CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

THIS PAGE INTENTIONALLY LEFT BLANK

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

4.0 INTRODUCTION

This chapter describes the anticipated impacts (beneficial and/or adverse) to existing social, economic, and environmental resources for the FHWA's recommended Build Alternative 3C and the No-Build Alternative. Resources identified in **FEIS Chapter 3** for which no impacts are anticipated have been excluded from further discussion in this chapter (e.g., Wild and Scenic Rivers, Prime and Unique Farmland). This chapter addresses only those environmental elements which would be affected by the proposed action. Potential impacts of the proposed project are discussed throughout this chapter based on the preliminary schematic design of the Build Alternative. These impacts are presented in contrast to the No-Build Alternative, which serves as the baseline for environmental conditions within the project area though this alternative does not meet the need and purpose for the proposed project. Although some references are made to mitigation in connection with the discussion of impacts in this chapter, the comprehensive discussion of recommended mitigation measures for the proposed action are addressed in **FEIS Chapter 5**.

The five alternatives under consideration in this FEIS, including the No-Build Alternative, are presented in **FEIS Chapter 2**. As a result of the EO practicability analysis in **FEIS Section 2.8.2**, the two Riverfront Boulevard Alternatives 2A (Irving/Riverfront Boulevard – Elevated) and 2B (Irving/Riverfront Boulevard At-Grade) were determined to be not practicable. The EO practicability analysis found both Dallas Floodway Alternative 3C (Combined Parkway – Further Modified) and Alternative 4B (Split Parkway Riverside – Modified) to be practicable alternatives. However, as Alternative 3C would result in fewer impacts to floodplains and wetlands, the FHWA recommended it for design development, impacts assessment, and mitigation planning to a higher level than the other Build Alternatives. Per 23 U.S.C. Section 139, Alternative 3C has been developed to a higher level of detail in order to better identify and consider impacts and also to facilitate the development of avoidance and mitigation measures to reduce impacts. Although not required to conduct a public hearing on the FEIS, the FHWA has exercised its discretion to conduct a public hearing to receive feedback on the FEIS prior to making a final decision to select either Build Alternative 3C or the No-Build Alternative. The FHWA will consider comments from agencies and the public, and any modifications to the project design or mitigation commitments in response to such comments will be reflected in the ROD to be issued.

4.1 LAND USE IMPACTS

The Build Alternative would change land use within the ROW of the proposed action. Direct land use impacts would be related to the relocation of residential and business structures and the loss of developable land within the ROW. The following subsections address several factors that were used to assess potential land use impacts for the No-Build and Build Alternative, including compatibility with local land use plans and policies, direct conversion of land use, regional land use impacts, and toll road impacts.

4.1.1 No-Build Alternative

Under the No-Build Alternative, current land use patterns within the project area would generally remain the same, consistent with prevailing land use and zoning plans. However, several major land use plans are proposed for flood control and recreational development within the Dallas Floodway and DFE portions of the project area. These plans were described previously in **FEIS Section 1.6.1.2** and will be discussed further in this chapter as part of the cumulative impacts analysis.

4.1.2 Build Alternative

Build Alternative 3C would result in a change in land use within the ROW proposed for the Trinity Parkway. Alternative 3C would directly result in the conversion of approximately 333 acres from current uses to roadway ROW, should it be selected by the FHWA in the ROD. Land use impacts would be related to the displacement and relocation of residential, business, and publicly owned properties (see **FEIS Section 4.4**) and the loss of developable land within the ROW. **Table 4-1** provides a summary of the estimated amount of new ROW required from the various types of land use within the project area.

TABLE 4-1. SUMMARY OF LAND USE IMPACTS

Land Use Type	Acres of Land Use Impacts from the Trinity Parkway Build Alternative [1]
Privately Owned	
Residential/Commercial/Industrial	93.77
Private Railroad ROW	6.27
Sub Total	**100.04**
Publicly Owned (Non-Taxable Property)	
Dallas Floodway	232.53 [2]
Existing Roadway ROW, including Sumps	216.25
City Acquired Property [3]	10.58
Sub Total	**459.36**
Total Estimated ROW	**559.4**

Notes:
1. All quantities shown in acres. Calculated areas are estimates only.
2. In the Dallas Floodway the Tollway operations area is proposed to be established by an agreement with the City of Dallas. The deed records for the land indicate that it can be used for transportation.
3. Property acquired by City of Dallas subsequent to the publication of the SDEIS.

Alternative 3C would result in long-term changes in land use where existing land use would be converted to transportation ROW. Short-term impacts to land uses adjacent to Alternative 3C, especially in developed areas, would occur during construction due to activities including the movement of workers and materials through the area.

4.2 COMPATIBILITY WITH LOCAL USE PLANS/POLICIES

Given the numerous local plans and policies influencing growth and development within the Trinity River Corridor, it is a stated purpose of the proposed Trinity Parkway to provide compatibility with the local plans and policies enacted by elected officials as to implement the wishes of the City of Dallas residents. **Table 4-2** below evaluates the compatibility of the Build Alternative and the No-Build Alternative with the various plans and policies of the project area (see **FEIS Section 3.1.7**). Compatibility was generally determined by preferences as stated in the jurisdiction's respective adopted plans and policies. Note that any plan or policy demonstrating consistency with Alternative 3B (the Combined Parkway - Modified alignment) is also considered consistent with Build Alternative 3C (the Combined Parkway - Further Modified alignment).

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE 4-2. COMPATIBILITY WITH LOCAL PLANS AND POLICIES

Local Plans and Policies	No-Build Alternative	Build Alternative	Explanation
Oak Cliff Gateway TIF District (City of Dallas, 1992a).	No	Yes	This TIF plan references a proposed Trinity Parkway running parallel to the Trinity River within the Dallas Floodway.
The Cedars TIF District (City of Dallas, 1992b).	Yes	n/a	This TIF plan does not reference a proposed Trinity Parkway.
City of Dallas Resolution, *The Dallas Plan*. (City of Dallas, 1994).	No	Yes	This resolution contemplated a Trinity Parkway alignment within the Dallas Floodway.
City of Dallas Resolution, TRCCC Report *Trinity Parkway Corridor (*City of Dallas, 1995).	No	Yes	This resolution contemplated a Trinity Parkway alignment within the Dallas Floodway and included an endorsement of the "Split Parkway-Riverside" alignment (i.e., Alternative 4A). [1]
City of Dallas Resolution, *Trinity Parkway Corridor MTIS* (City of Dallas, 1997a); Dallas County Commissioners Court Resolution - by Court Order (Dallas County Commissioners Court, 1997a); DART Resolution, *Trinity Parkway Corridor MTIS* (DART, 1997); and NCTCOG Resolution, *Trinity Parkway Corridor MTIS* (NCTCOG, 1998).	No	Yes	These resolutions contemplated a Trinity Parkway alignment within the Dallas Floodway and included an endorsement of the "Split Parkway-Riverside" alignment (i.e., Alternative 4A). [1]
Oak Cliff Gateway TIF District (City of Dallas, 1997b).	No	Yes	This TIF plan references a proposed Trinity Parkway running parallel to the Trinity River.
Trinity River Corridor Bond Program (City of Dallas, 1998a).	No	Yes	On May 2, 1998, Dallas voters authorized the issuance of General Obligation Bonds, which included $84 million for the Trinity Parkway reliever route and $34 million for other proposed transportation improvements in the corridor.
10th Street Land Use Study (City of Dallas, 1999b).	No	Yes	This study references a Trinity River Parkway and considers favorably the development of community-serving land uses along the Trinity Parkway, including restaurants, paddleboat/fishing boats, canoe rentals, snack shops, bait shops, and community theaters.
Trinity River Corridor MIP, Lake Design and Recreational Amenities Report (City of Dallas, 1999a); and City of Dallas Resolution, *Trinity River Corridor Master Implementation Plan* (City of Dallas, 1999c).	No	Yes	This plan contemplated a Trinity Parkway alignment within the Dallas Floodway and included an endorsement of the "Split Parkway-Riverside" alignment (i.e., Alternative 4A) as the locally-preferred alternative. [1]
A Renaissance Plan for Dallas Parks and Recreation in the 21st Century (City of Dallas, 2002).	Yes	n/a	This plan does not reference a proposed Trinity Parkway

Local Plans and Policies	No-Build Alternative	Build Alternative	Explanation
A Balanced Vision Plan for the Trinity River Corridor (City of Dallas, 2003a).	No	Yes *	This plan contemplated a Trinity Parkway alignment within the Dallas Floodway and specifically recognized the “Combined Parkway-Modified” Build Alternative (i.e., Alternative 3B). [2] The plan also acknowledged Industrial Boulevard as a collector/distributor that would function to “simplify the Parkway’s role in providing access to downtown Dallas.” Lake excavation as part of the BVP presents an optimum source of earth fill material for roadway embankments, which would be needed to construct a Dallas Floodway alternative. Additionally, the lakes would serve to mitigate the impacts of the roadway embankments on floodway conveyance. Thus, construction of either of the Dallas Floodway Alternatives would create efficiencies for the Trinity Parkway, floodway levee improvements, and the ultimate development of floodway lakes.
City of Dallas Resolution directing Inclusion of the proposed “Urban Design” (i.e., Alternative 3B) Parkway alternative in the NTTA’s Trinity Parkway EIS (City of Dallas, 2003b).	No	Yes *	This resolution contemplated a Trinity Parkway alignment within the Dallas Floodway and specifically recognized the ‘Combined Parkway-Modified’ Build Alternative (i.e., Alternative 3B). [2]
Trinity River Corridor CLUP - Final Report (City of Dallas, 2005a). [3]	No	Yes	This plan references the Trinity Parkway as a significant public transportation improvement and illustrates the Trinity Parkway as being constructed within the Dallas Floodway. Additionally, it designates Riverfront (formerly Industrial) Boulevard as a collector/distributor roadway and not as part of a Trinity Parkway Riverfront Boulevard alignment (i.e., Alternatives 2A and 2B).
Design District TIF District (City of Dallas, 2005b).	No	Yes	This TIF Plan acknowledges the planned Trinity Parkway within the Trinity River Corridor. It also designates Riverfront (formerly Industrial) Boulevard as a collector/distributor roadway and not as part of a Trinity Parkway Riverfront Boulevard alignment (i.e., Alternatives 2A and 2B).
Lake Configuration and Water Quality Study for the Dallas Floodway (City of Dallas, 2006a).	No	Yes *	This study contemplated a Trinity Parkway alignment within the Dallas Floodway; and was consistent with the assumptions of the BVP.
Forward Dallas! Let's Build our Future (City of Dallas, 2006b).	No	Yes	This plan acknowledges the Trinity Parkway as a component of the BVP and includes an implementation plan for the Trinity River Corridor. This implementation plan also recognizes the Trinity Parkway as was presented in the 2005 Trinity River Corridor CLUP.
Fort Worth Avenue TIF District (City of Dallas, 2008a).	Yes	n/a	This TIF plan does not reference the proposed Trinity Parkway.
Dallas Trail Network Plan (City of Dallas 2008b).	Yes	n/a	This plan does not reference the proposed Trinity Parkway.
Transit Oriented Development (TOD) TIF District (City of Dallas, 2010).	Yes	n/a	This TIF plan does not reference the proposed Trinity Parkway.
2011 Dallas Bike Plan (City of Dallas, 2011a).	Yes	n/a	This plan does not reference the proposed Trinity Parkway.

Local Plans and Policies	No-Build Alternative	Build Alternative	Explanation
Downtown Dallas 360 (City of Dallas, 2011b).	No	Yes	This plan acknowledges a planned toll road within the Trinity Corridor. It also discusses plans to redesign Riverfront Boulevard as a “multi-modal thoroughfare, creating dedicated bike lanes and multi-purpose paths to facilitate access…” and to “improve Riverfront Boulevard to serve as a primary gateway into the [Design] district with enhanced landscaping, public, art, and Design District-specific signage and branding.” Such plans for Riverfront Boulevard are inconsistent with Alternatives 2A and 2B.

Notes:
No = Not compatible with adopted resolution or court order
Yes = Compatible; n/a = The plan or policy makes no mention of the Trinity Parkway
n/a = Not referenced in a proposed the plan/resolution.
* Alignment was endorsed within this plan/resolution.

1. As previously discussed in **FEIS Section 2.3.1.5**, Alternative 4A was not considered approvable by the USACE Fort Worth District due to concerns about the effects to the operations and maintenance requirements within the Dallas Floodway. It was through consultation with the USACE that Alternative 4B was developed, which is a further-modified version of the combined parkway alternative (see **FEIS Section 2.3.2.3**).
2. As previously discussed in **FEIS Section 2.3.1.5**, Alternative 3B was not considered approvable by the USACE Fort Worth District due to concerns about the effects to the operations and maintenance requirements within the Dallas Floodway. It was through consultation with the USACE that Alternative 3C was developed, which is a further-modified version of the combined parkway alternative (see **FEIS Section 2.3.2.3**).
3. The 2009 amended revision to the *Oak Cliff Gateway* section of the CLUP (i.e., Study Area 14) is consistent with these assumptions. (City of Dallas, 2009).

THIS PAGE INTENTIONALLY LEFT BLANK

Of the plans in **Table 4-2** that account for the Trinity Parkway, all include or endorse a Dallas Floodway Build Alternative. Regardless whether the Build Alternative is selected by the FHWA in the ROD, the City of Dallas has a variety of ordinances, plans, and regulations at their disposal to manage growth within its jurisdiction. As previously discussed in **FEIS Chapter 3**, zoning and subdivision ordinances and other requirements can be applied to ensure the orderly growth of its communities; however, the application of such controls occurs within a political process.

In addition to the above described city plans and policies guiding development within the project area, several large projects are planned within the Trinity River Corridor, that although independent, may be subject to coordinated planning and design along with the proposed project. Such major projects include the DFE Project and the Dallas Floodway Project, both of which are proposed by the USACE with the City of Dallas as the local sponsor. **FEIS Section 1.6.1.2** presents details relating to these projects, as well as potential coordinated project design elements. The Build Alternative is considered the likely candidate alternative for coordinated planning with the DFE and BVP. The highway construction activities (earthen borrow areas) associated with the Build Alternative could be coordinated with levee and lake construction and wetland creation or re-creation (see **FEIS Section 1.6.1.2**). The City of Dallas has expressed its desire to enhance the visual character of the Dallas Floodway and DFE areas and provide more public recreational facilities. The City's efforts would be subject to a separate review and approval process.

4.3 SOCIAL IMPACTS

4.3.1 Impacts to Community Cohesion

4.3.1.1 No-Build Alternative

If the Trinity Parkway is not built, the potential displacement of residences, businesses and their employees, and public facilities would not occur. If alternative solutions are not developed and traffic continues to grow as projected, the Canyon/Mixmaster area would continue to experience an overall increase in congestion. The long-term cohesion of the community at large, as well as the specific neighborhoods through which the congested roadways pass, may be affected by not building the proposed project. Such impacts could include decreased air quality, increased noise levels, and decreased public safety, all of which affect the cohesive neighborhood unit. Future neighborhoods or neighborhood expansions would develop in accordance with local land use planning policies and zoning requirements.

4.3.1.2 Build Alternative

The overall impact of the Trinity Parkway can be expected to have some negative and positive impacts to community cohesion. The construction of a limited access toll facility may make it more difficult for some community members to interact because they would have to walk or drive longer distances to see one another. Displacements may cause some community members to move further away from their present community (see **FEIS Section 4.4**). The Build Alternative would cause residential displacements within the South Dallas neighborhood district (South Dallas HOA) (see **FEIS Section 4.4.1**). While some members of this community would be displaced, data regarding affordable housing suggests sufficient vacancies exist to accommodate relocations within this same community (see **FEIS Section 4.4.3**). Overall, no communities would be divided to an extent that would prohibit access or make it extremely inconvenient for community members to continue present relationships. To ensure community cohesion is not substantially affected, possible mitigation includes sidewalks and other pedestrian features to be considered on a case by case basis. These potential mitigation measures are discussed further in **FEIS Chapter 5**.

Residents within the Trinity Parkway project area generally identify with communities (e.g., South Dallas and West Dallas) and neighborhoods, such as Rochester Park, Ideal, Oak Cliff, and La Bajada (see **FEIS Section 3.1.6**). The core of each of these communities and neighborhoods would remain intact with only minor physical disruption, if any at all, should the Build Alternative be selected by the FHWA in the anticipated ROD. While some community and neighborhood members of the project area may have to travel slightly longer distances to their destinations, the long-term impact of such inconveniences on community cohesion would be minor.

Neighborhoods and communities located on both sides of the Dallas Floodway were developed independently of each other. Historically, these communities have been divided by the presence of the Trinity River (see **FEIS Plate 3-10**). Neither of these communities depends on their counterpart for social interaction or access to a localized community facility, and although Alternative 3C is aligned between them, travel from one community to its counterpart would not be restricted. The construction of the Build Alternative would not result in the removal or interruption of the existing arterial roadways that cross the Dallas Floodway and provide access between communities on both sides.

Table 4-3 presents a summary of anticipated adverse impacts from the proposed action likely to affect the cohesive nature of the project area neighborhoods. The impacts presented in **Table 4-3** are described in greater detail in subsequent sections of **FEIS Chapter 4** and include relocations/displacements (see **FEIS Section 4.4**), proximity impacts such as noise (see **FEIS Section 4.16**), visual intrusion (see **FEIS Section 4.17**), and increased traffic on local arterials and residential collector streets (see **FEIS Section 4.6**). Additional impacts relating to environmental justice are described in **FEIS Section 4.3.2**. Impacts identified here are generalized and may not be uniform for all residences within the neighborhood or residential area. Impacts may be more pronounced or less pronounced depending on the proximity of each residence to Alternative 3C. In addition, noise levels are expected to rise in all neighborhoods that are adjacent, or in proximity, to the Build Alternative, but only those sites where a noise impact has been identified are reported. For detailed information on what constitutes a noise impact, refer to **FEIS Section 4.16**.

TABLE 4-3. POTENTIAL IMPACTS ON NEIGHBORHOODS AND NEIGHBORHOOD DISTRICTS

Neighborhood Districts (ND) and Neighborhoods	Alternative 3C
Middle Stemmons/Brookhollow ND	
Residential area east of IH-35E/south of Record Crossing (Arlington Park)	P, V [1], T
Trinity Industrial District	R (2) [2], P, V, T
Middle Stemmons/Brookhollow ND	R (14), P, V, T
Lower Stemmons ND	
Design District	R (1), P, V, T
Market/Technology Center	P, V, T
Lower Stemmons ND	P, V, T
Cedars/Fair Park/East Dallas ND	
The Cedars	R (5), P, V, T
South Dallas Neighborhood District	
South Dallas Home Owners Association	R (7), P, N, V, T
Ideal	P, N, V, T
Rochester Park	P, N, V, T
South Dallas ND	R (1), P, V, T
West Dallas - West of Hampton ND	
West Dallas Home Owners Association	---
West Dallas - East of Hampton ND	
West Dallas Home Owners Association	---
La Bajada	---
North Oak Cliff ND	
Kessler Park	---
Lake Cliff Home Owners Association	---
North Oak Cliff ND	---
East Oak Cliff ND	---

Abbreviations used in Table:
ND = neighborhood district
R = relocation(s) anticipated at this location
P = proximity impacts
N = noise impact to one or more residences in neighborhood
V = visual intrusion expected to one or more residents of neighborhood [2]
T = increased traffic expected on local streets
--- = no impacts anticipated for alternative

Notes:

1. Visual intrusion is generally considered to be either the introduction of the highway facility into an area where none existed previously, or the loss of privacy of residents now exposed to motorists traveling on the highway.
2. Numbers in parentheses next to the letter **R**, indicating relocations, are the number of combined residential, commercial/industrial, and community/public facility displacements associated with the alternative. See **Table 4-12** for the estimated number and description of the displacement type for the Build Alternative.

As shown in **Table 4-3**, Alternative 3C would have some degree of adverse impact on a number of existing neighborhoods or neighborhood districts, thereby potentially affecting the cohesive nature of these neighborhood units. Impacts include the displacement and required relocation of one or more residence or business in a neighborhood. Proximity impacts would affect the Middle Stemmons/Brookhollow, Lower Stemmons, Cedars/Fair Park/East Dallas, and South Dallas Neighborhood Districts and their encompassing neighborhoods. Such proximity impacts include some combination of increased noise, visual intrusion, and/or increased traffic on local streets.

4.3.2 Environmental Justice Considerations

4.3.2.1 No-Build Alternative

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

4.3.2.2 Build Alternative

Potential impacts were evaluated for compliance with applicable laws and regulations (see **FEIS Section 3.1.5.3**). In summary, the evaluation measures included identifying whether minority or low-income populations exist in the project area, identifying impacts that would potentially affect minority and low-income communities of concern, determining whether the proposed project would have disproportionately high and adverse effects on minority and/or low-income groups, and identifying mitigation strategies for any EJ groups that were identified.

The subsections that follow make up the analysis of potential EJ impacts resulting from the proposed Build Alternative. These subsections include:

- Methodology and Approach: how Alternative 3C was evaluated for compliance with EO 12898 and the FHWA Order 6640.23A (see **FEIS Section 3.1.5.3**);

- Distribution of minority and low-income populations in the project area: the geographic distribution of minority and low-income populations in proximity to Alternative 3C. This was accomplished using 2010 U.S. Census data for the block groups and census tracts in the project area;

- Extent of adverse impacts: A comparison of extent and degree of potential adverse impacts;

- Public involvement: A description of past and planned public involvement and community outreach activities for the proposed action;

- Limited English proficiency considerations: The identification of residents in the project area with potential LEP;

- Title VI of the Civil Rights Act of 1964, as amended: Guidance for evaluating compliance with the EJ order derived by analogy from federal court decisions under Title VI;

- Toll road considerations: An analysis to determine minority and low-income population travel patterns in the project area. This form of analysis is useful in assessing "user impacts" of the proposed Trinity Parkway;

- Mitigation and compensation options: Description of available mitigation measures to be considered in response to the possible identification of disproportionately high and adverse impacts on a specific population; and

- Summary of environmental justice considerations: Review of environmental justice concepts and how they apply to the Trinity Parkway.

Methodology and Approach

Alternative 3C was evaluated for compliance with EO 12898 and the FHWA 6640.23A. For this analysis, three evaluation measures were used:

- Identify whether minority or low-income populations exist in the project area. The terms "minority populations" and "low-income populations" were defined in **FEIS Section 3.1.5.3**. Sources of data used included U.S. Census data, anecdotal information from coordination with local officials, field surveys, and public involvement;

- Identify impacts that would potentially affect any minority and low-income communities of concern; and

- Identify mitigation strategies for any identified adverse impacts.

Distribution of the Minority and Low-Income Populations within the Project Area

Minority and low-income demographics within the project area census tracts and block groups (see **FEIS Plate 4-1**) are shown in **Table 4-4**. It should be noted that some persons fall into more than one of these categories. As such, these percentages should not be combined to represent the area population, since doing so would result in duplication. For example, the columns for percent minority populations include all income levels; and low-income populations may be any mix of demographic characteristics.

TABLE 4-4. MINORITY AND LOW-INCOME CHARACTERISTICS

Census Geography		Total Project Area Population	Racial and Ethnic Distribution										
			Percent White Alone	Percent Black or African American Alone	Percent American Indian and Alaska Native Alone	Percent Asian Alone	Percent Native Hawaiian and Other Pacific Islander Alone	Percent Some Other Race Alone	Percent Two or More Races	Percent Hispanic or Latino	Percent Minority [1, 2]	Percent of Households Below Poverty Guideline [1]	Median Household Income [1]
City of Dallas		1,197,816	28.8	24.5	0.3	2.8	<0.1	0.2	1.0	42.4	71.2	23.0	$42,259
Project Area Census Block Groups [3]		37,907	14.9	41.8	0.2	0.8	0.1	0.1	0.6	41.5	85.1	29.3 [5]	$33,868 [6]
Census Tract [4]	Census Block Group [3]	Project Area Census Geography Demographics											
20	---	5,741	10.3	16.4	0.4	0.6	<0.1	0.2	0.8	71.3	89.7	25.0	$34,886
---	1	1,603	21.5	29.8	0.5	1.4	0.1	0.4	1.4	44.9	**78.5**	1.5	$53,789
---	2	774	12.7	27.3	0.8	0.0	0.0	0.1	1.3	57.8	**87.3**	**54.4**	**$18,125**
34	---	1,146	12.2	71.7	0.6	0.1	0.0	0.1	0.9	14.4	87.8	34.5	$20,125
---	1	562	2.8	77.8	0.2	0.0	0.0	0.2	0.9	18.1	**97.2**	37.3	**$16,371**
39.02	---	1,860	1.2	73.3	0.1	0.0	0.0	0.3	1.0	24.1	98.8	32.4	$20,828
---	1	452	1.6	61.7	0.0	0.0	0.0	0.0	1.5	35.2	**98.4**	32.4	**$18,828**
---	2	1,408	1.1	77.1	0.1	0.0	0.0	0.4	0.7	20.6	**98.9**	31.6	**$21,942**
40	---	1,082	0.6	86.9	0.3	0.0	0.0	0.1	0.8	11.3	99.4	23.3	$21,635
---	1	636	0.8	91.5	0.0	0.0	0.0	0.0	0.0	7.7	**99.2**	29.5	**$22,390**
---	2	446	0.4	80.3	0.7	0.0	0.0	0.2	2.0	16.4	**99.6**	17.7	$28,750
41	---	1,155	1.4	57.7	0.2	0.2	0.0	0.2	0.2	40.1	98.6	50.1	$13,870
---	2	474	1.5	48.7	0.4	0.0	0.0	0.0	0.2	49.2	**98.5**	34.7	$28,750
42.01	---	3,970	33.5	3.6	0.6	0.7	0.0	0.1	0.6	60.9	66.5	20.1	$48,108
---	1	728	83.1	1.2	1.1	1.2	0.0	0.0	0.2	13.2	16.9	6.7	$112,679
43	---	2,375	5.1	10.3	0.3	1.0	0.0	0.0	0.3	83.0	94.9	33.4	$37,575
---	1	421	9.3	8.8	0.4	1.7	0.0	0.0	0.7	79.1	**90.7**	42.3	$25,714
---	2	699	1.5	27.5	0.1	0.0	0.0	0.0	0.1	70.9	**98.5**	28.9	$38,125
86.03	---	1,237	1.9	60.2	0.3	0.0	0.1	0.1	1.0	36.4	98.1	36.0	$30,750
---	1	764	1.6	85.5	0.1	0.0	0.0	0.1	1.7	11.0	**98.4**	45.8	**$22,647**
---	2	473	2.3	19.5	0.6	0.0	0.2	0.0	0.0	77.4	**97.7**	0.0	$42,083
89	---	2,713	0.9	66.9	0.2	0.1	0.0	0.2	0.7	31.0	99.1	41.3	$21,667
---	1	916	1.2	56.9	0.0	0.1	0.0	0.6	0.4	40.8	**98.8**	33.2	$28,750

TABLE 4-4. MINORITY AND LOW-INCOME CHARACTERISTICS

Census Geography		Total Project Area Population	Racial and Ethnic Distribution										
			Percent White Alone	Percent Black or African American Alone	Percent American Indian and Alaska Native Alone	Percent Asian Alone	Percent Native Hawaiian and Other Pacific Islander Alone	Percent Some Other Race Alone	Percent Two or More Races	Percent Hispanic or Latino	Percent Minority [1, 2]	Percent of Households Below Poverty Guideline [1]	Median Household Income [1]
100	---	11,780	30.8	47.5	0.1	0.7	<0.1	0.1	0.3	20.5	69.2	25.1	$31,078
---	1	9,658	34.4	46.5	0.1	0.7	<0.1	0.1	0.2	18.0	**65.6**	7.8	$80,250
---	2	2,122	14.5	52.1	0.1	0.7	0.1	0.0	0.8	31.7	**85.5**	30.6	$23,702
101.01	---	4,549	1.1	49.4	0.1	0.1	<0.1	0.1	0.5	48.7	98.9	33.8	$23,899
---	1	1,445	2.6	44.9	0.2	0.1	0.0	0.1	1.0	51.1	**97.4**	37.4	$24,286
---	2	1,245	0.2	60.9	0.1	0.0	0.0	0.0	0.2	38.6	**99.8**	29.6	$25,741
---	3	1,859	0.5	45.1	0.1	0.0	0.1	0.2	0.4	53.6	**99.5**	33.3	$23,734
101.02	---	3,178	1.8	4.8	0.2	0.0	0.0	0.3	0.1	92.8	98.2	33.1	$31,104
---	1	958	2.4	2.1	0.2	0.0	0.0	0.5	0.0	94.8	**97.6**	26.6	**$21,917**
---	2	1,406	1.2	7.8	0.1	0.0	0.0	0.3	0.1	90.5	**98.8**	30.3	$33,750
---	3	814	2.2	2.7	0.3	0.0	0.0	0.0	0.1	94.7	**97.8**	**50.6**	**$19,659**
106.01	---	5,729	2.0	3.8	0.1	0.1	0.0	0.1	0.1	93.8	98.0	27.1	$38,287
---	2	3,056	2.1	6.6	<0.1	0.0	0.0	0.1	<0.1	91.2	**97.9**	33.8	$37,731
204	---	5,518	44.0	28.8	0.5	3.0	0.1	0.2	1.9	21.5	56.0	7	$52,461
---	1	1,148	48.9	26.9	1.0	1.7	0.2	0.3	2.4	18.6	**51.1**	2.9	$62,917
205	---	4,820	3.1	57.9	0.1	4.0	0.2	0.1	1.3	33.3	96.9	56.6	$13,423
---	2	3,840	2.5	56.5	0.1	4.6	0.3	0.1	1.4	34.5	**97.5**	**53.2**	**$14,074**

TABLE 4-4. MINORITY AND LOW-INCOME CHARACTERISTICS

Census Geography	Total Project Area Population	Racial and Ethnic Distribution										
		Percent White Alone	Percent Black or African American Alone	Percent American Indian and Alaska Native Alone	Percent Asian Alone	Percent Native Hawaiian and Other Pacific Islander Alone	Percent Some Other Race Alone	Percent Two or More Races	Percent Hispanic or Latino	Percent Minority [1, 2]	Percent of Households Below Poverty Guideline [1]	Median Household Income [1]

Source: U.S. Census Bureau, 2010e. The latest Census data has been utilized to obtain socioeconomic data as presented at the census tract and block group levels of analysis. The 2012 census data was used to obtain race and ethnicity demographic data; while the Census Bureau's 2007-2011 ACS 5-year estimate data was used to obtain economic characteristics

Notes

1. Bolded areas show project area block groups with a percent minority population greater than 50 percent, where the median household income is at or below the U.S. Department of HHS 2013 poverty guidelines for a four-person family ($23,550), and/or where 50 percent or more of households are below the U.S. Census poverty threshold.
2. Combined total of persons reporting Hispanic or Latino, and not Hispanic or Latino by Race (Census 2010 Table SF1, Table P9). Not Hispanic or Latino by Race includes persons reporting as Black or African American Alone, American Indian/Alaskan Native Alone, Asian Alone, Native Hawaiian and Other Pacific Islander Alone, Some Other Race Alone, or Two or More Races Alone.
3. Individual block groups within census tracts that fall within the project area boundary.
4. Census tracts partially or wholly encompassed by the project area boundary.
5. Average of poverty guideline for project area block groups.
6. Average of median household income for project area block groups.

