADD MANAGED LANE FACILITY - 4 MANAGED LANES
REMARKS:

REV DATE: 09/2007
GROUPED PROJECT CSJ: N/A
FUNDING CATEGORY: 2
MTP REFERENCE: HM1 8105

Total Project Cost Information:		Cost of Approved Phases:
Preliminary Engineering:	$2,209,143	
Right Of Way:	$0	
Construction:	$44,994,560	**$2,209,143**
Construction Engineering:	$1,803,382	
Contingencies:	$2,705,073	
Indirects:	$2,209,143	
Bond Financing:	$0	
Total Project Cost (YOE):	**$53,921,301**	

Authorized Funding by Category:	
Category 2:	$2,209,143
State PE/ROW:	$0
Total Category Funding:	**$2,209,143**

Authorized Funding by Share:	
Federal Funds:	$1,767,314
State Funds:	$441,829
Local Funds:	$0
Local Contribution:	$0
Total Funding:	**$2,209,143**

DISTRICT	COUNTY	CSJ	HWY	LET DATE	PHASE	CITY	MPO PROJ ID	YOE COST
FORT WORTH	TARRANT	0094-02-912	SH 183	09/2009	C,E,R	OTHER	20159	**$3,148,329**

LIMITS FROM: BOOTH CALLOWAY DRIVE
LIMITS TO: RUFE SNOW DRIVE; IN RICHLAND HILLS
TIP DESCRIPTION: INTERSECTION IMPROVEMENTS TO ADD RIGHT TURN LANES, CURB & GUTTER AND SIDEWALKS AT 3 LOCATIONS
REMARKS: ADD PROJECT

REV DATE: 11/2008
GROUPED PROJECT CSJ: N/A
FUNDING CATEGORY: 10
MTP REFERENCE: TSM 2100

Total Project Cost Information:		Cost of Approved Phases:
Preliminary Engineering:	$318,207	
Right Of Way:	$421,149	
Construction:	$2,408,973	**$3,148,329**
Construction Engineering:	$188,900	
Contingencies:	$220,383	
Indirects:	$173,158	
Bond Financing:	$0	
Total Project Cost (YOE):	**$3,730,770**	

Authorized Funding by Category:	
Category 10:	$3,148,329
Total Category Funding:	**$3,148,329**

Authorized Funding by Share:	
Federal Funds:	$0
State Funds:	$2,518,662
Local Funds:	$629,667
Local Contribution:	$0
Total Funding:	**$3,148,329**

DISTRICT	COUNTY	CSJ	HWY	LET DATE	PHASE	CITY	MPO PROJ ID	YOE COST
FORT WORTH	TARRANT	0353-03-059	SH 114	06/2009	C,E,R	OTHER		**$154,834,383**

LIMITS FROM: BS 114L, IN GRAPEVINE
LIMITS TO: DALLAS COUNTY LINE
TIP DESCRIPTION: RECONSTRUCT 4/8 LANE FREEWAY TO 8/13 LANES W/ AUXILIARY LANES, FRONTAGE ROADS AND RAMPS
REMARKS: CDA PARTNER IS THE SOURCE OF THE LOCAL CONTRIBUTION

REV DATE: 09/2008
GROUPED PROJECT CSJ: N/A
FUNDING CATEGORY: 2,12,LC
MTP REFERENCE: FT1 1425

Total Project Cost Information:		Cost of Approved Phases:
Preliminary Engineering:	$7,116,943	
Right Of Way:	$8,060,000	
Construction:	$139,657,440	**$154,834,383**
Construction Engineering:	$5,809,750	
Contingencies:	$8,714,624	
Indirects:	$7,116,943	
Bond Financing:	$0	
Total Project Cost (YOE):	**$176,475,700**	

Authorized Funding by Category:	
Category 2:	$40,113,510
Category 12:	$94,172,490
Local Contribution:	$5,371,440
State PE/ROW:	$15,176,943
Total Category Funding:	**$154,834,383**

Authorized Funding by Share:	
Federal Funds:	$107,428,800
State Funds:	$42,034,143
Local Funds:	$0
Local Contribution:	$5,371,440
Total Funding:	**$154,834,383**

***State Paying for PE and/or ROW Costs**

DISTRICT	COUNTY	CSJ	HWY	LET DATE	PHASE	CITY	MPO PROJ ID	YOE COST
FORT WORTH	TARRANT	0364-01-112	SH 121	08/2009	C,E,R	GRAPEVINE		**$167,050,741**

LIMITS FROM: SH 114
LIMITS TO: SH 360
TIP DESCRIPTION: RECONST 4 TO 6 LN W/ AUX LNS FREEWAY, FR. RDS.& RAMPS ADD COLLECTOR FACILITY (3/4 W/AUX) & DIR CONN TO SH 114 INCLUDING UP TO 7 LANE COLLECTOR/DIST
REMARKS: CDA PARTNER IS THE SOURCE OF THE LOCAL CONTRIBUTION

REV DATE: 09/2007
GROUPED PROJECT CSJ: N/A
FUNDING CATEGORY: 2,12,LC
MTP REFERENCE: FT1 1510, FR1 1510

Total Project Cost Information:		Cost of Approved Phases:
Preliminary Engineering:	$6,878,322	
Right Of Way:	$25,197,500	
Construction:	$134,974,919	**$167,050,741**
Construction Engineering:	$5,614,957	
Contingencies:	$8,422,435	
Indirects:	$6,878,322	
Bond Financing:	$0	
Total Project Cost (YOE):	**$187,966,454**	

Authorized Funding by Category:	
Category 2:	$37,188,237
Category 12:	$87,603,663
Local Contribution:	$10,183,019
State PE/ROW:	$32,075,822
Total Category Funding:	**$167,050,741**

Authorized Funding by Share:	
Federal Funds:	$99,833,520
State Funds:	$57,034,202
Local Funds:	$0
Local Contribution:	$10,183,019
Total Funding:	**$167,050,741**

***State Paying for PE and/or ROW Costs**

DISTRICT	COUNTY	CSJ	HWY	LET DATE	PHASE	CITY	MPO PROJ ID	YOE COST
FORT WORTH	TARRANT	0364-01-113	SH 121	06/2009	C,E,R	GRAPEVINE		$157,405,041

LIMITS FROM: IH 635
LIMITS TO: SH 114
TIP DESCRIPTION: RECONST FREEWAY 4 LANE TO 8/10 LNS W/ AUX LNS, COLLECTOR FACILITY (9) & INTERCHANGE WITH SH 114/INTL PKWY; FR W/ AUX LNS
REMARKS: CDA PARTNER IS THE SOURCE OF THE LOCAL CONTRIBUTION

REV DATE: 09/2007
GROUPED PROJECT CSJ: N/A
FUNDING CATEGORY: 2,12,LC
MTP REFERENCE: FT1 1715

Total Project Cost Information:		Cost of Approved Phases:	Authorized Funding by Category:		Authorized Funding by Share:	
Preliminary Engineering:	$6,508,681		Category 2:	$36,684,595	Federal Funds:	$98,247,200
Right Of Way:	$23,175,000		Category 12:	$86,124,405	State Funds:	$54,245,481
Construction:	$127,721,360	$157,405,041	Local Contribution:	$4,912,360	Local Funds:	$0
Construction Engineering:	$5,313,209		State PE/ROW:	$29,683,681	Local Contribution:	$4,912,360
Contingencies:	$7,969,813				Total Funding:	**$157,405,041**
Indirects:	$6,508,681					
Bond Financing:	$0					
Total Project Cost (YOE):	**$177,196,742**		**Total Category Funding:**	**$157,405,041**		

***State Paying for PE and/or ROW Costs**

DISTRICT	COUNTY	CSJ	HWY	LET DATE	PHASE	CITY	MPO PROJ ID	YOE COST
FORT WORTH	TARRANT	0504-02-008	SH 121	08/2009	C,E	FORT WORTH	11250	$1,075,000,000

LIMITS FROM: IH 30
LIMITS TO: ALTA MESA BLVD
TIP DESCRIPTION: CONSTRUCT NEW LOCATION 6 LANE TOLLWAY WITH INTERCHANGES AT IH 30 AND IH 20
REMARKS: NTTA IS THE SOURCE OF THE LOCAL CONTRIBUTION; INCREASE FUNDING

REV DATE: 11/2008
GROUPED PROJECT CSJ: N/A
FUNDING CATEGORY: 2,7,LC
MTP REFERENCE: FT1 1530, FT1 1535, IN1 15301, IN1 10151, FR 1530

Total Project Cost Information:		Cost of Approved Phases:	Authorized Funding by Category:		Authorized Funding by Share:	
Preliminary Engineering:	$28,384,720		Category 2:	$149,270,000	Federal Funds:	$127,416,000
Right Of Way:	$0		Category 7:	$10,000,000	State Funds:	$0
Construction:	$1,046,615,280	$1,075,000,000	Local Contribution:	$915,730,000	Local Funds:	$31,854,000
Construction Engineering:	$23,171,200				Local Contribution:	$915,730,000
Contingencies:	$34,742,947				Total Funding:	**$1,075,000,000**
Indirects:	$28,384,720					
Bond Financing:	$0					
Total Project Cost (YOE):	**$1,161,298,867**		**Total Category Funding:**	**$1,075,000,000**		

DISTRICT	COUNTY	CSJ	HWY	LET DATE	PHASE	CITY	MPO PROJ ID	YOE COST
FORT WORTH	TARRANT	0504-02-013	SH 121	06/2009	C,E,R	FORT WORTH		$148,000,000

LIMITS FROM: ALTA MESA BLVD
LIMITS TO: FM 1187
TIP DESCRIPTION: CONSTRUCT 4 LANE TOLLWAY ON NEW LOCATION
REMARKS: NTTA IS THE SOURCE OF THE LOCAL CONTRIBUTION; INCREASE FUNDING

REV DATE: 11/2008
GROUPED PROJECT CSJ: N/A
FUNDING CATEGORY: 2,LC
MTP REFERENCE: FT1 1537

Total Project Cost Information:		Cost of Approved Phases:	Authorized Funding by Category:		Authorized Funding by Share:	
Preliminary Engineering:	$4,081,053		Category 2:	$30,840,000	Federal Funds:	$24,672,000
Right Of Way:	$15,174,608		Local Contribution:	$112,250,425	State Funds:	$11,077,575
Construction:	$128,744,339	$148,000,000	State PE/ROW:	$4,909,575	Local Funds:	$0
Construction Engineering:	$3,331,472				Local Contribution:	$112,250,425
Contingencies:	$4,997,208				Total Funding:	**$148,000,000**
Indirects:	$4,081,053					
Bond Financing:	$0					
Total Project Cost (YOE):	**$160,409,733**		**Total Category Funding:**	**$148,000,000**		

***State Paying for PE and/or ROW Costs**

DISTRICT	COUNTY	CSJ	HWY	LET DATE	PHASE	CITY	MPO PROJ ID	YOE COST
FORT WORTH	TARRANT	0902-00-113	VA	08/2009	C	VARIOUS	11613	$3,847,950

LIMITS FROM: REGIONAL GOODS MOVEMENT/OUTER LOOP STUDY
LIMITS TO:
TIP DESCRIPTION:
REMARKS:

REV DATE: 09/2007
GROUPED PROJECT CSJ: N/A
FUNDING CATEGORY: 7
MTP REFERENCE: GM1320

Total Project Cost Information:		Cost of Approved Phases:	Authorized Funding by Category:		Authorized Funding by Share:	
Preliminary Engineering:	$0		Category 7:	$3,847,950	Federal Funds:	$3,078,360
Right Of Way:	$0				State Funds:	$739,590
Construction:	$3,847,950	$3,847,950			Local Funds:	$30,000
Construction Engineering:	$0				Local Contribution:	$0
Contingencies:	$0				Total Funding:	**$3,847,950**
Indirects:	$0					
Bond Financing:	$0					
Total Project Cost (YOE):	**$3,847,950**		**Total Category Funding:**	**$3,847,950**		

APPENDIX J

MAPS REGARDING INDIRECT AND CUMULATIVE EFFECTS OF REGIONAL TOLL AND MANAGED/HOV SYSTEM

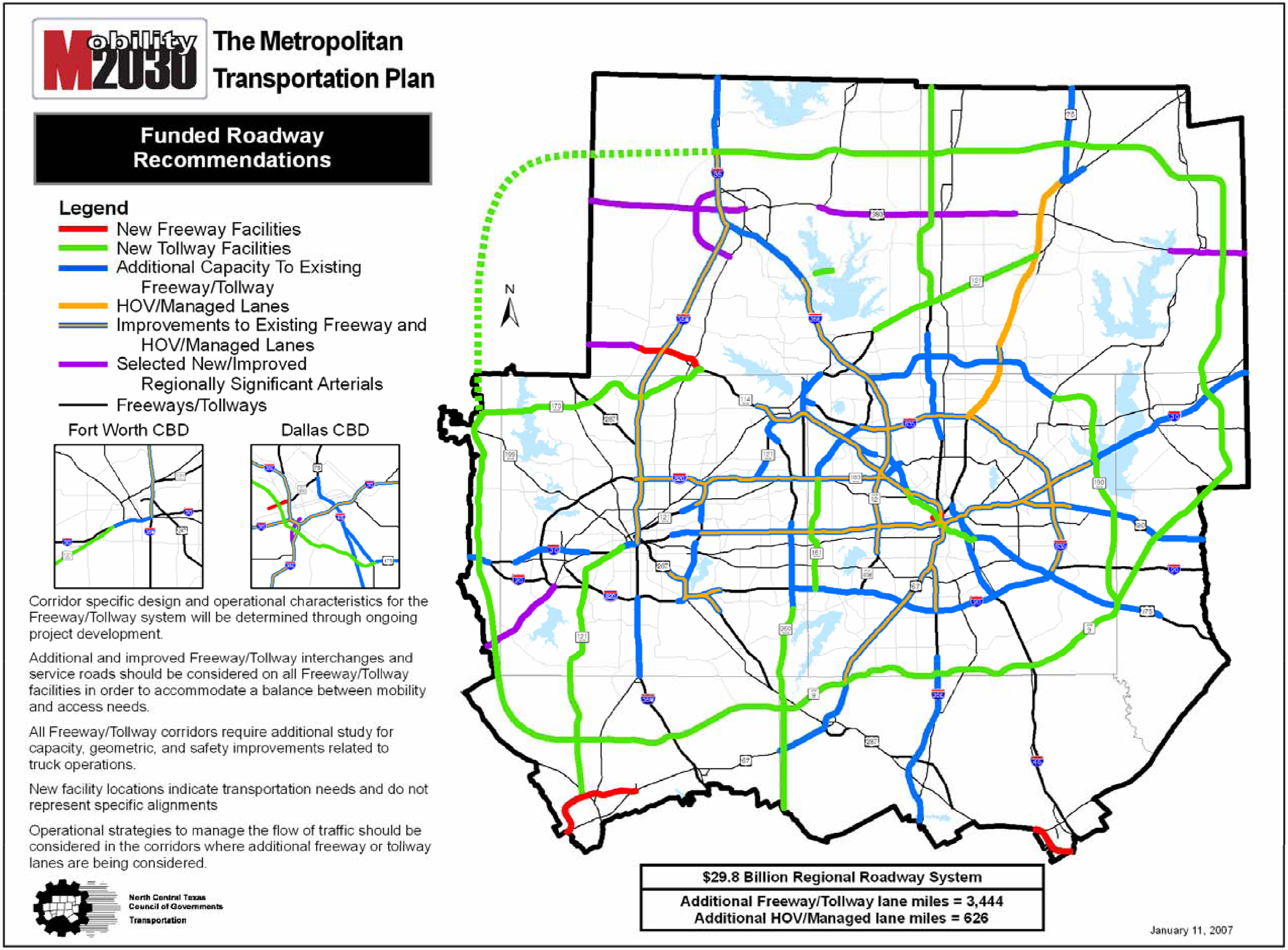
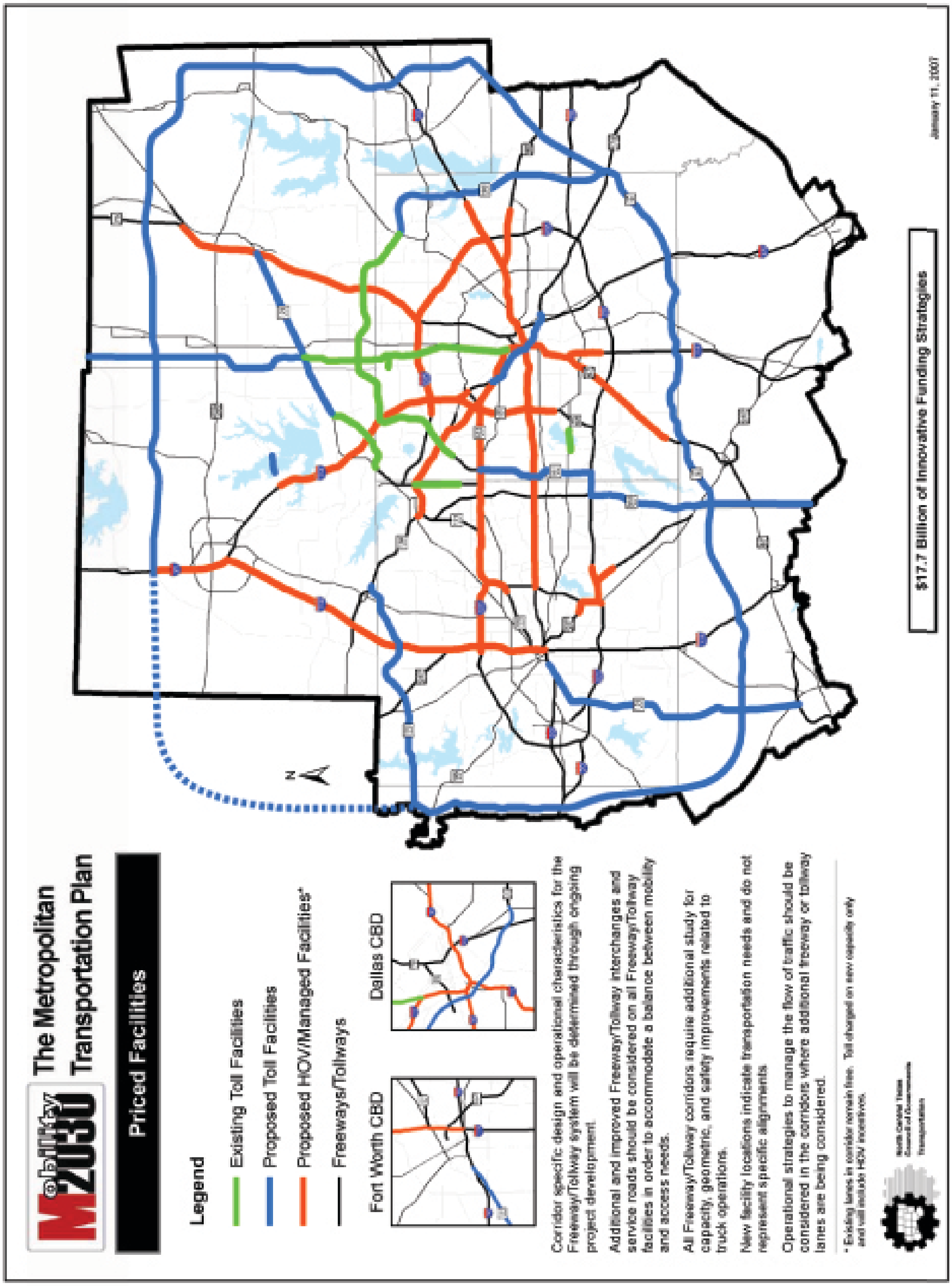

Mobility 2030
The Metropolitan Transportation Plan
Funded Roadway Recommendations
Legend
New Freeway Facilities
New Tollway Facilities
Additional Capacity To Existing Freeway/Tollway
HOV/Managed Lanes
Improvements to Existing Freeway and HOV/Managed Lanes
Selected New/Improved Regionally Significant Arterials
Freeways/Tollways
Fort Worth CBD
Dallas CBD
Corridor specific design and operational characteristics for the Freeway/Tollway system will be determined through ongoing project development.
Additional and improved Freeway/Tollway interchanges and service roads should be considered on all Freeway/Tollway facilities in order to accommodate a balance between mobility and access needs.
All Freeway/Tollway corridors require additional study for capacity, geometric, and safety improvements related to truck operations.
New facility locations indicate transportation needs and do not represent specific alignments
Operational strategies to manage the flow of traffic should be considered in the corridors where additional freeway or tollway lanes are being considered.
North Central Texas Council of Governments Transportation
N
$29.8 Billion Regional Roadway System
Additional Freeway/Tollway lane miles = 3,444
Additional HOV/Managed lane miles = 626
January 11, 2007

Figure 1



Mobility 2030
The Metropolitan Transportation Plan
Priced Facilities
Legend
Existing Toll Facilities
Proposed Toll Facilities
Proposed HOV/Managed Facilities*
Freeways/Tollways
Fort Worth CBD
Dallas CBD
Corridor specific design and operational characteristics for the Freeway/Tollway system will be determined through ongoing project development.
Additional and improved Freeway/Tollway interchanges and service roads should be considered on all Freeway/Tollway facilities in order to accommodate a balance between mobility and access needs.
All Freeway/Tollway corridors require additional study for capacity, geometric, and safety improvements related to truck operations.
New facility locations indicate transportation needs and do not represent specific alignments.
Operational strategies to manage the flow of traffic should be considered in the corridors where additional freeway or tollway lanes are being considered.
$17.7 Billion of Innovative Funding Strategies
January 11, 2007

Figure 2

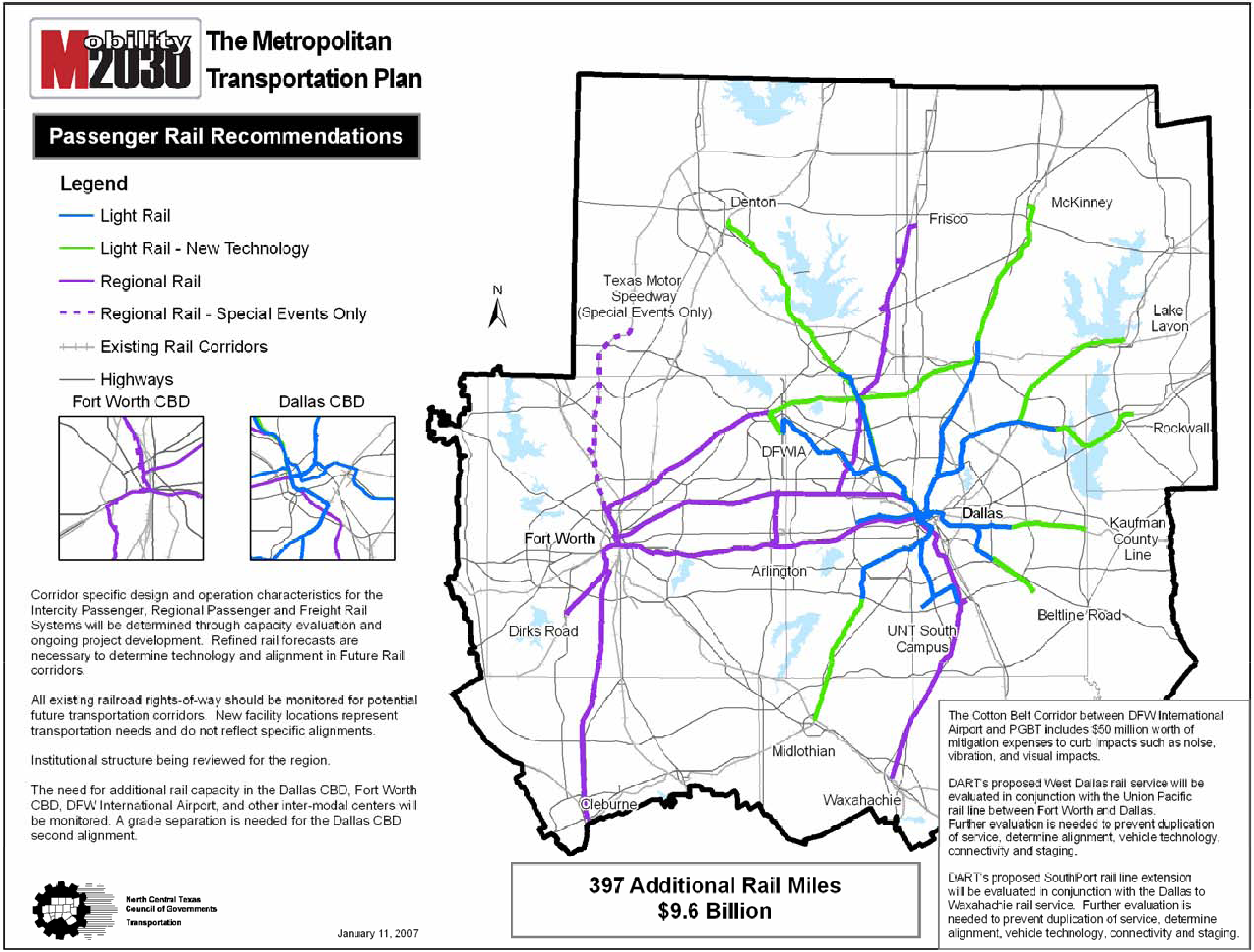
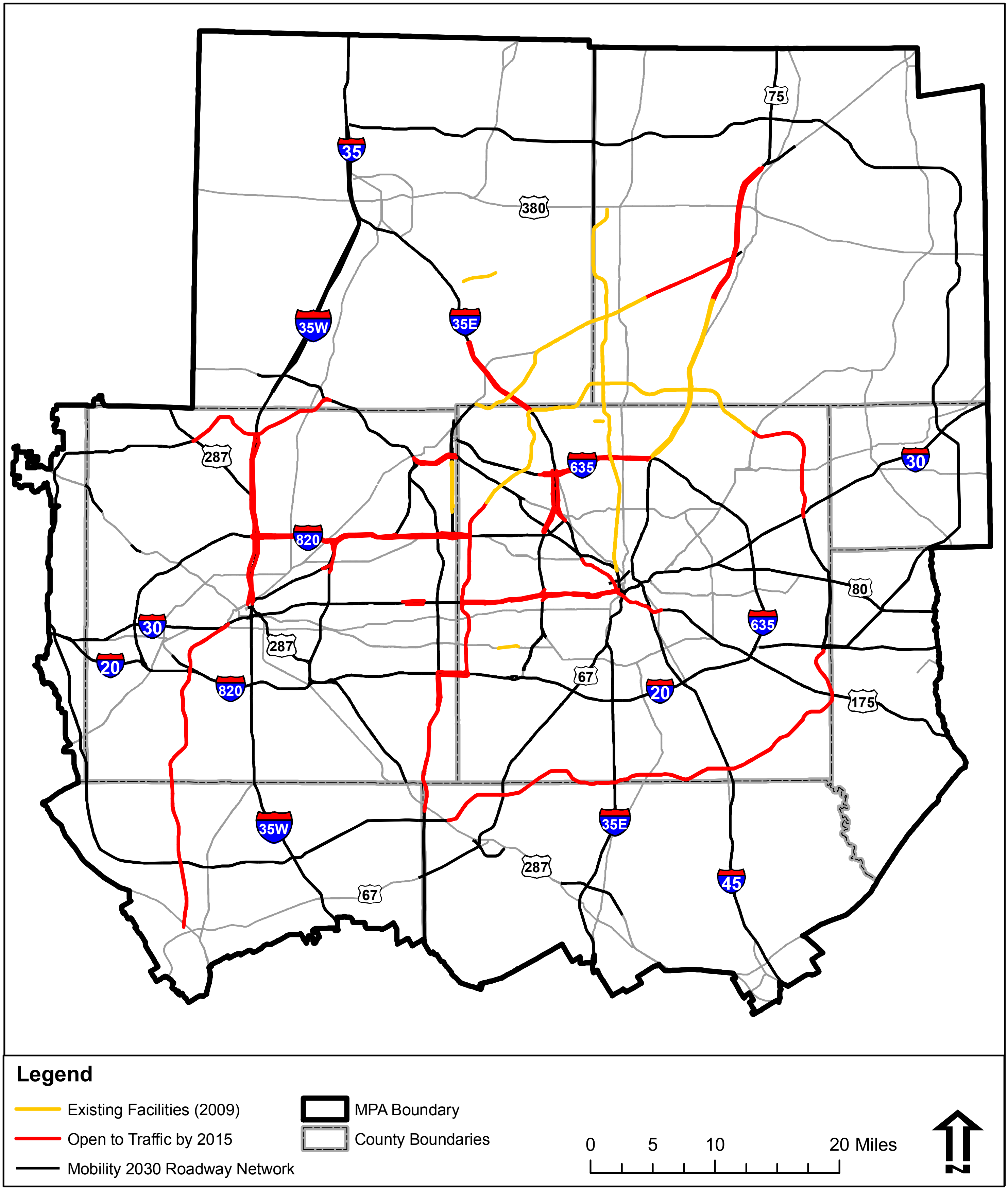

Mobility 2030
The Metropolitan Transportation Plan
Passenger Rail Recommendations
Legend
Light Rail
Light Rail - New Technology
Regional Rail
Regional Rail - Special Events Only
Existing Rail Corridors
Highways
Fort Worth CBD
Dallas CBD
Corridor specific design and operation characteristics for the Intercity Passenger, Regional Passenger and Freight Rail Systems will be determined through capacity evaluation and ongoing project development. Refined rail forecasts are necessary to determine technology and alignment in Future Rail corridors.
All existing railroad rights-of-way should be monitored for potential future transportation corridors. New facility locations represent transportation needs and do not reflect specific alignments.
Institutional structure being reviewed for the region.
The need for additional rail capacity in the Dallas CBD, Fort Worth CBD, DFW International Airport, and other inter-modal centers will be monitored. A grade separation is needed for the Dallas CBD second alignment.
North Central Texas Council of Governments Transportation
January 11, 2007
N
Denton
Frisco
McKinney
Texas Motor Speedway (Special Events Only)
Lake Lavon
Rockwall
DFWIA
Dallas
Fort Worth
Kaufman County Line
Arlington
Dirks Road
Beltline Road
UNT South Campus
Midlothian
Waxahachie
Cleburne
397 Additional Rail Miles
$9.6 Billion
The Cotton Belt Corridor between DFW International Airport and PGBT includes $50 million worth of mitigation expenses to curb impacts such as noise, vibration, and visual impacts.
DART's proposed West Dallas rail service will be evaluated in conjunction with the Union Pacific rail line between Fort Worth and Dallas. Further evaluation is needed to prevent duplication of service, determine alignment, vehicle technology, connectivity and staging.
DART's proposed SouthPort rail line extension will be evaluated in conjunction with the Dallas to Waxahachie rail service. Further evaluation is needed to prevent duplication of service, determine alignment, vehicle technology, connectivity and staging.