THIS PAGE INTENTIONALLY LEFT BLANK

In **Table 4-4,** the data in bold show project area block groups with minority population densities high enough to be considered minority populations based on the CEQ's guidance as presented in **FEIS Section 3.1.5.2**. All but one of the 25 block groups of the project area contain minority populations that are 50 percent or greater. In addition, nine of the 25 block groups contain populations whose median household income is less than the HHS 2013 poverty guideline of $23,550 for a four-person family; and three of the 25 block groups contain 50 percent or more of households below the U.S. Census poverty threshold. Based on these minority and low-income statistics, it can be concluded that EJ populations exist throughout the project area.

The findings presented in **Table 4-4** and described above provide a broad look at the project area demographics. A more focused analysis is presented below which concentrates on each of the block groups and neighborhoods located within or immediately adjacent to the proposed ROW of Alternative 3C. These block groups and neighborhoods were used as the EJ analysis unit to establish the area of potential effect for Alternative 3C. The results of the analysis of minority and low-income data at the block group level are shown in **Table 4-5**. This information identifies where these populations are located in proximity to the Build Alternative. The data in bold in the tables indicate where the block group percentages for racial and ethnic minorities and persons and/or households below the U.S. Census poverty threshold exceed 50 percent, or where the median household income is below the HHS poverty guideline.

TABLE 4-5. CENSUS BLOCK GROUPS AFFECTED BY ALTERNATIVE 3C - MINORITY AND LOW-INCOME CHARACTERISTICS

Census Tract/ Block Group	Total Block Group Pop-ulation	Racial and Ethnic Distribution									Percent of House-holds Below Poverty Guideline [2]	Median House-hold Income [2]
		Percent White Alone	Percent Black or African American Alone	Percent American Indian and Alaska Native Alone	Percent Asian Alone	Percent Native Hawaiian and Other Pacific Islander Alone	Percent Some Other Race Alone	Percent Two or More Races	Percent Hispanic or Latino	Percent Minority [1, 2]		
34/1	562	2.8	77.8	0.2	0.0	0.0	0.2	0.9	18.1	**97.2**	37.3	**$16,371**
39.02/1	452	1.6	61.7	0.0	0.0	0.0	0.0	1.5	35.2	**98.4**	32.4	**$18,828**
39.02/2	1,408	1.1	77.1	0.1	0.0	0.0	0.4	0.7	20.6	**98.9**	31.6	**$21,942**
40/1	636	0.8	91.5	0.0	0.0	0.0	0.0	0.0	7.7	**99.2**	29.5	**$22,390**
40/2	446	0.4	80.3	0.7	0.0	0.0	0.2	2.0	16.4	**99.6**	17.7	$28,750
89/1	916	1.2	56.9	0.0	0.1	0.0	0.6	0.4	40.8	**98.8**	33.2	$28,750
100/1	9,658	34.4	46.5	0.1	0.7	<0.1	0.1	0.2	18.0	**65.6**	7.8	$80,250
100/2	2,122	14.5	52.1	0.1	0.7	0.1	0.0	0.8	31.7	**85.5**	30.6	$23,702
204/1	1,148	48.9	26.9	1.0	1.7	0.2	0.3	2.4	18.6	**51.1**	2.9	$62,917

Source: U.S. Census Bureau, 2010e. The latest Census data has been utilized to obtain socioeconomic data as presented at the Census block group level of analysis. The 2012 Census data was used to obtain race and ethnicity demographic data; while the Census Bureau's 2007-2011 ACS 5-year estimate data was used to obtain economic characteristics.

Notes:

1. Combined total of persons reporting Hispanic or Latino, and not Hispanic or Latino by Race (Census 2010 Table SF1, Table P9). Not Hispanic or Latino by Race includes persons reporting as Black or African American Alone, American Indian/Alaskan Native Alone, Asian Alone, Native Hawaiian and Other Pacific Islander Alone, Some Other Race Alone, or Two or More Races Alone.
2. Bolded areas show project area block groups with a percent minority population greater than 50 percent, where the median household income is at or below the U.S. Department of HHS 2013 poverty guidelines for a four-person family ($23,550), and/or where 50 percent or more of households are below the U.S. Census poverty threshold.

Table 4-5 indicates that every block group affected by Alternative 3C (total of nine block groups) have a minority population percentage exceeding 50 percent; and four of these block groups also have median household incomes at or below the HHS poverty guideline.

Since neighborhoods represent a geographic unit that can be readily identified by community members, a correlation of the affected block groups to the project area neighborhoods (see **FEIS Section 3.1.6** and **FEIS Plate 3-10** for the location of neighborhood districts/neighborhoods) is shown in **Table 4-6**. The table provides the block group-level statistics on minority composition, income level, and related information for the neighborhoods with a potential for disproportionate impacts by Alternative 3C. These neighborhoods are the communities for which an impact analysis was conducted.

TABLE 4-6. DEMOGRAPHIC CHARACTERISTICS OF AFFECTED NEIGHBORHOODS/CENSUS BLOCK GROUPS OF CONCERN

Neighborhood District/ Neighborhood [1, 3]	Census Tract / Block Group [2, 3]	Total Block Group Population	Percent Black or African American Alone	Percent American Indian and Alaska Native Alone	Percent Asian Alone	Percent Native Hawaiian and Other Pacific Islander Alone	Percent Some Other Race Alone	Percent Two or More Races	Percent Hispanic or Latino	Percent Minority [4, 5]	Percent of House-holds Below Poverty Guideline [4]	Median Household Income [4]
Middle Stemmons/Brookhollow ND [8]												
Residential area along Record Crossing (Arlington Park); Trinity Industrial District; Brookhollow Industrial Park	100/2	2,122	52.1	0.1	0.7	0.1	0.0	0.8	31.7	**85.5**	30.6	$23,702
Lower Stemmons ND												
Design District-Market/ Technology Center	100/1	9,658	46.5	0.1	0.7	<0.1	0.1	0.2	18.0	**65.6**	7.8	$80,250
Cedars/Fair Park/East Dallas ND												
South Dallas HOA	34/1	562	77.8	0.2	0.0	0.0	0.2	0.9	18.1	**97.2**	37.3	**$16,371**
The Cedars	204/1	1,148	26.9	1.0	1.7	0.2	0.3	2.4	18.6	**51.1**	2.9	$62,917
South Dallas ND												
South Dallas HOA	40/1	636	91.5	0.0	0.0	0.0	0.0	0.0	7.7	**99.2**	29.5	**$22,390**
	40/2	446	80.3	0.7	0.0	0.0	0.2	2.0	16.4	**99.6**	17.7	$28,750
Rochester Park	39.02/1	452	61.7	0.0	0.0	0.0	0.0	1.5	35.2	**98.4**	32.4	**$18,828**
Ideal	39.02/2	1,408	77.1	0.1	0.0	0.0	0.4	0.7	20.6	**98.9**	31.6	**$21,942**

Source: U.S. Census Bureau, 2010c and 2010e.

Notes:

The latest Census data has been utilized to obtain socioeconomic data as presented at the neighborhood district/neighborhood level of analysis. The 2012 Census data was used to obtain race and ethnicity demographic data; while the Census Bureau's 2007-2011 ACS 5-year estimate data was used to obtain economic characteristics.

1. Neighborhood Districts/Neighborhoods are shown on **FEIS Plate 3-10**.
2. Census 2010 tracts/block groups are shown on **FEIS Plate 4-1**.
3. Neighborhood and district boundaries do not correspond exactly with census tracts or block groups. A rough correlation has been established so that census data can be used to provide a general description of population and income characteristics. All Census figures shown are at the block group level.
4. Bolded areas show project area block groups with a percent minority population greater than 50 percent, where the median household income is at or below the U.S. Department of HHS 2013 poverty guidelines for a four-person family ($23,550), and/or where 50 percent or more of households are below the U.S. Census poverty threshold.
5. Combined total of persons reporting Hispanic or Latino, and not Hispanic or Latino by Race (Census 2010 Table SF1, Table P9). Not Hispanic or Latino by Race includes persons reporting as Black or African American Alone, American Indian/Alaskan Native Alone, Asian Alone, Native Hawaiian and Other Pacific Islander Alone, Some Other Race Alone, or Two or More Races Alone.

Abbreviations used in table:

ND = Neighborhood District; **HOA =** Home Owners Association.

THIS PAGE INTENTIONALLY LEFT BLANK

Extent of Adverse Impacts

The impacts with the greatest relevance to the identified EJ neighborhoods are relocation/displacements and proximity impacts such as noise impacts, visual intrusion, and transportation impacts. **Table 4-7** shows each neighborhood affected by Alternative 3C, along with the types of impacts anticipated to occur.

TABLE 4-7. POTENTIAL IMPACTS TO AFFECTED MINORITY AND/OR LOW-INCOME NEIGHBORHOODS

Neighborhood District/ Neighborhood	Inclusive 2010 Census Tracts/Block Groups [1]	Affected by the Build Alternative	Types of Impacts
Middle Stemmons/Brookhollow ND			
Residential area east of IH-35E/south of Record Crossing (Arlington Park)	100/2	3C	P, V, T
Trinity Industrial District	100/2	3C	R, P, V, T
Middle Stemmons/Brookhollow ND	100/2	3C	R, P, V, T
Lower Stemmons ND			
Design District	100/1	3C	R, P, V, T
Market/Technology Center	100/1	3C	P, V, T
Lower Stemmons ND	100/1	3C	P,V,T
Cedars/Fair Park/East Dallas ND			
The Cedars	204/1	3C	R, P, V, T
South Dallas ND			
South Dallas HOA	34/1, 40/1, 40/2	3C	R, P, N, V, T
Rochester Park	39.02/1	3C	P, N, V, T
Ideal	39.02/2	3C	P, N, V, T
South Dallas ND	34/1	3C	R, P, V, T

Notes:
2010 Census tracts and block groups utilized to determine impacts resulting from Alternative 3C (see **FEIS Plate 4-1**).
Abbreviations used in table:
R = Relocation; **P** = Proximity; **N** = Noise; **V** = Visual; **T** = Traffic increase
ND = Neighborhood District; **HOA** = Home Owners Association

As shown in **Table 4-7**, the primary impacts to EJ neighborhoods include:

- Acquisition of property, and relocation/displacements of residences and businesses (see **FEIS Section 4.4**);
- Increased in traffic on local arterials and collector streets at new access road locations (see **FEIS Section 4.6**);
- Proximity impacts, such as noise (see **FEIS Section 4.16**) and visual intrusion (see **FEIS Section 4.17**); and
- Construction impacts, such as noise and additional traffic (see **FEIS Section 4.21**).

The impacts experienced by the affected areas containing minority and low-income populations are discussed in detail in the above-referenced sections. A summary of the primary impacts is presented below.

The Build Alternative would result in displacements in minority and/or low income neighborhoods. The three proposed residential displacements resulting from Alternative 3C would occur in the South Dallas neighborhood district. No schools, community or recreation centers, or places of worship, which may be considered especially important community and public resources to minority or low-income populations, would be displaced (see **FEIS Section 4.4.1**). Alternative 3C would also result in approximately 27 commercial displacements and would occur in four general locations: near the southern project terminus, near the northern project terminus, at the proposed Woodall Rodgers interchange, and at the intersection of Corinth Street and Riverfront Boulevard. In the short term, project construction would provide direct economic benefits to the region by increasing employment and earnings in the construction industry and through economic multiplier impacts, which would provide benefits to the broader economy as well. These displacements should not result in a shortage of employment opportunities in the project area and surrounding areas. Over the long run, improved access to major employment centers and mobility resulting from an improved transportation infrastructure would be an incentive for future development or redevelopment within the project area and beyond. Due to the opportunities for business redevelopment and relocation in the area, re-employment opportunities for affected employees would likely occur in the vicinity of their current employment or at other similar business establishments. Assistance would also be available from both the public and private sectors for those who may need new employment (see **FEIS Sections 4.4.3, 4.5.2** and **4.5.2.2**).

With regard to traffic impacts, some new traffic would be introduced in the immediate vicinity of interchanges. However, the proposed action would have an overall beneficial impact by improving public safety, mobility, and access in the project area. Alternative 3C is expected to improve congestion on the major arterial streets and would also manage congestion on other major highways in the project area (see FEIS **Section 4.6**).

Residential areas containing minority and low-income populations located at the south end of the project area (the South Dallas neighborhood district) would be impacted by noise from traffic on Alternative 3C. No community or public resources (i.e. schools, recreation centers, or places of worship) identified in the neighborhoods of EJ concern would be impacted by noise. For additional details on what constitutes a noise impact, see **FEIS Section 4.16**.

Alternative 3C would also result in some visual changes; however, visual impacts along the majority of the Build Alternative would be limited due to the east and west levees acting as a visual barrier for viewers outside of the Dallas Floodway. The northern and southern project termini would be dominant visual features to adjacent viewers within the Middle Stemmons/ Brookhollow and South Dallas neighborhood districts, respectively.

Impacts during construction, such as noise and visual changes, would be temporary and would not be expected to result in a disruption of normal activities for minority or low-income populations.

Public Involvement

Extensive public involvement has been an integral part of the proposed action during the *Trinity Parkway Corridor MTIS* (TxDOT, 1998a), DEIS (FHWA, 2005a), SDEIS (FHWA, 2009) and LSS (FHWA, 2012a) processes. The purpose of the public involvement has been to establish and maintain communication with the public and various affected or interested parties. These public involvement activities included a formal DEIS scoping meeting and informal presentations to a wide range of organizations, agencies, and individuals (see **FEIS Chapter 8** and **Appendix A-3**). Representative examples include:

- A formal public scoping meeting held in July 1999;
- A Community Advisory Work Group (CAWG);
- An Interagency Executive Team (IET);
- Establishment of a project office telephone number;
- Project newsletters;
- Media outreach;
- Meetings with local institutions, civic groups, business associations, neighborhood groups, and other local organizations;
- A project-specific internet web page;
- A DEIS public hearing;
- A SDEIS public hearing; and
- A LSS public hearing.

The IET is comprised of representatives from local governments, resource agencies, and the project consultant team. The CAWG is comprised of members of the community to provide a broad-based representation of the community at-large. CAWG members have included representatives from project area neighborhoods/districts, the Dallas Black Chamber of Commerce, and the Dallas Hispanic Chamber of Commerce (see **Appendix A-3**). During the *Trinity Parkway Corridor MTIS*, DEIS, SDEIS, and LSS processes, public meeting announcements were published in local newspapers including: *The Dallas Weekly* (a local African American newspaper), *El Sol de Texas and/or Al Dia* (both local Spanish newspapers), and *The Dallas Morning News*. Additional efforts for public involvement have included meetings and presentations at forums hosted by the City of Dallas, the Dallas City Council, and other civic groups.

Table 4-8 shows key public outreach activities that have occurred in an effort to involve the affected minority and low-income populations of communities/neighborhoods identified in **Table 4-7**. These activities were concentrated early in the NEPA process and continued throughout the initial development of the DEIS in 2005. These activities were conducted in an early effort to inform the public regarding the proposed project, provide an opportunity for participation in the planning process, and identify impacts or issues of concern. These activities also served as a forum to obtain input concerning potential mitigation measures for the project. The Neighborhood District column of **Table 4-8** lists the neighborhoods where the public outreach has occurred thus far. The neighborhood names are identified at the bottom of the table. Since publishing the DEIS in February 2005, major revisions of the EIS have primarily been the result of design-related concerns raised by the USACE with regard to the Dallas Floodway and not the result of issues or concerns raised by members of the adjacent neighborhoods. For this reason, outreach activities since 2005 have included public hearings held in March 2005, May 2009, and May 2012, all of which received active participation from members of the project area neighborhoods.

TABLE 4-8. KEY PUBLIC OUTREACH ACTIVITIES FOR MINORITY AND LOW-INCOME POPULATIONS

Date	Event	Neighborhood District with Opportunity for Involvement*	Major Issues/Concerns Discussed
October 4, 1999	Conducted first in a series of Community Advisory Work Group (CAWG) meetings	1, 2, 3, 4, 5, 6, 7, 8, & 9	Role of the CAWG Overview of engineering and environmental issues
October 30 and November 10, 1999	Study corridor tours for CAWG members	1, 2, 3, 4, 5, 6, 7, 8, & 9	Preferences and times for future CAWG meetings Site conditions within the Trinity Parkway project area
November 17, 1999 February 8, 2000	Presentations to West Dallas Business Associations	1 & 2	Presentation of the Trinity Parkway EIS process and preliminary schematics for alternative alignments
December 13, 1999	Conducted second CAWG meeting	1, 2, 3, 4, 5, 6, 7, 8, & 9	Alternative alignments Overview of Trinity River MIP access points and types
January 10, 2000	Conducted third CAWG meeting	1, 2, 3, 4, 5, 6, 7, 8, & 9	Engineering design developments Ramp connections to IH-35E

TABLE 4-8. KEY PUBLIC OUTREACH ACTIVITIES FOR MINORITY AND LOW-INCOME POPULATIONS

Date	Event	Neighborhood District with Opportunity for Involvement*	Major Issues/Concerns Discussed
February 14, 2000	Conducted fourth CAWG meeting; topics discussed included Environmental Justice	1, 2, 3, 4, 5, 6, 7, 8, & 9	Hazardous materials Cultural resources and parklands Community impacts (land use, displacements) Environmental Justice
February 24, 2000	Meeting with T.R. Hoover (South Dallas) Neighborhood Association	6	History of Ideal Neighborhood/TR Hoover Community Development Corporation Partnership opportunities with NTTA, TxDOT, City of Dallas Review of alternatives - focus on southern terminus at US-175, proposed Gateway parks Establishing adjacent neighborhood associations
March 13, 2000	Conducted fifth CAWG meeting	1, 2, 3, 4, 5, 6, 7, 8, & 9	Utility relocations Natural resource impacts Visual impacts
March 23, 2000	Public Meeting conducted in South Dallas	6	Number of displacements and impacts Compensation for value of time in establishing a home and preferred way of life, trust issues Noise and air quality Traffic congestion Dividing existing neighborhoods (community cohesion)
April 10, 2000	Conducted sixth CAWG meeting	1, 2, 3, 4, 5, 6, 7, 8, & 9	Visual impacts Transportation impacts Temporary impacts during construction Water quality
May 8, 2000	Conducted seventh CAWG meeting	1, 2, 3, 4, 5, 6, 7, 8, & 9	Traffic Toll rates and collection methods Toll plaza layout and design
May 23, 2000	Meeting with the TR Hoover Community Development Corporation (Ideal Neighborhood Association)	6	Project overview
June 12, 2000	Conducted eighth CAWG meeting	1, 2, 3, 4, 5, 6, 7, 8, & 9	Hydraulic analysis Air quality Noise
July 25, 2000	Conducted Public Meeting for Industrial Corridor Businesses	6, 7, 8, & 9	Project overview
September 11, 2000	Conducted CAWG meeting	1, 2, 3, 4, 5, 6, 7, 8, & 9	Traffic Hydraulic analysis Cost estimates Right-of-way needs Overview of alternatives evaluation

TABLE 4-8. KEY PUBLIC OUTREACH ACTIVITIES FOR MINORITY AND LOW-INCOME POPULATIONS

Date	Event	Neighborhood District with Opportunity for Involvement*	Major Issues/Concerns Discussed
May 3 - 31, 2001	Trinity River Corridor Comprehensive Land Use Plan stakeholders meetings (16 Meetings)	1, 2, 3, 4, 5, 6, 7, 8, & 9	Project overview
July 2 and 19, 2001	Presentations to the Oak Cliff Chamber of Commerce	3 & 4	Project overview
February 17, 2004	Conducted CAWG meeting	1, 2, 3, 4, 5, 6, 7, 8, & 9	Project overview (changes since 2000) Incorporation of Balanced Vision Plan into the DEIS
February 24, 2004	Public Meeting conducted in West Dallas	1 & 2	Project design within the Dallas Floodway Impacts from Build Alternatives and related displacements Design speeds and vehicle-class restrictions Flood protection and management Financing by TxDOT and/or City of Dallas
February 26, 2004	Public Meeting conducted in South Dallas	6	Noise reduction measures (roadway materials used, noise barriers, reduction in traffic on SM Wright) Revenue sharing with community Economic impacts and possible remedies Contract labor for project from the community Community betterment during and after project Air quality impacts
March 9, 2004	TR Hoover Neighborhood Association Presentation	6	Project overview
March 9, 2004	New Hope Baptist Church Presentation	6	Project alignment and design decisions (ramp locations, accessibility, number of lanes) Decisions on parks, availability, recreational amenities Notices/displacements for affected property owners
March 18, 2004	Bus tour for South Dallas elected official's staff and neighborhoods	6	Project overview
March 27, 2004	Booth at TR Hoover Neighborhood Association Community Fair	6	Project overview
March 27, 2004	Clean South Dallas Joint Neighborhood Associations' meeting	6	Project overview
June 23, 2004	New Hope Church - Presentation to Trustees	6	Project overview

TABLE 4-8. KEY PUBLIC OUTREACH ACTIVITIES FOR MINORITY AND LOW-INCOME POPULATIONS

Date	Event	Neighborhood District with Opportunity for Involvement*	Major Issues/Concerns Discussed
September 09, 2004	St. Phillips Neighborhood Development Corporation briefing		Project overview
September 16-17 2004	South Dallas local and state-elected officials briefing	6	Accessibility to/from the Trinity Parkway and surrounding community Staged construction Reclassification of adjacent highways Recreational facilities in southern portion of project
September 18, 2004	West Dallas Chamber of Commerce presentation	1 & 2	Land use planning Design elements (building materials, traffic management, design standards) Community cohesion
November 16, 2004 December 16, 2004 January 28, 2005	Briefings for South Dallas local and state-elected officials	6	Project overview
February 15, 2005	Conducted CAWG meeting	1, 2, 3, 4, 5, 6, 7, 8, & 9	Project overview
March 29, 2005	Public hearing for the DEIS at the Dallas Convention Center Arena. Notices published prior to the public hearing in *The Dallas Morning News, Al Dia* (Spanish), and *Dallas Weekly* (African American); notices also mailed to community leaders, agencies, interested groups, and potential affected property owners.	1, 2, 3, 4, 5, 6, 7, 8, & 9	Project design and operation Relocations and displacements Impacts to floodplains, waters of the U.S., including wetlands, wildlife habitat, air quality, and cultural resources Indirect and cumulative impacts
October 24, 2005	South Dallas Planning Workshop	6	Project overview
September 20, 2007	Meeting hosted by Senator Royce West and Commissioner John Wiley Price on Trinity Project	4	Project overview Cost estimates

TABLE 4-8. KEY PUBLIC OUTREACH ACTIVITIES FOR MINORITY AND LOW-INCOME POPULATIONS

Date	Event	Neighborhood District with Opportunity for Involvement*	Major Issues/Concerns Discussed
May 5, 2009	Public hearing for the SDEIS at the Dallas Convention Center Arena. Notices published prior to the public hearing in *The Dallas Morning News, Al Dia* (Spanish), and *Dallas Weekly* (African American); notices also mailed to community leaders, agencies, interested groups, and potential affected property owners.	1, 2, 3, 4, 5, 6, 7, 8, & 9	Project design and operation Relocations and displacements Impacts to floodplains, waters of the U.S., including wetlands, wildlife habitat, air quality, and cultural resources Indirect and cumulative impacts
May 8, 2012	Public hearing for the LSS at the Dallas Convention Center Arena. Notices published prior to the public hearing in *The Dallas Morning News, Al Dia* (Spanish), and *Dallas Weekly* (African American); notices also mailed to community leaders, agencies, interested groups, and potential affected property owners.	1, 2, 3, 4, 5, 6, 7, 8, & 9	New information regarding compatibility of the Build Alternatives with City of Dallas levee remediation plans for the Dallas Floodway; new information regarding historic resources and an update on compliance with Section 106 of the National Historic Preservation Act and Section 4(f) of the United States Department of Transportation Act of 1966; and supplemental analysis regarding the performance of the Trinity Parkway build alternatives relative to factors used to evaluate practicability pursuant to EO 11990 (Protection of Wetlands) and EO 11988 (Floodplain Management).

Notes: The CAWG consists of 54 representatives from neighborhoods (including West Dallas, East Oak Cliff, Magna Vista/Cedar Crest [Cadillac Heights], North Oak Cliff, South Dallas, and the Cedars), businesses, civic groups, landowners, and environmental groups. CAWG meetings are open to the public.

***Key to Neighborhood Districts:**

1 - West Dallas West of Hampton	4 - East Oak Cliff	7 – Cedars/Fair Park/East Dallas
2 - West Dallas East of Hampton	5 - Magna Vista/Cedar Crest	8 - Lower Stemmons
3 - North Oak Cliff	6 - South Dallas	9 - Middle Stemmons/ Brookhollow

During the *Trinity Parkway Corridor MTIS*, DEIS, SDEIS, and LSS public involvement processes, alternatives were revised to reflect concerns expressed by neighborhoods (see **FEIS Chapter 2** and **FEIS Appendices K, L,** and **M**). For example, to resolve community concerns regarding neighborhood access to future city park improvements in the Dallas Floodway, design refinements were made to add structured ramps from the Trinity Parkway alignment into the floodplain at access locations. Comments on alternatives and appropriate options were used to modify or eliminate alternatives. The FEIS Build Alternative was identified based on its ability to satisfy the project's need and purpose, goals and objectives, community input, and to minimize the project's social, economic, and environmental impacts. To date, neighborhood group representatives and individuals from the affected minority and low-income populations have indicated major issues of concern to be:

- Housing displacements;
- Loss of affordable housing;
- Relocation of businesses;
- Air quality, noise levels, and noise barrier location;
- Increased traffic; and
- Construction impacts, such as noise and additional traffic.

These issues have been addressed in this FEIS. Specific impacts are described throughout this chapter, and proposed mitigation measures are further described later in this section and in **FEIS Chapter 5.** Future public outreach activities are planned and will continue throughout the EIS and design phases of the project. Future activities will include, but are not limited to:

- A formal public hearing for this FEIS;
- Additional Interagency Executive Team meetings;
- Media outreach;
- Additional meetings with local institutions, civic groups, business associations, neighborhood groups, and other local organizations; and
- Continued coordination with the City of Dallas.

NCTCOG Transportation Public Involvement Process

The NCTCOG *Mobility 2035 – 2013 Update* (2013a) includes the Trinity Parkway as a major element of the freeway/toll road plan. Public involvement and outreach efforts to reach low-income and minority communities continue to be an important component of the NCTCOG MTP development process. One of the primary goals of *Mobility 2035-2013 Update* is to provide a balanced transportation system that is responsive to all residents, including historically underserved populations.

The NCTCOG is committed to incorporating EJ (EO 12898) elements and Title VI considerations into its public involvement process. This is accomplished through an EJ and Title VI analysis, which measures mobility and accessibility for the identified protected class populations and non-protected class populations. Overall, the results of this analysis show that mobility and accessibility increase for the protected populations in the proposed *Mobility 2035 – 2013 Update* Build scenario, which includes the proposed Trinity Parkway. The plan also reflects the continued recognition of quality-of-life issues and the relationship between community development and transportation in the sustainable development initiatives, documented in *Mobility 2035 – 2013 Update*.

During the public involvement process, populations that have been traditionally underserved by existing transportation systems, including but not limited to low-income and minority households, are sought out and their needs considered. Other fundamental concepts of EJ included in NCTCOG's policy are to ensure the full and fair participation by all potentially affected communities in the transportation decision making process; and to prevent the denial of, reduction in, or substantial delay in receipt of benefits by minority and low-income populations.

Limited English Proficiency

Under both the No-Build and Build Alternative, LEP individuals would be afforded the opportunity to participate in the decision-making process. An analysis was conducted to identify residents in the project area with LEP, since these residents may not understand outreach materials. LEP populations were determined using Census block group level data from the U.S. Census Bureau (2007-2011 ACS data). Within the population that is five years of age and older, persons who speak English less than "very well" are considered to have a limited English proficiency. The populations that speak English less than "very well" according to ACS 2007 to 2011 5-year estimates data are presented in **Table 4-9**. There are 25 block groups within the project area (see **FEIS Plate 3-9**).

TABLE 4-9. PERCENT OF PROJECT AREA POPULATION THAT SPEAKS ENGLISH LESS THAN "VERY WELL"

Census Tract/Block Group	Total Population	LEP Population	Percent LEP *	Languages Spoken by LEP Populations % (No. of persons)			
				Spanish	Indo-European	Asian/Pacific Island	Other
20/1	1,385	210	15%	15% (210)	0	0	0
20/2	889	446	50%	49% (439)	1% (7)	0	0
34/1	588	23	4%	4% (23)	0	0	0
39.02/1	377	40	11%	11% (40)	0	0	0
39.02/2	1,293	93	7%	7% (93)	0	0	0
40/1	330	0	0	0	0	0	0
40/2	440	7	2%	2% (7)	0	0	0
41/2	395	66	17%	17% (66)	0	0	0
42.01/1	561	0	0	0	0	0	0
43/1	532	416	78%	78% (416)	0	0	0
43/2	456	53	12%	12% (53)	0	0	0
86.03/1	847	119	14%	14% (119)	0	0	0
86.03/2	344	94	27%	27% (94)	0	0	0
89/1	1,154	571	49%	49% (571)	0	0	0
100/1	9,684	289	3%	3% (279)	0.1% (10)	0	0
100/2	2,134	43	2%	2% (43)	0	0	0
101.01/1	1,517	548	36%	36%(548)	0	0	0
101.01/2	1,017	334	33%	33%(334)	0	0	0
101.01/3	1,393	274	19%	17% (243)	0	0	2% (31)
101.02/1	593	219	37%	37%(219)	0	0	0
101.02/2	1,914	999	52%	52% (999)	0	0	0
101.03/2	408	127	31%	31% (127)	0	0	0
106.01/2	3,568	1,636	46%	46%(1,636)	0	0	0
204/1	1,052	49	5%	5% (49)	0	0	0
205/2	3,239	407	12%	12% (392)	0	0.4% (15)	0

Source: U.S. Census Bureau, 2011d.
Note: * Rounded to the nearest whole percentage.

As shown in **Table 4-9**, the percentages of LEP populations in the 25 individual block groups within the project area range from zero to 78 percent. Of the 36,110 persons within all of the block groups, approximately 19.6 percent of the population (7,063 persons) speak English less than "very well." Of this LEP population, the predominant language spoken is Spanish (approximately 99.1 percent). Other representative languages include 1.1 percent Indo European languages, 0.4 percent Asian/Pacific Islander, and 2.0 percent other languages. LEP persons were identified within the block groups throughout the majority of the project corridor, although higher percentages of LEP persons are concentrated in the West Dallas - East of Hampton, West Dallas - West of Hampton, North Oak Cliff, and East Oak Cliff neighborhood districts, as well as the La Bajada/La L'aceate and Lake Cliff HOA neighborhoods (see **FEIS Plate 3-10**). A windshield survey of the project area indicated that English was the primary language used for building signage and other forms of posted information and advertisements along the project corridor. Included were scattered areas of Spanish language signage, postings, and advertisements. These areas were primarily located in the Cedars/Fair Park/East Dallas, West

Dallas - East of Hampton, West Dallas - West of Hampton, and North Oak Cliff neighborhood districts. DISD personnel indicated that project area schools (see **Section 3.1.4**) have English as a Second Language (ESL) programs for both school age children and adults. Languages spoken in project area schools include a wide variety of European, African, and Asian dialects.