Figure 3



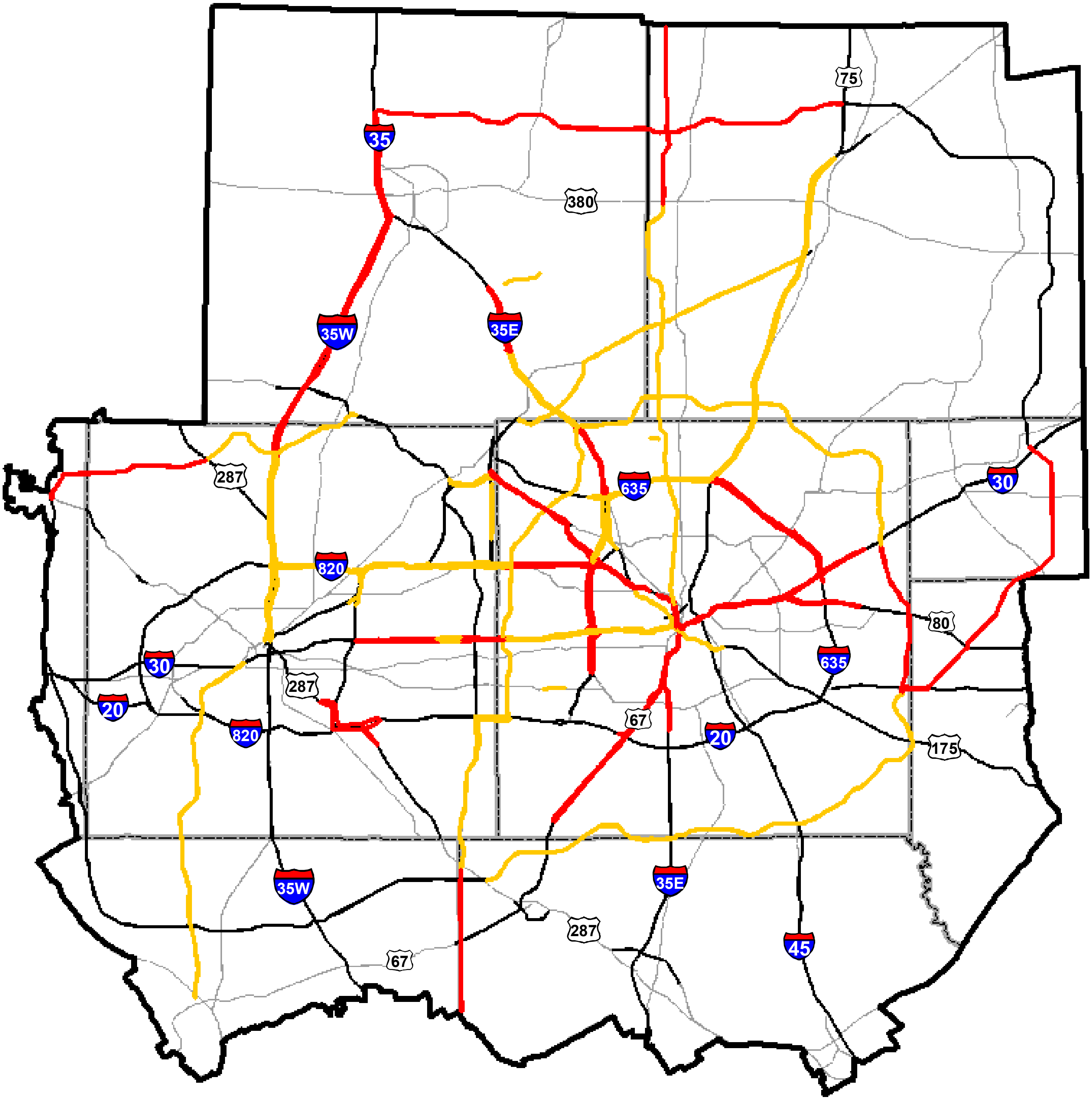
Texas Department of Transportation

Texas Department of Transportation
Tarrant County

2015 Priced Facility Network

Figure 4

Date Created: May 2008



Legend

- Existing 2015 Facilities
- Open to Traffic by 2025
- Mobility 2030 Roadway Network
- MPA Boundary
- County Boundaries

0 5 10 20 Miles

N

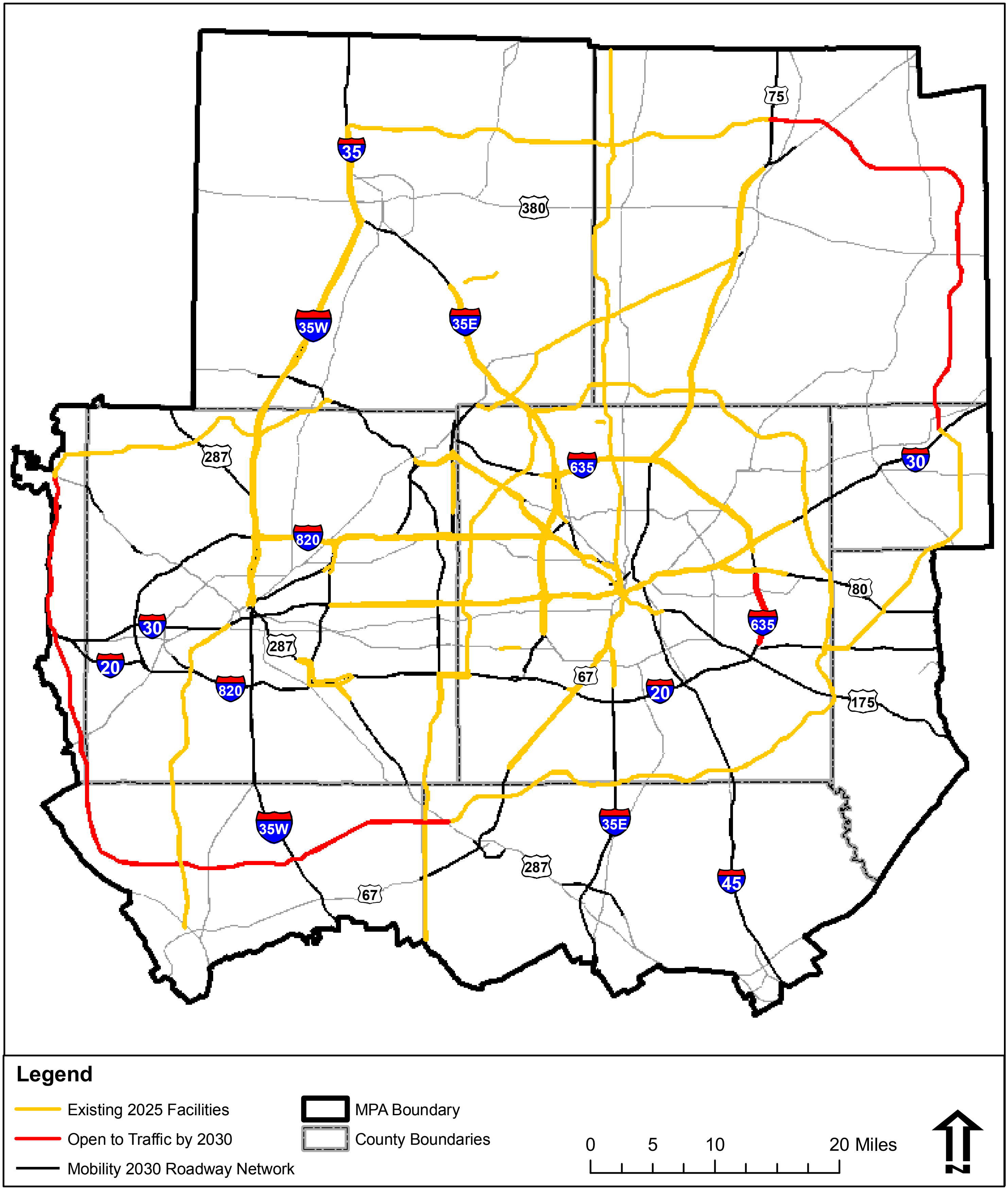
Texas Department of Transportation

Texas Department of Transportation
Tarrant County

2025 Priced Facility Network

Figure 5

Date Created: May 2008

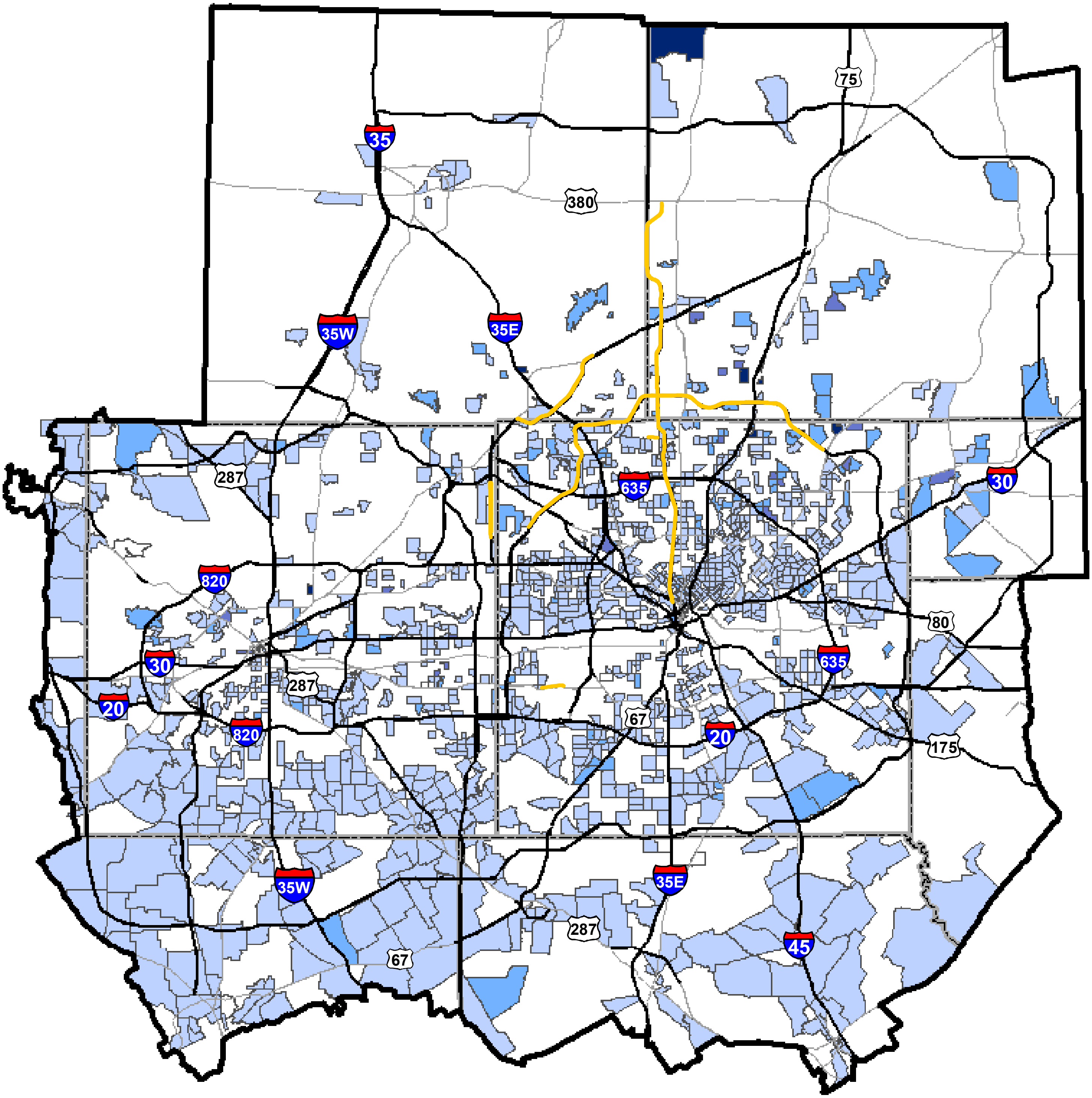


Texas Department of Transportation
Texas Department of Transportation
Tarrant County

2030 Priced Facility Network

Figure 6

Date Created: May 2008



Legend

2009 Priced Facilities
Mobility 2030 Roadway Network
MPA Boundary
County Boundaries

Environmental Justice TSZs
TRIPS

<1 Trip
1-50 Trips (19,099 EJ Trips, 52% of total EJ Trips)
51-150 Trips (10,018 EJ Trips, 28% of total EJ Trips)
151-300 Trips (4,390 EJ Trips, 12% of total EJ Trips)
>300 Trips (2,893 EJ Trips, 8% of total EJ Trips

0 5 10 20 Miles

N

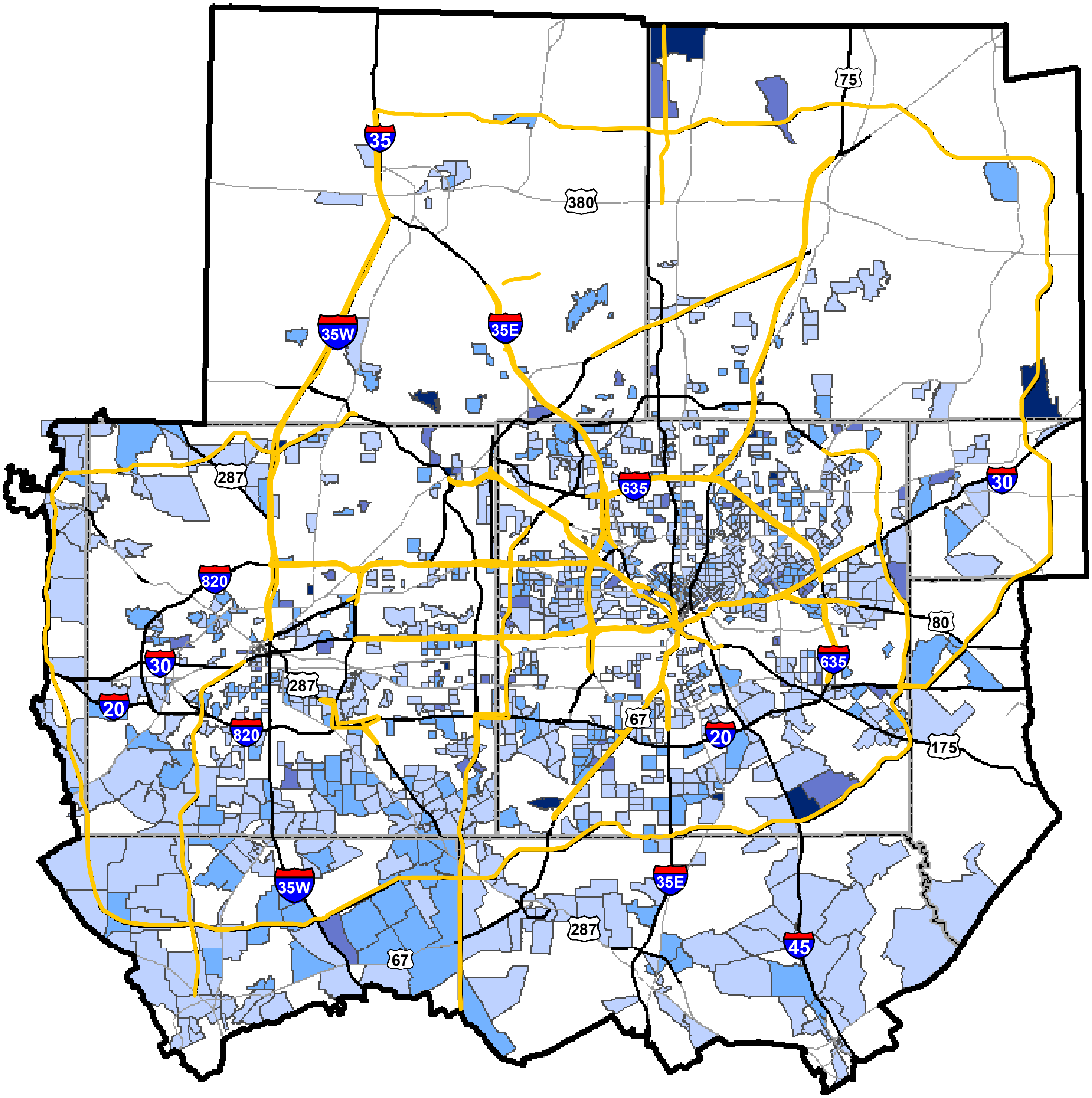
Texas Department of Transportation

Texas Department of Transportation
Tarrant County

Environmental Justice
Traffic Survey Zones:
Daily Trips on Existing (2009) Priced Facilities

Figure 7

Date Created: May 2008



Legend

2030 Future Priced Facilities
Mobility 2030 Roadway Network
MPA Boundary
County Boundaries

Environmental Justice TSZs
Trips by TSZ

- <1 Trip
- 1-50 Trips (23,109 EJ Trips, 27% of total EJ Trips)
- 51-150 Trips (43,809 EJ Trips, 41% of total EJ Trips)
- 151-300 Trips (17,740 EJ Trips, 21% of total EJ Trips)
- >300 Trips (9,353 EJ Trips, 11% of total EJ Trips)