As previously described, efforts have been made to include all affected communities and populations, including minority and low-income populations, in the public involvement and decision making process. Public outreach efforts have included announcements in local English and Spanish media, the CAWG (which included representatives from project area neighborhoods), a public scoping meeting, neighborhood meetings, project newsletters, a project web site, and three public hearings. Future public outreach activities will include additional announcements in local English and Spanish media, neighborhood meetings, and a final public hearing. A proactive public involvement program will continue for the proposed project and all populations affected will have a continuing opportunity to participate in the development of the project. Translators have been present at several of the public meetings and at the public hearings and will continue to be utilized in future meetings with LEP communities.

<u>Title VI of the Civil Rights Act of 1964, as amended</u>

EO 12898 is an administrative directive to federal agencies and does not create any judicially enforceable rights; therefore, EJ proponents also look to the judicial system for guidance. Federal court decisions under Title VI have provided several criteria by which compliance with EO 12898 can be assessed. The following section deals with the application of these Title VI criteria, as well as EO 12898, in regards to the Trinity Parkway.

Among the most important EJ criteria that have evolved out of Title VI litigation are the requirements that:

- Defendants justify their actions by showing a legitimate non-discriminatory purpose; and
- Plaintiffs demonstrate that there is a reasonable alternative to the proposed action that is also non-discriminatory.

  (See *Georgia State Conference of Branches of NAACP v. State of Georgia*, 775 F.2d 1403, 1417 [11th Cir. 1985]).

Due to the demographic composition and spatial distribution of minority populations within the project area, the proposed action would have unavoidable impacts to minority populations. Therefore, the Title VI analysis suggests that it must be demonstrated that a legitimate, non-discriminatory purpose in implementing the proposed action would be achieved. The Title VI criteria would similarly require that the question of whether there is a reasonable, non-discriminatory alternative to the proposed action be addressed.

With respect to the above criteria, there are a number of environmental and transportation issues which have led to the recommendation of the Trinity Parkway in this area of Dallas over other transportation alternatives. Throughout the *Trinity Parkway Corridor MTIS*/EIS process, one of the goals has been to minimize impacts on local residents, while accomplishing the primary purpose of the roadway: managing congestion in the Canyon/Mixmaster/Lower Stemmons corridors. The transportation planning, economic, and land use considerations that determined the location for the proposed action have been discussed in **FEIS Chapter 1**. Alternatives that were considered (e.g., transit, improvements to existing roadways) during the MTIS/EIS process were discussed in **FEIS Chapter 2**. There are well supported environmental and transportation planning considerations that demonstrate the reasonableness of the proposed Trinity Parkway.

<u>Toll Road Considerations</u>

Various toll road considerations are presented in **FEIS Section 2.6**. These include a description of the proposed toll collection facilities to be used on the Trinity Parkway, a description of the proposed method of toll collection and payment, and an analysis of toll based traffic modeling. The toll road consideration items presented in the sections below relate to how toll charges may affect individual households, including low-income households in the project area whose yearly household income for a family of four is below the 2013 HHS poverty guidelines ($23,550). A Regional Toll Analysis was performed to evaluate the effects of the proposed expansion of the regional priced facility system in the Dallas-Fort Worth region, including potential effects on land-use, air quality, and EJ populations (see **Section 4.27**).

Comparison of Payment Methods

FEIS Section 2.6.2.2 explains the differences between the two methods of toll collection: using a prepaid toll transponder account (i.e., NTTA TollTag®) or the “drive through now, pay later” method (i.e., NTTA’s ZipCash®), where motorists accrue electronic toll charges in the form of monthly statements. 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. Cash payment options are available for each payment method; however, only those users who maintain prepaid accounts would benefit from reduced toll rates. Toll rates are 50 percent higher for drivers who do not have an electronic toll transponder to offset the costs related to processing the license plate information associated with ZipCash® (Note: “Pay by Mail” toll rates are one-third more than TxTag® rates on TxDOT toll roads in Central Texas). The toll transponder account holders would benefit from reduced toll rates compared to the total toll rates associated with ZipCash®. NTTA recently introduced a $20 Starter TollTag program designed for motorists who drive toll roads less frequently. The Starter TollTag has the benefits of a regular TollTag at a lower start-up cost that may be a more feasible prepayment amount for low-income users to establish an account.

Toll Pricing

The toll rates for the Trinity Parkway would be consistent with other toll rates in the region. The exact toll rate would be determined prior to facility opening and is subject to ongoing consideration by the NTTA. The regional toll rates, per the RTC, are 17 cents per mile in peak periods and 12.5 cents per mile during off-peak periods (NCTCOG, 2007). As a NTTA facility, the Trinity Parkway is expected to operate as a "fixed rate" facility (i.e. all vehicles would be tolled at the same rate all the time) like the rest of the NTTA road system, but the NTTA may implement flexible rates in the future. As of July 1, 2013 the fixed system-wide toll rate for NTTA facilities was set at 16.2 cents per mile traveled, and the NTTA has announced system-wide toll rate increases for 2015 (17.1 cents per mile) and 2017 (18.0 cents per mile) (NTTA, 2013b). For the following discussion, the toll rate was set at the regional average toll rate of 14.5 cents per mile for toll-tag users (TollTag®) and 21.8 cents per mile for non-toll-tag users (ZipCash®).

The potential economic effects of tolling the Trinity Parkway on individual households can be illustrated using the following scenario. For example, assume that the toll rate would be set at 14.5 cents per mile for TollTag® users and 21.8 cents per mile for non-TollTag® users, and that the average household would make 250 round-trips per year (this is the average number of work trips per year based on industry observations provided by NTTA). Under this scenario, the annual cost to use the entire 9-mile tolled section would be approximately $652 and $981 per year, respectively. A TollTag® user with an annual household income equal to the median household income of $48,942 for Dallas County (U.S. Census Bureau, 2011b) would spend approximately 1.3 percent of the household income on Trinity Parkway tolls, while a ZipCash® user would spend approximately 2.0 percent of the household income. However, households with a TollTag® and incomes at the 2013 HHS poverty level of $23,550 for a family of four would spend 2.8 percent of household income on tolls, or approximately 1.5 percent more than the average household income user. Likewise, households without a TollTag® and incomes at the 2013 HHS poverty level for a family of four would spend approximately 4.2 percent of their household income on tolls, or approximately 2.2 percent more than the average household income user, when paying within 30 days after receipt of a mailed invoice. Toll road users might decide to reduce their personal economic impact of tolls by carpooling, where tolls would be divided among many travelers.

A worst case scenario would occur when non-toll-tag user invoices are not paid within the allotted time frame (see **FEIS Section 2.6.2.2**). The following is a hypothetical worst case scenario of non-payment, with new ZipCash toll fees that were effective in mid-October, 2013. If a low-income, non-toll tag user were to delay the payment over 30 days after receipt of their first invoice for which 20 round-trips are made on the facility (with four toll gantries) at 21.8 cents per mile (invoice total approximately $79), the total charges associated with the "First Notice of Nonpayment" would be approximately $89 (this includes a $10 administrative fee). Should the customer delay payment for an additional 30 days, after the "Second Notice of Nonpayment" is issued, the amount owed would increase to approximately $114 (this includes a $25 administrative fee plus the charges associated with the "First Notice of Nonpayment"). Over the 60-day period of non-payment, a non-toll tag customer would have accumulated tolls and fees totaling approximately 2.9 percent ($114) of their average two-month income ($3,925) at the 2013 HHS poverty level for a family of four ($23,550). This worst case scenario presented above does not include the collection service fees that would be issued to the customer when a collection service overtakes the unpaid account (Note: the total charges and financial implications would vary slightly from the above scenario for TxTag® users compared to "Pay By Mail" users on a TxDOT toll road). In September 2013, the NTTA revised its billing procedures in accordance with state legislation to grant customers 90 days to pay tolls before moving to a collection agency. Previously NTTA would coordinate with customers and allow exceptions to payments after their invoices had been forwarded to a collection agency in hopes that these customers would maintain a TollTag® account. However, due to the strain on NTTA finances and customer service levels, once a customer reaches the collection agency phase, the customer will have to work directly with their assigned collection agency to resolve payments without NTTA assistance (NTTA, 2011b).

Trinity Parkway Origin-Destination Analysis

Origin-destination (O&D) data secured from the NCTCOG was used for analysis of "user impacts" of the proposed Trinity Parkway on low-income and minority populations. Studying O&D data can determine 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). Assessing "user impacts" in the form of an O&D analysis is an integral component of the environmental justice analysis for the tolling aspects of the Trinity Parkway.

As funding mechanisms for improving area roadways evolve, the trend towards tolling of facilities in this region may, through time, create “user impacts” as access to highway systems becomes an issue to the economically disadvantaged.

Traffic Survey Zones, Project Area, and Data Sources

The information associated with the O&D analysis is organized by traffic survey zones (TSZs) which are small geographic units of area that are developed as a basis for estimate of travel. TSZs may vary in size, are determined by the roadway network and homogeneity of development, and directly reflect demographic data generated by the U.S. Census Bureau. Delineated by state and/or transportation officials for tabulating traffic-related data, TSZs usually consist of one or more census blocks, block groups, or census tracts.

The NCTCOG MPA consists of 9,441 square miles encompassing 12 counties. A total of 5,252 TSZs comprise the NCTCOG MPA. Given the regional operating characteristics of Trinity Parkway, it is reasonable to assume the NCTCOG MPA contains the proposed project daily users and therefore is considered the project area.

TransCAD®, a GIS-based transportation planning software, was utilized by the NCTCOG to generate the traffic data analyzed during the O&D analysis. NCTCOG conducted a “select-link analysis” based on 2035 A.M. peak period traffic to generate O&D data associated with the proposed project. Traffic data exported directly from TransCAD® select-link matrices was correlated with U.S. Census Bureau data to provide a demographic profile of users anticipated to utilize the proposed Trinity Parkway tollroad. The data identified anticipated users and associated travel patterns related to the proposed project and identified environmental justice populations in order to assess the intensity of use by those populations.

Analysis Assumptions and Limitations

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 identifies the origins and intensity of trips based on collective socio-economic characteristics at the TSZ level for the proposed project. In other words, the O&D analysis predicts the potential users of the Trinity Parkway facility in 2035 by correlating the general socio-economic characteristics of the future users based on *Census 2010* and *American Community Survey (ACS) 2005-09* data to the intensity of use quantified by the number of trips per TSZ generated by TransCAD®. Because the Trinity Parkway is proposed to operate only as a tolled facility, only the numbers for the build-toll scenario were determined and no comparison with any other scenario (i.e., build-toll vs. build-non-toll) was necessary. NCTCOG conducted a “select link analysis” based on 2035 A.M. peak period traffic for the build-toll scenario to generate the number of trips per TSZ. The correlation of *Census 2010, ACS 2005-09,* and TransCAD® data is the best available method to identify which TSZs would originate trips anticipated to utilize the Trinity Parkway facility and the general demographics of the population associated with those TSZs. The model identifies the Trinity Parkway tolled links and these "toll links" are assigned a cost per mile for the Build 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. 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 the Trinity Parkway or similar type facilities, the O&D analysis cannot predict the specific race, ethnicity, or economic status associated with the predicted trips on tolled or non-tolled facilities.

Analysis of TSZs and Number of Trips Predicted to Utilize the Trinity Parkway in 2035

Analysis of the O&D data for TSZs is discussed below and summarized in **Table 4-10**. Of the total 5,252 TSZs located within the MPA, motorists from 3,173 TSZs are anticipated to utilize the Trinity Parkway with at least one trip per A.M. peak period. These TSZs are projected to generate 41,144 trips per A.M. peak period on the Trinity Parkway. The number of projected trips from these TSZs varied from a high of 216 trips per A.M. peak period to a low of one trip per A.M. peak period. Of the total TSZs, 2,079 TSZs would have less than one trip per A.M. peak period on the Trinity Parkway. The TSZs were color-coded and mapped based on the number of trips per A.M. peak period from each TSZ that are predicted to utilize Trinity Parkway (see **FEIS Plate 4-2 A**). Data analysis indicates that approximately 60 percent of the TSZs within the MPA are expected to have at least one trip per A.M. peak period along the Trinity Parkway.

Identification of Environmental Justice TSZs

The threshold for an environmental justice TSZ ("EJ TSZ") was defined as a TSZ with an EJ population (specifically low-income and minority populations) equal to or greater than 51 percent of the total TSZ population. This percentage indicates a majority presence of environmental justice populations for that TSZ. A total of 2,272 EJ TSZs were identified within the MPA (see **Plate 4-2 B**).

Analysis of EJ TSZs and Number of Trips Predicted to Utilize the Trinity Parkway in 2035

Analysis of the O&D data for EJ TSZs is discussed below and summarized in **Table 4-10**. Of the total 2,272 EJ TSZs within the MPA, there are 1,478 EJ TSZs anticipated to utilize the Trinity Parkway with at least one trip per A.M. peak period. These EJ TSZs are projected to generate 25,359 trips per A.M. peak period on the Trinity Parkway (61.7% of total trips). The number of projected trips from these EJ TSZs varied from a high of 196 trips per A.M. peak period to a low of one trip per A.M. peak period in 2035. Of the total EJ TSZs, 794 of the project area EJ TSZs would have less than one trip per A.M. peak period along the Trinity Parkway. The EJ TSZs predicted to utilize the Trinity Parkway facility were color-coded and mapped based on the number of trips per A.M. peak period from each EJ TSZ (**Plate 4-2 B**).

Summary Analysis Results

Table 4-10 summarizes the 2035 O&D analysis results for the Trinity Parkway. The analysis indicates that motorists from EJ TSZs would contribute approximately 61.7% of daily trips on the Trinity Parkway.

TABLE 4-10. ORIGIN-DESTINATION DATA FOR THE TRINITY PARKWAY

Traffic Survey Zone (TSZ) Type	Number of Trips
Total TSZs Anticipated to Utilize the Trinity Parkway	3,173
Total TSZ trips	41,144
Total EJ TSZs Anticipated to Utilize the Trinity Parkway	1,478
Total EJ TSZ trips	25,359
Source: NCTCOG TransCAD® data for 2035 utilization of the Trinity Parkway.	

Effects of Tolling to EJ Populations

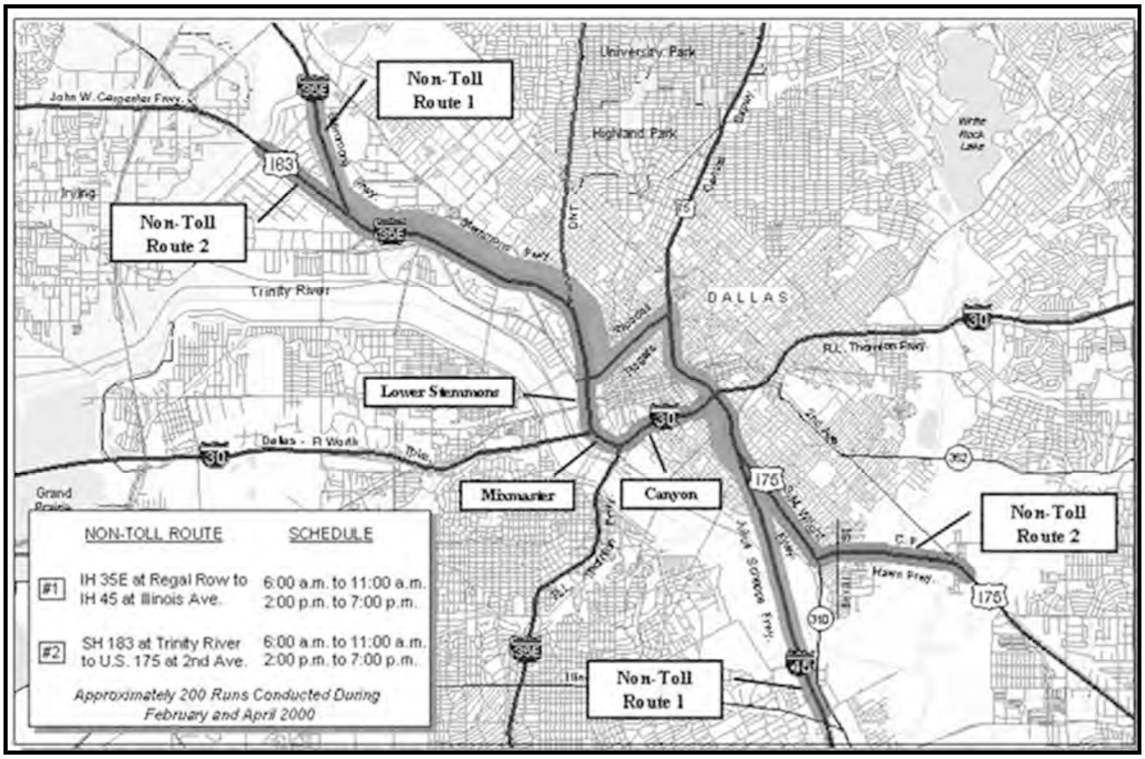
The O&D analysis indicates that EJ TSZs would contribute over one-half of the A.M. peak period trips on the Trinity Parkway. There would be an economic impact to any motorist who uses the Trinity Parkway; however, the economic impact would be higher for low-income populations because the cost of paying tolls would represent a higher percentage of household income than for non-low-income users. Additionally, the requirement to prepay for a toll tag, keep money in a deductible account, and replenish that account may be too great of a financial burden for low-income populations. However, as previously mentioned, NTTA recently introduced a $20 Starter TollTag program with all the benefits of a regular TollTag at a lower start-up cost that may be a more feasible prepayment amount for low-income users. Of the 3,173 TSZs and 1,478 EJ TSZs anticipated to have at least one trip per A.M. peak period on the Trinity Parkway, 54 low-income TSZs (1.7% of the total TSZs and 3.7% of the EJ TSZs), 1,281 minority TSZs (40.4% of the total TSZs and 86.6% of the EJ TSZs) and 143 low-income and minority TSZs (4.5% of the total TSZs and 9.7% of the EJ TSZs) had populations greater than 51 percent of the TSZ total population. The 54 low-income TSZs were predicted to generate a total of 740 trips (1.8% of the total trips and 2.9% of the total EJ population trips on the Trinity Parkway). The 1,281 minority TSZs were predicted to generate a total of 21,239 trips (51.7% of the total trips and 83.8% of the total EJ population trips on the Trinity Parkway). The 143 TSZs having a population that is predominantly both low-income and minority were predicted to have a total of 3,379 trips (8.2% of the total trips and 13.3% of the total EJ population trips on the Trinity Parkway).

Due to the greater economic burden of paying a toll, low-income motorists would likely be more reluctant to utilize the Trinity Parkway and instead use other non-tolled alternative routes. As discussed below in *Non-Toll Alternatives*, there are two existing alternative non-tolled routes on major highways that would serve the motorists traveling between the northwest and southeast Trinity Parkway project area limits. For motorists who utilize the non-tolled alternative routes, the difference in travel times would likely be highest during peak hours of travel when traffic congestion would be the greatest. As described in **FEIS Chapter 1**, the Trinity Parkway is intended to provide one component of a transportation solution to better manage traffic congestion and improve safety in the area of the Dallas CBD, particularly congestion in the IH-30/IH-35E (Mixmaster) interchange on the west edge of downtown Dallas; the depressed segment of IH-30 (Canyon) south of the CBD; and the segment of IH-35E from the Mixmaster north to the DNT (Lower Stemmons). These major roadways make up critical segments of the non-tolled alternative routes likely to be utilized by low-income motorists traveling through the project area. These congestion management improvements would benefit all motorists, including low-income motorists.

Non-Toll Alternatives

If motorists do not utilize the Trinity Parkway toll road, they can use the extensive network of toll-free roadways in the area (see **FEIS Section 3.2**). As shown in **Figure 4-1**, there are two primary alternative non-tolled routes that could be used in lieu of the Trinity Parkway. These major roadways (IH-35E, IH-30, IH-45, and US-175) connect to the same general endpoints as the proposed Trinity Parkway in the northwest and southeast portions of the project area. Motorists would not be required to venture onto frontage roads or side streets within neighboring residential and commercial areas. These alternative non-tolled routes are similar, but diverge within the Dallas CBD, where traffic flow is at a consistent congested state. An analysis performed by Wilbur Smith Associates (2000) compared travel times along the Trinity Parkway and the two non-tolled alternative routes. The analysis cited an additional travel time expenditure of 7 minutes for Non-Toll Route 1 during peak A.M. and P.M. travel times in the peak travel direction. The study also showed an additional time expenditure of 7 minutes during the A.M. and 17 minutes during the P.M. for Non-Toll Route 2 in the peak travel direction. For both non-toll alternative routes in the peak direction, travel speeds during the A.M. peak period ranged on average from 20 to 40 mph within the Dallas CBD and 40 to 60 or more mph traveling through the West and South Dallas areas. During the P.M. peak period, average travel speeds throughout the Dallas CBD in the peak direction ranged from 20 to 50 mph, with special exception to East-bound IH-30 within the CBD, where travel speeds were consistently between from 20-29 mph. P.M. peak travel speeds throughout West and South Dallas ranged from 40 to 60 mph.

FIGURE 4-1. NON-TOLL ALTERNATIVE ROUTES



Source: Wilbur Smith Associates, 2000.

Transit

Various means of public transportation are provided within the City of Dallas including the DART rail and bus services, which provide service to destinations in Dallas, Carrollton, Farmers Branch, Garland, Plano and Richardson. DART serves the elderly, school districts, and public transportation needs within the area. DART services the public, and all persons desiring transit have an equal opportunity to scheduled rides. Other services offered include the M-Line Trolley, which provides access to commuter travel in the downtown area; the Trinity Railway Express (TRE) Commuter Rail, which provides access between Dallas and the City of Fort Worth; and the National Railroad Passenger Corporation, Amtrak, which provides access to national travel.

Although there are no existing or proposed transit services along the proposed Trinity Parkway, DART's light rail Green Line virtually follows the same route. The Green Line is a 28-mile, 20-station rail line that serves Fair Park, Deep Ellum, Baylor University Medical Center, Victory Park, the Dallas Market Center, the UT Southwestern Medical District, Love Field Airport, and the cities of Farmers Branch and Carrollton. Local DART bus routes as well as the Express Bus Routes are also available for use within the proposed project area.

Because the Trinity Parkway does not currently exist, no transit service is currently provided along this route. The Build Alternative could provide a new route for buses and taxis, thus expanding the existing transit service in the project area. Should transit service be provided along the proposed Trinity Parkway in the future, the transit vehicles would not be exempt from tolling per current policy. Per an existing contract between NTTA and DART, DART would be responsible for a fixed monthly rate for utilization of the Trinity Parkway facility. If a new transit route is implemented along the proposed Trinity Parkway, it can be anticipated that over the long-term, as the regional toll network develops, the increased user cost may make transit a more competitive option.

Mitigation

FHWA Order 6640.23A states that the agency shall avoid disproportionately high and adverse impacts on minority and/or low-income populations by

> "…proposing measures to avoid, minimize, and/or mitigate disproportionately high and adverse environmental health effects and interrelated social and economic effects, and providing offsetting benefits and opportunities to enhance communities, neighborhoods, and individuals affected by the FHWA programs, policies, and activities…"

Due to the high concentration of minority and low-income populations in the project area (see **Table 4-5** and **Plate 4-1**), consideration of mitigation options is warranted. As previously described, the principal impacts of the proposed project on these populations are expected to be relocation/displacements of residences and businesses and proximity impacts (e.g., noise and visual intrusion). When it is determined that a project may have disproportionately high and adverse impacts on minority or low-income populations, mitigation and enhancement measures and potential offsetting benefits to the affected minority and/or low-income population should be taken into account. The proposed project should only be carried out if further mitigation measures or alternatives that would avoid or reduce any disproportionately high and adverse impacts are not practicable.

The No-Build Alternative would avoid the impacts of the Build Alternative, but would not provide:

- Improvement in corridor mobility;
- New points of access to neighborhoods;
- Aesthetic improvements, such as landscaping;

- Access/service roads that would facilitate improved transit; or
- Sidewalks and/or trails.

Total avoidance of project impacts to the identified minority and low-income populations in the project area would require construction of the proposed facility at a different location away from the affected population or the recommendation of a No-Build Alternative. There are no undeveloped corridors that exist in the project area in which a facility meeting the project need and purpose could be constructed without similar impacts to other minority and/or low-income populations. In addition, a location too far removed from the project area would not satisfy the need and purpose of the proposed action (see **FEIS Chapter 1**). As currently proposed, construction of the Trinity Parkway would result in displacements in commercial/industrial areas and on the edges of residential neighborhoods along the Build Alternative 3C. While the Build Alternative would result in social impacts to residents displaced and to those remaining, the impacts would likely be fewer and of less magnitude than if the facility were to be constructed at a different location.

Implementation of the recommended Build Alternative 3C would result in beneficial impacts, including:

- Improved access to some neighborhoods;
- The opportunity for improved transit;
- Possible inclusion of sidewalks and/or trails adjacent to access roads for pedestrians/bicyclists;
- Landscaping;
- Improved congestion management; and
- Economic revitalization.

The development of the proposed project Build Alternative has involved minimizing residential displacements and community cohesion impacts where feasible. In addition, during the DEIS and SDEIS process, both NTTA and the City of Dallas led public outreach efforts to involve potentially affected minority and low-income populations, share information with the public, and listen to potential issues of concern. Community concerns voiced during the public meeting process outreach activities were used to inform the public regarding the proposed project, provide an opportunity for participation in the planning process, and modify alternatives, identify impacts or issues of concern. These activities also served as a forum to obtain input concerning potential mitigation measures for the project. As part of future outreach efforts, dialog with affected low-income and minority neighborhoods would continue through the EIS process.

The NTTA/City of Dallas would provide relocation advisory assistance to any person, business, or non-profit organization displaced as a result of the acquisition of real property for public use. Those displaced would be relocated with assistance in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. More information about how this would be accomplished is provided in **FEIS Section 4.4.2** and **FEIS Appendix C**. Affordable housing programs sponsored by the City of Dallas would play a role in safe-guarding against potential development pressures to convert low-income housing to some other use.

The NTTA is committed to coordinate available programs provided by Workforce Solutions to those employees affected by the businesses potentially displaced as a result of the proposed project at the future FEIS public hearing. The NTTA will invite the Workforce Solutions Manager and staff to attend the FEIS public hearing for the proposed project to answer questions or present services information on behalf of Workforce Solutions.

The Workforce Solutions has employer services representatives in each workforce center to match the most qualified candidates with the right employers. Services provided to employers include:

- Personal attention from one of the account managers;
- Recruiting assistance/placement;
- “Work in Texas” internet-based job posting and matching system;
- Job fairs on location or in one of the workforce centers;
- Fee-based customized training to meet employer needs;
- Current labor market information; and
- Outplacement services for companies who are restructuring, downsizing, or closing operations.

Services provided by the Workforce Solutions to all job seekers include:

- Determination of eligibility to receive potential services;
- Initial registration and orientation to available information and services;
- Initial assessment of skill level, aptitude, abilities, and supportive service needs;
- Job search, placement assistance, and career counseling (as appropriate);
- Job search workshops and seminars;
- Resource room services (e.g., access to telephone, fax, copier, resource library, computer, internet, and resume assistance);
- Employment and labor market information;
- Job listings via “Work In Texas” and other on-line employment resources;
- Job referrals;

- Target occupations – required skills and earnings in those occupations;
- Eligible Training Provider System and training program information;
- Performance statistics of our local area;
- Supportive service information (e.g., child care and transportation);
- "How to" information and filing unemployment claims;
- Assistance in establishing eligibility for non-Workforce Investment Act funded training and education programs; and
- Follow-up services (as appropriate).

While it is to be expected that the redevelopment of land may create new jobs for the community that may exceed the quantity and salaries of current positions, this potential beneficial offset for the community would not lessen the need to make Workforce Solutions services available to those persons who could still lose their jobs in existing businesses. Accordingly, the types of services offered by Workforce Solutions will be presented during the future FEIS public hearing for the Trinity Parkway to raise community awareness of this resource.

Mitigation in the form of landscaping, sidewalks/trails, and aesthetic improvements would be included in the project as needed by adhering to the concepts and principles of FHWA's "Context-Sensitive Solutions" approach. The CSS approach seeks to enhance the positive values of both the local community and the natural environment. CSS provides community benefits as it seeks to:

- Incorporate feedback from the local populace affected by proposed transportation facilities;
- Encourage collaboration between neighborhoods and local, state, and federal public officials;
- Enhance not only the roadway and transit communities, but the bicycle and pedestrian communities as well;
- Assist in the development of strategies for smart growth or sustainable development;
- Encourage assessments and design of alternatives consistent with local needs; and
- Help effectively merge transportation, engineering, architectural, historical, and natural environmental systems into transportation decision-making.

CSS contributes to community, safety, and mobility and considers the total context within which a transportation improvement project will exist. It is a collaborative and interdisciplinary approach to developing and re-designing transportation facilities that fit into the physical and human environment while preserving aesthetic, historic, community, and environmental values (FHWA, 2013).

Mitigation could include aesthetic enhancements along stretches of ROW in the Trinity Parkway design. In 2009, the NTTA published the *Trinity Parkway DCM*, which provides design parameters for structures, design elements, and landscaping of the proposed project. As detailed in the DCM, design enhancements might include upgrades in the design and construction of flood separation walls, retaining walls, and security walls that improve their aesthetic appearance, including selection of wall materials, lighting, manipulation of structural design, and the use of native vegetation for the purposes of softening and enriching the wall surfaces. Examples of mainlane enhancements as presented in the *Trinity Parkway DCM* are shown in **FEIS Plate 4-3 A**. Similar improvements could be incorporated into the design of bridge structures and open areas underneath the elevated sections. It should be noted that enhancements as presented in the DCM are subject to change in final design PS&E. Such enhancements have been employed in and around the City of Dallas (e.g., President George Bush Turnpike and US-75 Central Expressway) and have generally been met with positive responses by neighboring residents.

FEIS Plates 4-3B and 4-3C show conceptual representations of the southern terminus area (US-175/SH-310) as an example of proposed enhancements to mitigate community impacts. Included are proposed landscaping improvements that include ornamental grasses and trees, large canopy trees, and vines on walls. These conceptual landscaping enhancements near the southern project terminus are included within the *Trinity Parkway DCM* described above, and are subject to change during final design PS&E. In key public outreach meetings (see **Table 4-8**), neighborhood stakeholders (which included elected officials) provided preliminary suggestions on the conceptual design of the proposed connection at US-175/SH-310 regarding pedestrian and automobile circulation, and landscaping to enhance the facility and to minimize impacts to adjacent properties.

Another mitigation measure or offsetting benefit that could directly improve conditions at these locations include the implementation of noise abatement measures (such as noise barriers), if a determination is made that such measures are effective, reasonable, and feasible (see **FEIS Section 4.16**). The final decision to construct any proposed noise barriers would be made upon completion of the public involvement process and the final design for the proposed action.

Due to the greater economic burden of paying a toll, low-income motorists would likely be more reluctant to utilize the Trinity Parkway and instead use other non-tolled alternative routes. As discussed in Non-Toll Alternatives, there are existing alternative non-tolled routes on major highways that would serve the motorists traveling between the northwest and southeast Trinity Parkway project area limits. For motorists who utilize the non-tolled alternative routes, the difference in travel times would likely be highest during peak hours of travel when traffic congestion would be the greatest. As described in **FEIS Chapter 1**, the Trinity Parkway is intended to provide one component of a transportation solution to better manage traffic congestion and improve safety in the area of the Dallas CBD, particularly congestion in the IH-30/IH-35E (Mixmaster) interchange on the west edge of downtown Dallas; the depressed segment of IH-30 (Canyon) south of the CBD; and the segment of IH-35E from the Mixmaster north to the DNT (Lower Stemmons). These major roadways make up critical segments of the non-tolled alternative routes likely to be utilized by low-income motorists traveling through the project area. These congestion management improvements would benefit all motorists, including low-income motorists.

Additionally, the network of non-tolled major roadways (IH-35E, IH-30, IH-45, and US-175) offer benefits to neighborhoods because these existing roadways connect to the same general endpoints as the proposed Trinity Parkway in the northwest and southeast portions of the project area, and would not require venturing onto frontage roads or side streets within neighboring residential and commercial areas should motorists elect not to use the proposed Trinity Parkway. It should be noted that the most southern mainlane toll gantry proposed for the Build Alternative occurs north of IH-45. This allows non-tolled movements between IH-45 and the US-175/SH-310 intersection at the south project terminus, and would minimize tolling impacts for communities near the proposed Trinity Parkway southern terminus and further removed along IH-45 and US-175. These and other offsetting benefits have been presented by NTTA in an effort to minimize, avoid, or mitigate potential environmental justice impacts.

Also, the MTP identifies regional planning efforts and outlines a number of measures that may minimize potential disproportionate impacts on low-income populations from tolled lanes. Some of these measures would require cooperation between or among various governmental entities or agencies and do not constitute current commitments, but possible solutions that may be developed further at a regional level and implemented after appropriate study and consideration. Measures may include but are not limited to:

- Improvements to non-tolled roadway facilities and alternative transportation modes;
- Increased public transit access through improved headways and/or routes;
- Increased efforts to promote ridesharing and vanpooling;
- Improvements in transportation systems management, through measures such as improved signal timing, additional left/right turn bays, and additional bus bays;
- Funding of alternative transportation infrastructure (e.g., rail transit, bicycle and pedestrian facilities); and

- Funding of non-toll projects within the current transportation plan which would add capacity to non-tolled general purpose lanes.

These are measures that would contribute to facilitating travel for low-income persons who may be unable to afford traveling on tolled lanes. **FEIS Section 4.27** contains additional discussion regarding the regional tolling analysis performed by NCTCOG to assess the significance of regional impacts and address the potential need for mitigation of the tolled components of the long-range metropolitan transportation plan. The regional tolling analysis determined that the implementation of the proposed toll/managed lane system would not result in disproportionately high and adverse impacts to EJ communities.

Finally, it should be noted that in an effort to enhance opportunities for utilization of its toll facilities, NTTA offers toll-tag registration online (in Spanish and English) and at various types of facilities located throughout City of Dallas neighborhoods. Such facilities include grocery stores, city offices, and over 150+ ACE Cash Express businesses located throughout the DFW Metroplex. The ACE Cash Express locations provide the following services: ZipCash® payments, new cash-backed TollTag® accounts, and cash TollTag® account replenishment. See **FEIS Chapter 5** for additional discussion related to EJ mitigation.

<u>Summary of Environmental Justice Considerations</u>

The proposed Build Alternative was evaluated for compliance with EO 12898 and FHWA Order 6640.23A. As discussed in the *Methodology and Approach* section above, a three-tiered approach was used to support a determination:

- Identify whether minority or low-income populations exist in the project area. The terms "minority populations" and "low-income populations" are defined in **FEIS Section 3.1.5.3**. Sources of data used included census data; anecdotal information from coordination with local officials; and public involvement.
- Identify adverse impacts that would potentially affect any minority and low-income communities of concern.
- Identify mitigation strategies for any identified adverse impacts.

As reported in the series of impact evaluations prepared for this FEIS, the project has the potential for disproportionate impacts on minority and low-income populations within the project area. With the proposed mitigation previously discussed (also see **FEIS Chapter 5**) it is anticipated that the impacts would be adequately mitigated and, therefore, would not be high or adverse. The proposed action is similarly consistent with Title VI in that there is no evidence of discriminatory intent or effect. The proposed action offers the possibility of long-term benefits to these areas and their residents. Based on the above, the analysis concludes that the Trinity Parkway can be considered consistent with the policy established in EO 12898 and FHWA Order 6640.23A.

4.3.3 Impacts to Various Community or Public Resources

4.3.3.1 No-Build Alternative

The No-Build Alternative could have adverse impacts on community and public resources within the Trinity Parkway project area. For example, increases in traffic congestion and travel delays anticipated under the No-Build Alternative could adversely affect schools, emergency services, recreational facilities, and businesses, as mobility and access within the project area worsen. School buses and emergency service vehicles could experience increasing amounts of delay.

4.3.3.2 Build Alternative

Several different types of adverse impacts to community and public resources may occur as a result of the proposed project. These impacts may include relocations or proximity impacts, such as noise, visual intrusion, or increased traffic on local arterials and residential collector streets (see **Table 4-11**). The impacts reported here are generalized and would not be uniform for all of the community or public resources specified. Impacts may be more pronounced or less pronounced depending on the proximity of each resource to a proposed alternative. Although noise levels are expected to increase near resources that are adjacent, or in close proximity to, the Build Alternative, noise levels at these resources are not expected to increase noticeably. Reasonable and feasible noise mitigation has been proposed for noise impacts (see **FEIS Section 4.16**).

TABLE 4-11. POTENTIAL IMPACTS TO COMMUNITY OR PUBLIC RESOURCES

Plate ID No.	Facility	Address	Trinity Parkway Build Alternative 3C
Police and Fire Facilities			
1	Lew Sterrett Justice Center Parking Garage	133 N. Industrial Boulevard	P (V,T)
1A	Lew Sterrett Justice Center Gas Pump Bldg.	111 W. Commerce Street	P (V,T)
4	Fire Station No. 47	7161 Envoy Court	P (V,T)
6	Dallas Police Department	8500 N. Stemmons Freeway #5040	P (V,T)
Schools/DISD Facilities			
7	DISD Storage and Maintenance Facility	3701 South Lamar Street	P (V,T)
12	H.S. Learning Center	5700 Bexar Street	P (V,T)
Places of Worship			
48	Christ's Willing Worker Baptist Church	2213 Lowery Street	P (V,T)
49	New Hope Baptist Church	5002 S. Central Expressway	P (V,T)
50	Harding Street Baptist Church	223 Harding Street	P (V,T)

Key to Terms:
R = relocation(s) anticipated at this location
P = proximity effect
V = visual intrusion
T = increased traffic expected on local streets
--- = no impacts anticipated for alternative.
Note: Plate ID numbers correspond with **Table 3-2** and **Plate 3-8** in **Chapter 3.**

As shown in **Table 4-11** above, the implementation of the Alternative 3C would result in proximity impacts to community and public resources. Such proximity impacts include visual intrusion (see **FEIS Section 4.17**) and increased traffic on adjacent streets (see **FEIS Section 4.6**). Alternative 3C would not result in the relocation of any community/public buildings. Some of these community and/or public resources may also benefit from the Build Alternative, due to improved access from the proposed major transportation facility.

4.4 RELOCATION AND DISPLACEMENT IMPACTS

This section describes the potential relocation and displacement impacts resulting from the Trinity Parkway Displacements were determined from project mapping and aerial photography with alignment overlays. Impacts were confirmed through field inspections in the project area. Demographic characteristics of neighborhoods and their corresponding census block groups are provided below in **FEIS Section 4.4.1.2**.

The NTTA/City of Dallas would provide relocation advisory assistance to any person, business, or non-profit organization displaced as a result of the acquisition of real property for public use. This would be done in accordance with the Uniform Relocation Assistance and Real Property Acquisition Polices Act of 1970, as amended (see **FEIS Section 4.4.2**).

4.4.1 Estimated Number and Description of Relocations or Displacements

4.4.1.1 No-Build Alternative

The No-Build Alternative would not result in the displacement of any existing residence, business, or other type of facility; therefore, no relocations are required with this alternative.

4.4.1.2 Build Alternative

Table 4-12 summarizes the displacement impacts of Alternative 3C on existing buildings in the project area. Impacts are characterized by potentially displaced single-family residential buildings, commercial/industrial buildings, community/public facilities, schools, places of worship, and cemeteries. No schools, community centers, places of worship (including churches, temples, mosques, and synagogues), public health care facilities, or cemeteries would be displaced by the Build Alternative. Additional details concerning impacts to community/public facilities are provided in **FEIS Section 4.3.3**. **FEIS Plates 4-4 (A-B)** show the location of anticipated building displacements for the Build Alternative. **Table C-1** in **FEIS Appendix C** provides a list of building displacements by address.

TABLE 4-12. ESTIMATED NUMBER AND DESCRIPTION OF DISPLACEMENTS

Type of Displacement	Alternative 3C
Residential Building	3
Commercial/Industrial Building [1]	27
Community/Recreation Center	--- [2]
Pump Stations/Levee Operations Office Building	---
Police and Fire Station Building	---
Public Health Care Facility	---
School	---
DISD Facility Building	---
Places of Worship	---
Cemetery	---
Total Displacements	30

Notes:
1. The number of displaced buildings/structures is shown in this table; however, the number of individual businesses displaced may be higher due to multiple tenants in some buildings.
2. **---** = no impact.

Alternative 3C would result in the displacement of three single-family residences and 27 commercial/industrial buildings. The displaced single-family residences would be from the South Dallas HOA (located along Colonial Avenue and Starks Street between Lamar Street and US-175), which contains EJ populations (see **Table 4-6** of **FEIS Section 4.2.3**). All of the displaced residential housing units represent affordable housing. According to personnel with the Dallas Housing Authority (DHA), none of these represent DHA low-income housing (e.g., tenants who qualify for federal Section 8 assistance). The 27 commercial displacements would occur in four general locations: near the southern project terminus, near the northern project terminus, at the proposed Woodall Rodgers interchange, and at the intersection of Corinth Street and Riverfront Boulevard.

Table 4-13 shows the neighborhood/neighborhood district census block groups with displacements under Alternative 3C and their respective demographic characteristics. In general, these districts and neighborhoods have demographic characteristics substantially different from the City of Dallas as a whole.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE 4-13. DEMOGRAPHIC CHARACTERISTICS OF ALTERNATIVE 3C DISPLACEMENTS BY CENSUS BLOCK GROUPS

Neighborhood or Neighborhood District	Census Tract/ Block Group(s)	Displacements				Demographic Characteristics						
		Residential Building [1]	Commercial/ Industrial Building [2]	Community/ Public Facility Buildings	Other [3]	Total Pop.	Percent White	Percent Minority [4]	Percent Elderly [5]	Median Household Income	Median Value of Owner-Occupied Housing Units [6]	Median Contract Rent [6]
Middle Stemmons/Brookhollow ND												
Trinity Industrial District	100/2	---	2	---	---	2,122	14.5	85.5	16.8	$23,702	NA	NA
Middle Stemmons/ Brookhollow ND		---	14	---	---							
Sub Total		**---**	**16**	**---**	**---**							
Lower Stemmons ND												
Design District	100/1	---	1	---	---	9,658	34.4	65.6	0.4	$80,250	NA	NA
Sub Total		**---**	**1**	**---**	**---**							
Cedars/Fair Park/East Dallas ND												
The Cedars	204/1	---	5	---	---	1,148	48.9	51.1	2.9	$62,917	NA	NA
Sub Total		**---**	**5**	**---**	**---**							
South Dallas ND												
South Dallas HOA	40/2	3	4	---	---	446	0.4	99.6	14.8	$28,750	NA	NA
South Dallas ND	40/1	---	1	---	---	636	0.8	99.2	12.1	$22,390	NA	NA
Sub Total		**3**	**5**	**---**	**---**							
Project Area Total		**3**	**27**	**---**	**---**							

Source: U.S. Census Bureau, 2010c. **Notes:** **ND** = Neighborhood District; **NA** = Not Available; **---** = No Impact

Census tracts/block groups are shown on **FEIS Plate 3-9** and neighborhoods/districts are shown on **FEIS Plate 3-10** at the end of **Chapter 3**. Displacements associated with Alternative 3C are shown on **FEIS Plate 4-4 (A-B).**

Neighborhood and district boundaries do not correspond exactly with census tracts or block groups. A rough correlation has been established so that census data can be used to provide a general description of population, income, and housing characteristics. All Census figures shown are at the block group level.

1. Displacement counts are individual single-family residential buildings.
2. Displacement counts are individual buildings/structures; however, the number of individual businesses potentially affected may be higher due to multiple tenants in some buildings.
3. This category represents schools, places of worship, and cemeteries.
4. Combined total of persons reporting Hispanic or Latino, and not Hispanic or Latino by Race (Census 2010 Table SF1, Table P9). Not Hispanic or Latino by Race includes persons reporting as Black or African American Alone, American Indian/Alaskan Native Alone, Asian Alone, Native Hawaiian and Other Pacific Islander Alone, Some Other Race Alone, or Two or More Races Alone.
5. 65-years of age or older.
6. Median Value of Owner-Occupied Housing Units and Median Contract Rent are not available in the 2010 Census at the block group level.

THIS PAGE INTENTIONALLY LEFT BLANK

4.4.2 Compliance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970

To ensure that decent, safe, and sanitary dwellings would be available to all affected residents, relocation assistance would be available to all those displaced as a result of the construction of the proposed project. Relocation assistance would be conducted in accordance with PL 96-146, the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Relocation resources would be made available to all individuals without discrimination and in accordance with the requirements of Title VI and the Department of Housing and Urban Development (HUD) Amendment Act of 1974. Special relocation considerations would be made to accommodate residents in need of additional assistance. Last Resort Housing would also be available in the event of a housing shortage or for residents who cannot find comparable housing within their means. This may involve the use of replacement housing payments that exceed the Uniform Relocation Assistance Act maximum amounts or the use of other methods of providing comparable decent, safe, and sanitary housing within a person's financial means (HUD, 2005). Similar provisions in the Uniform Relocation Assistance Act apply to all businesses displaced by the proposed action. Refer to **FEIS Chapter 5** and **FEIS Appendix C** for a more detailed discussion of the relocation assistance process.

4.4.3 Available Replacement Properties

Residential Housing

The City of Dallas administers a multitude of programs and funds directed toward the creation and maintenance of affordable housing. Throughout this discussion, the term "affordable housing" is used with reference to the standards established by the HUD based on family size and median income, which are primary factors for determining eligibility for government housing assistance programs. For example, HUD provides funding to the City of Dallas to promote partnerships with local nonprofit groups to develop affordable housing through the Community Housing Development Organization (CHDO) Program. CHDO-certified nonprofit groups are eligible to apply to the Dallas Housing Department for annual home CHDO funds that may be used to build, buy, or rehabilitate affordable housing that may be rented or sold (City of Dallas, 2013a). In addition, the Housing Department administers the Land Transfer Program, which makes tax foreclosed and surplus vacant lots available for acquisition and development by participating nonprofit groups. In conjunction with this, the Urban Land Bank Demonstration Program produces affordable single-family homes on properties that meet certain criteria (City of Dallas, 2013f).

The Dallas Housing Authority, the Dallas Mortgage Assistance Program (MAP), and the Neighborhood Investment Program (NIP) all strive to provide affordable housing and assistance throughout the city. MAP provides mortgage assistance loans to borrowers whose incomes and available assets fall below certain threshold values. Current NIP recommendations include improvements to the Ideal and Rochester Park neighborhoods adjacent to the South Dallas HOA in the South Dallas neighborhood district, as well as West Dallas, and North Oak Cliff. In December 2012, the Dallas City Council approved Low Income Housing Tax Credit (LIHTC) 2013 Qualified Allocation Plan (QAP) Community Revitalization Plans for the South Dallas – Ideal – Rochester Park area and West Dallas area (Census tract 101.02 only). This approval will continue to leverage the City's investment in these targeted low- to moderate- income NIP communities (City of Dallas, 2013g). Private developers are also actively involved in the creation or improvement of affordable housing within the project area and surrounding areas. The Dallas Area affiliate of Habitat for Humanity International (HFHI) works to provide affordable housing for those individuals who cannot be assisted by other local non-profit and lending services. Examples of HFHI homes in the project area are present in the Ideal community within the South Dallas neighborhood district, and the Bon Ton community near US-175 and Bexar Street (Habitat for Humanity – Dallas Area, 2013).

A survey of online real estate services for the DFW metropolitan area revealed an adequate supply of affordable housing available in the project area (as of November 2012). **Table 4-14** lists the number of units available (for sale and rental) in various zip codes located within, and adjacent to, the project area in a variety of price ranges. The project area zip codes are shown on **FEIS Plate 4-5**. DCAD (2013) lists the proposed market values for displacements in the South Dallas HOA ranging from $26,260 to $35,910. Within the 75215 zip code (encompassing the South Dallas HOA residential displacements), there are nine homes available for purchase at a cost between $20,000 and $40,000. As described in greater detail in **FEIS Appendix C**, should a displacee be unable to be relocated because of a lack of available comparable replacement housing, the Last Resort Housing Program (49 CFR 24) would be utilized.

TABLE 4-14. AVAILABLE HOUSING IN THE TRINITY PARKWAY PROJECT AREA

Price Range ($)	Zip Codes											
	75201	75202	75203	75207	75208	75212	75215	75216	75219	75226	75235	75247
Homes (for Sale)												
0 to 20,000	0	0	1	0	0	0	5	6	0	0	0	0
20,000 to 40,000	0	0	1	0	1	1	9	22	0	0	2	0
40,000 to 60,000	0	0	6	0	2	4	19	19	0	0	1	0
60,000 to 75,000	0	0	0	0	1	2	6	7	0	0	0	0
75,000 to 100,000	0	0	2	0	5	12	6	4	0	0	0	0
100,000 to 150,000	0	0	1	0	8	3	1	1	2	0	4	0
150,000 to 200,000	0	0	1	0	13	2	0	1	0	0	3	0
Condominiums/Town Homes (for Sale)												
0 to 20,000	0	0	0	0	0	0	0	0	0	0	0	0
20,000 to 40,000	0	0	0	0	0	0	0	0	0	0	0	0
40,000 to 60,000	0	0	0	0	0	0	0	0	6	0	0	0
60,000 to 75,000	0	0	0	0	0	0	0	0	2	0	0	0
75,000 to 100,000	0	0	0	0	0	0	0	0	15	0	2	0
100,000 to 150,000	0	9	0	0	1	0	3	0	30	2	4	0
150,000 to 200,000	1	7	0	0	2	0	1	0	37	0	0	0
Total (for Sale)	**1**	**16**	**12**	**0**	**33**	**24**	**50**	**60**	**92**	**2**	**16**	**0**
Housing for Rent												
0 to 500	0	0	0	0	0	1	0	1	0	0	0	0
500 to 700	0	0	0	0	1	0	2	5	2	0	0	0
700 to 1,000	4	1	4	0	2	2	2	1	9	0	4	0
1,000 to 1,400	5	7	2	0	5	2	1	0	15	1	1	0
1,400 to 2,000	3	8	0	2	3	1	0	0	29	1	2	0
2,000 to 5,000	22	8	0	0	5	0	0	0	58	1	0	0
5,000 to 10,000	3	0	0	0	0	0	0	0	6	0	0	0
Total (for Rent)	**37**	**24**	**6**	**2**	**16**	**6**	**3**	**7**	**119**	**3**	**7**	**0**

Source: Realtor.com, November 2012.
Notes: **N/A** = Not Available
Zip codes within and/or adjacent to the project area (shown on **FEIS Plate 4-5**) were used to identify available housing and average home characteristics.

Commercial Properties

Similarly, there is no shortage of commercial sites in the DFW metropolitan area. The City of Dallas reported an expenditure of $2.04 billion on construction activity in 2011 (City of Dallas, 2012m). Following the first quarter of 2012, Grubb & Ellis Co. reported an availability of 30.3 percent and 26.1 percent for real estate in the central business district of Dallas and the DFW suburbs, respectively. On the basis of metro area vacancy rates, Dallas ranked third in the nation with 26.3 percent (Grubb & Ellis, 2012a). Although the availability of vacant land for new business development and/or relocation is relatively limited within the project area, building vacancy in 2012 was 26.7 percent (Grubb & Ellis, 2012a) and the turnover of commercial space is typical for any major U.S. urban area.

The Fourth Quarter 2012 *Dallas Industrial Market View* published by the CB Richard Ellis Group for the DFW Metropolitan Area indicates that approximately 19.0 percent of the office market and 8.4 percent of the industrial market (e.g., warehouse, distribution, manufacturing facilities) were vacant at the time of review. According to the Grubb & Ellis Co. fourth quarter report of 2011, 10.4 percent of the warehouse sector was vacant (Grubb & Ellis, 2012b). In the third quarter of 2010, DataVest reported that 12.0 percent of the flex market (i.e., buildings accommodating to both office and other uses, such as manufacturing) was vacant (DataVest, 2010). These vacancy rates demonstrate the opportunity for displaced businesses to be relocated to comparable locations in the general area.

In addition, improved access and mobility resulting from the Build Alternative would be an incentive to future development or redevelopment within the project area and beyond. Over the long term, the project area would benefit from the Build Alternative because of improved access and mobility, managed traffic congestion, and increased safety. Due to the opportunities for business redevelopment and relocation in the area, re-employment opportunities for affected employees would likely occur in the vicinity of their current employment or at other similar business establishments. Assistance would also be available from both the public and private sectors for those who may need new employment (see **FEIS Section 4.5.2.2**).

4.5 ECONOMIC IMPACTS

4.5.1 No-Build Alternative

The No-Build Alternative would not involve construction expenditures and as a result, no benefits to employment and income would be experienced. Under the No-Build Alternative, the local and regional economies of the area are likely to continue growth trends described in **FEIS Section 3.1.5**. However, future travel delay costs associated with the existing and anticipated congestion would be borne by roadway users and businesses that are dependent on corridor roadways for employment and commerce activities. Negative economic impacts of the No-Build Alternative may include reductions in workplace productivity due to excessive congestion and higher per-mile costs for vehicles idling in traffic.

4.5.2 Build Alternative

Economic activities that may be affected by the proposed project include employment, income, housing, and taxes. The majority of impacts of the proposed project on the local economy are associated with ROW acquisition and the resulting relocations of businesses and employees (see **FEIS Section 4.4** for potential relocation and displacement impacts).

The construction and operation of the proposed project would affect both employment and income within the region. In the short term, project construction would provide direct economic benefits to the region by increasing employment and earnings in the construction industry and through economic multiplier impacts, which would provide benefits to the broader economy as well. When a major construction project is undertaken, the direct expenditures of the project “trickle down” through the economy and tend to “multiply” the economic effects beyond the original direct expenditures. In addition, by facilitating access to local areas, the proposed project could induce long-term growth in the region through an improved transportation infrastructure. Other long-term benefits could result from the operation and maintenance of the proposed project. The following subsections summarize estimated economic impacts associated with the construction of Alternative 3C at the state, regional, and local levels.

4.5.2.1 Statewide and Regional Economic Impacts

Statewide Economic Impacts

The statewide economic impacts of the Trinity Parkway can be estimated using the Texas Input/Output Model prepared by the Economic Analysis Center of the Texas Comptroller of Public Accounts (1989). This model uses statewide multipliers for final demand, employment, and income related to new road/highway construction. The construction cost multiplied by these factors produces estimates of statewide economic impacts.

Direct benefits result from purchases made for equipment, materials, and supplies needed for road/highway construction, as well as wages and salaries paid to workers engaged in the project’s construction. The total of labor and capital costs is shown as output in **Table 4-15**. Added benefits are the sum of expenditures by all interrelated sectors of the state’s economy. The total estimated statewide impacts from project construction is approximately $5.22 billion, as shown in **Table 4-15**.

TABLE 4-15. ESTIMATES OF STATEWIDE ECONOMIC IMPACTS FOR ALTERNATIVE 3C

Construction Cost Estimate (Year 2003)	Income [1]			Employment [2]			Statewide Final Demand [3]
	Direct	Added	Total	Direct	Added	Total	
$1,415,447,000	$409,347,272	$820,817,715	$1,230,164,988	38,623	37,472	76,095	$5,220,876,613

Source: Calculated using Texas Comptroller Office Employment, Income, and Final Demand Multipliers.
Notes: The model accounts for all economic activity that occurred in Texas with tables describing sales and purchases among the state's many industries, businesses and institutions.
1. Personal income includes wages, salaries, dividends, rents, and other forms of payments to persons by businesses.
2. Person-years of employment (rounded to whole numbers) over total construction period. Person-years of employment do not necessarily indicate additional total employment
3. Statewide Final Demand consists of the consuming sectors, such as households and government consumption. The final demand multiplier indicates the total effects of the change in sector output (new road/highway construction) on output from all Texas sectors.

Regional Economic Impacts

The U.S. Bureau of Economic Analysis (BEA) uses the Regional Input-Output Modeling System (RIMS II) methodology for estimating the economic impacts of a project on regional employment, earnings, and total output for the Dallas Metropolitan Division (Collin, Dallas, Delta, Denton, Ellis, Hunt, Kaufman, and Rockwall Counties). **Table 4-16** indicates that Build Alternative 3C would generate approximately $685.5 million in earnings, approximately $2.12 billion in economic output, and approximately 24,871 jobs during construction.

TABLE 4-16. ESTIMATES OF REGIONAL ECONOMIC IMPACTS

Category	Alternative 3C
Est. Construction Cost	$1,415,447,000
Less 35 percent Spent Outside Region	$495,406,450
Amount Spent in Region	$920,040,550
Est. Increase in Regional Economic Output	$2,118,209,000
Est. Increase in Regional Economic Earnings	$685,495,000
Est. Increase in Regional Employment	24,871

Source: Insight Research Corporation, 2011.
Notes: Calculated using the U.S. Bureau of Economic Analysis, RIMS II input-output multipliers (specific to the Dallas Metropolitan Division (MD). The study assumes that 35 percent of the construction costs would be spent outside of the region, thus, would not impact the regional economy. The defined economic region for this study is the Dallas MD, which includes the counties of Collin, Dallas, Delta, Denton, Ellis, Hunt, Kaufman, and Rockwall in north central Texas. The economic and employment impact findings are based on public construction expenditures only, and do not include any private sector investments or private development or redevelopment expected to occur in the immediate area. The larger the infusion of public expenditures for tollway construction, the higher the payrolls and purchases, as well as economic and employment impact results. Private investments in new development or redevelopment are likely to significantly and materially change the outcome of the economic and employment findings for the alternative.

4.5.2.2 Local Economic Impacts

The Trinity Parkway has been developed with continuous direct input from local government officials, representatives from the business community, and local residents. Throughout the project development process, it has been recognized that the Trinity Parkway would improve the local economy by managing congestion and improving safety on the major routes near and within the project area, especially along IH-35E.

Overall, economic impacts would be positive for this project. For example local businesses could initially supply much of the construction-related purchases. The proportion of economic benefit retained locally depends on capturing the sale or acquisition of local materials and labor during the construction process.

Some negative aspects of the Trinity Parkway can also be expected. While the Trinity Parkway is likely to facilitate an increase in local and regional transportation along its route, diversion of traffic flow from traditionally used routes (i.e., IH-35E) could diminish local business exposure and revenue in and around the CBD.

However, the Build Alternative would stimulate some areas with improved access and visibility, creating new opportunities for development, jobs, and revenue to local tax bases. The City of Dallas is a regional economic and cultural center and the presence of governmental offices, schools, medical facilities, neighborhoods, shopping centers, tourist attractions, major transportation facilities, and places of worship would continue to draw the regional population to and through the downtown area.

Direct Interstate connections and a major north-south reliever route, as proposed in this project, would improve the movement of people and goods throughout the City of Dallas and the north central Texas region. The available routes connecting area residents with commercial and industrial development activity in both the northern and southern parts of the city currently result in considerable delays and inconvenience for motorists.

Changes in land use would affect the local economy as a result of removing privately-owned land and improvements are removed from the tax rolls. **Table 4-17** identifies the estimated total loss in the tax base affecting all relevant taxing entities as a result of converting private land to ROW; the table also reflects the fraction (expressed as percent) by which the tax base for each taxing entity would be diminished. The estimated tax value that would be lost under Alternative 3C is approximately $54 million; and the percent loss from the tax base would be approximately 0.03 percent for Dallas County, 0.07 percent for the City of Dallas, and 0.07 percent for the DISD. The foregoing tax base loss estimates would be offset by the potential future development of undeveloped properties or property redevelopment in the project area that would increase the tax base.

TABLE 4-17. ESTIMATED LOSS TO LOCAL TAX BASE

Taxing Entity and Tax Base	Percent Loss from Tax Base
Dallas County Total Tax Base: $155.5 Billion	0.03%
City of Dallas Total Tax Base: $77.3 Billion	0.07%
DISD Total Tax Base: $74.7 Billion	0.07%
Sources: Insight Research Corporation (2011); and Dallas Central Appraisal District 2011 tax rates and base property values	

The loss of tax base reflected in **Table 4-17** would result in an annual loss of revenue to each of the taxing entities, which would vary according to the tax rates of each governmental entity. An estimate of the loss in annual tax revenues for each entity is provided in **Table 4-18** for Alternative 3C. The collective total loss of tax revenues in future years from the conversion of private land to ROW would be approximately $1.4 million per year.

TABLE 4-18. ESTIMATED IMPACTS TO ANNUAL TAX REVENUES

Taxing Entity and Tax Rate	Annual Tax Revenue Loss in 2011 Dollars (Millions)
Dallas County Tax Rate: 0.624%	$0.3 M
City of Dallas Tax Rate: 0.797%	$0.4 M
DISD Tax Rate: 1.290%	$0.7 M
Sources: Insight Research Corporation (2011); and Dallas Central Appraisal District 2011 tax rates and base property values.	

Another notable economic impact is related to the displacement of businesses and the short-term (and possibly long-term) loss of employment opportunities. Based on information obtained from Dun & Bradstreet by the City of Dallas, Office of Economic Development, Research & Information Division (January 2010), the estimated number of businesses displaced by Alternative 3C is a range of 15 to 20. These data were developed from the expected displacements of the commercial and industrial buildings shown in **Table 4-12**. The number of businesses differs from the number of building displacements as some buildings are occupied by multiple businesses and some businesses occupy a complex comprised of multiple buildings In the short-term (see **Table 4-19**), there would be some local jobs created by construction of the tollway; long term operation of the tollway would likewise generate a limited number of jobs related to facility and ROW maintenance. However, many of these businesses and associated jobs could be permanently lost if displaced businesses are unable to relocate within the same geographic area or decide for other reasons to cease operations and employees are unable to find similar work. Mitigation for job losses would be implemented through proactive use of services available from the Texas Workforce Commission (TWC) and Workforce Solutions Greater Dallas ("Workforce Solutions") for both business owners and employees. These efforts would include increasing community awareness of the Workforce Solutions' services at the future FEIS public hearing. It is expected that this approach will assist in minimizing adverse impacts to employees, as well as impacts to the local economy. Refer to **FEIS Chapter 5** for a more detailed discussion of mitigation efforts for loss of employment opportunities.