0 5 10 20 Miles

N

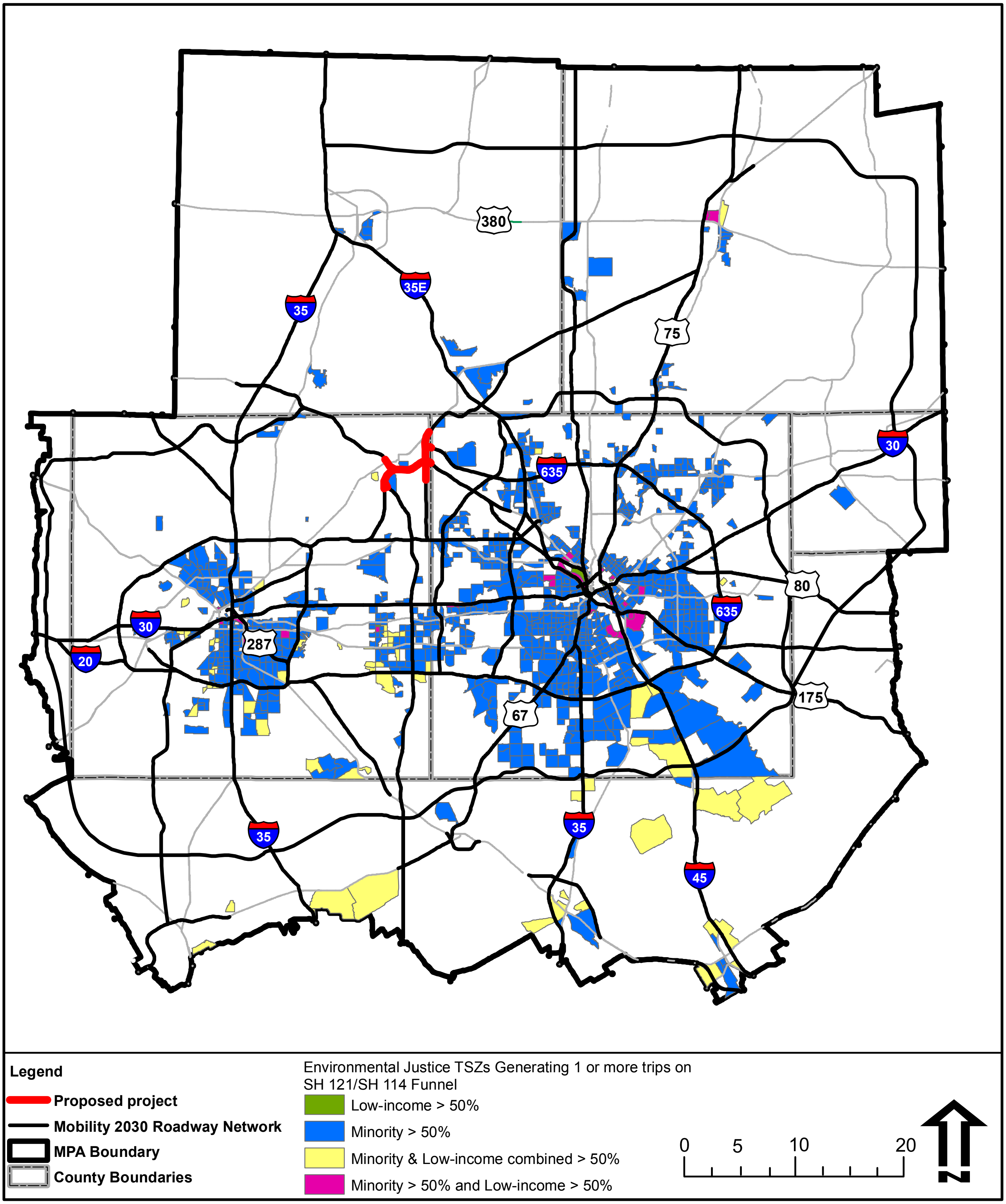
Texas Department of Transportation

Texas Department of Transportation
Tarrant County

Environmental Justice
Traffic Survey Zones:
Daily Trips on Future (2030) Priced Facilities

Figure 8

Date Created: May 2008



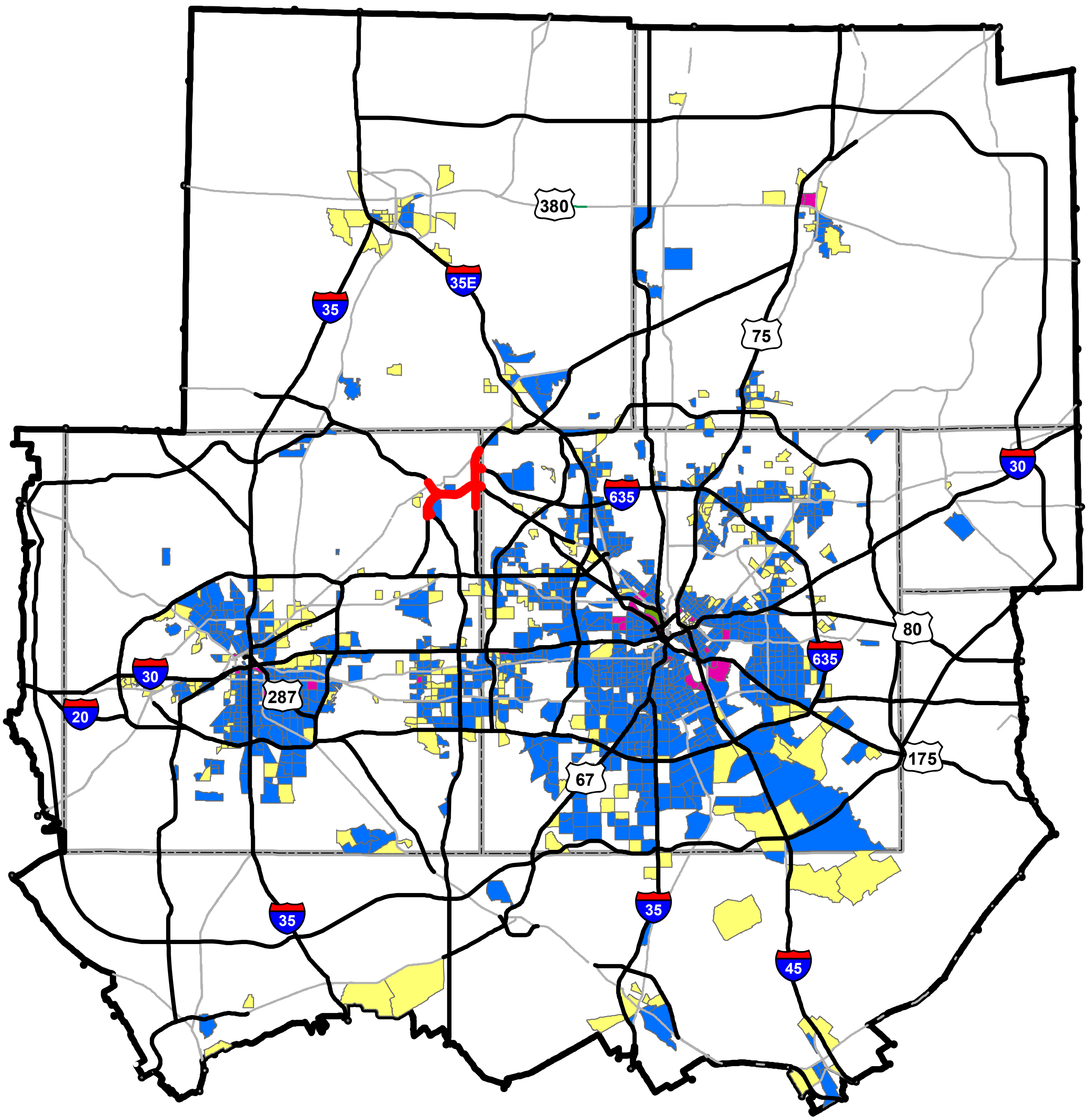
Texas Department of Transportation
Texas Department of Transportation
Tarrant County

Environmental Justice
Traffic Survey Zones:
2030 No Build Alternative

SH 121 / SH 114 Funnel

Figure 9

Date Created May 2008



Legend

Proposed project

Mobility 2030 Roadway Network

MPA Boundary

County Boundaries

Environmental Justice TSZs Generating 1 or more trips on SH 121/SH 114 Funnel

Minority > 50% and Low-income > 50%

Minority > 50%

Low-income > 50%

Minority & Low-income combined > 50%

0 5 10 20

N

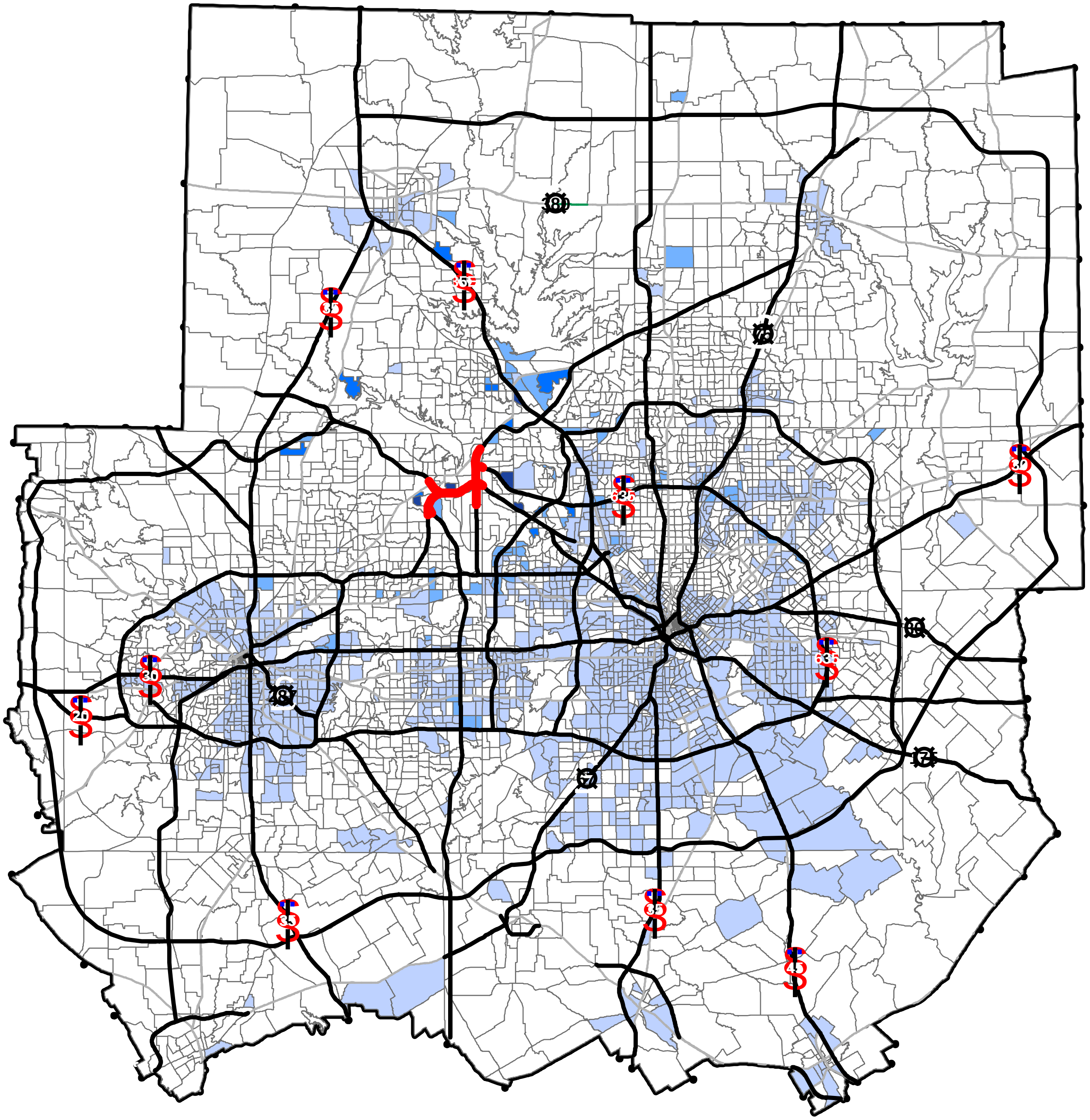
Texas Department of Transportation
Tarrant County

Environmental Justice
Traffic Survey Zones:
2030 Build Alternative

SH 121 / SH 114 Funnel

Figure 10

Date Created May 2008



Legend

- Proposed project
- Mobility 2030 Roadway Network
- MPA Boundary
- County Boundaries

Environmental Justice TSZs Trips

- <1
- 1-25 Trips (8423 EJ Trips, 62% of total EJ Trips)
- 26-75 Trips (2803 EJ Trips, 21% of total EJ Trips)
- 76-150 Trips (1174 EJ Trips, 9% of total EJ Trips)
- >150 Trips (1100 EJ Trips, 8% of total EJ Trips)

0 5 10 20

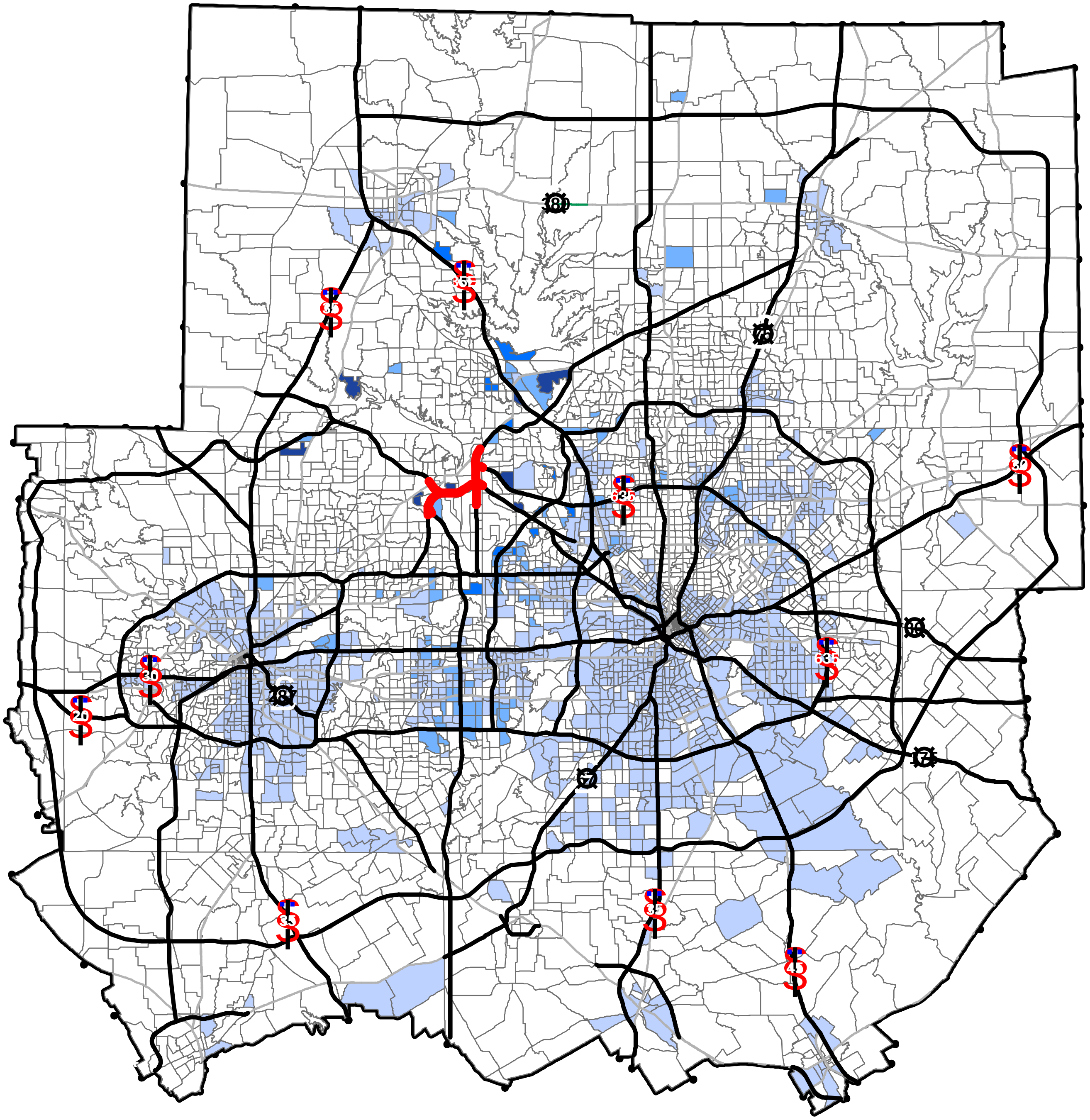
Texas Department of Transportation
Tarrant County

Environmental Justice
Traffic Survey Zones:
2030 Daily Trips on No-Build Alternative

SH 121 / SH 114 Funnel

Figure 11

Date Created: Sept 2008



Legend

- Proposed project
- Mobility 2030 Roadway Network
- MPA Boundary
- County Boundaries

Environmental Justice TSZs Trips

- <1 Trip
- 1-25 Trips (9423 EJ Trips, 56% of total EJ Trips)
- 26-75 Trips (4161 EJ Trips, 24% of total EJ Trips)
- 76-150 Trips (1340 EJ Trips, 8% of total EJ Trips)
- >150 Trips (1974 EJ Trips, 12% of total EJ Trips)

0 5 10 20

Texas Department of Transportation

Texas Department of Transportation
Tarrant County

Environmental Justice
Traffic Survey Zones:
2030 Daily Trips on Build Alternative

SH 121 / SH 114 Funnel

Figure 12

Date Created: Sept 2008

APPENDIX K

AGENCY CORRESPONDENCE

TEXAS PARKS & WILDLIFE

Life's better outside.™

April 3, 2008

Karen H. Clary, Ph.D.
Biological Resources Branch
Environmental Affairs Division
Texas Department of Transportation
125 East 11th Street
Austin, TX 78701-2483

RE: Environmental Assessment for DFW Connector Improvements
SH 114: From Business 114L to International Parkway
SH 121: From SH 360 to FM 2499
(CSJ 0353-03-059, etc., Tarrant and Dallas Counties)

Dear Ms. Clary:

The Texas Parks and Wildlife Department (TPWD) has reviewed the Environmental Assessment (EA) for the proposed project referenced above.