TABLE 4-19. IMPACTS TO BUSINESSES AND EMPLOYMENT

Type of Displacement	Number of Displacements
Number of Commercial or Industrial Buildings Displaced	27
Number of Businesses Displaced	15 to 20*
Sources: Table 4-12 and Insight Research Corporation (2011). **Notes:** * Based on information obtained from Dun & Bradstreet by the City of Dallas, Office of Economic Development, Research & Information Division (January 2010), the estimated number of businesses displaced by Alternative 3C would affect approximately 72 to 203 jobs.	

4.6 TRANSPORTATION IMPACTS

The Trinity Parkway is a proposed north-south reliever route that would serve as an alternate route around downtown Dallas. Currently, the major north-south route in the project area is IH-35E, located east of the proposed Trinity Parkway. Based on traffic models, if the Build Alternative is not built as currently proposed, congestion on alternative routes in this section of Dallas would continue to rise (see **FEIS Section 4.6.1.1**). The existing IH-35E is a parallel highway facility, which already operates with unacceptable levels of congestion during peak commuting periods. As previously described in **FEIS Chapter 1**, drivers would be required to tolerate more congestion and longer travel times if the Trinity Parkway is not constructed.

The information in this section is primarily based on the *Mobility 2035 – 2013 Update.* As previously described in **FEIS Section 1.6.1.1**, the MTP serves as a guide for the expenditure of state and federal transportation funds for the region through the year 2035. *Mobility 2035 – 2013 Update* was developed in accordance with the planning transportation requirements established in MAP-21, SAFETEA-LU, TEA-21, ISTEA of 1991, and the CAAA of 1990.

This section describes the impacts of the proposed action on the transportation system (see **FEIS Section 3.2**). Impacts are assessed to roads and highways, public transportation, passenger airports, freight activities, and bicycle/pedestrian facilities. Although each of these elements plays an important role in making up the overall use characteristics of the transportation system, each has unique characteristics and requirements. Impacts to traffic and public safety, as well as impacts to travel patterns and accessibility resulting from the proposed project are also accessed in the sections below.

4.6.1 Roads and Highways

Build and No-Build Alternatives

The No-Build Alternative and the Build Alternative assume that all programmed projects are completed by the year 2035. These projects include improvements to the Canyon/Mixmaster corridors (i.e., Horseshoe Project) as well as other transportation improvement projects previously described in **FEIS Section 3.2.6**. The No-Build Alternative provides a point of comparison for evaluating the impacts of constructing the Trinity Parkway. **Table 4-20** presents the existing and projected traffic volumes along with LOS characteristics for the No-Build Alternative and the recommended Build Alternative, Alternative 3C. LOS E represents traffic operation at or near capacity with varied densities (number of passenger vehicles per mile per lane) depending on the free-flow-speed. Under LOS E, vehicles are typically operating with minimum spacing and disruptions often cause queues to form.

Table 4-20 shows that the Trinity Parkway provides congestion relief benefits within the project area where traffic, mobility, and access issues are the most acute (i.e., the Canyon/Mixmaster area). There are some roadway segments where congestion would not be improved with the Build Alternative; however, congestion on the roadway segments within the distressed Canyon/Mixmaster area would generally be improved compared to the No-Build Alternative. For instance, traffic volumes on IH-35E, from the DNT to IH-30, would be reduced by 11,000 ADT; traffic volumes on IH-35E, from South R.L. Thornton Freeway to IH-45, would be reduced by 8,000 ADT; and traffic volumes through the Mixmaster on IH-30 and IH-35E at Houston/Jefferson, would be reduced by 10,000 ADT. This reduction in traffic volume would help manage congestion through the Canyon/Mixmaster area.

TABLE 4-20. EXISTING AND PROJECTED TRAFFIC VOLUMES AND LOS

Roadways	Existing Conditions (2013)		No-Build Alternative (2035)		Build Alternative (2035)	
	ADT	LOS	ADT	LOS	ADT	LOS
IH-35E						
North of SH-183	138.000	D-F	149,000	D-F	174,000	D-F
SH-183 to Dallas North Tollway	303,000	F	346,000	F	317,000	F
Dallas North Tollway to IH-30	319,000	D-F	349,000	D-F	338,000	D-F
South of IH-30	234,000	F	310,000	F	315,000	F
IH-30						
West of IH-35E (Stemmons Freeway)	167,000	F	217,000	DE	218,000	DE
IH-35E (S. RL Thornton Freeway) to IH-45	250,000	F	234,000	D-F	226,000	D-F
East of IH-45	250,000	F	269,000	F	273,000	F
Mixmaster						
IH-30 & IH-35E at Houston-Jefferson	346,000	D-F	397,000	D-F	387,000	D-F
SH-183						
West of IH-35E (Stemmons Freeway)	193,000	D-F	250,000	F	320,000	F
US-175						
East of SH-310	103,000	F	128,000	A-C	169,000	F
North of SH-310 (future SM Wright Parkway)	110,000	DE	29,000	D-F	17,000	A-C
IH-45						
North of Trinity River	104,000	D-F	135,000	DE	160,000	F
IH-345						
North of IH-30	203,000	DE	226,000	DE	223,000	DE
US-75						
North of Woodall Rodgers	279,000	F	306,000	F	311,000	F
Riverfront Boulevard						
North of Woodall Rodgers	24,000	DE	30,000	DE	22,000	A-C
Irving Boulevard						
West of Sylvan Avenue	13,000	A-C	21,000	DE	18,000	A-C
West of Westmoreland	29,000	A-C	30,000	DE	32,000	DE
Trinity Parkway						
Commonwealth to Hampton/Inwood	---	---	---	---	145,000	A-C
Hampton/Inwood to Wycliff/Sylvan	---	---	---	---	121,000	A-E*
Wycliff/Sylvan to Woodall Rodgers	---	---	---	---	127,000	A-E*
Woodall Rodgers to Houston/Jefferson	---	---	---	---	104,000	DE
Houston/Jefferson to Corinth	---	---	---	---	99,000	DE
Corinth to MLK	---	---	---	---	122,000	D-F
MLK to IH-45	---	---	---	---	128,000	DE
IH-45 to US-175	---	---	---	---	90,000	DE

Source: NCTCOG, 2013b.
Notes: **ADT** = Average Daily Traffic; **LOS** = Level of Service; **---** = None
*: Trinity Pkwy Alternative 3C North Bound LOS is A-C, South Bound LOS is DE.

Table 4-20 also shows a projected increase in traffic of 41,000 ADT on US-175, East of SH-310, compared to the No-Build Alternative. This can be attributed to the Trinity Parkway because it would provide a regionally important connecting link to US-175 at SH-310. This connection creates an attractive and more efficient way for motorists traveling to and from communities in South Dallas, southern Dallas County, and beyond to access the major roadway network within the project area and surrounding the Dallas CBD. In contrast, traffic volumes on US-175 (SM Wright Freeway) north of SH-310 would be substantially reduced. With the Trinity Parkway in-place, the major bottle neck that occurs for motorists traveling between US-175 (CF Hawn Freeway) and US-175 (SM Wright Freeway) would be substantially improved.

In order to further analyze the effects of traffic redistribution on the local transportation network, the major and minor arterials in the project area were analyzed for predicted changes in traffic volume due to the proposed Trinity Parkway. The following 14 arterials were analyzed:

- South Lamar Street
- Riverfront Boulevard
- Irving Boulevard
- Canada Drive
- Houston Street
- Jefferson Boulevard/Memorial Drive
- Corinth Street
- Sylvan Avenue
- Singleton Boulevard
- Hampton Road
- Inwood Road
- Martin L. King Boulevard
- Hatcher Street
- Malcolm X Boulevard

The individual links of each of these 14 arterials were analyzed for changes in volume between the No-Build Alternative and Build Alternative. The largest increase in volume for Alternative 3C occurred on Riverfront Boulevard with a volume increases of 23,924 vehicles. The largest decrease in volume under Alternative 3C occurred on South Lamar Street, with a volume decreases of 14,156 vehicles. A detailed table listing of the traffic volume changes for each alternative and graphic maps showing the predicted increase and decrease in traffic redistribution are presented in **Appendix I-1.** Overall, the analysis indicated the redistribution of traffic would be evenly dispersed along the local transportation network, with only a limited number of roadways experiencing a substantial increase or decrease in vehicular traffic.

4.6.1.1 Congestion

Substantial growth in area traffic volumes by the year 2035 would result in increased capacity deficiencies on the area transportation system. As shown in **Table 4-20**, although there is not a substantial change in the LOS along IH-35E, IH-30 and through the Mixmaster under the Build

Alternative, the proposed project is anticipated to better manage congestion on these roadways compared to the No-Build Alternative, as is exhibited by the decreased ADT's along these roadways under the Build Alternative due to additional capacity provided by the Trinity Parkway (see **FEIS Section 4.6.1)**. Additionally, overall congestion on the major arterial streets is anticipated to improve, due to local street and access road improvements associated with the proposed action. For example, LOS along Riverfront Boulevard is anticipated to have an improved LOS under the Build Alternative (LOS A-C) compared to the No-Build Alternative (LOS DE).

Additional TSM improvements to the local transportation system, although not sufficient by themselves to solve the congestion problem in the region, would further ease traffic congestion. TSM strategies include better access and land use management to reduce turning movement conflicts and optimizing traffic signals to accommodate changes in traffic patterns after the proposed construction of the facility. **Table 4-39** provides a summary of the various TSM improvements and additional CMP strategies (e.g., signalization/intersection improvements, pedestrian/bicycle facilities, rail transit, ITS, HOV) programmed for the Trinity Parkway project area.

4.6.1.2 Measures of Effectiveness

The NCTCOG travel modeling provides methods to measure the effectiveness to describe the existing and future performance of the roadway network throughout the project area. Measures of Effectiveness (MOEs) include the total daily VMT, total daily VHT, average travel speed (mph), congestion delay (vehicle-hours), and the percent of lane miles at LOS D, E, or F. **Table 4-21** shows MOEs for the Build Alternative and No-Build Alternative based on the *Mobility 2035 – 2013 Update* travel demand model network for a designated traffic study area of approximately 34.27 square miles.

TABLE 4-21. MEASURES OF EFFECTIVENESS

MOE [1] Parameter	Existing Condition (2013)	No-Build Alternative (2035)	Build Alternative (Alternative 3C) (2035)
	Traffic Study Area = 34.27 sq. mi		
Vehicle Miles of Travel [2]	5,636,254	7,022,833	8,075,699
Vehicle Hours of Travel [3]	174,324	237,528	249,205
Average Speed (mph) [4]	32	30	32
Lane Miles	787	846	922
Congestion Delay (vehicle-hours) [5]	41,152	68,067	63,250
Percent Lane Miles at LOS D, E or F [6]	38	47	47

Source: NCTCOG DFX Model, 2013.
Notes: **LOS** = Level of Service; **mph** = miles per hour; **sq. mi** = square miles; Based on *Mobility 2035 – 2013 Update* Travel Demand Model Network.

1. MOEs focus on the identified project needs and also provide a method to determine the degree that traffic conditions, such as congestion and mobility, could be managed or improved by the Build Alternative.
2. VMT = the total number of miles driven by all vehicles in the area on an average day.
3. Vehicle Hours of Travel (VHT) = the total time spent driving vehicles in the area on an average day.
4. Average Speed (mph) = VMT divided by the VHT.
5. Congestion Delay (vehicle hours) = hours per day of increased travel time or delay due to congestion; determines whether vehicles are experiencing substantial delays on the roadways and gauges the degree that congestion could be managed by the Build Alternative.
6. Percent Lane Miles at LOS D, E or F = percent of lane miles operating in congested conditions at LOS D, E or F.

As shown in **Table 4-21**, the total VMT would increase in 2035 for both the Build and No-Build Alternatives; and correspondingly, the VHT would also increase for both of these alternatives. Under the No-Build Alternative, vehicles would experience greater congestion delay compared to the Build Alternative, and the average speed traveled for the No-Build Alternative would be less than the average speed traveled for the Build Alternative. Accordingly, under the No-Build Alternative, traffic would move slower (average speed) and people would spend more time in their vehicles due to congestion (congestion delay), all while traveling shorter distances (VMT) compared to the Build Alternative.

The difference in average speed (mph) is slight when comparing the No-Build to the Build Alternative and would result in a non-perceptible effect to users in the traffic analysis study area. However, the purpose of the proposed facility is to manage congestion both for those who use the facility as well as for users of other streets in the corridor; therefore the Build Alternative is consistent with the purpose of the project. See **Section 4.3.2.2**, (Page 4-48) for a traffic development study that compares travel times along the Trinity Parkway and two non-toll alternatives for a better illustration of possible travel time reduction from the Build Alternative compared to the No-Build Alternative.

4.6.1.3 Anticipated Usage of the Trinity Parkway

A study was completed by the NCTCOG for the Build Alternative to determine the usage of the proposed roadway by drivers in the region. The focus of this analysis was to estimate the percentage of vehicles on the Trinity Parkway beginning or ending their journeys within the City of Dallas. To derive this data, an origin-destination analysis was completed using the DFW Regional Travel Model based on data from *Mobility 2035*. This process involves identifying the roadway links which comprise the Trinity Parkway, and then running the travel model for the A.M. peak period to determine in which local TSZ each vehicle using the roadway either began or completed their journey. Employing this method, TSZs which produce or attract trips that use the Trinity Parkway for some part of their journey were identified, analyzed, and mapped. For the purpose of this origin-destination study, the data was cross-referenced with Dallas city limits.

The results of this origin-destination analysis indicated that use of the Trinity Parkway by drivers who live, work, shop, and do business in the City of Dallas is expected to be very strong. The data indicated that 42 percent of the projected trips on the Trinity Parkway in the morning peak-hours would be made by City of Dallas residents. Additionally, 60 percent of all morning commuters on the Trinity Parkway would be driving to a job or other destination within the City of Dallas. Of the trips forecasted to use the Trinity Parkway, 50 percent would begin or end their journey in the City of Dallas. Less than 4 percent of trips on the Trinity Parkway would be to or from outside the Dallas-Fort Worth region. **Figures 4-2 and 4-3** below display the results of the origin-destination study. The density of trips per TSZ that are originating or ending their travel in Dallas are shown, along with the city limits of Dallas for reference.

FIGURE 4-2. TRINITY PARKWAY AM PEAK ORIGIN-DESTINATION ANALYSIS (YEAR 2035)

TRIP ORIGIN DENSITY

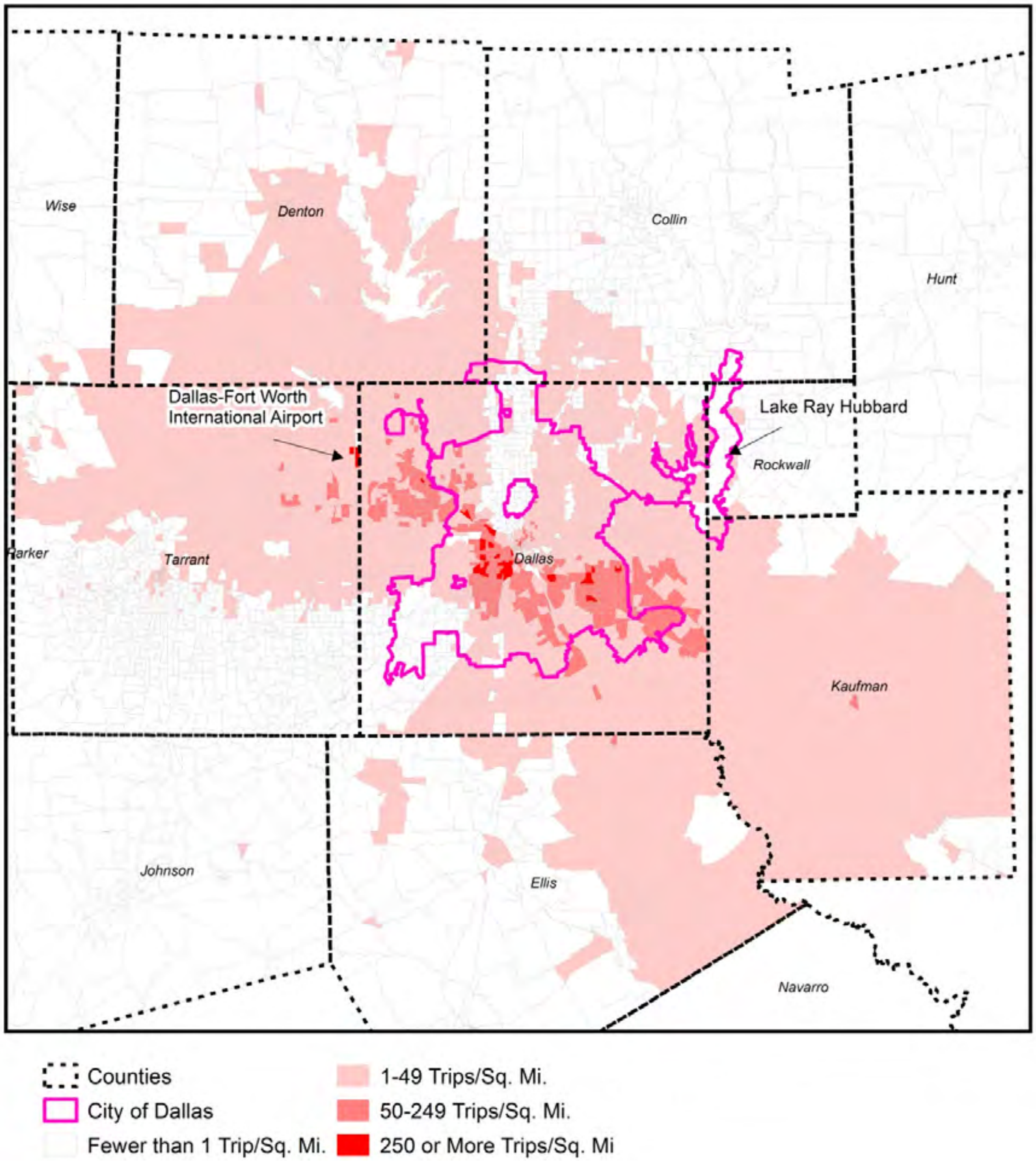
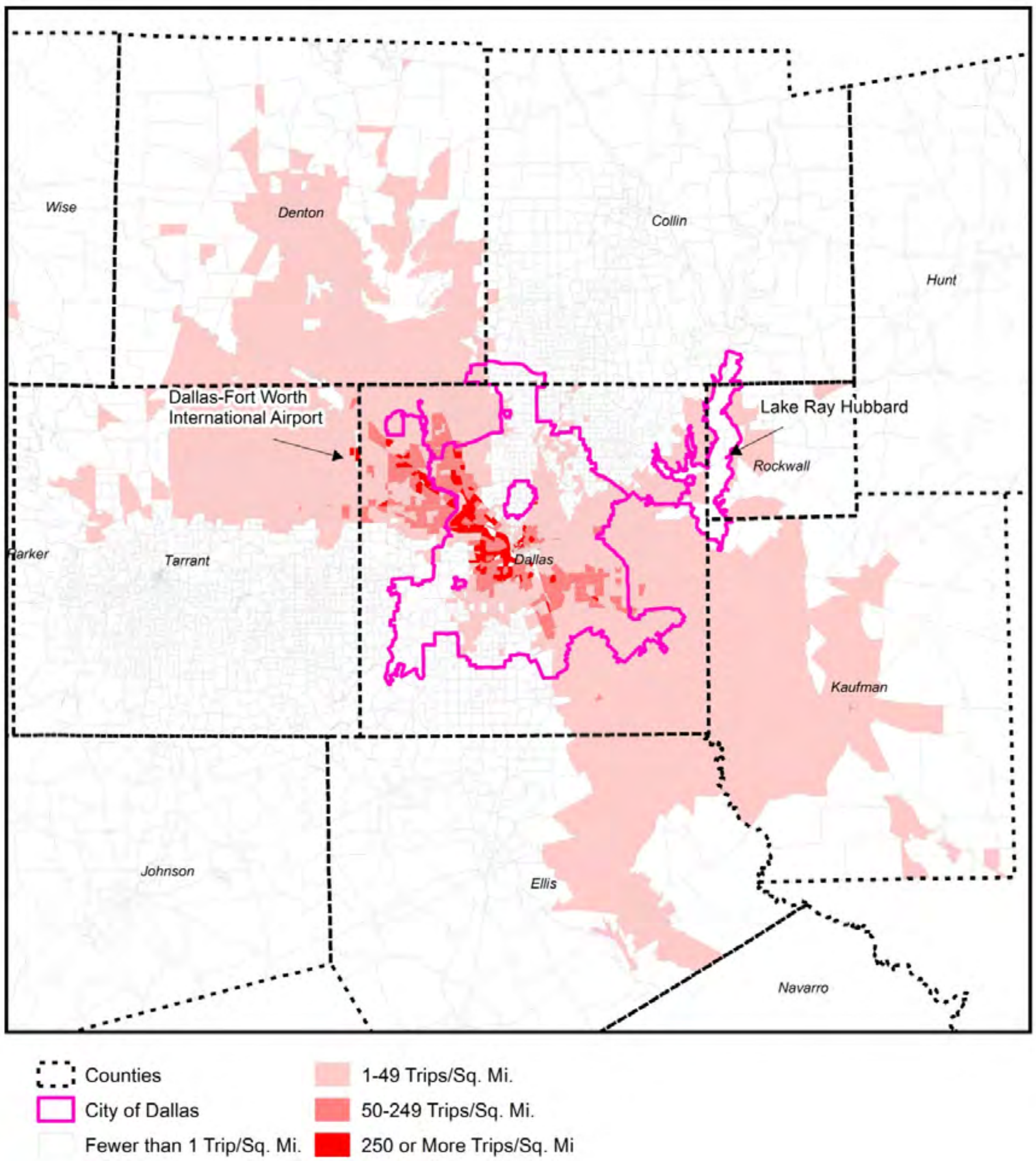


FIGURE 4-3. TRINITY PARKWAY AM PEAK ORIGIN-DESTINATION ANALYSIS (YEAR 2035) TRIP DESTINATION DENSITY



The results of this origin-destination study indicate that the Trinity Parkway would have substantial usage by both residents of the City of Dallas and other drivers destined for locations within Dallas. The corridor would provide balanced service to residents and business interests in both the City of Dallas and the surrounding region.

4.6.2 Public Transportation

4.6.2.1 No-Build Alternative

Impacts to public transportation are not anticipated from the No-Build Alternative.

4.6.2.2 Build Alternative

DART provides bus and rail transit service throughout the project area (see **FEIS Section 3.2**). In addition, Amtrak and the TRE operate passenger rail service through the project area. Taxi service is available on demand. As planned, the Trinity Parkway would cross under the DART Bridge at the south end of the project area, and bridge over the TRE line at the north end of the project area. The proposed project would not have any substantial adverse impact on DART and TRE operations or taxi service providers in the project area. The Build Alternative would manage congestion through the creation of alternative routes and additional capacity in the project area.

Because the Trinity Parkway does not currently exist, no transit service is currently provided along this route. The proposed project could provide a new route for buses and taxis, thus expanding the existing transit service in the project area. Should transit service be provided along the proposed Trinity Parkway in the future, the transit vehicles would not be exempt from tolling per current policy. Per an existing contract between the NTTA and DART, DART would be responsible for a fixed monthly rate for utilization of the Trinity Parkway facility. If a new transit route is implemented along the proposed Trinity Parkway, it can be anticipated that over the long-term, as the regional toll network develops, the increased user cost of using tolled facilities may make transit a more competitive option. However, as toll user costs are indexed to the cost of living, the relative cost to travelers using toll roads would remain approximately the same.

Low-income residents within the project area who rely on public transportation or who may be eligible for ride subsidies or "welfare-to-work" programs may also benefit from the Trinity Parkway. Access to jobs located within and outside the project area would be improved by the Build Alternative.

4.6.3 Passenger Airports

Within the project area, the majority of traffic traveling to and from both DFW International Airport and Dallas Love Field Airport do so via IH-35E. Dallas Love Field Airport, the nearest airport to the proposed project (approximately 2 miles north of the northern project terminus), is primarily accessed from the project area via the IH-35E and SH-183 intersections with Mockingbird Lane.

4.6.3.1 No-Build Alternative

Under the No-Build Alternative, travel conditions along IH-35E, SH-183, Mockingbird Lane, and other arterials commonly utilized for travel to and from DFW International and Dallas Love Field Airports would continue to experience travel conditions and operations at levels similar to existing standards. Traffic operations at Mockingbird Lane and IH-35E, as well as along other arterial roadways leading to Dallas Love Field Airport, are anticipated to worsen in the near future following the repeal of the Wright Amendment in October 2014. This repeal, which will allow carriers out of Dallas Love Field Airport to fly nonstop to any other U.S. city for the first time since the federal law limiting flights from the airport went into effect in 1980, is expected to increase the number of flights out of and the number of air passengers accessing Dallas Love Field Airport (Dallas Morning News, 2013).

4.6.3.2 Build Alternative

The enhanced mobility from the Trinity Parkway would be expected to generally improve conditions for travel to and from DFW International and Dallas Love Field Airports for those travelers accessing these airports from the southeast. As presented in **FEIS Section 2.9.1.1**, the Trinity Parkway includes areas of mainlane reconstruction and intersection improvements along both IH-35E and SH-183 at the northern terminus as to accommodate the transitioning of the proposed Trinity Parkway onto these adjacent highways. In doing so, interchange improvements at Mockingbird Lane, Empire Central Drive, and Commonwealth Drive would function to better facilitate travel in this already heavily congested area. This is particularly important at the Mockingbird Lane and IH-35E intersection, which serves as a primary route for travel to and from Dallas Love Field Airport. Such planned interchange improvements at Mockingbird Lane and IH-35E include the construction of dual-left hand turn lanes, the addition of U-turn lanes, and lane widening. Likewise, the addition of dual-left hand turn lanes and a U-turn lane are also planned at the Mockingbird Lane and SH-183 intersection. The importance of these intersection improvements is heightened given the anticipated increase in travel to and from Dallas Love Field Airport once the Wright Amendment is repealed in October 2014 (see **FEIS Section 4.6.3.1**).

4.6.4 Movement of Freight

4.6.4.1 No-Build Alternative

Travel patterns utilized by heavy trucks within the project area to transport freight to warehouse distributors, freight rail yards, air freight facilities, and other intermodal facilities would remain largely unchanged if the proposed action is not constructed. Under the No-Build Alternative, vehicular motorists (and truck drivers, should heavy trucks be permitted on the Trinity Parkway at the consensus of the FHWA, TxDOT, RTC, the NTTA, and the Dallas City Council) would not have an alternative route to utilize, which would otherwise function to reduce the number of vehicles operating on the already heavily congested major trucking routes of the project area (i.e., IH-35E, IH-30, IH-45). The increased congestion anticipated under the No-Build Alternative could influence travel times to and from intermodal facilities, affecting the timeliness of freight transport via truck, rail, and/or air. Adverse impacts to freight facilities themselves are not anticipated to result from the No-Build Alternative.

4.6.4.2 Build Alternative

The proposed project would generally improve conditions for the various types of freight traffic within the project area, as described in **FEIS Section 3.2.4**, in comparison to the No-Build Alternative. The impacts of the Build Alternative on the transport of truck freight, rail freight, intermodal freight, and air freight are discussed below.

<u>Trucking</u>

IH-35E, IH-30, IH-45, and other major roadways are heavily traveled routes for freight truck movements. IH-35E is a part of the NAFTA Superhighway from Mexico to Canada. Reduced congestion on IH-35E would allow NAFTA-related commercial truck traffic to travel more quickly and efficiently through the project area. The Trinity Parkway would offer an additional north-south corridor for trucks, which may prove particularly beneficial during peak traffic hours when the financial benefits of efficient passage through the downtown Dallas area would offset the added expense of tolls. However, the prohibition of heavy trucks (greater than two axles) is being considered for this project, which would require consensus by the FHWA, TxDOT, RTC, the NTTA, and the Dallas City Council. If heavy trucks were prohibited, truck traffic would continue to use the proposed roadway system as described by the 2035 plan in the project area.

Freight Railroads

Alternative 3C would cross existing railroad lines in the project area. At all such crossings, the Trinity Parkway mainlanes would be grade separated from the rail lines to ensure no interruption of rail service and no conflicts between trains and motor vehicles. Accordingly, Alternative 3C would not have any substantial impact on freight railroad operations through the project area.

Intermodal Facilities

The operational improvements anticipated to occur on roadways throughout the project area (see **FEIS Section 4.6.1**) under Alternative 3C would function to better facilitate the regional transfer of heavy truck cargo to and from major intermodal facilities. Such regional mobility improvements would likely occur regardless of whether heavy truck travel is allowed on the Trinity Parkway (at the consensus by the FHWA, TxDOT, RTC, the NTTA, and the Dallas City Council). This is because traffic operations on adjacent major roadways would experience congestion relief as more motorists choose to utilize the proposed Trinity Parkway as a bypass route instead of traveling on the non-tolled roadways.

Air Cargo

Major air cargo facilities in the DFW region include DFW International, Dallas Love Field, and Alliance Airports. From the IH-35E/SH-183 northern project terminus, DFW International Airport is located approximately 11 miles northwest and Dallas Love Field Airport is located approximately 2 miles north; Alliance Airport is located in Fort Worth. Given the close proximity of the proposed project to both DFW International and Dallas Love Field Airports, and that Alternative 3C includes improvements along IH-35E, SH-183, and their respective intersections with Mockingbird Lane (a primary route to Dallas Love Field Airport), it is anticipated that the proposed project would improve traffic operations to these major air cargo facilities. **FEIS Sections 2.9** and **4.6.3** provide additional details on the design improvements along IH-35E and SH-183. The improved travel conditions experienced by motorists traveling to the airport for passenger air travel would also be experienced by truck drivers traveling to the air cargo facilities at DFW International and Dallas Love Field Airports. In addition, should heavy truck travel be allowed on the Trinity Parkway (at the consensus by the FHWA, TxDOT, RTC, the NTTA, and the Dallas City Council), heavy trucks transporting cargo to all three major air cargo facilities, including Alliance Airport, would experience improved regional mobility. This would likely also be the case even if heavy trucks are prohibited from use of the Trinity Parkway, as more motorists choose to utilize the proposed project as a bypass, thereby aiding to manage congestion on adjacent roadways continuing to be utilized by heavy trucks.

4.6.5 Bicycle and Pedestrian Facilities

4.6.5.1 No-Build Alternative

Impacts to bicycle and pedestrian facilities are not anticipated from the No-Build Alternative.

4.6.5.2 Build Alternative

Schematic plans for Alternative 3C would include provisions such as 14-foot shared-use lanes, sidewalks, and a shared use path along major cross streets in the project area. The following cross streets include bicycle and pedestrian facilities (see **Plate 2-9**):

- Mockingbird Lane
- Empire Central
- IH 35E Frontage Roads
- SH 183 Frontage Roads
- Halifax/Iron Ridge
- Commonwealth
- Continental
- Corinth
- Riverfront
- Riverfront Park Access Road
- Hampton Park Access Road
- Cedar Crest

Bicycle and pedestrian facilities would be enhanced by the Trinity Parkway. Many of the proposed bicycle and pedestrian facilities in the project area are being planned and may be developed concurrently with the proposed action (see **FEIS Section 3.3.2.3**). Sections of the Trinity Parkway with adjacent access roads may also have pedestrian walkways (i.e., sidewalks) within the ROW, outside of the access road. In other areas where existing or proposed non-motorized pathways including sidewalks, shared use paths, bike lanes, buffered bike lanes, or paved shoulders would be crossed by the Trinity Parkway ROW (see **FEIS Section 3.2.5, Table 3-10**), provisions for safely connecting the walkway on either side of the facility would be considered. As previously described, some bicycle and pedestrian facilities would be constructed where necessary as a measure to mitigate impacts to neighborhoods. Additional pedestrian walkways/bicycle trails may be added to the Trinity Parkway ROW through partnerships between local sponsors and the NTTA. Any new pedestrian facilities, including pedestrian signals, would be in compliance with the Americans with Disabilities Act (ADA).

4.6.6 Traffic and Public Safety

4.6.6.1 No-Build Alternative

FEIS Section 1.4 presents an analysis of both previous and existing traffic accident data, demonstrating an increase in the number of crashes within the project area over time. By not constructing the proposed action, traffic congestion on IH-35E, IH-30, and other major roadways within the project area would continue to worsen. Increased traffic volumes lead to increased congestion, which interrupts normal traffic flow, leads to a greater number of vehicle conflicts, and tends to result in a greater number of accidents.

4.6.6.2 Build Alternative

The proposed project would have an overall beneficial impact on the level of public safety in the project area. This improvement in public safety would be attributable to the diversion from local roads of motorists who would use the new tollway because of greater convenience and faster travel time. Similarly, any reduction in peak, weekday, weekend, and holiday local and non-local auto traffic on existing area roads would have beneficial public safety implications for the local area. Management of congestion on local roads could facilitate a reduction in response time for police, fire protection, and medical services (see **FEIS Section 4.6.7.2**).

FEIS Section 1.4 presents data from TxDOT that suggests managed congestion could contribute to a decrease in traffic accidents along major roadways, such as the Canyon/Mixmaster/Lower Stemmons corridors. Safety for slow-moving vehicles (including bicycles and pedestrians) would also increase on existing roadways, as fast-moving traffic looking to bypass downtown Dallas would likely be directed to the Trinity Parkway.

4.6.7 Travel Patterns and Accessibility

4.6.7.1 No-Build Alternative

Travel patterns within the project area would remain largely unchanged if the proposed action is not constructed. This would result in a continuation of vehicular travel delays and access constraints that currently characterize the project area. Under the No-Build Alternative, the insufficient and underdeveloped transportation network within the project area would continue to pose mobility and access constraints. The adverse effect of impaired mobility in the project area would continue to be felt mainly by residents, commercial establishments, and other interests in the form of increased commute time and other costs of congestion. The lack of accessibility to key public facilities and centers of economic activity negatively affects interests located for the most part outside of the project area. This includes residents and commercial transporters trying to get to and from major regional transportation facilities, such as Dallas Love Field Airport and DFW International Airport; major tourist and visitor destinations, such as the Victory Development, Dallas Arts District, and Dallas Convention Center; and major business and employment centers throughout the DFW metropolitan area. Additionally, the No-Build Alternative fails to address congestion and safety concerns (see **FEIS Section 4.6.6**), resulting in a negative impact on regional communities and a negative impact on IH-35E's ability to function efficiently as a national and international trade corridor.

4.6.7.2 Build Alternative

The Build Alternative offers improvements to travel patterns and accessibility within the project area. As an alternate route to IH-35E, especially in the more congested areas, the Trinity Parkway would present an attractive option for regional travel. Access to regional destinations would be improved by the proposed project. Many of the vehicle trips bound for regional destinations that currently rely on IH-35E and other local roadways would have a convenient alternative in the Trinity Parkway, especially those trips that originate from the Dallas CBD and the communities, towns, and cities located south of the downtown area. Also, access to major employment centers in the project area would be improved by the Trinity Parkway.

Build Alternative 3C would cross numerous existing roadways. The highway design incorporates some form of connection or interchange on most of these intersections to provide uninterrupted service on existing roadways. Of the relatively smaller roadways that are not provided with bridges or interchanges, connections are provided via access roads in order to maintain property access.

Finally, the Trinity Parkway would improve access for emergency vehicles responding to calls within the project area. In some instances, the new roadway would provide access into and out of the project area with a more direct and rapid route for emergency vehicles (see **FEIS Figure 2-10** and **Table 2-6** for interchange access locations). In addition, NTTA policies permit the toll-free use of toll lanes by emergency vehicles in emergencies.

4.7 CULTURAL RESOURCES AND PARKLANDS

The following sections describe the potential impacts to cultural resources and parklands identified in **FEIS Chapter 3**. Potential impacts to cultural resources (archeological and historic architectural) are described in **Sections 4.7.1** and **4.7.2**. Potential impacts to parks/recreational areas are described in **Section 4.7.3.** For cultural resources, tribal coordination by the FHWA occurred in August and September of 2002, and again by FHWA and TxDOT as appropriate in January 2010 (see **FEIS Appendix B**). This evaluation of impacts focuses on those archeological and historic architectural resources currently listed in, or eligible for, the NRHP.

4.7.1 Impacts to Archeological Resources

4.7.1.1 No-Build Alternative

The No-Build Alternative would have no impacts on significant prehistoric and/or historic archeological resources.

4.7.1.2 Build Alternative

An assessment has been conducted to identify archeological resources within the established APE for the Build Alternative (see APE discussion in **Section 3.3.1.2**). Research has centered upon the identification of prehistoric and historic archeological sites and assessing their eligibility for listing in the NRHP. Pursuant to the PA-TU, TxDOT determined in January 2010, with concurrence from the SHPO, that the original APE does not contain archeological historic properties (36 CFR 800.16(l)), and thus the proposed undertaking would not affect significant archeological resources (see **FEIS Appendix B**).

Based on the results of previous investigations and the amount of disturbances throughout the portion of the APE that was expanded in 2013 to address the merging/transition of the proposed project with IH-35E and SH-183 (see **Section 3.3.1.3**), there is a very low probability of encountering intact archeological historic properties in this area and no further work is warranted.

4.7.2 Impacts to Historic Architectural Properties

This section identifies historic architectural resources (e.g., buildings, structures, objects, districts) that are listed in, or eligible for listing in, the NRHP. Impacts to historic architectural resources can be classified as either direct or indirect, depending on the proximity of the proposed action. A direct impact is defined as a direct taking in which the proposed ROW would include all of an existing building and/or site or any portion of its associated land. An indirect impact, such as noise or visual intrusion, may occur to buildings and/or sites situated beyond the ROW, but within the defined APE. Efforts to avoid or minimize such impacts were undertaken during the planning stages for the proposed project. Consultation with the SHPO to determine effects under Section 106 was completed on March 26, 2013, for all properties that are listed or have been determined eligible for listing in the NRHP (see **FEIS Appendix B**).

4.7.2.1 No-Build Alternative

Impacts to historic architectural resources are not anticipated as a result of the No-Build Alternative.

4.7.2.2 Build Alternative

Impacts to Historic Infrastructure Properties

As outlined in **Section 3.3.1.4**, the Dallas Floodway system in the project area was determined by the FHWA with SHPO concurrence to be eligible for listing in the NRHP. The Dallas Floodway was evaluated in terms of its physical relationship to Alternative 3C. The location of this resource is shown on **Plate 3-15 (FEIS Chapter 3)** and **Plates 4-6 (A-B)** at the end of this chapter.

While Alternative 3C would be constructed in part within the Dallas Floodway, measures have been taken to avoid and minimize harm to the floodway resources and to comply with applicable regulatory conditions (see **FEIS Section 4.14**). Consequently, Alternative 3C would result in no adverse effect to the Dallas Floodway.

Impacts to Historic Districts and Bridges

The historic districts and bridges in the project area have been evaluated in terms of their physical relationship to Alternative 3C. The locations of these resources are shown on **Plate 3-15 (FEIS Chapter 3)** and **Plates 4-6 (A-B)** at the end of this chapter. The expected physical relationships are summarized at the outset of this discussion in **Table 4-22**, which is followed by a brief description of the effects of Alternative 3C on each historic district or bridge. There are two rows of information for all of the bridges in **Table 4-22**; the upper row indicates whether Alternative 3C would pass over, under, or through the bridge, and the lower row indicates whether Alternative 3C would connect with the bridge and result in a partial reconstruction.

TABLE 4-22. IMPACTS TO HISTORIC DISTRICTS AND BRIDGES

Plate ID Nos.[1]	Resource	Effects	Alternative 3C Relationship
DISTRICTS AND BRIDGES LISTED IN THE NRHP			
1	Colonial Hill Historic District	No adverse effect	1,000 feet to the southwest
16	Dealey Plaza Historic District	No adverse effect	Over 1,000 feet to the west
17	West End Historic District	No adverse effect	930 feet to the west
18	Lake Cliff Historic District	No adverse effect	1,195 feet or further to the north
2	Houston Street Viaduct	No adverse effect	Parkway under No connection
DISTRICTS AND BRIDGES ELIGIBLE FOR THE NRHP			
3	UP RR Bridge	No adverse effect	Parkway under No connection
4	Corinth Street Viaduct	No adverse effect	Parkway under No connection
5	AT&SF RR Bridge	No adverse effect	Parkway through[2] No connection
6	MKT RR Bridge	No adverse effect	600 feet to the east No connection
7	Continental Avenue Viaduct	**Adverse effect**	Parkway under Ramp connection
8	Commerce Street Viaduct	No adverse effect	Parkway under No connection
15	Corinth Street Overpass	No adverse effect	700 feet to the south No connection

Notes:
1. Plate ID Numbers correspond to the locations shown on **Plates 4-6 (A-B)**.
2. See the below discussion on the AT&SF Railroad Bridge for explanation of the effect determination.

Colonial Hill Historic District

Alternative 3C would be located approximately 1,000 feet southwest of the Colonial Hill Historic District (**FEIS Plate 4-6 (A-B)**, ID# 1). No taking of land or structures would occur. Alternative 3C would not impact integrity of location, design, setting, materials, workmanship, feeling, or association and thus would have no adverse effect on the district.

West End Historic District

Alternative 3C would be located at least 930 feet or more to the west of the West End Historic District (**FEIS Plate 4-6 (A-B)**, ID# 17). In addition, Alternative 3C would be separated from the historic district by Stemmons Freeway (IH-35E). No contributing features of the resource would be impacted, resulting in no loss of integrity of location, design, setting, materials, workmanship, feeling or association. Alternative 3C would have no adverse effect on the district.

Dealey Plaza Historic District

Alternative 3C would be located over 1,000 feet to the west of Dealey Plaza Historic District (**FEIS Plate 4-6 (A-B)**, ID# 16). In addition, Alternative 3C would be separated from the historic district by Stemmons Freeway (IH-35E). No contributing features of the resource would be impacted, resulting in no loss of integrity of location, design, setting, materials, workmanship, feeling or association. Alternative 3C would have no adverse effect on the district.

Lake Cliff Historic District

Alternative 3C would be located approximately 1,195 feet or further to the north of the Lake Cliff Historic District (**FEIS Plate 4-6 (A-B)**, ID# 18). No contributing features of the resource would be impacted, resulting in no loss of integrity of location, design, setting, materials, workmanship, feeling or association. Alternative 3C would have no adverse effect on the district.

Houston Street Viaduct

Alternative 3C mainlanes would pass under the Houston Street Viaduct inside the floodway (**FEIS Plate 4-6 (A-B)**, ID# 2). Re-grading would occur around the base of the supports associated with three of the bridge's distinctive arches (out of 51, 79.5-foot arches). A flood separation wall with a height of approximately 18 feet would be located on the river side of the tollway and would pass under the viaduct with no physical connection. A future bridge planned to replace the existing Jefferson Street Bridge that is being processed separately from the proposed Trinity Parkway project would provide other ramp connections that would pass under the Houston Street Viaduct. The Build Alternative would not significantly impact any contributing feature of the bridge and would not result in a loss of integrity of location, design, setting, materials, workmanship, feeling or association. The proposed alignment would have no adverse effect on the bridge.

UP Railroad Bridge

Alternative 3C mainlanes would pass under the UP Railroad Bridge inside the floodway (**FEIS Plate 4-6 (A-B)**, ID# 3). Roadway embankment for the mainlanes would fill around a portion of four bridge piers (out of 31 total piers) up to a height of approximately 10 feet on average from the floodway floor. The existing exposed pier height typically ranges from approximately 25 to 30 feet. A flood separation wall with a height of approximately 18 feet would be located on the river side of the tollway and would pass under the railroad bridge with no physical connection. The Build Alternative would not significantly affect the property's integrity of location, design, setting, materials, workmanship, feeling or association and would have no adverse effect.

Corinth Street Viaduct

Alternative 3C mainlanes would pass under the Corinth Street Viaduct inside the floodway (**FEIS Plate 4-6 (A-B)**, ID# 4). Roadway embankment for the mainlanes would fill around a portion of eight bridge piers (out of 88 total piers inside the floodway) up to heights ranging from approximately 5 to 10 feet from the floodway floor. The existing exposed pier height is typically 25 feet. A flood separation wall with a height of approximately 18 feet would be located on the river side of the tollway and would pass under the viaduct with no physical connection. Access to Corinth Street would be provided by an extension of Riverfront (Industrial) Boulevard to the east of the viaduct. The Build Alternative would not significantly impact the property's integrity of location, design, setting, materials, workmanship, feeling or association and would have no adverse effect.

AT&SF Railroad Bridge

In order for Alternative 3C to avoid the Corinth Street viaduct immediately to the northwest, approximately 350 feet of the north timber trestle approach span to the AT&SF Railroad Bridge would be removed (**FEIS Plate 4-6 (A-B)**, ID# 5). This same section of the approach would be removed for proposed floodway improvements by the USACE, and the City of Dallas proposes to remove minor sections of wood trestle for safety concerns as part of the Santa Fe Trestle Trail project. Although removal of some of the timber trestle would physically impact the bridge, it is no longer in use and has already been disconnected from the tracks at the south end. Sufficient timber trestle would remain for the bridge to convey its engineering features and significance, as the primary span supporting the steel through-truss over the Trinity River would not be impacted. As such, the Build Alternative would not significantly impact the bridge's integrity of location, design, setting, materials, workmanship, feeling or association and would have no adverse effect.

MKT Railroad Bridge

Alternative 3C would be approximately 600 feet or more to the east of the MKT Railroad Bridge (**FEIS Plate 4-6 (A-B)**, ID# 6). The Build Alternative would not impact the integrity of location, design, setting, materials, workmanship, feeling or association. The Build Alternative would have no adverse effect on the property.

Continental Avenue Viaduct

Alternative 3C mainlanes would pass under the Continental Avenue Viaduct inside the floodway (**FEIS Plate 4-6 (A-B)**, ID# 7). Approximately 195 linear feet of the viaduct's approach spans on the landside of the east levee would be reconstructed. The bridge section would be replaced with larger spans to allow connecting ramps to the Woodall Rodgers Freeway to pass under the bridge on the land side of the east levee (see photo below). Ramps to and from the mainlanes would connect to the new bridge section on the land side of the east levee. Roadway embankment for the mainlanes would fill around a portion of 10 bridge piers (out of 74 total piers inside the floodway) up to a height of approximately 10 feet from the existing floodway floor. The existing exposed pier height is typically 40 feet. A flood separation wall with a height of approximately 18 feet would be located on the river side of the mainlanes and would pass under the viaduct with no physical connection. The Build Alternative would impact the integrity of design, materials, and workmanship of the Continental Avenue Viaduct, resulting in an adverse effect on the viaduct.

View of the section of the Continental Avenue viaduct that would be reconstructed for Alternative 3C (*Source: Microsoft Bing, accessed February 10, 2011*).

Commerce Street Viaduct

Alternative 3C mainlanes would pass under the Commerce Street Viaduct within the floodway without ramp connections to the viaduct (**FEIS Plate 4-6 (A-B)**, ID# 8). Roadway embankment for the mainlanes would fill around a portion of eight bridge piers (out of 66 total piers) up to a height of approximately 10 feet on average from the existing floodway floor. The existing exposed pier height is typically 28 feet. A flood separation wall with a height of approximately 18 feet would be located on the river side of the mainlanes and would pass under the viaduct with no physical connection. The Build Alternative would not significantly impact the integrity of location, design, setting, materials, workmanship, feeling or association. The proposed alignment would have no adverse effect.

Corinth Street Overpass

Alternative 3C would be located approximately 700 feet or further to the south of the property at Corinth Street Overpass (**FEIS Plate 4-6 (A-B)**, ID# 15). No contributing features of the resource would be impacted, resulting in no loss of integrity of location, design, setting, materials, workmanship, feeling or association. The proposed alignment would have no adverse effect on the property.

Impacts to Properties with Historic Buildings

As outlined in **Section 3.3.1.4**, archival research and field surveys conducted by architectural and historical specialists identified 12 properties with historic buildings that have been determined by TxDOT with SHPO concurrence to be eligible for listing in the NRHP. Each of these structures has been evaluated in terms of potential building displacement (direct impact) by Alternative 3C, and the results are summarized in **Table 4-23**. The location of each property containing historic buildings is shown on **FEIS Plates 4-6 (A-B)** at the end of this chapter.

TABLE 4-23. POTENTIALLY DISPLACED PROPERTIES WITH HISTORIC BUILDINGS

Plate ID No.	Location	Building Type	NRHP Status	Build Alternative (Yes/No)
9	2255 Irving Boulevard - City/County Levee Operations	Public Utility-Pump Station B	Eligible[1]	No
10	3701 South Lamar - DISD Storage and Maintenance Facility	Institutional	Eligible[2]	No (1.98 acres from property)
11	1715 Market Center - Pettigrew Associates	Commercial	Eligible[1]	No
12	1202 North Riverfront (Industrial) - ACF Corp.	Commercial	Eligible[1]	No
14	1212 South Riverfront (Industrial) - Oak Cliff Box Co.	Commercial	Eligible[1]	No
CA-2	7138 Envoy Court (Salinas International Freight Building)	Commercial	Eligible[3]	No
DT-8	207 S. Houston Street (Terminal Annex Building)	Commercial	Eligible[1]	No
ES-1 (ES-1A, -1B, and -1C	818 Singleton Boulevard (Atlas Metal Works)	Commercial	Eligible[1]	No
IN-47	959 Dragon Street (Clifton Carpets)	Commercial	Eligible[3]	No
MK-2 (MK-2C and -2D)	1000 Forest Avenue (Faubion Industries)	Commercial	Eligible[4]	No
OC-5A	911 N. Lancaster Avenue (Apartments)	Commercial	Eligible[1]	No
WT-3A	613 Canada Drive at the Dallas Floodway west levee (Pavaho Pump Station)	Public Utility-Pump Station	Eligible[5]	No

Notes:
1. Eligible under Criterion C, Architecture, at the level of local significance.
2. Eligible under Criterion A, Community Development, and Criterion C, Architecture, at the level of local significance.
3. Eligible under Criterion A, Commerce, and Criterion C, Architecture, at the level of local significance.
4. Eligible under Criterion B, Significant Person Association, at the level of local significance.
5. Eligible under Criterion A, Local Planning and Development and Criterion C, Design and Construction, at the local level of significance.

2255 Irving Boulevard

Alternative 3C would be located approximately 135 feet to the southwest of the pump station and would be screened from the building by the east levee at 2255 Irving Boulevard (**FEIS Plate 4-6 (A-B)**, ID# 9). The Build Alternative would not affect the property's integrity of location, design, setting, materials, workmanship, feeling or association and would have no adverse effect.

3701 South Lamar Street

Alternative 3C would take approximately 1.98 acres of land from the southeast corner of the property (7 percent of the total area) at 3701 South Lamar Street (**FEIS Plate 4-6 (A-B)**, ID# 10).

No contributing features of the resource would be impacted, resulting in no loss of integrity of location, design, setting, materials, workmanship, feeling or association. The proposed alignment would have no adverse effect on the property.

1715 Market Center Boulevard

Alternative 3C proposed ROW would be located approximately 1,600 feet from the property at 1715 Market Center Boulevard (**FEIS Plate 4-6 (A-B)**, ID# 11). No contributing features of the resource would be impacted, resulting in no loss of integrity of location, design, materials, workmanship, setting, feeling or association. The proposed alignment would have no adverse effect on the property.

1202 North Riverfront (Industrial) Boulevard

Alternative 3C proposed ROW would be located approximately 1,580 feet away from the property at 1202 North Riverfront (Industrial) Boulevard (**FEIS Plate 4-6 (A-B)**, ID# 12). No contributing features of the resource would be impacted, resulting in no loss of integrity of location, design, materials, workmanship, setting, feeling or association. The proposed alignment would have no adverse effect on the property.

1212 South Riverfront (Industrial) Boulevard

Alternative 3C proposed ROW would be located approximately 900 feet away from the property at 1212 South Riverfront (Industrial) Boulevard (**FEIS Plate 4-6 (A-B)**, ID# 14). No contributing features of the resource would be impacted, resulting in no loss of integrity of location, design, materials, workmanship, setting, feeling or association. The proposed alignment would have no adverse effect on the property.

7138 Envoy Court

Alternative 3C would be located approximately 287 feet or further to the northeast of the property at 7138 Envoy Court (**FEIS Plate 4-6 (A-B)**, ID# CA-2). No contributing features of the resource would be impacted, resulting in no loss of integrity of location, design, setting, materials, workmanship, feeling or association. The proposed alignment would have no adverse effect on the property.

207 South Houston Street

Alternative 3C would be located approximately 1,350 feet or further to the west of the Terminal Annex building at 207 South Houston Street (**FEIS Plate 4-6 (A-B)**, ID# DT-8), and would be separated from the historic property by Stemmons Freeway (IH-35E). No contributing features of the resource would be impacted, resulting in no loss of integrity of location, design, setting, materials, workmanship, feeling or association. The proposed alignment would have no adverse effect on the property.

818 Singleton Boulevard - Atlas Metal Works

Alternative 3C would be located approximately one-half mile or further to the northeast of the Atlas Metal Works complex **(FEIS Plate 4-6 (A-B)**, ID# ES-1 [ES-1A, -1B, and -1C]). No contributing features of the resource would be impacted, resulting in no loss of integrity of location, design, setting, materials, workmanship, feeling or association. The proposed alignment would have no adverse effect on the property.

959 Dragon Street

Alternative 3C would be located approximately 182 feet or further to the southwest of the building at 959 Dragon Street (**FEIS Plate 4-6 (A-B)**, ID# IN-47). No contributing features of the resource would be impacted, resulting in no loss of integrity of location, design, setting, materials, workmanship, feeling or association. The proposed alignment would have no adverse effect on the property.

1000 Forest Avenue

The proposed Alternative 3C alignment would be inside of a new USACE levee (DFE Lamar Levee) proposed adjacent to the Faubion Industries property at 1000 Forest Avenue (**FEIS Plate 4-6 (A-B)**, ID# MK-2 [MK-2C and -2D]). No contributing features of the property would be impacted, resulting in no loss of integrity of location, design, materials, workmanship, feeling or association (setting had already been compromised due to non-contributing additions to the property and is thus not considered a contributing aspect of integrity). The proposed alignment would have no adverse effect on the property.

911 North Lancaster Avenue

Alternative 3C would be located approximately 965 feet or further to the north of the property at 911 North Lancaster Avenue (**FEIS Plate 4-6 (A-B)**, ID# OC-5A). No contributing features of the resource would be impacted, resulting in no loss of integrity of location, design, setting, materials, workmanship, feeling or association. The proposed alignment would have no adverse effect on the property.

613 Canada Drive at the Dallas Floodway West Levee (Pavaho Pump Station)

The proposed Alternative 3C alignment would be over 2,200 feet to the north of the property at 613 Canada Drive at the Dallas Floodway West Levee (**FEIS Plate 4-6 (A-B)**, ID# WT-3A). No contributing features of the property would be impacted, resulting in no loss of integrity of location, design, setting, materials, workmanship, feeling or association. The proposed alignment would have no adverse effect on the property.

Summary of Effects

Alternative 3C would have no adverse effect on the integrity of location, design, setting, materials, workmanship, feeling or association of 24 of the 25 listed or eligible historic properties and districts located in the project APE. However, Alternative 3C would impact the integrity of design, materials, and workmanship of the Continental Avenue Viaduct, resulting in an adverse effect on a historic property in the APE under Section 106. A summary table of effects is presented in **Table 4-24**.

TABLE 4-24. SUMMARY OF EFFECTS

Map ID	Historic Property	Alternative 3C
1	Colonial Hill Historic District	No Adverse Effect
2	Houston Street Viaduct	No Adverse Effect
3	UPRR Bridge	No Adverse Effect
4	Corinth Street Viaduct	No Adverse Effect
5	AT&SF Railroad Bridge	No Adverse Effect
6	MKT Railroad Bridge	No Adverse Effect
7	Continental Avenue Viaduct	**Adverse Effect**
8	Commerce Street Viaduct	No Adverse Effect
9	2255 Irving Boulevard (City and County Levee Operations Pump Station B)	No Adverse Effect
10	3701 S. Lamar Street (Former Procter & Gamble Manufacturing Facility)	No Adverse Effect
11	1715 Market Center Boulevard (Shipping/Warehouse Facility)	No Adverse Effect
12	1202 N. Riverfront (Industrial) Boulevard (Shipping/Warehouse Facility)	No Adverse Effect
14	1212 S. Riverfront (Industrial) Boulevard (Oak Cliff Box Company Office Building)	No Adverse Effect
15	Corinth Street Overpass	No Adverse Effect
16	Dealey Plaza Historic District	No Adverse Effect
17	West End Historic District	No Adverse Effect
18	Lake Cliff Historic District	No Adverse Effect
CA-2	7138 Envoy Court (Salinas International Freight Building)	No Adverse Effect
DT-8	207 S. Houston Street (Terminal Annex Building)	No Adverse Effect
ES-1 (ES-1A, -1B, and -1C)	818 Singleton Boulevard (Atlas Metal Works)	No Adverse Effect
IN-47	959 Dragon Street (Clifton Carpets)	No Adverse Effect
MK-2 (MK-2C and -2D)	1000 Forest Avenue (Faubion Industries)	No Adverse Effect
OC-5A	911 N. Lancaster Avenue (Apartments)	No Adverse Effect
WT-3A	613 Canada Drive at the Dallas Floodway west levee (Pavaho Pump Station)	No Adverse Effect
DF	Dallas Floodway	No Adverse Effect

A discussion concerning potential mitigation measures for the adverse effect of Alternative 3C on the Continental Avenue Viaduct is presented in **FEIS Chapter 5**.

4.7.3 Impacts to Parks and Recreational Areas

This section describes the potential impacts to parks and recreational areas (existing and/or planned) identified in **FEIS Section 3.3.2.** The properties included in this FEIS were evaluated in the context of their surrounding neighborhoods and adjacent properties; access routes between the facilities and their users; ownership and/or jurisdiction; proximity of the proposed alignment; and associated impacts. See **FEIS Section 4.10** for a discussion concerning the applicability of Section 4(f) to these resources.

4.7.3.1 No-Build Alternative

Under the No-Build Alternative, the FHWA/TxDOT/NTTA would not continue to participate in cooperative planning for the Dallas Floodway and adjacent areas (i.e., Great Trinity Forest Park). The USACE/City of Dallas' plans for parks and recreational areas within the project area would not be affected by this alternative. The No-Build Alternative would not prohibit the USACE/City of Dallas' planned development of parkland within the Dallas Floodway or other areas; therefore, no impact would occur and no mitigation would be required.

Although the No-Build Alternative would avoid direct impacts to parks/recreational areas, potential coordinated development opportunities that would have been possible with the Build Alternative would be lost. The No-Build Alternative would contribute to increased traffic congestion as well as both human and air quality impacts. Traffic volume and congestion would continue to increase on the existing roadway network, possibly contributing to traffic congestion to and from parks and recreational areas, as well as less than ideal bicycle and pedestrian use of trail systems.

4.7.3.2 Build Alternative

FEIS Section 3.3.2.2 and **Table 3-13** provide a description of the parks and recreational areas in the project area that may be affected by Alternative 3C. These areas are shown on **FEIS Plate 3-16**. **Plate 4-6(A-B)** at the end of this chapter show the park and recreational areas and the proposed Alternative 3C footprint.

Several different types of impacts to existing and proposed parks/recreational areas may occur as a result of the proposed action. These impacts may include ROW or proximity impacts such as noise impacts or visual effects. This analysis includes those resources where the technical studies prepared for other sections of this document (i.e., land use, noise, visual) indicate that one or more direct and/or potential proximity impacts are possible. Where the technical studies have documented that there are clearly no direct impacts (e.g., ROW take) or potential proximity impacts to certain park/recreational resources, then those resources have not been analyzed below.

The impacts discussed in this section are generalized and would not be uniform for all locations within the park/recreational area. Impacts may be more pronounced or less pronounced depending on the proximity to the Build Alternative. Only those areas within the project area where a direct impact or proximity impact may occur have been identified in **Table 4-25** below.

TABLE 4-25. POTENTIAL IMPACTS ON PARKS AND RECREATIONAL AREAS WITHIN THE PROJECT AREA

Plate ID Number / Letter	Site Description	Alternative 3C
1	**Sleepy Hollow Park** (Existing)	V
	Closest Distance to/from Build Alternative	720 feet (0.14 miles)
4	**Trinity River Greenbelt Park** (Existing) Includes existing Trinity Levee Trail, Crow Lake Trail, Trinity Trails, and Santa Fe Trestle Trail Park/Trail	R (222.0)*, V
	Closest Distance to/from Alternative	Encroaches within park
21	**Trinity Strand Trail Park** (Existing)	---
	Closest Distance to/from Alternative	840 feet (0.16 mile)
24	**Oak Cliff Founders Park** (Existing) Includes existing Oak Cliff Founders Trail	---
	Closest Distance to/from Alternative	2,150 feet (0.41miles)
26	**Eloise Lundy Park** (Existing)	---
	Closest Distance to/from Alternative	1,910 feet (0.36 mile)
K	**Great Trinity Forest Expansion Area** (Planned)	V
	Closest Distance to/from Alternative	Adjacent to park at AT&SF RR Bridge**

Abbreviations Used in Table:
R = ROW would be required, and access rights for construction, operation, and maintenance are anticipated to be established by an operating agreement with the City of Dallas (estimated number of acres shown in parentheses – see **FEIS Section 4.1.2.**
V = visual – indicates a project alternative can be seen from the park, the effect ranges from minimal visual change, moderate visual change, or strong visual change depending on location and other factors - see **FEIS Section 4.17.**
--- = indicates no impact anticipated.
Notes:
* - The deed records for the parkland indicate that it can be used for transportation.
** - Due to concurrent planning efforts with the City of Dallas, it is expected that the proposed project would be adjacent or further away from the final area designated as parkland.
Calculated distances/areas are estimates only.
Plate ID numbers correspond to the locations shown on **FEIS Plates 3-16**, **4-6 (A-B).**

As shown in **Table 4-25**, Alternative 3C would have some degree of proximity impact to six parks and/or recreation areas (five existing and one planned). **FEIS Plates 4-6 (A-B)** located at the end of this chapter show the locations of these facilities by Map ID, as well as the Alternative 3C alignment. No other park/recreational areas identified within the project area would be adversely impacted by Alternative 3C.