The project would involve the reconstruction and widening of the DFW Connector and interconnected facilities north of the DFW International Airport to upgrade the facilities and eliminate "the funnel" along this area while also providing consistent frontage roads, managed lanes, and direct connectors. The project would require approximately 192 acres of additional right-of-way (ROW).

The EA indicates that the project would impact 1 acre of riparian woodlands, 29 acres of mixed oak woodlands, and 23 acres of mesquite-juniper savannah.

Many areas of the new ROW consist of narrow bands along the existing ROW. Wide bands of new ROW are primarily proposed along the project from Texan Trail to the intersection with IH 635, as shown in Appendix D, Plates C and D. TPWD review of aerial imagery shows that within this segment alone, it appears the riparian habitat associated with Cottonwood Branch exceeds 1 acre. A conservative estimate of the impacts to riparian habitat along Cottonwood Branch at this location is approximately 8 acres. Jurisdictional impacts of 0.1 acre to Water 15 would reduce the impacts to riparian habitat at this location by a small amount. It was difficult to determine where TxDOT identified riparian habitat because the EA did not contain visual delineations of wetlands and vegetation types. The EA discusses riparian habitat occurring along 5 creeks and their associated tributaries.

In accordance with Provision (4)(A)(ii) of the TxDOT-TPWD Memorandum of Understanding (MOU), the Memorandum of Agreement (MOA) includes riparian sites as an item to be considered for non-regulatory mitigation.

The EA indicates that no non-regulatory compensatory mitigation would be offered for loss to riparian habitat associated with the proposed project because all stream crossings would be spanned and because impacts to riparian vegetation would be minimized. The EA did not show locations and lengths of bridge spans and their associated profile designs to verify how riparian habitat would be conserved at bridge crossings. Additionally, the EA indicates that all vegetation would be removed within the ROW, thus impacts to riparian habitat will occur.

Riparian areas provide important ecological functions. Riparian vegetation serves as an energy source for aquatic organisms while providing habitat for terrestrial wildlife species. Trees provide shade and prevent wide fluctuations in water temperature, protecting aquatic wildlife from the harmful effects of climatic extremes. The stems and roots of riparian vegetation stabilize soil by reducing water velocity and minimizing erosion. Wooded riparian corridors along streams generally provide nesting habitat for birds and food, cover, and travel corridors for wildlife.

In areas experiencing growth and development it is essential to protect remaining riparian systems and to enhance riparian buffer zones at every opportunity. Riparian vegetation is a priority habitat type for conservation by TPWD across the state; therefore staff requests this loss be mitigated at a 1:1 ratio. A three to five year maintenance plan that ensures an 85% survival rate should be developed for the replacement trees at the riparian site chosen for restoration.

> <u>Request</u>. Plates delineating riparian woodlands, mixed oak woodlands, mesquite-juniper savannah, and wetlands should be provided.
>
> <u>Request</u>. The riparian woodland impacts should be recalculated to include the wooded buffer along Cottonwood Branch.
>
> <u>Request</u>. No less than 8 acres of habitat restoration/mitigation for loss to riparian habitat should be provided. Riparian habitat restoration would be most beneficial within the same system impacts occur.

Bridge Profile

Recommendation. The bridge spans should be designed to include adequate vertical and horizontal clearances under the bridge to allow for terrestrial wildlife to safely pass under the road. Such spaces should appeal to wildlife by using natural surfaces and vegetation.

Recommendation. TPWD prefers that riprap or other bank stabilization structures be used only if an erosion problem exists. Bank stabilization or riprap should not obstruct the path of terrestrial wildlife. Riprap should only be necessary if the new bridge were too low or oriented such that no light will get under the bridge to support sufficient bank vegetation.

TPWD advises review and implementation of these requests and recommendations. If you have any questions, please contact me at (903) 675-4447.

Sincerely,

Karen B. Hardin

Karen B. Hardin
Wildlife Habitat Assessment Program
Wildlife Division

kbh:5246

Texas Department of Transportation

P.O. BOX 6868 • FORT WORTH, TEXAS 76115-0868 • (817) 370-6500

October 3, 2008

Karen Hardin
Wildlife Habitat Assessment Program
Wildlife Division
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, Texas 78744

RE: Environmental Assessment for DFW Connector Improvements
SH 114: From Business 114L to International Parkway
SH 121: From SH 360 to FM 2499
(CSJ: 0353-03-059, etc. Tarrant and Dallas Counties)

Dear Ms. Hardin,

We appreciate your attention to this project and the opportunity to provide you with additional information. This letter responds to TPWD comments and recommendations made in a letter dated April 3, 2008 regarding the review of the Draft Environmental Assessment (EA) document prepared for the above referenced project. We have very carefully reviewed TPWD comments regarding biological impacts and are providing the following response:

TPWD Comment/Request: *Plates delineating riparian woodlands, mixed oak woodlands, mesquite-juniper savannah, and wetlands should be provided.*

TxDOT Response: Plates depicting existing vegetation have been prepared and are included as an attachment to this letter. Project area streams and wetlands were depicted on the plates in the draft of the EA document that was reviewed. These are included on the attached plates, along with the requested vegetation layer. Furthermore, these plates will be included in future drafts of the EA document.

TPWD Comment/Request: *The riparian woodland impacts should be recalculated to include the wooded buffer along Cottonwood Branch.*

TxDOT Response: The wooded buffer along Cottonwood Branch does contain riparian woodland vegetation and was inadvertently mislabeled in the draft of the EA that was reviewed. This error has since been corrected and vegetation impacts for the proposed project have been recalculated.

In addition, minor design changes made since the February 2008 draft EA document review resulted in the need for minor amounts of additional right-of-way. These areas are along SH 114 southeast of the SH 114 interchange with International Parkway on DFW International Airport property (Plate D of Appendix D), and at the northeast corner of the FM 2499/Grapevine Mills Boulevard intersection (Plate E of Appendix D). Also, please see the attached Vegetation Impacts, Sheets 4 and 5, for updated right-of-way limits in these two areas.

A field visit was conducted on August 29, 2008 to re-verify and re-quantify the extent and composition of riparian woodland vegetation in the project area. As a result of that field visit, one additional vegetation type (Riparian Scrub/Shrub vegetation) has been added, and vegetation impacts for the proposed project have been recalculated. Riparian scrub/shrub vegetation within the project area occurs alongside and within the channel of some creeks and drainages. It consists of a mixture of woody shrubs, saplings, and herbaceous species, including cattails (*Typha sp.*), black willow (*Salix nigra*), willow baccharis (*Baccharis neglecta*), ironweed (*Vernonia sp.*), rattle-bush (*Sesbania drummondii*), johnsongrass, flatsedges (*Cyperus sp.*), sedges (*Carex sp.*), cottonwood (*Populus deltoides*), cockle-bur (*Xanthium strumarium*), dallisgrass (*Paspalum dilatatum*), spurges (*Euphorbia sp.*), amaranth (*Amaranthus sp.*), and balloonvine (*Cardiospermum halicacabum*). Mature woody vegetation is generally lacking or represented by only a few isolated individuals. Approximately 4.87 acres of riparian scrub/shrub vegetation is found within the project area. No unusual features were observed.

Table 1 below displays the updated calculations for all categories of vegetation identified within the project area.

Table 1 Vegetation Impacts

Vegetation type	Existing ROW		Proposed ROW		Total	
	Acres	Percent	Acres	Percent	Acres	Percent
Riparian Woodland	0.53	0.08%	3.96	2.19%	4.48	0.52%
Riparian Scrub/shrub Vegetation	4.65	0.68%	0.22	0.12%	4.87	0.56%
Mixed Oak Woodland	0.63	0.09%	22.50	12.47%	23.12	2.66%
Mesquite-juniper Savannah	0.06	0.01%	22.77	12.61%	22.83	2.63%
Grassland	681.88	99.15%	131.04	72.61%	812.92	93.63%
Total	687.74	100.0%	180.48	100.0%	868.23	100.0%

TPWD Comment/Request: *No less than eight acres (as estimated by TPWD from visual examination of aerial photographs) of habitat restoration/mitigation for loss to riparian habitat should be provided. Riparian habitat restoration would be most beneficial within the same system impacts occur. Additionally, a three to five year maintenance plan that ensures an 85% survival rate should be developed for the replacement trees at the riparian site chosen for restoration.*

TxDOT Response: As mentioned above, a field visit was conducted on August 29, 2008 to re-verify and re-quantify the extent and composition of riparian woodland vegetation in the project area. As a result of this field visit, the impacts to riparian woodlands were recalculated and are summarized in Table 2.

Table 2 Riparian Woodland			
Riparian Woodland	**Acres within Proposed Right-of-Way**	**Acres within Existing Right-of-Way**	**Total Acreage**
Cottonwood Branch	3.86	0.25	4.11
Denton Creek	0.01	0.01	0.02
Bear Creek	0	0.24	0.24
Farris Branch	0.01	0	0.01
Grapevine Creek	0.07	0.04	0.11

During the field visit on August 29, 2008, a representative sampling was taken within each riparian woodland area in order to more fully describe each riparian woodland area. Attachment 1 provides the number and percent occurrence for each mature tree species within the sampling, the diameter at breast height (dbh) range and approximate height range for each species, the density of trees within the woodland, a listing of sapling/shrub and herbaceous species within the sampling, and a listing of other species identified within the woodland.

The Texas Department of Transportation Fort Worth District revisited the riparian impacts for Cottonwood Branch, an intermittent stream. As provided by guidance from the United States Army Corps of Engineers, normally the riparian area will be 25 to 50 feet wide on each side of the stream for a well established riparian corridor. Classifying the riparian corridor utilizing the USACE estimate is very generous for the area. Of the species present within this corridor, it does not appear to be of good quality. Historically this area was grazed prior to becoming a part of the Dallas-Fort Worth (DFW) International Airport property. Since then, aggressive species have matured but lack the quality necessary for any substantial benefit to wildlife. TxDOT believes that an estimated 4.11 acres of riparian woodland exist along the Cottonwood Branch channel. This area is identified as water feature number 15 on the attached plates. Essentially, of the 4.11 acres that are present in the area, only minimal impacts are expected. The design for the new development of the DFW Connector project calls for this area to be bridged by a new structure. Only minor impacts are expected where columns would be necessary to support the new structures. Judging from a worst case scenario, these impacts are expected to be less than one acre.

In regards to any non-regulatory mitigation effort for riparian impacts as a result of the proposed project, the TxDOT - Fort Worth District does not propose to mitigate for any unregulated habitat of such minimal disruption or impact. TxDOT apologizes for not relaying the bridging concept of the riparian area of Cottonwood Branch during its initial submittal. Please find attached, a layout that illustrates the riparian area of Cottonwood Branch along with the proposed area being bridged and therefore minimizing riparian impacts. In another point, the DFW International Airport has established a wetland mitigation area to be preserved just northeast of this area. The DFW International Airport abides by an US Department of Transportation Federal Aviation Administration Advisory Circular No: 150-5200-33B that prohibits the development of airport property in such a manner that may attract hazardous wildlife on or near public-use airports. Most of the property surrounding this project is owned by the DFW International Airport. Therefore, mitigation within the same system would be impossible.

TxDOT will commit to adding restrictions in the plans, dictating clearing activities within the Cottonwood Branch riparian area, be limited to that necessary to build the supporting elements of the proposed structure. Disturbed areas caused by the clearing activities, associated with building the supporting elements of the proposed structure, would be reseeded and would eventually foster similar species. Also, no impacts to the wetland near Cottonwood Branch are expected since the area would also be bridged. Furthermore, TxDOT will also commit to adding a note to the plans to establish fencing around the wetland area and make aware that the wetland area is not to be disturbed.

TPWD Comment/Recommendation: *The bridge spans should be designed to include adequate vertical and horizontal clearances under the bridge to allow for terrestrial wildlife to safely pass under the road. Such spaces should appeal to wildlife by using natural surfaces and vegetation.*

TxDOT Response: All bridges are planned to accommodate at a minimum a 50 year flood with a two-foot clearance. Due to the topography in the area there should be sufficient vertical and horizontal clearance to allow for terrestrial wildlife to pass safely under the bridges.

TPWD Comment/Recommendation: *TPWD prefers that riprap or other bank stabilization structures be used only if an erosion problem exists. Bank stabilization or riprap should not obstruct the path of terrestrial wildlife. Riprap should only be necessary if the new bridge were too low or oriented such that no light will get under the bridge to support sufficient bank vegetation.*

TxDOT Response: The proposed riprap should not pose an obstruction to the movement of terrestrial wildlife under the proposed bridges; usual placement would be only on the slope from the bridge abutment to the toe of slope. On small channels, wildlife would be able to use the channel bottom as a pathway, while on larger channels there should be ample opportunity in the overbank areas for wildlife movement. Historically, TxDOT has experienced substantial erosion problems at unprotected bridge abutments, not only from water flowing through the bridge opening, but also from stormwater runoff flowing from the road down the embankment slope. The resultant damage to the embankment poses a major maintenance problem. Because the problems associated with stormwater runoff flowing down the slope, riprap protection is necessary even on grade separation structures - not just at stream crossings. Even with bridges as much as 20’ off the ground, and as little as 20’ wide, there is typically insufficient ambient light under the bridges to provide an environment conducive to the growth of sufficient vegetation that will maintain an erosion-resistant slope. The vegetation that will grow under these conditions tends to be of the noxious, undesirable varieties. Even when vegetation does grow under bridges, it generally does not do so on the abutment slopes, leaving those areas exposed to erosion.

TxDOT will make every effort to ensure that wildlife paths, as described above, are provided whenever practical.

We appreciate the time and effort taken by TPWD to review the project document for impacts to biological resources. Please contact me at (817) 370-6718 if you have additional comments or need any further clarifications.