Notably, the City of Dallas PARD has indicated that Alternative 3C would not have a negative impact on any of the existing/planned parks and recreational areas located in the project area. The PARD acknowledges that one of the goals for the Trinity Parkway as a whole is to improve access to existing and proposed recreational opportunities. In this regard, the Trinity Parkway would provide positive benefits for these resources (see **FEIS Appendix A-1**, pages 63-64).

<u>Existing Parks/Recreational Areas</u>

The following discussion describes the potential project impacts to the existing park and recreation areas. Additional information regarding noise impacts described below may be found in **FEIS Section 4.16.** The Great Trinity Forest Expansion Area (Plate 3-16, ID# K) is discussed in the next section.

Sleepy Hollow Park

Sleepy Hollow Park (**FEIS Plate 3-16**, ID# 1) is an urban neighborhood park located approximately 300 feet northeast of IH-35E. The park is rectangular in shape and approximately 0.6 acre in size. The park is surrounded on three sides by residential streets. On the remaining side (south) is a commuter rail line and further south is IH-35E. Amenities at the park include picnic benches, a playground, and a multi-use court facility (primarily basketball). In this area, Alternative 3C would have connecting ramps to the southwest side of the existing IH-35E facility (greater than 700 feet from the park). Because of their height, the proposed ramp structures of Alternative 3C would likely be visible from the park, as is the IH-35E facility. Alternative 3C would cause minimal visual impacts in that they would be somewhat visible, but consistent with the existing landscape. Due to its proximity, traffic on IH-35E is the main source of traffic related noise at the park. Alternative 3C connections to IH-35E occur on the southwest side of IH-35E at a distance of greater than 700 feet from the park. Because of these conditions, Alternative 3C's contribution to noise levels at the park is minimal and below FHWA Noise Abatement Criteria. See **Section 4.16** for the Alternative 3C noise analysis.

Trinity River Greenbelt Park

Trinity River Greenbelt Park (**FEIS Plate 3-16**, ID# 4) is an urban open space park of approximately 3,652 acres extending from Northwest Highway (SH-348), located northwest and outside the project area, to the AT&SF Railroad bridge located in the southwest portion of the project area. The designated primary use of the Trinity River Greenbelt Park is floodplain and flood control, with secondary use as park and open space. The Dallas Floodway encompasses approximately 2,000 acres of this park. Research of the City of Dallas' acquisition and deed stipulations was performed for the floodway land between Westmoreland Road and the DART/AT&SF Railroad Bridge, comprising approximately 1,900 acres. This segment of the Dallas Floodway is part of the 3,652 acre Trinity River Greenbelt Park. It is through this area that Alternative 3C would be constructed. The deed records of the City of Dallas' acquisition of the Trinity River Greenbelt Park include a conveyance for transportation purposes (see correspondence in **FEIS Appendix A-1**, pages 33-43 and 54-65). As noted previously, the City of Dallas PARD (official with jurisdiction) has indicated that Alternative 3C would not have a negative impact to any of the existing or planned parks and recreational areas in the project area, including the Trinity River Greenbelt Park.

Future recreational facilities proposed to be constructed within the Trinity River Greenbelt Park are being planned by others concurrently with the Trinity Parkway. The Alternative 3C noise analysis (see **Section 4.16**) included specific areas within the park where amenities are proposed, considered reasonable and feasible noise mitigation for impacted areas, and included noise impact contour data for undeveloped areas within the floodplain area.

These efforts would guide local officials responsible for land use control programs to ensure, to the maximum extent possible, that new recreational activity areas within the park are planned or constructed with the predicted future noise environment in mind. Alternative 3C would be constructed within or adjacent to the levees and would be visible from the park and planned recreational areas. Similarly, concurrent planning efforts would allow local officials responsible to ensure that new recreational activity areas within Trinity Park are planned or constructed with the location of Alternative 3C in mind.

Oak Cliff Founders Park

Oak Cliff Founders Park (**FEIS Plate 3-16**, ID# 24) is located approximately 500 feet west of the west levee and is bounded by Zang Boulevard and Marsalis Avenue, which are major city arterials connecting to the Houston Street and Jefferson Boulevard Viaducts. This urban open space park is triangular in shape and is approximately 16.1 acres in size. Amenities at the park include: a hike/bike trail extending around the perimeter and through the interior of the park, and several sitting benches throughout the park. The park has fairly heavy tree cover through most of its interior. Land use around the park includes single and multi-family residential, retail, and commercial.

Alternative 3C would have no noise impact on the park because of distance away (approximately 2,000 feet). Zang Boulevard and Marsalis Avenue are closer to the park than Alternative 3C and their traffic is the dominant noise generator at the park. Visual impacts resulting from Alternative 3C are not anticipated.

Eloise Lundy Park

Eloise Lundy Park (**FEIS Plate 3-16**, ID# 26) is an urban community park located west of the west levee approximately one-quarter mile southeast of the IH-35E crossing of the Dallas Floodway. The park is approximately 3.4 acres in size. Amenities include a picnic area, swimming pool, tennis court, softball field, playground, multi-use court facilities, and a community recreation center building. The park has residential streets on two sides, a major city arterial on the southwest side, and the floodway levee on the northeast side. Land use around the park is primarily residential. Alternative 3C would not result in an impact (including noise and visual impacts) to Eloise Lundy Park.

Trinity Strand Trail Park

Trinity Strand Trail Park (**FEIS Plate 3-16**, ID# 21) is an urban open space park located east of the east levee along a meander of the old Trinity River channel (see **FEIS Plate 3-16**). The park extends along the meander from IH-35E to near Irving Boulevard for a distance of approximately 2 miles and contains an area of approximately 57.5 acres. The park currently has no amenities, and functions as a sump of the Eastside Interior Drainage Sump System of the Dallas Floodway. A hike/bike trail and enhanced landscaping are proposed for this park. Land use in the area is primarily industrial and retail commercial. Irving Boulevard (a major city arterial) parallels the park on the southwest at a distance that varies from adjacent to 3,000 feet. IH-35E parallels the park on the northeast at a distance that varies from adjacent to 2,000 feet. Alternative 3C would not result in an impact (including noise and visual impacts) to Trinity Strand Trail Park.

In summary, all of the existing parks identified in **Table 4-25** exist or would exist in an urban environment where the influences of the local transportation system are part of their operational and functional characteristics. All are located adjacent to, near, or crossed by operating roadways, so the passage of vehicles nearby would not introduce an activity that has not previously existed. Any visual proximity impacts caused by Alternative 3C would not obscure the views from these parks and would be consistent with the landscape surrounding the parks. The existing parks provide an urban recreation opportunity, and serenity is not a component to achieve that purpose.

Planned Parks/Recreational Areas

The following discussion describes the potential project impacts to the planned park and recreation areas.

The Great Trinity Forest Expansion Area

The Great Trinity Forest refers to an area of approximately 7,000 acres of land, of which approximately 4,600 acres are forested, that is planned by the City of Dallas for multiple uses including parkland, recreation, ecosystem restoration, and flood control. The Great Trinity Forest includes a large area of floodplain associated with the main stem of the Trinity River from the south end of the Dallas Floodway at the AT&SF Railroad Bridge downstream to IH-20 and the White Rock Creek floodplain upstream from the Trinity River to IH-30.

In March 1997, Dallas City Council approved *The Great Trinity Forest Master Plan (*TPWD, 1997*)*, which outlined the acquisition and preservation of forest and provided the framework to carefully guide development in the area. The city plan set a goal for acquisition of over 2,500 acres of privately owned land that would knit together existing public parks and open space into a vast, contiguous corridor of public lands. According to DCAD records, a total of over 6,000 acres of land within the boundaries suggested by the city for the Great Trinity Forest are now publicly owned (i.e., city, county, and state ownership). These publicly owned lands encompass eight separate City of Dallas parks (including William Blair, Jr. Park) with a combined area of approximately 1,980 acres.

The Great Trinity Forest Expansion Area (**FEIS Plate 3-16**, ID# K), is an area of potential park expansion of the Great Trinity Forest. The potential park expansion area would contain an area of approximately 537.4 acres and would be located adjacent to the park at the AT&SF Railroad Bridge between the DART Rail crossing and just south of IH-45.

Table 3-14 of **FEIS Section 3.3.2.3** provides a description of planned parks/recreational areas in the project area that may be affected by Alternative 3C. The NTTA continues to participate in a cooperative multi-project planning effort with the City of Dallas, Dallas County, TxDOT, the

FHWA, NCTCOG, and the USACE to implement various components of the City of Dallas' *Trinity River Corridor MIP/BVP*. The Trinity Parkway has been identified as a key component of this plan. As detailed in **FEIS Appendix J-2**, the *Trinity River Corridor MIP/BVP* incorporates the proposals from these agencies into one cohesive concept plan. Such proposals include the Dallas County Trail Plan, Trinity Trails System, Regional Veloweb, and Great Trinity Forest Master Plan. As described in **FEIS Section 1.6.1.2**, proposed *Trinity River Corridor MIP/BVP* recreation measures are being further developed and evaluated as part of the Dallas Floodway Project by the USACE/City of Dallas. The Trinity Parkway has and will continue to be closely coordinated with the Dallas Floodway Project, as well as with the nearby DFE Project. The DFE Project adopted recommendations of the Great Trinity Forest Master Plan and includes such potentially coordinated elements as hike and bike trails located adjacent to neighborhoods and/or paralleling the Trinity River. The planned parks and recreational areas (e.g., trails) listed in **Table 3-14** of **FEIS Section 3.3.2.3** have been included within one or more of the aforementioned plans that have been and/or will continue to be coordinated with the proposed project.

Efforts to avoid potential impacts to planned park/recreational areas initially involved the development of an alignment that avoided or minimized impacts to these resources. No direct use of the planned resources listed in **Table 3-14** of **FEIS Section 3.3.2.3** are anticipated as a result of Alternative 3C. Any park/recreational use that may be affected by potential noise or visual impacts associated with Alternative 3C can be planned and designed to avoid or minimize those impacts. For additional details, see **FEIS Section 5.1.2**.

As mentioned above, the NTTA is participating in a cooperative planning effort with all agencies involved with proposed recreational and non-recreational developments planned for the Dallas Floodway (i.e., Trinity Park) and DFE (i.e., Great Trinity Forest Park) portions of the project area. NTTA would work closely with these agencies in order to maximize these multi-project planning efforts and, thereby, work to minimize any potential adverse impacts that may result from the implementation of Alternative 3C.

Section 6(f) Considerations

Section 6(f) lands in the project area (see **Table 3-13**) include a portion of William Blair, Jr. Park (formerly Rochester Park) located between IH-45 and the Amtrak rail line. Alternative 3C mainlanes travel to the north of, but do not contact this area of William Blair, Jr. Park. However, as currently planned, a proposed northbound connection ramp from IH-45 to Alternatives may result in some degree of modification near, but outside of, William Blair, Jr. Park. However, no direct impacts to Section 6(f) lands are anticipated because all work is assumed to take place within the existing TxDOT ROW for IH-45 and, therefore, would not result in a permanent loss of recreational land. No other Section 6(f) lands are located within the project area; therefore, no Section 6(f) involvement is required (see **FEIS Appendix A-1**, page 21).

Access to Trinity Park

Should Alternative 3C be selected in the anticipated ROD instead of the No-Build Alternative, access to the future planned Trinity Park may be affected. The proposed access to Trinity Park falls into two broad categories: vehicular/bicycle/pedestrian access from adjacent arterial streets and bicycle/pedestrian access from adjacent neighborhoods. The measures proposed to resolve the potential effects of the proposed project on access to Trinity Park are discussed in the following paragraphs.

Access from Arterial Streets

The City of Dallas, as part of the *Trinity River Corridor MIP/BVP,* proposes to access Trinity Park from several arterial streets, which currently cross the Dallas Floodway on bridges. Some of the proposed access points are funded in the initial implementation of the city's plan, while others are designated as future construction. For these access points, the city proposes to construct park access roads originating at the top of the east and west levees, which would travel down the riverside faces of the levees on an angled path to reach the floodplain. Alternative 3C may directly affect this type of access because the roadway may block the planned park access road if it were placed on the levee face.

The proposed resolution to this access issue is the implementation of structured ramps from the Trinity Parkway alignment into the floodplain at access locations. Ramps would originate on the arterial street near the riverside edge of the proposed Trinity Parkway and would bring two-way traffic into the park areas without having to cross the facility. If provided by the NTTA, ramps of this kind would mitigate any cost impact to the city for park access. **Table 4-26** provides a summary of the proposed park access ramps associated with Alternative 3C, along with the proposed Reunion Gateway, a pedestrian overlook deck structure located at Reunion Boulevard. The budget for the Build Alternative includes the costs for these ramps to a touchdown point in the Dallas Floodway.

TABLE 4-26. PROGRAMMED ACCESS RAMP IMPROVEMENTS FOR TRINITY PARK

Access Point No.	Proposed Access Location	Build Alternative
5	Hampton Road Bridge, East Levee	Ramp
6	Hampton Road Bridge, West Levee	---
11	Sylvan Avenue Bridge, East Levee	Ramp [2]
12	Sylvan Avenue Bridge, West Levee	---
17*	Commerce Street Viaduct, East Levee	---
18	Commerce Street Viaduct, West Levee	---
19 [1]	Reunion Gateway, East Levee	Pedestrian Overlook Deck Structure
20	Reunion Gateway, West Levee	---
23	Proposed Jefferson Memorial Bridge	Ramp
23	Houston/Jefferson Viaduct, East Levee	---
24	Houston/Jefferson Viaduct, West Levee	---
--	Corinth Street/Riverfront Boulevard	Ramp
29	Cedar Crest/MLK, Jr. Bridge, East Levee	---
--	Cedar Crest/MLK, Jr. Bridge, West Levee	Ramp [3]

Source: City of Dallas (1999a and 2003a).
Notes:
Access point number locations are shown on **FEIS Plate 2-6**.
1. Funded as part of the City of Dallas' Trinity River Corridor MIP/BVP.
2. Currently under construction as part of the Sylvan Avenue Bridge Project (by others); Trinity Parkway funds have been applied to the construction cost of this park access ramp. Satisfies the Trinity Parkway requirement to provide a park access ramp at this location. See discussion below this table.
3. Trinity Parkway funds allotted for improvements to Cedar Crest/MLK, Jr. Bridge (project by others); includes parking and trail elements providing park access over the West Levee of the Dallas Floodway. Satisfies the Trinity Parkway requirement to provide a park access ramp at this location. See discussion below this table.

--- = No action

As shown in **Table 4-26**, park access ramps are proposed at the following five locations for Alternative 3C: Hampton Road, Sylvan Avenue, the proposed Jefferson Memorial Bridge, Corinth Street/Riverfront Boulevard, and the Cedar Crest/MLK, Jr. Bridge. Although not shown as a vehicular access location in the *Trinity River Corridor MIP/BVP* (see **FEIS Plate 2-6**), vehicular park access from Alternative 3C was coupled with the planned bike/pedestrian access at Cedars Crossing, East Levee (see **Table 4-27** below) instead of at the Commerce Street Viaduct in order to avoid impacts to this NRHP eligible resource.

The City of Dallas is going forward with improvements at the Cedar Crest/MLK, Jr. Bridge (project by others) and at the Sylvan Avenue Dallas Floodway crossing (project by others). Both of these projects would include providing access to the Dallas Floodway. Trinity Parkway funds have either been expended (in the case of the under construction Sylvan Avenue Bridge and park access ramp) or allotted for future use (in the case of the Cedar Crest/MLK, Jr. Bridge parking and trail elements with park access), thereby meeting the Trinity Parkway's responsibility for construction of programmed access ramps at these locations. See **FEIS Section 2.7.3** for details relating to these projects and the agreements made between project sponsors. The remaining three park access ramps at Hampton Road, the proposed Jefferson Memorial Bridge, and Corinth

Street/Riverfront Boulevard would be constructed as part of the Trinity Parkway and maintained by the City of Dallas. The locations of the above described park access ramps associated with Alternative 3C (except for at Cedar Crest/MLK, Jr. Bridge which is still under design) are shown in **FEIS Plate 2-9.** Approximately 8.3 acres of additional ROW would be required to construct these three park access locations, broken down as follows:

- Hampton/Inwood Road: 2.1 acres
- Proposed Jefferson Memorial Bridge: 1.0 acre
- Corinth Street/Riverfront Boulevard: 5.2 acres

Based on the plans described above to provide vehicular access to Trinity Park as part of the Trinity Parkway, implementation of Alternative 3C would not adversely impact vehicular access to Trinity Park.

Access from Adjacent Neighborhoods

The *Trinity River Corridor MIP/BVP* includes proposed bicycle/pedestrian access points to Trinity Park from adjacent neighborhoods. These proposed access routes are bicycle/pedestrian trails, which would go up and over the Dallas Floodway levees, typically using a zigzag layout on the levee slopes in order to meet ADA grade requirements. Most of the proposed bicycle/pedestrian trails would be directly affected by Alternative 3C.

To resolve the neighborhood access issue, NTTA has proposed that both underpasses and overpasses of the Trinity Parkway mainlanes would provide bicycle/pedestrian access to Trinity Park from adjacent neighborhoods. The underpass version takes advantage of several existing drainage channels in the Dallas Floodway, which are located at outfalls of gravity sluices and pump stations. Since these channels would need to be bridged by the Trinity Parkway mainlanes, the NTTA has proposed that these bridge locations be modified as needed in order to accommodate trails to be located under one or both abutments. The overpass version would be considered on a case-by-case basis in the future. The schematic plans for Alternative 3C on **FEIS Plates 2-4 (A-B)** show the proposed underpass/overpass locations. **Table 4-27** provides a summary of the proposed neighborhood access locations associated with Alternative 3C.

TABLE 4-27. PROGRAMMED NEIGHBORHOOD ACCESS IMPROVEMENTS FOR TRINITY PARK

Access Point No.	Proposed Access Location	Alternative 3C
4	Bernal Trail, West Levee	---
7	Old Meander North No. 1, East Levee	B/P underpass
8	West Dallas/Vilbig, West Levee	---
9	Old Meander North No. 2, East Levee	B/P underpass
10	West Dallas/Winnetka, West Levee	---
13	Oak Lawn, East Levee	B/P underpass
14	Sylvan South/Bataan, West Levee	---
15	Continental Avenue Viaduct, East Levee	Bridge left in place for B/P access
16	Continental Avenue Viaduct, West Levee	---
21	Oak Cliff/Coombs Creek, West Levee	---
22	Oak Cliff Gateway, West Levee	---
25	Cedars Crossing, East Levee	B/P underpass
26	Tenth Street/Oak Cliff Park, West Levee	---
27	AT&SF RR Bridge, East Levee	B/P underpass

Source: City of Dallas, 1999a and 2003a
Abbreviations Used in Table:
B/P = Bicycle/Pedestrian; **---** = No action
Notes: Access point locations are shown on **FEIS Plate 2-6**.

Based on the plans described above to provide bicycle/pedestrian access to Trinity Park from adjacent neighborhoods as part of the Trinity Parkway, implementation of Alternative 3C would not adversely impact bicycle/pedestrian access to Trinity Park.

4.8 IMPACTS TO WATER FEATURES

As described and discussed in **FEIS Section 3.4.3**, waters of the U.S., including wetlands, are found within the project area and these jurisdictional features are protected by federal law and policy. This section presents an assessment of impacts resulting from the proposed project to waters of the U.S., including wetlands, as well as water features not subject to Section 404 jurisdiction.

4.8.1 No-Build Alternative

The No-Build Alternative would result in no impacts to waters of the U.S., including wetlands, or to water features not subject to Section 404 jurisdiction.

4.8.2 Build Alternative

Alternative 3C would cross water features within the project area using bridges or concrete box culverts. Although the use of bridges would likely minimize impacts to wetlands and aquatic areas, bridge construction may require placement of fill material, such as dirt, concrete, or bridge pillars within jurisdictional areas. In addition to potential fill areas, construction of the roadway and bridges may result in temporary or permanent impacts to wetlands by removing vegetation, excavating and/or compacting soils, and changing the hydrology of the immediate area. Precautions would be taken to avoid unnecessary impacts during construction.

4.8.2.1 Build Alternative and Potential Borrow Areas

Build Alternative 3C, as well as the potential borrow areas, would require some placement of fill material in, or excavation in, waters of the U.S., including wetlands, identified and discussed in **FEIS Section 3.4.3.2**. **FEIS Plates 4-7A** and **4-7B** show the locations of waters of the U.S., including wetlands, that potentially would be affected by construction activities; detailed maps of expected areas of impacts are included as part of the Section 404(b)(1) Guidelines analysis in **FEIS Appendix G-1**. In addition, **FEIS Plate 4-8** shows the approximate locations of the potential borrow areas for soil that would be used to construct the embankments associated with Build Alternative 3C. Additional discussion concerning the potential borrow areas within the Dallas Floodway is presented in **FEIS Section 2.8.4.2**. The potential impacts to waters of the U.S., including wetlands, are presented in **Table 4-28**; this table excludes project area water features previously listed in **Table 3-16** that would not be affected by the either excavation areas or the proposed roadway. A summary of the potential impacts by aquatic feature type is shown in **Table 4-29**.

TABLE 4-28. POTENTIAL IMPACTS TO WATERS OF THE U.S.

Map ID Number[1]	Feature (Type/Class)	Function Index[2]	TXRAM Score[2]	Quality Rating[2]	Potential Impacts (acres)[3]	
					ROW Fill	Excavation
9	Emergent Wetland	0.45	59.50	medium		0.13
16	Emergent Wetland	0.39	58.26	medium	--	0.60
17	Emergent Wetland	0.49	56.97	low	--	0.04
18	Emergent Wetland	0.49	60.56	medium	--	1.45
19	Emergent Wetland	0.50	57.87	medium	--	1.66
20	Emergent Wetland	0.51	60.97	medium	--	0.91
21	Emergent Wetland	0.37	58.46	medium	--	0.08
24	Trinity River (Perennial Stream)	0.53	68.52	high	3.67	2.80
25	Emergent Wetland	0.48	53.16	low	--	1.64
26	Emergent Wetland	0.58	55.63	low	--	1.29
27	Emergent Wetland	0.45	57.52	medium	--	0.15
29*	Emergent Wetland	0.48	57.76	medium	0.31	--
31*	Emergent Wetland	0.62	53.95	low	1.56	--
32*	Emergent Wetland	0.44	55.27	low	2.53	--
33	Emergent Wetland	0.54	58.09	medium	0.69	--
34*	Open Water - Intermittent	0.23	---	---	0.79	--
35*	Open Water - Intermittent	0.23	---	---	1.27	--
46	Emergent Wetland	0.45	57.49	medium	1.56	--
47*	Open Water - Intermittent	0.23	---	---	0.64	--
48	Emergent Wetland	0.43	55.46	low	0.28	--
49	Open Water - Intermittent	0.23	---	---	0.14	0.64
50	Emergent Wetland	0.40	59.60	medium	--	0.15
51	Open Water - Intermittent	0.23	---	---	0.33	0.88
52	Emergent Wetland	0.40	57.93	medium	0.02	1.25
54	Emergent Wetland	0.63	58.96	medium	2.34	3.03
59	Emergent Wetland	0.47	60.73	medium	1.19	0.15
62	Open Water - Intermittent	0.23	---	---	1.44	--
65	Emergent Wetland	0.63	58.18	medium	--	0.33
66	Emergent Wetland	0.51	58.26	medium	7.97	--
67	Emergent Wetland	0.65	56.98	low	--	3.22
68	Emergent Wetland	0.63	56.63	low	--	4.33
69	Emergent Wetland	0.68	59.26	medium	--	10.12
70*	Old Trinity River Channel	0.35	---	---	0.51	--
71	Emergent Wetland	0.43	54.82	low	0.54	--
76*	Forested Wetland	1.00	70.67	high	1.24	--
78*	Intermittent Stream	0.56	65.33	high	0.09	--
80*	Old Trinity River Channel	0.35	---	---	0.23	--
85	Emergent Wetland	0.39	62.61	medium	--	0.73
215*	Intermittent Stream	0.65	62.37	medium	0.15	--
216*	Forested Wetland	1.00	67.59	high	0.16	--
222	Trinity River (Perennial Stream)	0.53	68.52	high	0.32	--
				TOTAL IMPACTS (acres)	**29.97**	**35.58**

Notes:

1. Plate ID numbers correspond to the locations shown in **FEIS Plates 4-7 (A-B)**.
2. For derivation of wetland Function Index (i.e., HGM Score), TXRAM Score, and Quality Rating (three-level relative ranking based on TXRAM Score), see discussion in **FEIS Section 3.4.3.4**.
3. Calculated areas are estimates only and may change as final configuration is refined. ROW fill impacts are expected from roadway construction; excavation impacts are expected from potential borrow areas. Expected impacts are based on the jurisdictional determination approved by USACE on March 24, 2011(File # SWF-2011-00049) and subsequent preliminary jurisdictional determination surveys.

* Potential impacts to this water of the U.S., including wetlands, may occur from bridge column construction and would likely be substantially reduced or eliminated during final design.

TABLE 4-29. SUMMARY OF POTENTIAL IMPACTS TO AQUATIC FEATURES

AQUATIC FEATURE TYPE	POTENTIAL FILL IMPACTS (ACRES)*		
	ROW FILL	EXCAVATION	TOTAL
Emergent Wetland	18.99	31.26	50.25
Forested Wetland	1.40	0	1.40
River or Stream Channel	4.23	2.80	7.03
Old River Channel (Open Water)	0.74	0	0.74
Other Open Water	4.61	1.52	6.13
TOTAL	**29.97**	**35.58**	**65.55**

Notes:
* Calculated areas are estimates only. ROW fill impacts are expected from roadway construction; excavation impacts are expected from potential borrow areas (see **FEIS Plate 4-8** for borrow area locations). Potential impacts to waters of the U.S., including wetlands, may occur from bridge column construction and would likely be substantially reduced or eliminated during final design.

In the discussion above, the term “potential” is used in connection with the calculation of impacts to waters of the U.S., including wetlands. This term is used because assessed impacts would be revised during final design of the Build Alternative, and the ultimate expected impacts addressed in a Section 404 permit would be expected to be less than the impacts estimated at this point in project design. Impacts reported in **Table 4-28** were calculated based on overlap between the delineated aquatic feature and either the planned outline of excavation areas or the ROW footprint. The estimates of permanent fill to these aquatic features are considered conservative estimates because the actual area of permanent impacts would be diminished and the remaining impacts would be temporary in nature. For example, aquatic features that would be bridged over by the proposed project thereby limiting permanent fill of the aquatic feature to the areas occupied by bridge support columns. Thus, much of the disturbed areas under bridges would receive only temporary impacts as these areas would be restored to pre-construction contours and reseeded with native plants appropriate for the site; aquatic sites that would be bridged over by the proposed project are noted in **Table 4-48** by an asterisk in the Map ID column.

Losses to waters of the U.S., including wetlands, are predominantly associated with a number of emergent wetland depressions that are dry during portions of the year. Alternative 3C would also impact, to a lesser degree, portions of seasonally flooded areas, intermittent stream, perennial stream, and forested wetland features. The proposed roadway would cross smaller stream channels through the use of various-sized concrete box culverts, while larger drainages would be bridged. Depending upon the topography at alignment crossings, channel modification may be necessary along certain drainages, although this would be a relatively infrequent occurrence and avoided if at all practicable. Detailed information concerning the proposed design and construction of Alternative 3C within and adjacent to the Dallas Floodway is presented in **FEIS Section 2.8**.

As designed, Alternative 3C would require excavation and earthwork activities that would result in modification of the existing Trinity River channel. This channel modification is necessary due to the very narrow floodplain area between the Trinity River and the East Levee between the IH-35E bridges and Corinth Street. That is, design constraints required for the protection of the East Levee preclude moving the proposed toll road any closer to the toe of the levee, thus requiring a river-side retaining wall that would extend into the existing Trinity River pilot channel. The proposed borrow plan for roadway embankment involves excavation of a secondary channel within the west overbank in this area for a distance of approximately 2,900 feet that is needed for hydraulic mitigation. The secondary channel would begin approximately 1,000 feet downstream of the northbound IH-35E bridge and transition back into the existing channel just upstream of the Corinth Street bridge, and would be excavated to the same approximate depth as the existing Trinity River channel. This secondary channel could also allow water to be diverted during the construction of the retaining wall along the east side of the river. After construction of the retaining wall, the secondary channel would remain in place to augment the flow capacity of the existing channel.

As noted in **FEIS Section 3.4.3**, waters of the U.S., including wetlands, in the project area provide a wide range of functions, with each level of function dependent on a range of variables. The level of wetland function shares a relationship with wetland condition, which is also addressed in **FEIS Section 3.4.3**. The most recognizable function that would be affected is that of long-term surface water storage, which is dependent on the ability of the waters of the U.S., including wetlands, to receive and retain water for an extended period during the growing season.

In many instances, excavation areas and roadway fill areas within the ROW would not include the entire delineated area of an emergent wetland. These partially filled or excavated wetlands were examined to determine whether actions during construction could be taken to preserve the functions of the remaining wetland areas. In most instances involving partial excavation of an emergent wetland, it was determined that the primary function of long-term surface water storage could be maintained by creating a new shelf along the wetland edge near the exaction area to prevent drainage. As the principal source of water for most emergent wetlands within the Dallas Floodway is occasional overflow of stream banks by the Trinity River, then replacing the edge of a wetland depression would be expected to preserve the hydrologic regime in most cases. For these wetland remnants, it was considered that preservation of the hydrologic function of the wetland would also generally preserve other functions that may be performed by the wetland. However, in those instances where the remnant wetland was very small (i.e., typically less than 0.01 acre) or an upslope source of water would be severed by excavation, then such wetland areas were included as part of wetland impacts in the calculations shown in **Table 4-28**.

The Dallas Floodway is regularly mowed, which is necessary to maintain flood conveyance capabilities. In doing so, the required maintenance mowing of the Dallas Floodway prevents the development of riverine emergent wetlands into forested riverine wetlands. This influence on wetland condition limits the ability of the wetlands to function in general, and lack of structural and species diversity (i.e., condition) affects the ability of the wetland to function as wildlife habitat. Whereas the loss of the long-term surface water storage function may be more recognized, losses of aquatic function associated with vegetation characteristics (e.g., vegetation communities, interspersion, and connectivity) are comparatively low.

Loss of other familiar aquatic functions such as dynamic surface water storage, energy dissipation, and particulate retention would occur at an intermediate level. Unlike long-term water storage and habitat associated functions, these functions are affected by multiple variables. The effect is that where a particular wetland is lacking in a certain variable, other variables exist that compensate and increase the level of function for a particular wetland. Furthermore, depending on the function, some variables are weighted more than other variables, which tend to mask the effect of deficient variables.