Sincerely,

Elisa F. Garcia

Elisa F. Garcia
Environmental Specialist
Fort Worth District

cc: Environmental Affairs Division
Attachments

Attachment 1

Riparian Woodlands Within the DFW Connector Project Area

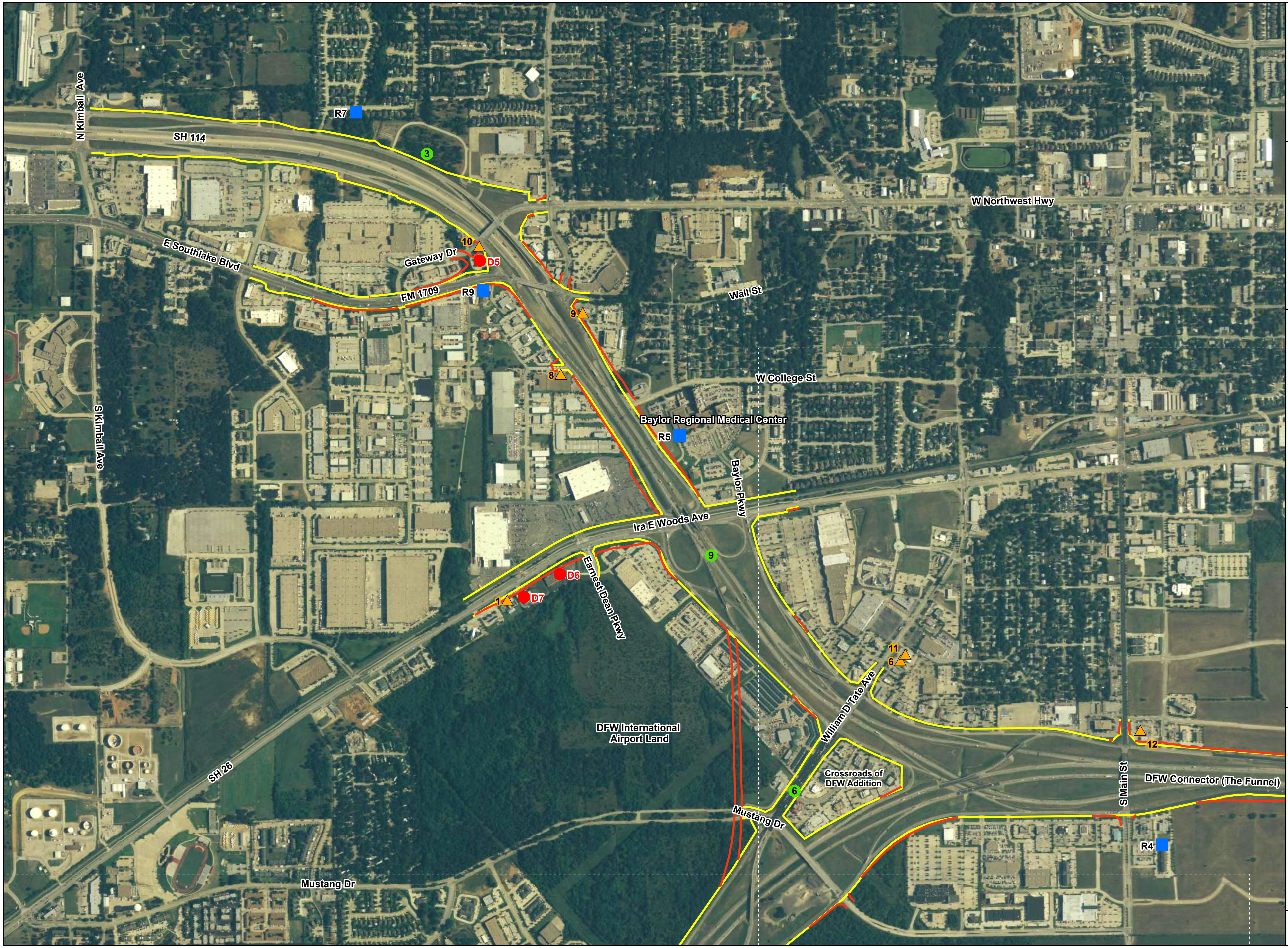
Riparian woodland	Tree species with dbh>6” within sampling					Density (# trees per acre)	Sapling/shrub species observed within sampling	Herbaceous species observed within sampling	Other species observed in moderation
	Species	Number of individuals	Percent occurrence (%)	Dbh range (inches)*	Height range (feet)*				
Cottonwood Branch	Sugarberry (*Celtis laevigata*)	18	94.7	6 to 12	20 to 50	333.3	Sugarberry, honey locust (*Gleditsia triacanthos*), dewberry (*Rubus trivialis*), rattle-bush (*Sesbania drummondii*), poison ivy (*Toxicodendron radicans*), coral-berry (*Symphoricarpos orbiculatus*)	Canada wild-rye (*Elymus canadensis*), flatsedge (*Carex sp.),* beggars lice (*Torilis arvensis*), goldenrod (*Solidago sp*.)	Bois d’Arc (*Maclura pomifera*), black willow (*Salix nigra*)
	Boxelder (*Acer negundo*)	1	5.3	8	30				
Denton Creek	American elm (*Ulmus americana*)	2	25.0	14 and 24	60	140.3	American elm, sugarberry, green ash, chinaberry, bur oak (*Quercus macrocarpa*), cedar elm (*Ulmus crassifolia*), greenbrier (*Smilax bona-nox*), poison ivy, elderberry (*Sambucus canadensis*), willow baccharis (*Baccharis neglecta*)	Giant ragweed (*Ambrosia trifida*), croton (*Croton sp.),* ryegrass (*Lolium perenne*)	Cottonwood (*Populus deltoides*)
	Sugarberry	1	12.5	26	50				
	Green ash (*Fraxinus pennsylvanica*)	3	37.5	8 to 14	15-25				
	Chinaberry (*Melia azedarach*)	1	12.5	10	10				
	Bois d’arc	1	12.5	5	10				
Bear Creek	Black willow	3	16.7	10 to 38	40 to 80	315.8	Boxelder, green ash	Canada wild-rye, sedge (*Carex sp.*)	Inland sea-oats (*Chasmanthium latifolium*), grapevine (*Vitis sp.*), poison ivy, giant ragweed, sugarberry, ironweed (*Vernonia sp.*), frostweed (*Verbesina virginica*)
	Boxelder	14	77.8	6 to 18	15 to 40				
	American elm	1	5.5	15	60				
Farris Branch	Bois d’arc	2	22.2	8 and 24	15 to 60	157.9	Cedar elm, sugarberry, pecan (*Carya illinoiensis*)	Greenbrier, coral-berry, giant ragweed, grapevine	None
	Sugarberry	4	44.5	6 to 14	25 to 45				
	Cedar Elm (*Ulmus crassifolia*)	3	33.3	6 to 14	25 to 40				
Grapevine Creek	Boxelder	5	62.5	6 to 16	30	140.3	Sugarberry, boxelder, American elm, coral-berry, hog plum (*Prunus rivularis*)	Cockle-bur (*Xanthium strumarium*), balloonvine (*Cardiospermum halicacabum*), poison ivy, Johnsongrass (*Sorghum halepense*), goldenrod, smartweed (*Polygonum sp.*)	Black willow, mulberry (*Morus sp.*), bois d’arc, honey locust
	Sugarberry	1	12.5	6	18				
	American elm	2	25.0	8 and 12	25 to 35				

*Where only one number is listed, all trees of that species exhibited the same dbh and/or height.

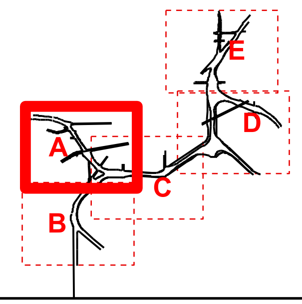
DFW CONNECTOR

APPENDIX D

HUMAN ENVIRONMENT



Location Diagram



Proposed ROW

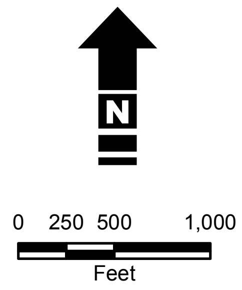
Existing ROW

D Potential Building Displacement

R Noise Receiver

Photo Locations

Hazardous Materials Site



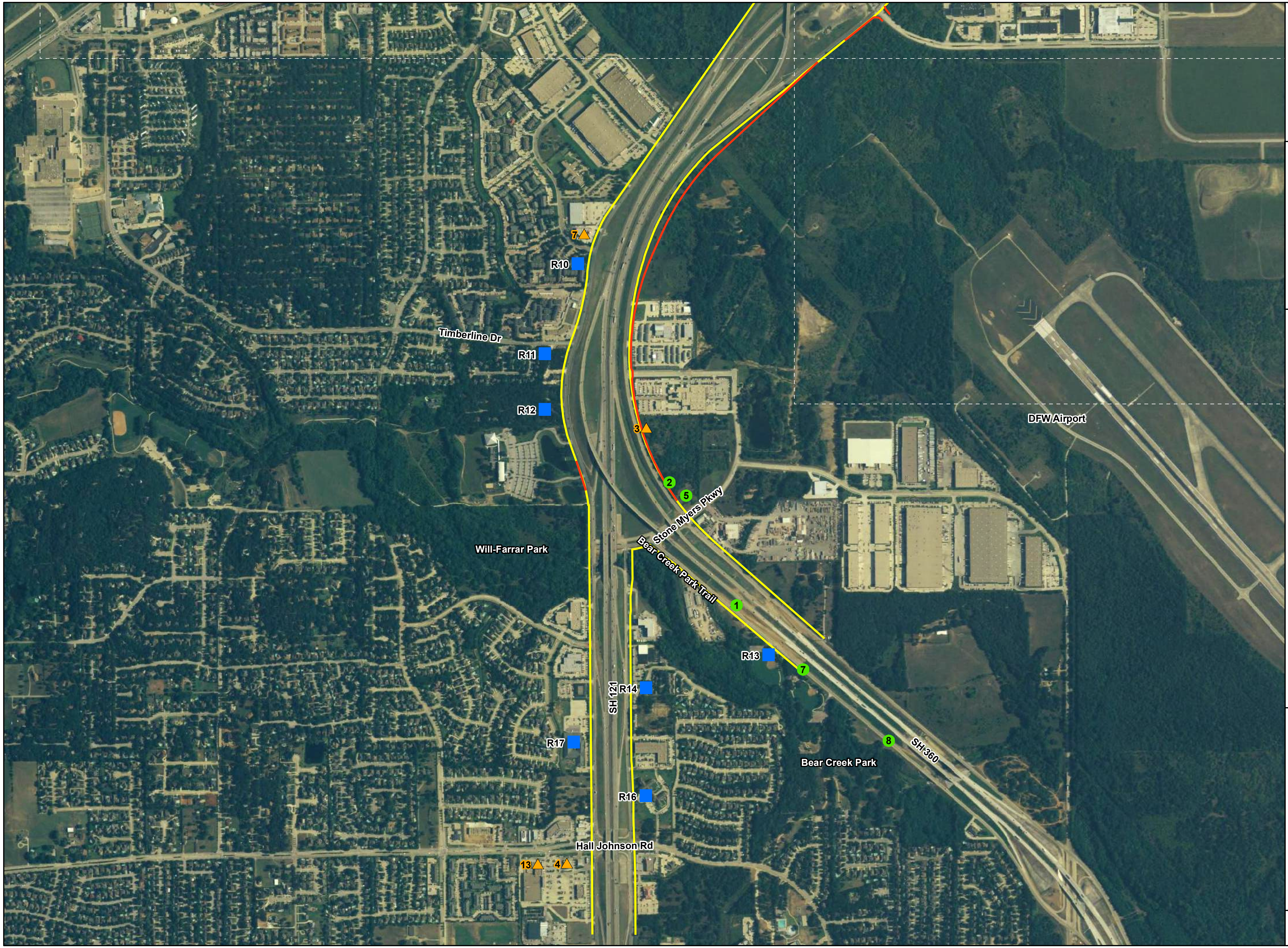
One Inch Equals 1000 Feet

Plate A

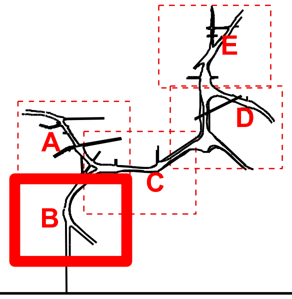
DFW CONNECTOR

APPENDIX D

HUMAN ENVIRONMENT



Location Diagram



Proposed ROW

Existing ROW

D Potential Building Displacement

R Noise Receiver

Photo Locations

Hazardous Materials Site

N

0 250 500 1,000

Feet

One Inch Equals 1000 Feet

Plate B

DFW CONNECTOR

APPENDIX D

HUMAN ENVIRONMENT

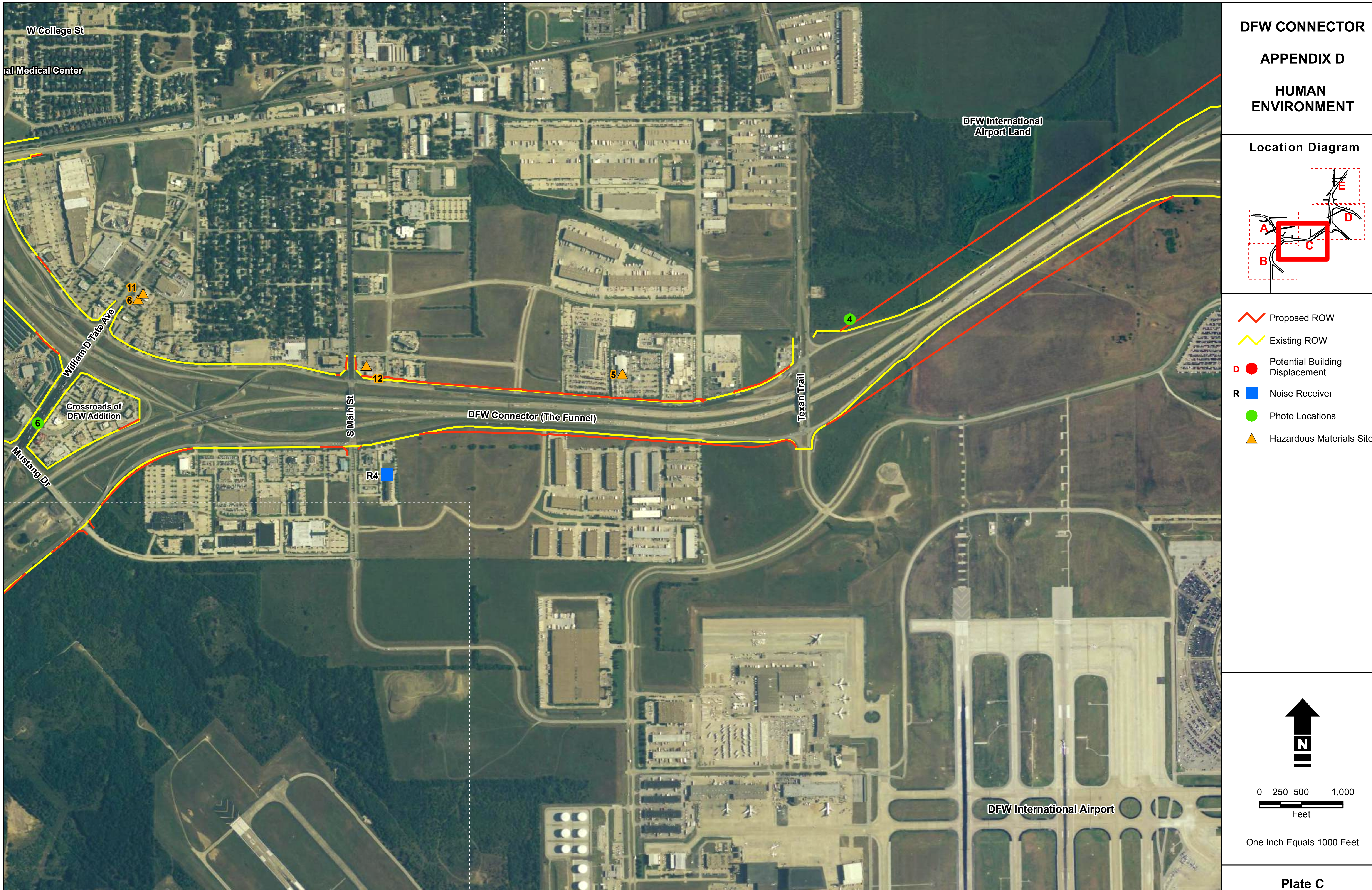
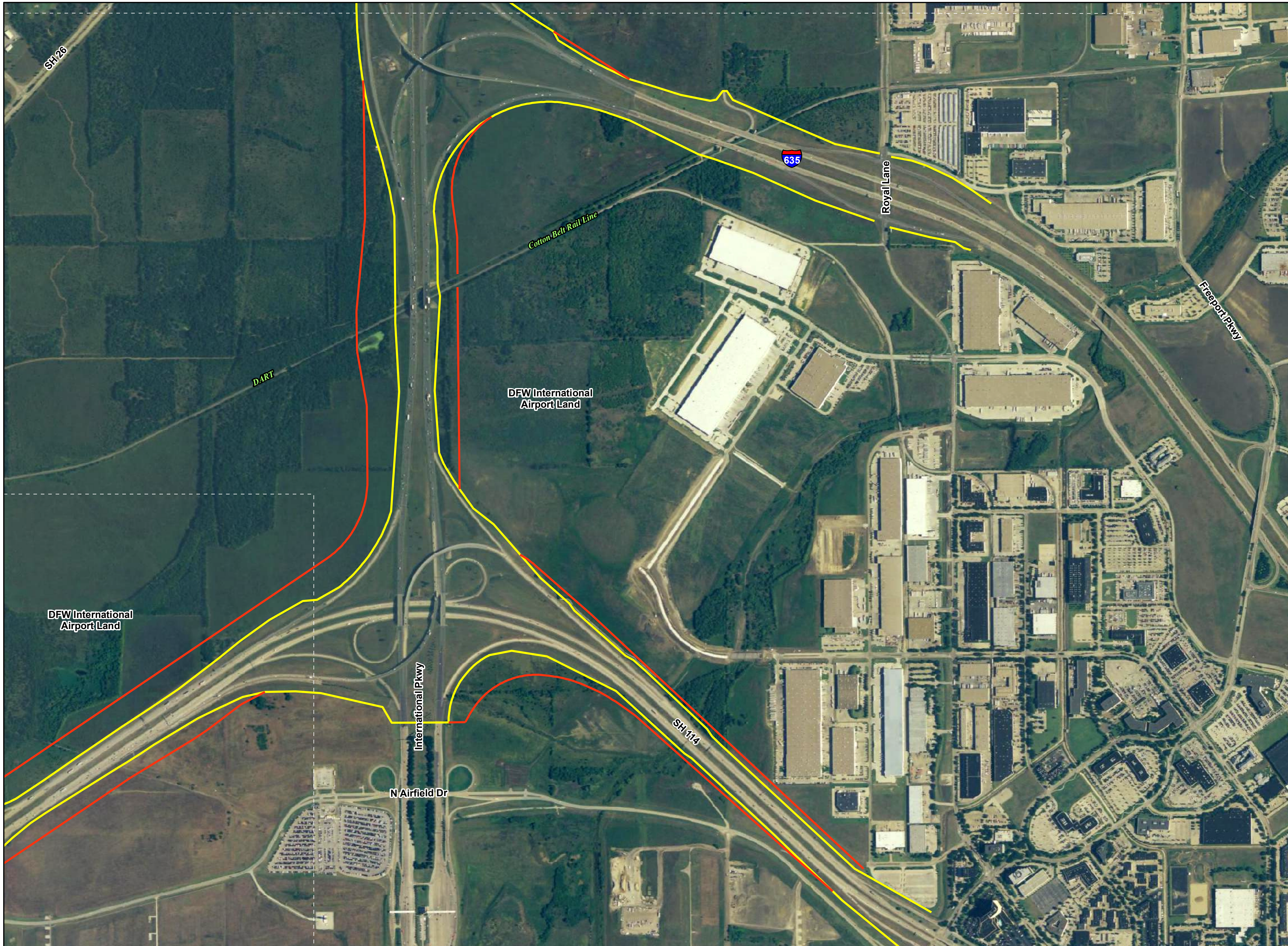


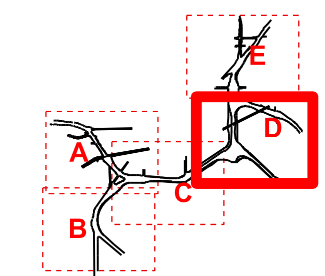
Plate C

DFW CONNECTOR

APPENDIX D

HUMAN ENVIRONMENT





Proposed ROW

Existing ROW

D Potential Building Displacement

R Noise Receiver

Photo Locations

Hazardous Materials Site

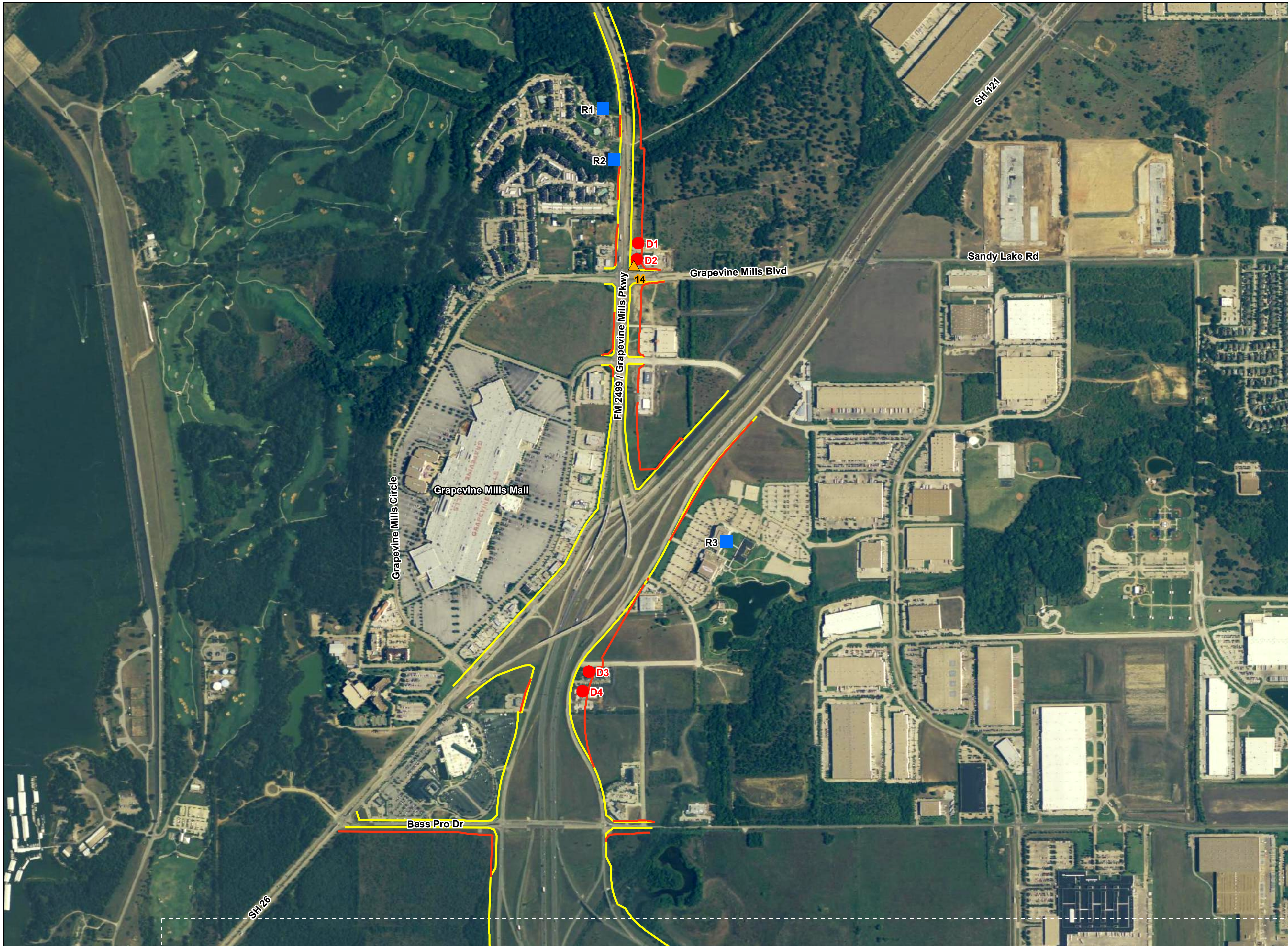
N

0 250 500 1,000

Feet

One Inch Equals 1000 Feet

Plate D

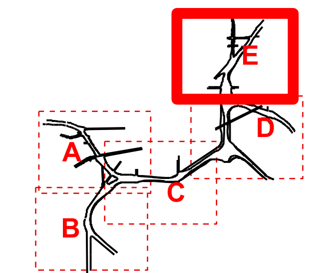


DFW CONNECTOR

APPENDIX D

HUMAN ENVIRONMENT

Location Diagram



Proposed ROW

Existing ROW

D Potential Building Displacement

R Noise Receiver

Photo Locations

Hazardous Materials Site

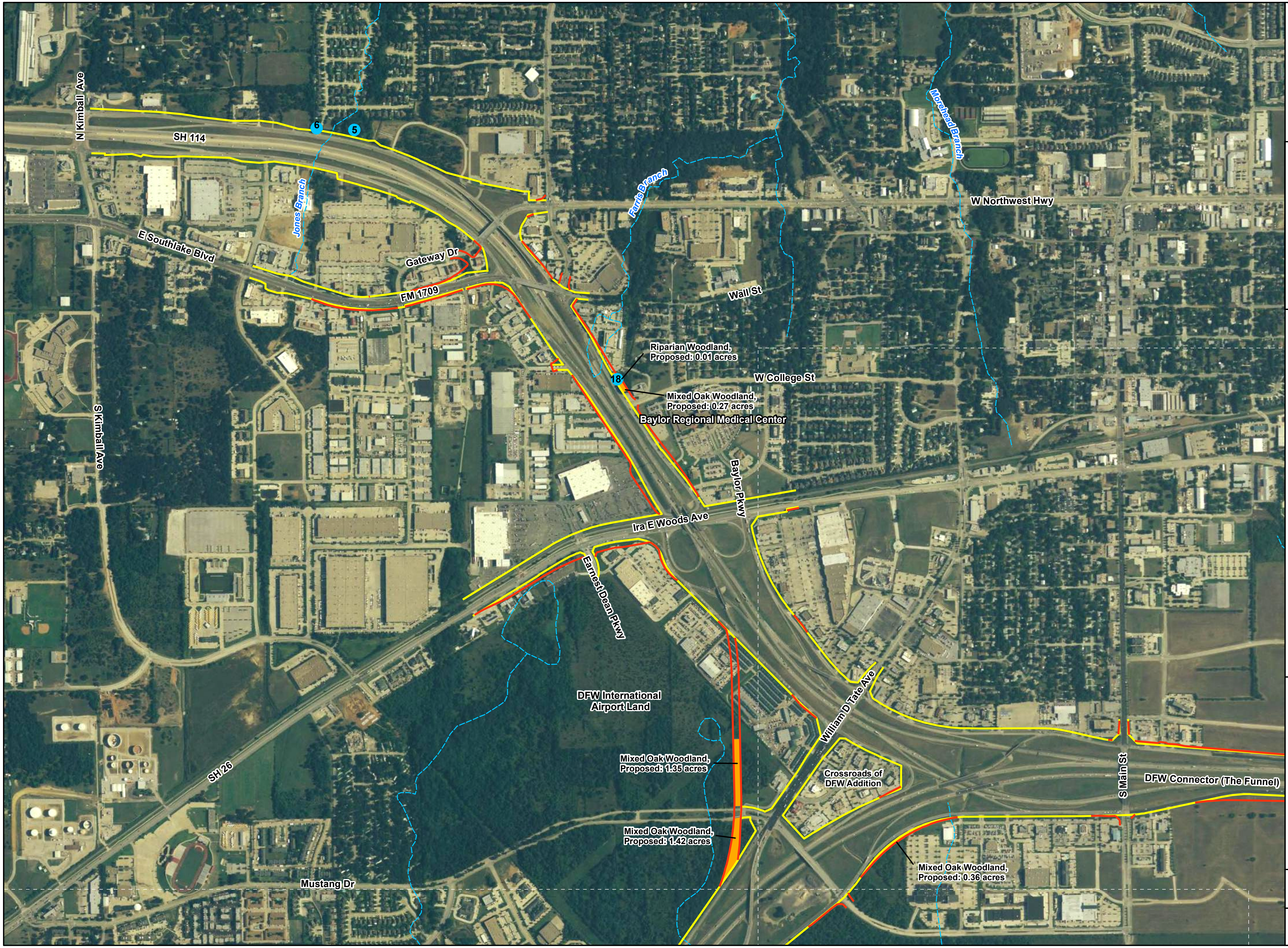
N

0 250 500 1,000

Feet

One Inch Equals 1000 Feet

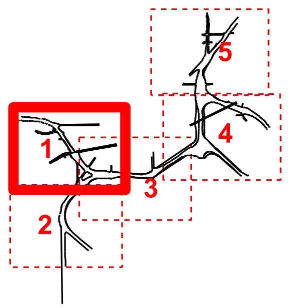
Plate E



DFW CONNECTOR

VEGETATION IMPACTS

Location Diagram



- Proposed ROW
- Existing ROW
- Stream / Creek
- Mesquite Juniper Savannah
- Mixed Oak Woodland
- Riparian Woodland
- Riparian Scrub/Shrub Vegetation
- Water Features

N

0 250 500 1,000

Feet

One Inch Equals 1000 Feet

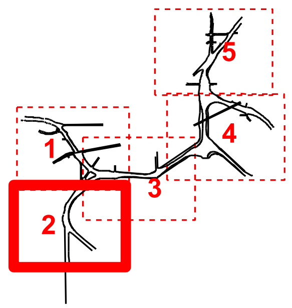
September 2008

Sheet 1

DFW CONNECTOR

VEGETATION IMPACTS

Location Diagram



- Proposed ROW
- Existing ROW
- Stream / Creek
- Mesquite Juniper Savannah
- Mixed Oak Woodland
- Riparian Woodland
- Riparian Scrub/Shrub Vegetation
- Water Features

N

0 250 500 1,000

Feet

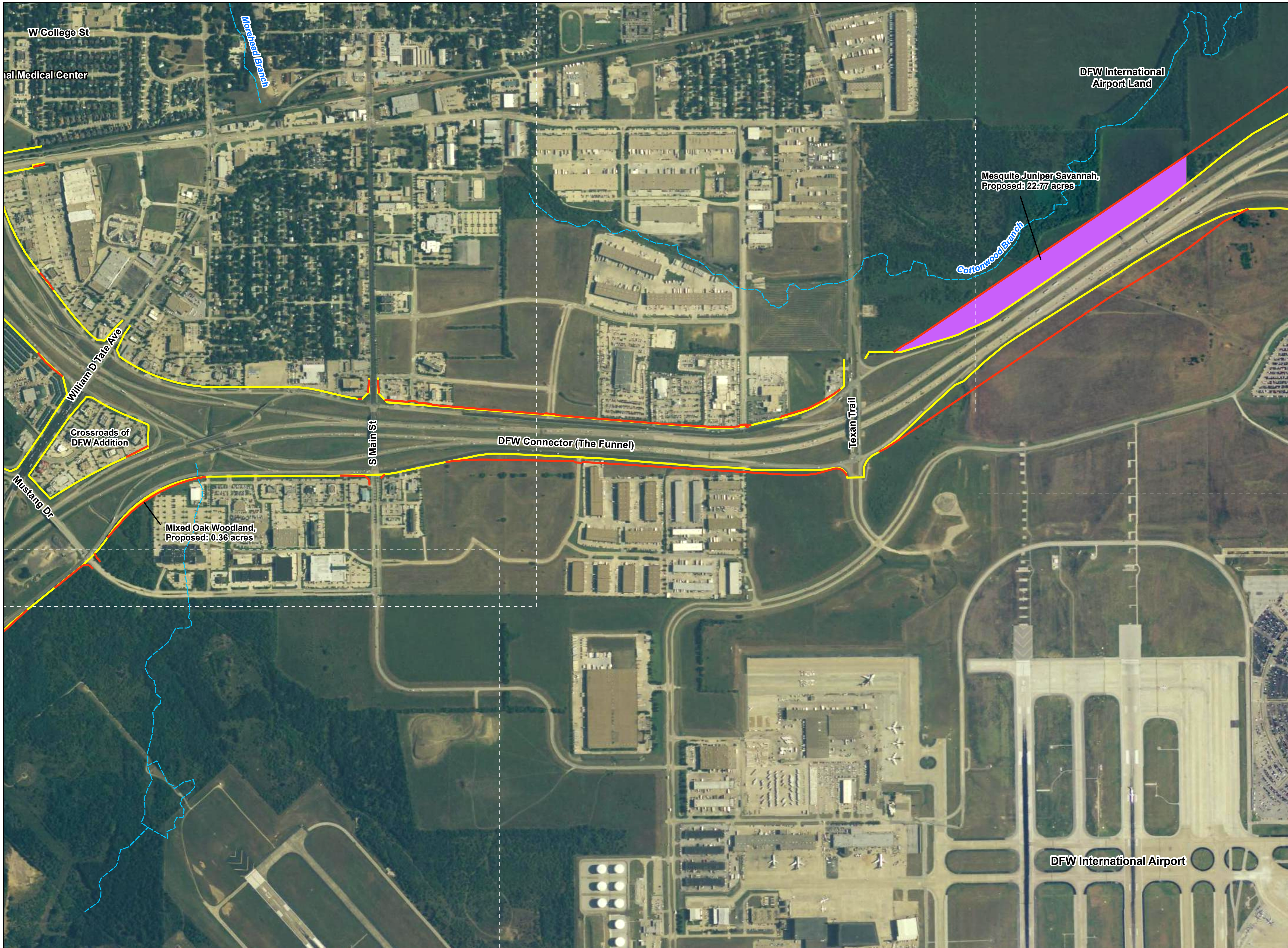
One Inch Equals 1000 Feet

September 2008

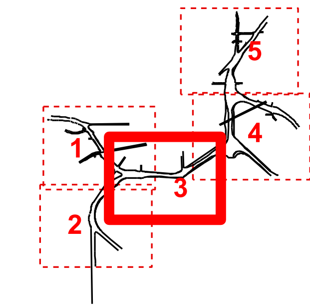
Sheet 2

DFW CONNECTOR

VEGETATION IMPACTS



Location Diagram



Proposed ROW
Existing ROW
Stream / Creek
Mesquite Juniper Savannah
Mixed Oak Woodland
Riparian Woodland
Riparian Scrub/Shrub Vegetation
Water Features

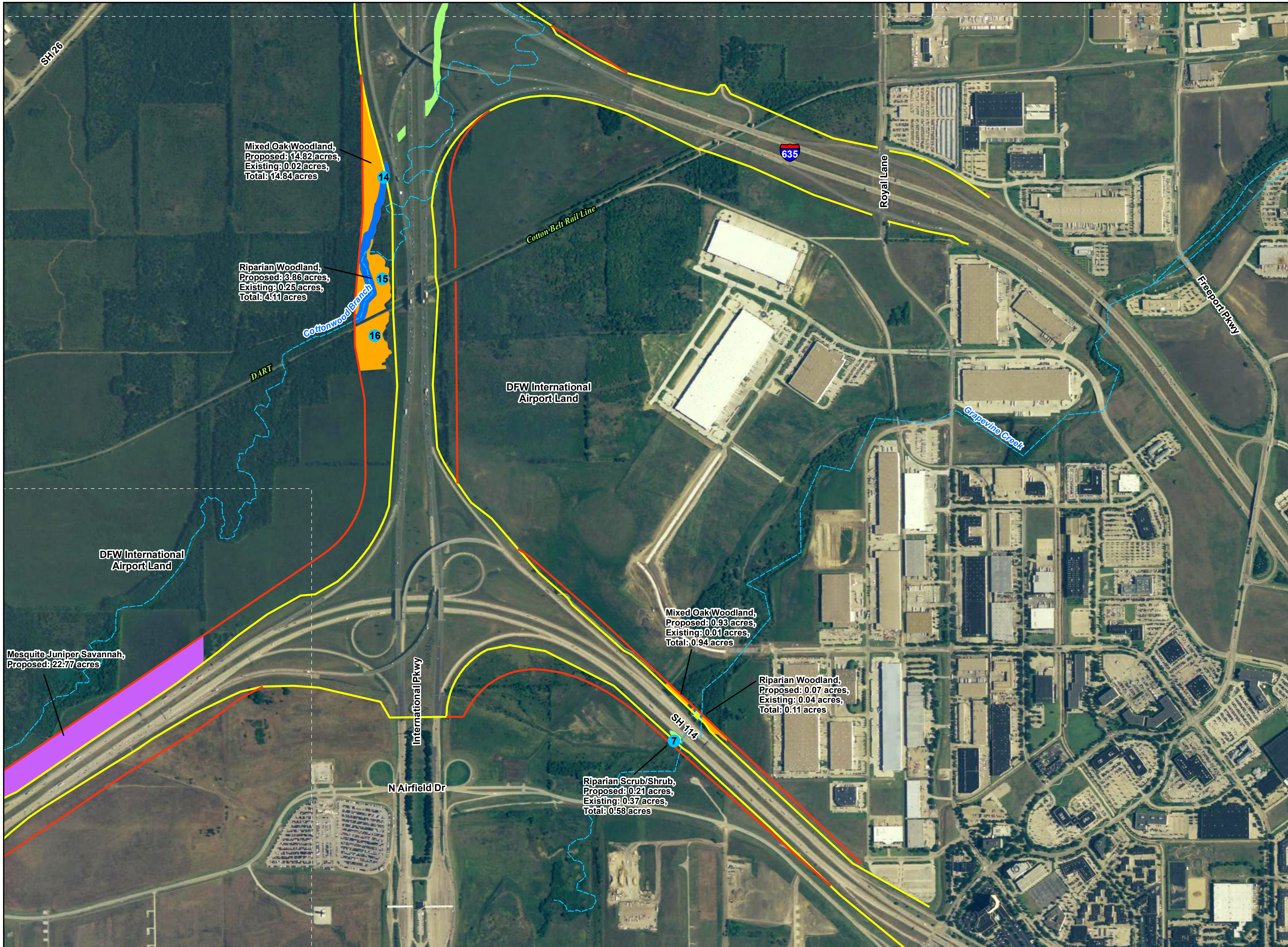
N

0 250 500 1,000
Feet

One Inch Equals 1000 Feet

September 2008

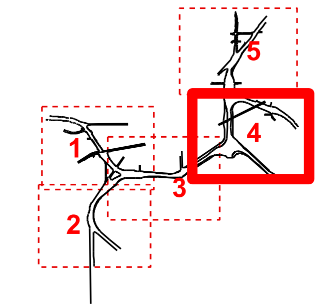
Sheet 3



DFW CONNECTOR

VEGETATION IMPACTS

Location Diagram



- Proposed ROW
- Existing ROW
- Stream / Creek
- Mesquite Juniper Savannah
- Mixed Oak Woodland
- Riparian Woodland
- Riparian Scrub/Shrub Vegetation
- Water Features

N

0 250 500 1,000
Feet

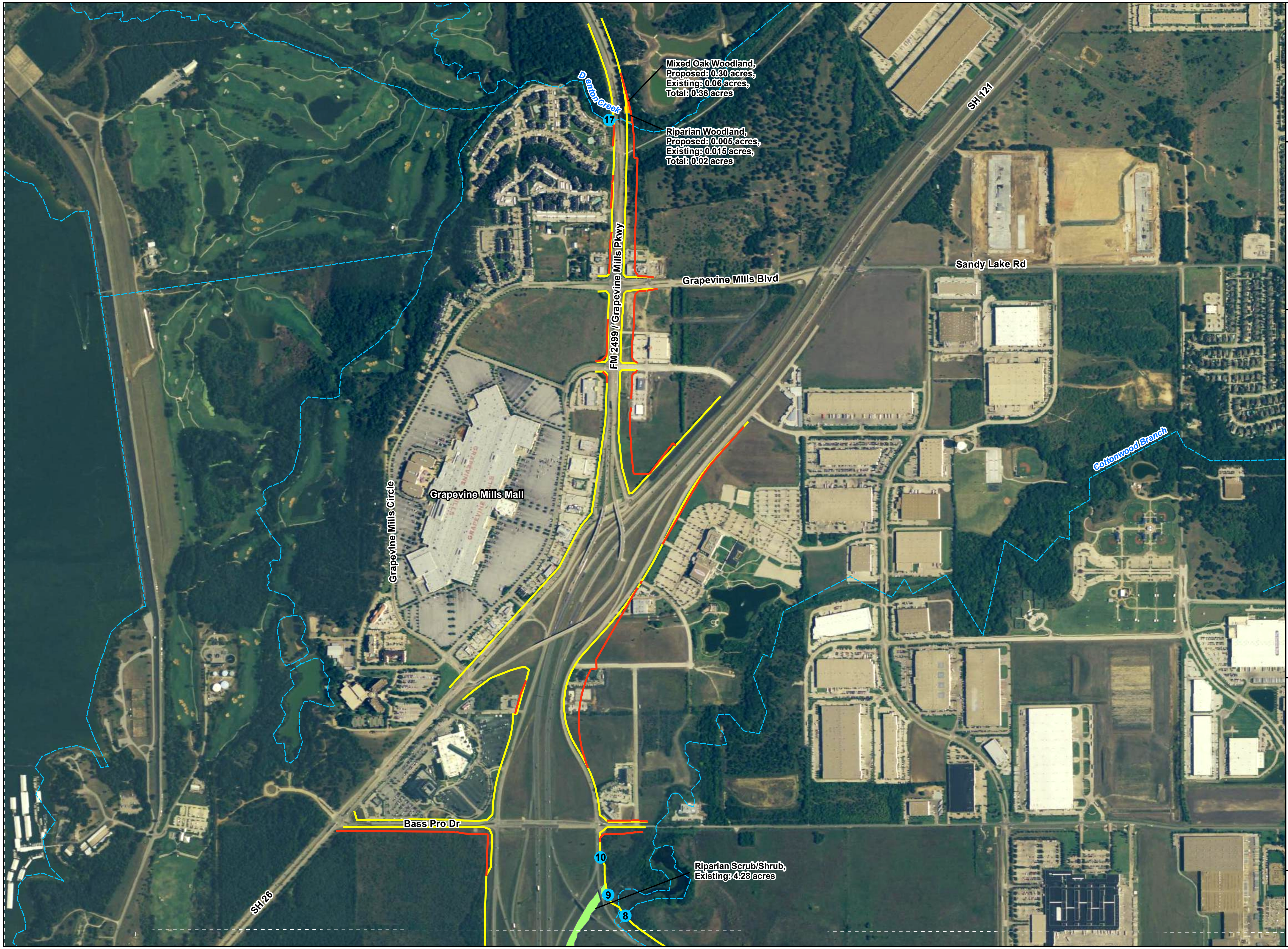
One Inch Equals 1000 Feet

September 2008

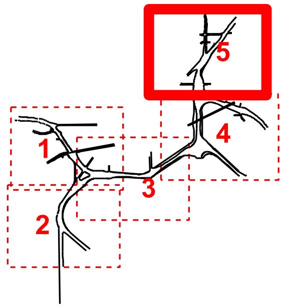
Sheet 4

DFW CONNECTOR

VEGETATION IMPACTS



Location Diagram



- Proposed ROW
- Existing ROW
- Stream / Creek
- Mesquite Juniper Savannah
- Mixed Oak Woodland
- Riparian Woodland
- Riparian Scrub/Shrub Vegetation
- Water Features

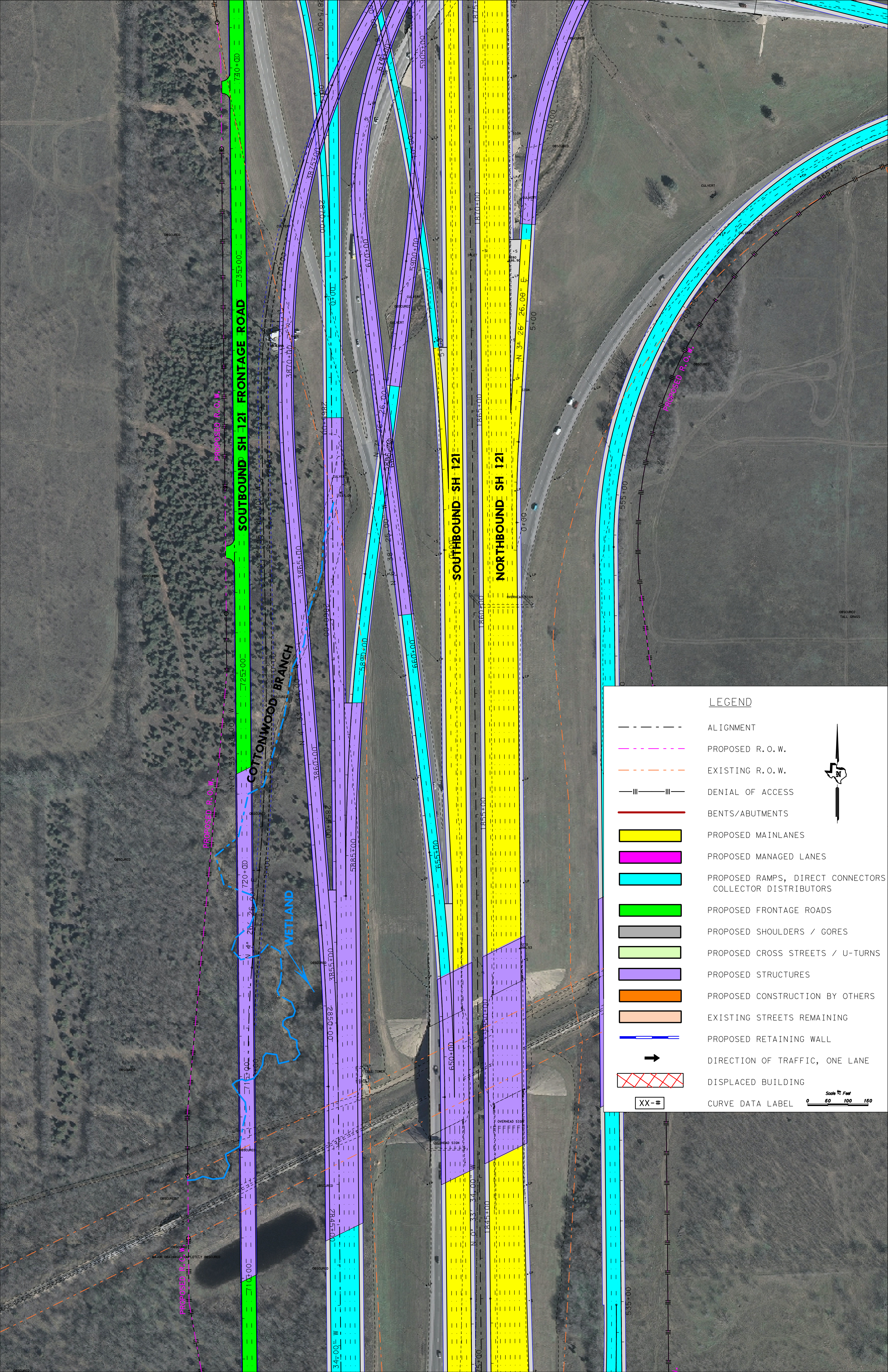
0 250 500 1,000

Feet

One Inch Equals 1000 Feet

September 2008

Sheet 5


SOUTBOUND SH 121 FRONTAGE ROAD
SOUTHBOUND SH 121
NORTHBOUND SH 121
COTTONWOOD BRANCH
WETLAND
PROPOSED R.O.W.
LEGEND
ALIGNMENT
PROPOSED R.O.W.
EXISTING R.O.W.
DENIAL OF ACCESS
BENTS/ABUTMENTS
PROPOSED MAINLANES
PROPOSED MANAGED LANES
PROPOSED RAMPS, DIRECT CONNECTORS COLLECTOR DISTRIBUTORS
PROPOSED FRONTAGE ROADS
PROPOSED SHOULDERS / GORES
PROPOSED CROSS STREETS / U-TURNS
PROPOSED STRUCTURES
PROPOSED CONSTRUCTION BY OTHERS
EXISTING STREETS REMAINING
PROPOSED RETAINING WALL
DIRECTION OF TRAFFIC, ONE LANE
DISPLACED BUILDING
XX-#
CURVE DATA LABEL
Scale in Feet
0 50 100 150