In summation, various wetland functions would be affected by Alternative 3C. The quality of affected waters of the U.S., including wetlands range from low to high; however, collectively the impacts would be weighted towards medium quality waters of the U.S., including wetlands.

Where possible, the project would avoid impacting waters of the U.S., including wetlands, outside the proposed ROW. Disturbed areas would be treated with native grass seeding, mulching, erosion blankets, or similar erosion preventative measures to provide temporary soil stabilization until natural vegetation becomes re-established. Additional details concerning avoidance and minimization techniques are discussed in **FEIS Chapter 5** (see also materials relating to mitigation that would be required under CWA Section 404 in **FEIS Appendices G1** through **G-3**).

4.8.2.2 Agency Coordination and Permit Requirements

The proposed project would require coordination and permitting with the USACE under Section 404 and Section 10. Based on the initial assessment of impacts, Alternative 3C would exceed the impact threshold allowed by Nationwide Permit 14 - Linear Transportation Crossings, and would require a Section 404 Individual Permit. Upon review of the Section 404 Individual Permit application, options available to the USACE relative to the application would include:

- issue a permit;

- issue a permit with special conditions; or
- deny a permit.

As outlined in **FEIS Section 3.5.7**, any activity involving excavation or fill to any portion of a navigable water of the U.S. would trigger the requirement for a Section 10 permit from the USACE. Given the potential impacts of Alternative 3C on the pilot channel of the Trinity River, the proposed excavation/borrow activities for the Build Alternative would require issuance of a Section 10 permit.

As noted in **FEIS Section 1.6.5**, RGP 12 has been identified as a potential permitting option for compliance with Section 404 and Section 10 because the Trinity Parkway may meet the eligibility criteria for it (USACE, 2010c). The Build Alternative would result in modifications of the Dallas Floodway that would require USACE authorization under Section 408 (33 U.S.C. Section 408). Authorization under Section 408 requires the applicant to provide the USACE with information about the potential effects of a project, including information specifying details regarding waters of the U.S., including wetlands; this includes the requirement for project design to result in minimal impacts to aquatic features. The scope of RGP 12 extends to potential project impacts to jurisdictional water features within the Dallas Floodway as well as impacts to water features located both upstream and downstream of it. The purpose of RGP 12 is to eliminate unnecessary duplication of work that would result from submitting separate applications for an individual permit under Section 404 and a Section 10 permit, in addition to authorization under Section 408. RGP 12 requires the submittal of detailed information demonstrating compliance with numerous prerequisites to achieving Section 404 and Section 10 compliance in concert with authorization under Section 408. Accordingly, an application proposing to fill waters of the U.S., including wetlands, must meet the same compliance requirements under either an individual permit or authorization under RGP 12. Likewise, the prerequisites for a Section 10 permit would need to be satisfied before approval under RGP 12 could be issued.

The proposed action would also comply with the CWA Section 404(b)(1) Guidelines (40 CFR Part 230), administered by the USEPA and the USACE. These guidelines mandate that dredged or fill material should not be discharged into aquatic ecosystems (including wetlands) unless it can be demonstrated that there are no practicable alternatives to such discharge, that such discharge will not have unacceptable adverse impacts, and that all practicable measures to minimize adverse effects are undertaken. Materials prepared to assist the USACE in achieving compliance requirements under the Section 404(b)(1) Guidelines are included in **Appendix G**.

4.8.2.3 Impacts to Man-Made Linear Sumps

Alternative 3C would have no impacts on linear drainage sumps, including any wetland areas associated with these water features.

4.9 VEGETATION AND WILDLIFE IMPACTS

The construction of a new roadway affects the environment at various geographic levels. On a landscape level, the ecological communities currently existing along Alternative 3C would be fragmented to some degree. It is difficult to quantify this effect, primarily because there are numerous dynamic variables involved. Many generalizations regarding the concept of habitat fragmentation are well accepted, but specific processes and functional relationships are site specific, dynamic, and are interrelated. The greatest fragmentation impacts would be expected to occur where substantial, contiguous blocks of habitat would be intersected by a proposed roadway alignment.

The direct impacts of construction, operation, and maintenance of the proposed Trinity Parkway within the new ROW would also add an element of disturbance to the ecosystem. The existing vegetation occurring along Alternative 3C would be temporarily or permanently impacted by construction-related activities. Such disruption to vegetation communities, particularly well-established forested areas, could also potentially modify hydrologic processes as well as general nutrient cycling and transfer processes within non-urban plant communities.

Wetland and aquatic systems are impacted in a similar fashion through direct disturbance by heavy machinery compaction and scarification, placement of fill and construction materials, and the disruption of hydrological and nutrient cycling. As with other elements of the ecosystem, wildlife communities are impacted by the permanent loss of habitat. In addition to direct construction-related mortality or injury, wildlife populations often suffer impacts associated with displacement into adjacent habitats, which may already be at carrying capacity (i.e., the maximum sustainable level) for a particular species or animal group.

4.9.1 Impacts to Vegetation/Habitat Resources

4.9.1.1 No-Build Alternative

The No-Build Alternative would result in no vegetation impacts other than what is already occurring from urban-related activities. That is, existing wildlife populations within or near the Dallas Floodway are already affected by routine mowing of grassland areas during the growing season, and by noise, stormwater runoff, air emissions, and roadway fragmentation of habitat from existing urban areas nearby. The past effects of human activity within an urban environment surrounding the Trinity River floodplains would be expected to continue and possibly intensify as continued development and redevelopment of the urban community occurs in the future.

4.9.1.2 Build Alternative

As discussed in **FEIS Section 3.4.5**, a primary reason for inventorying vegetation cover is the strong correlation between plant communities and the wildlife species that exhibit a preference for nesting or foraging within a particular type of plant community (i.e., "habitat" for that species). The primary impact of the proposed action to various types of vegetation/habitat would be the direct conversion to impervious roadbed and the introduction of roadside vegetation cover. The indirect impacts relate more to the potential future degradation of the quality of remaining vegetation communities to serve as habitat for wildlife. Indirect impacts may include the reduction in value of the wildlife habitat surrounding the direct impact zone (i.e., construction area), increased potential for erosion and water quality degradation due to exposed soils, or impacts to vegetation resulting from project-induced land use alterations; such potential indirect impacts to vegetation are discussed in **FEIS Section 4.25**. An assessment of direct and indirect impacts on vegetation, resulting from the Build Alternative compared to the vegetation impacts anticipated from reasonably foreseeable future projects independent of the proposed Trinity Parkway, is included in **FEIS Section 4.26**.

To determine the potential direct impacts to vegetation/habitat, the acreage of the land cover types identified and discussed in **FEIS Section 3.4.4** within the proposed ROW of Alternative 3C was calculated. The direct impacts to vegetation/habitat expected from constructing the proposed project are summarized in **Table 4-30**, and areas of impacts (i.e., ROW overlap) to aquatic habitats and riparian woodlands are shown in **FEIS Plates 4-7 (A-B).** The locations of proposed excavation/borrow areas and the expected impacts to aquatic resources are shown in **FEIS Plate 4-8** for Alternative 3C.

TABLE 4-30. ACRES OF POTENTIAL IMPACTS TO UNDEVELOPED AREAS [1,2]

Build Alternative	Grassland Habitat	Riparian Forest Habitat	Aquatic Habitats			Total Undeveloped Area Impacts
			Forested Wetland	Emergent Wetland	All Open Water [3]	
ROW [4]	220.7	37.7	1.4	19.0	9.6	**606.50**
Borrow Areas	271.2	11.3	--- [5]	31.3	4.3	
Total	**491.9**	**49.0**	**1.4**	**50.3**	**13.9**	

Notes:
1. All quantities are shown in acres. Calculated areas are estimates based on proposed project planned construction footprint (i.e., ROW and excavation/borrow areas), superimposed on map of land cover types.
2. Potential impacts to waters of the U.S., including wetlands, may occur from bridge column construction and can be addressed during final design.
3. Includes impacts associated with water features subject to Section 404 jurisdiction (e.g., river and stream channel, old river meanders), most of which would be spanned by bridges.
4. The Build Alternative would also require excavation from the potential borrow areas shown in the row beneath the ROW estimate; the approximate locations of potential borrow areas are shown in **FEIS Plate 4-8**.
5. **---** = No impact anticipated.

As shown in **Table 4-30**, the predominant type of vegetation/habitat affected by the proposed project would be grassland areas, most of which are dominated by non-native grass that is periodically maintained by mowing. The lack of native species and mowing regimen greatly diminish the quality of this vegetation type to serve as habitat for many wildlife species. In contrast, the proposed project would also impact riparian forests, which represents relatively high quality habitat for a variety of bird and mammal species. The bulk of riparian forest impacts would occur between the DART Bridge and the area just east of MLK Boulevard. The riparian forest identified in **Table 4-30** is an unusual habitat feature according to the TxDOT-TPWD MOA, and includes some unusually large hardwood trees within this habitat type (also an unusual habitat feature). Aquatic habitats, which include bottomland hardwoods (i.e., forested wetlands) and water bodies (i.e., emergent wetlands and open water habitat), are special habitat features according under the TxDOT-TPWD MOA.

In addition to the maximum potential acreage impacts to vegetation discussed above, the potential relative impacts were assessed by expressing impacts as a percentage of the total habitat available within the project area (see **Table 3-20**). The results, shown in **Table 4-31**, indicate the relatively minor level of impacts (i.e., less than 9 percent) to riparian forest habitat for Alternative 3C, as compared to riparian forest habitat throughout the project area. Alternative 3C would have a substantial impact on the single area of forested wetland in the project area. Additionally, Alternative 3C would impact approximately 18 percent of emergent wetland, 23 percent of grassland, and 4 percent of open water features relative to the project area.

TABLE 4-31. IMPACTS TO VEGETATION/HABITAT RELATIVE TO PROJECT AREA

Build Alternative	Grassland Habitat	Riparian Forest Habitat	Aquatic Habitats		
			Forested Wetland	Emergent Wetland	All Open Water
3C ROW	10.0%	6.4%	48.3%	6.9%	2.6%
3C Borrow Areas	12.3%	1.9%	0%	11.1%	1.1%
3C Total	**22.3%**	**8.3%**	**48.3%**	**18.0%**	**3.7%**

Notes:
1. All values are the percent of impacts as compared to the total acreage of each habitat type within the project area shown in **Table 3-20**: grassland, 2,209.8 acres; riparian forest, 590.2 acres; forested wetland, 2.9 acres; emergent wetland, 268.6 acres; all open water, 376.7 acres.

The acreage figures in **Table 4-31** reflect the greatest amount of potential impacts to undeveloped land cover types in the project area, which includes both temporary and permanent impacts to existing vegetation cover and aquatic habitat. The level of impacts at a specific site would vary widely because approximately half of the acreage of undeveloped area impacts in **Table 4-30** for Alternative 3C is not associated with the construction of paved surfaces. That is, an estimated 317.4 acres of excavated areas for borrow material to construct tollway embankments for Alternative 3C would be revegetated with native grasses, and none of these areas would be paved. This source of impacts to habitat represents 52 percent of the total estimated impacts (i.e., 606.50 acres) for Alternative 3C. In addition, approximately half of the ROW areas for Alternative 3C would be needed for at-grade and bridge paved surfaces, leaving the remainder of ROW areas to be revegetated with native vegetation. Although an additional fraction of the ROW would be used to create a gravel surface service road for facility maintenance, the bulk of unpaved ROW would be maintained as grass cover after construction of the proposed project. Although the final acreage amounts of paved/hardened surface and vegetated areas within the ROW would not be determined until final design, it is important to recognize that a substantial portion of land within the proposed ROW would be revegetated with vegetation cover that is similar to existing conditions. Moreover, it may be said that revegetating borrow areas and unpaved areas within the proposed ROW with native grasses would represent an improvement from the existing grasslands that are dominated by nonnative grass species.

In light of the substantial variations in the nature of impacts to vegetation within undeveloped areas, impacts are further considered according to the three basic impact scenarios that would apply to Alternative 3C. The three scenarios described below are presented in order of decreasing severity of adverse impacts to existing vegetation or aquatic habitat.

- Scenario 1: Permanent Conversion of Undeveloped Cover to Paved Surfaces. The construction of at-grade tollway mainlanes in the floodway would have the most severe impacts on vegetation, and would permanently convert existing vegetation to paved surfaces. In addition, at this stage of design it has been presumed that areas under bridge structures would be some form of hardened surface for the purpose of assessing impacts. This impact scenario would occur exclusively within the proposed ROW.

- Scenario 2: Permanent Conversion of the Type of Undeveloped Cover. This scenario is also permanent in nature but would not result in conversion of vegetation to pavement. In this instance, construction of the proposed project would permanently transform one type of vegetation or aquatic cover to another type of vegetation or aquatic cover. For example, excavation/borrow areas would convert the riparian forest and emergent wetland habitat shown in **Table 4-31** to grass-dominated habitat. In the event that the BVP is completed as currently designed, much of these borrow areas would eventually become open water habitat included within one of the three lakes planned for the BVP. For the purposes of impact assessment in this FEIS, it is anticipated that excavated areas would be revegetated to stabilize soil and restore cover until such time as BVP lake development may be completed. In contrast most borrow areas, the relatively shallow excavations of grasslands at the north end of the project area on the north side of the river would create drainage swales, resulting in grassland, emergent wetland, and open water areas, depending on the availability of water. The types of permanent conversion of one type of habitat to another would occur in all of the borrow areas and within some areas of the proposed ROW (e.g., riparian forest area within ROW that would be converted to maintained grass cover).

- Scenario 3: Temporary Impacts Only – No Alteration in Vegetation Type. For most of the borrow areas, ground disturbance during excavation would temporarily remove existing vegetation cover. Generally the same basic type of cover would be reestablished after construction activities cease. This scenario would occur to a substantial portion of the floodplain areas currently dominated by nonnative grasses, which would remain as grassland. Although revegetation efforts would emphasize use of native species, the end result would be maintained grass cover similar to existing conditions. However, the creation of side slopes for the borrow areas would result in changes to localized topography. Most impacts within this scenario occur within borrow areas, but would also include most of the unpaved areas within proposed ROW that would not be covered by pavement or crossed by bridges.

Although some of the mitigation inherent in the levels of impact severity outlined above cannot be calculated with precision until final design of a selected alternative, it is still an important consideration in understanding the overall effects of Alternative 3C. The most severe impacts to habitat (i.e., converting existing vegetation or water features to paved surfaces) would be limited to roughly one-fourth of total impacts to undeveloped areas. In contrast, most of the impacts would be either temporary in nature, resulting in little overall long term change to habitat, or would effect a permanent conversion of smaller amounts of habitat such as riparian forests to maintained grassland areas.

The potential introduction of invasive plant species could occur under Alternative 3C. This potential exists because, as with almost any type of construction project, ground-disturbing activities occur that require seeding, landscaping, and long-term maintenance. Barring appropriate mitigation measures, invasive plant species can be introduced into a corridor during erosion control and revegetation operations. Weed seed can be inadvertently introduced into a corridor during construction on equipment or through the use of imported mulch, soil, gravel, or sod. As discussed in **FEIS Section 3.4.4.4**, current implementation of EO 13112 requires planned transportation projects to avoid the use of known invasive plant species for revegetation or landscaping activities. In the absence of an approved national list of invasive plants, the FHWA would look to the Texas noxious weed list to ensure no plants or seeds from the state's noxious weed list would be planted. Any seed mixes used to reestablish vegetation will be consistent with NTTA's *Construction Manual* which generally follows TxDOT's *Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges* (NTTA, 2011a; TxDOT, 2004) meeting the requirements for Texas Seed Law, including the testing and labeling for pure live seed. In addition, the type of vegetation within the Dallas Floodway is subject to approval by the USACE to ensure there is no diminution of flood conveyance capacity.

4.9.2 Potential Impacts to Wildlife

Estimating the impacts of a project on wildlife populations is a complex matter, primarily because detailed information about species populations is unavailable and effectively unobtainable. However, wildlife diversity and density correlate strongly with vegetation diversity and the type, degree, and frequency of disturbances to which an area's vegetation is subjected. Therefore, for the purposes of evaluating the potential impacts to wildlife resources of the proposed roadway project, vegetation impacts serve as a useful indicator of the magnitude of project impacts on wildlife populations that depend on such vegetation as preferred habitat. For this reason, **Table 4-31** provides useful data in this assessment.

4.9.2.1 No-Build Alternative

Under the No-Build Alternative, wildlife species in the project area would be expected to continue to live within existing habitat that is subject to past fragmentation, ongoing human activity, and maintenance of grassland areas within the Dallas Floodway. Riparian forest areas, particularly the relatively contiguous forested area south of the DART bridge, would likely remain intact under the no-build scenario.

4.9.2.2 Build Alternative

Although consideration of impacts to wildlife focuses primarily on habitat alteration, some general observations about the potential for direct impacts to wildlife may be made. Increased noise and activity levels during construction may affect wildlife in the vicinity, temporarily displacing animals from or within the project area. Animals with lesser mobility and size may suffer loss of habitat or life by actions of construction vehicles and other equipment. The noise and physical activity of work crews and machinery may temporarily disturb the normal behavior of some species. Impacts to mobile, earthbound species, such as small mammals, amphibians, and reptiles are typically minor and temporary, although nests of small mammals may be lost during clearing or construction. Some animals, being temporarily deprived of habitat cover, would be subject to increased natural predation. Ground-dwelling animals may be negatively affected by soil compaction caused by heavy machinery. These same activities, if conducted during the breeding season, may destroy nests and broods of some bird species or may prevent them from utilizing potential nesting areas. Phasing of construction activities to avoid nesting season would minimize negative impacts to most of these species.

The primary potential impact to wildlife would result from the clearing of vegetation and further habitat fragmentation. Floodplain grasslands account for the majority of the aerial coverage of the undeveloped portions of the Alternative 3C ROW and associated excavation/borrow areas (**Table 4-30**). As discussed in **FEIS Sections 3.4.4** and **3.4.5**, predominantly nonnative grasslands are not considered by the TPWD to be unusual or special habitat for wildlife; moreover, periodic mowing of these areas greatly diminishes grassland areas as habitat. Therefore, the greatest impact to wildlife would result from the destruction of riparian forest and wetland habitats even though these occur on a much smaller scale than grassland impacts. Forested areas require greater regenerative time after clearing as compared to grasslands or emergent wetlands. Furthermore, riparian forest habitat and associated transition areas to grasslands or emergent wetlands provide the most valuable habitat for wildlife within the project area. These areas typically contain the greatest diversity of wildlife species. For these reasons, the evaluation of project-related impacts on wildlife is largely focused on the amount of riparian forest, as well as the amount of aquatic habitat affected by Alternative 3C. Impacts to contiguous stands of mature woodlands would be associated with riparian and bottomland forests between the DART Bridge and MLK.

Another potential impact to wildlife might result from road kills from the operation of the Trinity Parkway. Road kills may be an issue for other species in addition to those classified as federally- or state-listed threatened or endangered. However, a combination of facility design and habitat characteristics on either side of the Trinity Parkway would preclude the likelihood of a substantial problem with road kills. Potential road kills could occur as non-avian wildlife would seek to move from the Trinity River floodplain (principally the riparian buffer along the river) toward the levees and possibly beyond into the urban environments outside the levees.

As it is not expected that many ground-dwelling wildlife species reside in the urban areas that flank the Dallas Floodway, the amount of wildlife movement from the city toward the floodway is not likely to be great. These highly-urbanized industrial, commercial, or residential areas are characterized by the presence of buildings, roads, artificial surfaces, and associated ornamental landscapes. Vegetation is usually restricted to landscaped business parks or residential areas, and often includes nonnative plant species that are of limited use to wildlife. Such nonnative species include lawn species such as Bermuda grass (*Cynodon dactylon*) and Saint Augustine grass (*Stenotaphrum secundatum*), as well as exotic trees and shrubs such Chinaberry (*Melia azedarach*) and Chinese privet (*Ligustrum sinense*). For these reasons, in addition to proximity to the noise and motion of human activity in an urban environment, these habitats are not considered to be high quality habitat for wildlife species. Consequently, these human-altered habitats would not likely harbor a substantial wildlife population, and animal traffic from the city toward the floodplain is not expected to result in other than negligible road kills.

In contrast, the presence of wildlife in terms of abundance and diversity is expected to be much greater within the Dallas Floodway, and there exists the potential that ground-dwelling wildlife may want to move toward the levees or the city landscapes. This likelihood is counter-intuitive to the behavior for wildlife species, which are much more likely to remain in areas of higher quality habitat, such as the riparian forests that form a buffer of varying width along the Trinity River. As noted above, urban landscapes do not offer much in the way of nesting habitat, and the levees and most of the floodplain areas offer little in terms of nesting habitat or forage. This is primarily because the City of Dallas conducts mowing and other maintenance activities within the Dallas Floodway and on the levees to preserve the flood control function and to facilitate periodic inspections of levee condition. The levees and adjacent 50-foot strips are subject to mowing on a frequent schedule. Other areas throughout the floodplain are subject to periodic mowing, but generally less frequently than the levees and adjacent buffer strips. Because this area is subject to periodic disturbance from mowing, it is not considered to be valuable habitat for many wildlife species except for those species which are adapted to life under a regimen of periodic mowing (e.g., rabbits and the raptors, which prey on rabbits). The most likely migration scenario for floodplain-dwelling wildlife would be the possibility that some nocturnal species (e.g., raccoon, skunk, opossum) may be attracted to urban or roadway areas to forage in human garbage or litter. However, even these wildlife species seeking to move from habitats near the Trinity River toward the levees would encounter the Trinity Parkway's six-foot tall security wall that would prevent wildlife from entering the toll road travel lanes (see **FEIS Plate 2-10**).

4.9.3 Threatened and Endangered Species

This section assesses whether the proposed project is likely to result in adverse impacts to threatened and endangered species, and summarizes the coordination process with the USFWS under the ESA and the FWCA. Although this section contains some references to actions that may be taken to mitigate adverse impacts to protected species, **FEIS Chapter 5** discusses proposed measures to avoid, minimize, and mitigate the expected adverse impacts to wildlife habitat and threatened or endangered species.

4.9.3.1 No-Build Alternative

The No-Build Alternative would have no effect on any endangered, threatened, proposed, or candidate species.

4.9.3.2 Build Alternative

The federally- and state-listed threatened and endangered species and SOCs included in **Table 3-21** have been further evaluated to determine whether Alternative 3C would be likely to result in adverse effects or impacts to those species. This assessment has focused on available information about preferred habitat in the project area and expected loss of habitat from Alternative 3C, as well as field observations within the project area, and NDD records of wildlife within 10 miles of the project area. In addition, the USFWS field study of habitat and species in the Dallas Floodway considered the character of available habitats to attract migratory birds and ground dwelling species before concluding that "it is unlikely that any federally-listed threatened or endangered species would be present" (USFWS, 2010). The results of this evaluation are summarized in **Table 4-32**, which includes only the species from **Table 3-21** for which preferred habitat may be found within the project area. The assessment of potential adverse effects for federally-protected species is expressed in terms of species "effect", and adverse effects to state-listed species or SOCs is expressed in terms of species "impact" as described further in notes at the bottom of the table. Also included in **Table 4-32** is a brief explanation addressing the basis for the species effect/impact determination. In some instances of federally- or state-listed species, as indicated in the table, more extensive information regarding the effect/impact determination is provided in the discussion following the table.

TABLE 4-32. EFFECT/IMPACT FOR SPECIES WITH PREFERRED HABITAT

SPECIES	FED. STATUS	STATE STATUS	SPECIES EFFECT / IMPACT	EXPLANATION OF EFFECT/IMPACT ASSESSMENT
American peregrine falcon *Falco peregrinus anatum*	DL*	T	No Effect / No Impact	Effect/impact unlikely because this species is not likely to use the project area for stopover during migration given the presence of preferred lake habitat in the vicinity and the lack of other preferred water features in the project area.
Arctic peregrine falcon *Falco peregrinus tundrius*	DL*	SOC	No Effect / No Impact	Effect/impact unlikely because this species is not likely to use the project area for stopover during migration given the presence of preferred lake habitat in the vicinity and the lack of other preferred water features in the project area.
Peregrine falcon *Falco peregrinus*	DL*	T	No Effect / No Impact	See explanation for both subspecies above.
Henslow's sparrow *Ammodramus henslowii*	—	SOC	N/A[1] / No Impact	Species not expected to utilize the project area because of curtailment in its migratory range. Also, nonnative, mowed grassland habitat in project area along with very limited bare ground areas and vines/brambles in open areas would not be attractive to this bird.
Interior least tern *Sterna antillarum athalassos*	E	E	May Affect, But Not Likely to Adversely Affect / No Impact	Project area does not have preferred sand and gravel bars within braided streams or rivers, but man-made structures can be found near water and birds may be attracted to construction sites. <u>See discussion following table for additional information.</u>
Piping plover *Charadrius melodus*	T	T	No Effect / No Impact	This species may make short-term use of habitat in the project area as stopover during migration. Preferred habitat is scarce and the proposed project would have very limited impacts on river sandbar areas.
Sprague's pipit *Anthus spragueii*	C	SOC	No Effect / No Impact	The project area does not include any native upland prairie areas which is preferred habitat. No effect/impact due to unlikely use of use mowed nonnative grasslands as stopover during migration and brief duration of stay in the area if used.

TABLE 4-32. EFFECT/IMPACT FOR SPECIES WITH PREFERRED HABITAT

SPECIES	FED. STATUS	STATE STATUS	SPECIES EFFECT / IMPACT	EXPLANATION OF EFFECT/IMPACT ASSESSMENT
Western burrowing owl *Athene cunicularia hypugaea*	—	SOC	N/A[1] / No Impact	Although this species could make use of non-native grassland in project area, habitat value is further diminished by occasional mowing. No impact expected because birds are not likely to occur here because the project area is outside the current range of this species. If present, this species could move to abundant grassland in the area not needed for the project. Burrows occupied by owls or which could be utilized by this species were not observed during site visits.
White-faced Ibis *Plegadis chihi*	—	T	N/A[1] / No Impact	Proposed project would affect very little of the water-related habitat preferred by this species. Species does not nest locally, and may readily move to avoid any construction activity that may occur near or within water bodies and shoreline areas.
Whooping crane *Grus americana*	E	E	No Effect / No Impact	This species could use water-based habitat briefly as stopover during migration, but the proposed project would affect very little preferred habitat. Species would move readily to avoid any construction activity that may occur in water bodies or nearby marshy areas.
Wood stork *Mycteria americana*	—	T	N/A[1] / No Impact	This species could temporarily use portions of the project area as stopover during migration, but would readily move away from construction activity near preferred water-based habitat to avoid harm.
Cave myotis bat *Myotis velifer*	—	SOC	N/A[1] / No Impact	Species is not likely to be in the project area due to lack of caves or rock crevices, and because the project area is at the eastern extent of the range for this species. Although the bat may make use of bridges, no bridges would be removed by the proposed project and there is no recent evidence of this species making use of local bridges.
Plains spotted skunk *Spilogale putorius interrupta*	—	SOC	N/A[1] / No Impact	The project area contains potential habitat, however, there is no recent evidence of this species in the project area. Impact is possible, but unlikely, as this species would be expected to readily move away from construction activity. If present, this species would most likely occur in areas with brushy understory and such areas would not be extensively disturbed by the proposed project.

TABLE 4-32. EFFECT/IMPACT FOR SPECIES WITH PREFERRED HABITAT

SPECIES	FED. STATUS	STATE STATUS	SPECIES EFFECT / IMPACT	EXPLANATION OF EFFECT/IMPACT ASSESSMENT
Fawnsfoot *Truncilla donaciformis*	—	SOC	N/A[1] / May Impact	The Trinity River and major tributaries provide potential habitat but limited and temporary habitat impacts make harm unlikely. See discussion following table for additional information.
Little spectaclecase *Villosa lienosa*	—	SOC	N/A[1] / May Impact	The Trinity River and major tributaries provide potential habitat but limited and temporary habitat impacts make harm unlikely. See discussion following table for additional information.
Louisiana pigtoe *Pleurobema riddellii*	—	T	N/A[1] / May Impact	The Trinity River and major tributaries provide potential habitat. See discussion following table for additional information.
Texas heelsplitter *Potamilus amphichaenus*	—	T	N/A[1] / May Impact	The Trinity River and major tributaries provide potential habitat. See discussion following table for additional information.
Texas pigtoe *Fusconaia flava*	—	T	N/A[1] / May Impact	The Trinity River and major tributaries provide potential habitat. See discussion following table for additional information.
Wabash pigtoe *Fusconaia flava*	—	SOC	N/A[1] / May Impact	The Trinity River and major tributaries provide potential habitat but limited and temporary habitat impacts make harm unlikely. See discussion following table for additional information.
Alligator snapping turtle *Macrochelys temminckii*	—	T	N/A[1] / May Impact	The project area contains perennial water bodies, but limited and temporary habitat impacts make harm unlikely. See discussion following table for additional information.
Texas garter snake *Thamnophis sirtalis annectens*	—	SOC	N/A[1] / No Impact	This species is adapted to urban areas and would be expected to move away from construction activity to available habitat that would not be needed by the proposed project.
Timber/canebrake rattlesnake *Crotalus horridus*	—	T	N/A[1] / May Impact	The project area contains riparian forests, but species range lies generally to the east. See discussion following table for additional information.

TABLE 4-32. EFFECT/IMPACT FOR SPECIES WITH PREFERRED HABITAT

SPECIES	FED. STATUS	STATE STATUS	SPECIES EFFECT / IMPACT	EXPLANATION OF EFFECT/IMPACT ASSESSMENT
Key to Terms Reflecting Potential Harm to Species: **No Effect** = No positive or negative impacts are expected as the species would not be exposed to the potential project and its environmental consequences (applies to species with some form of federal protection under the ESA; USFWS concurrence is not required for this determination) **May Affect, But Not Likely to Adversely Affect** = All potential effects are beneficial, insignificant (i.e., undetectable or not measurable), or discountable (i.e., unlikely to occur) (term applies to species with federal protection ESA; this determination requires USFWS concurrence) **May Affect, and is Likely to Adversely Affect** = The species would likely be exposed to environmental consequences of the proposed project and would respond in a negative manner to the exposure **N/A** = No determination of effect or impact is required because species lacks federal listing status **No Impacts, May Impact, or Likely to Impact** = Determinations relating to state-listed species or SOCs regarding the likelihood of adverse impacts **Key to Abbreviations Used to Indicate Species Listing Status:** **E** = State- or Federal-Listed Endangered **T** = State- or Federal-Listed Threatened **C** = Federal Candidate for Listing (USFWS has acquired data on biological vulnerability to support listing, but data is being gathered regarding critical habitat) **DL** = Federally-Delisted **—** = No designation occurring within identified county by the USFWS or TPWD, as applicable **SOC** = Designated as a "species of concern" by the TPWD (rare, but with no regulatory listing status) * = TPWD T&E species list indicates species could be present in Dallas County; however, USFWS T&E species list does not indicate a listing status for the species in Dallas County				
Sources: U.S. Fish and Wildlife Service (January 25, 2013); Texas Parks and Wildlife Department, Wildlife Division, Diversity and Habitat Assessment Programs, County Lists of Texas Special Species (Denton County list acquired on January 22, 2013, which was last revised on February 28, 2011); and Field Biological Survey (November 14, 2012); USFWS Dallas Floodway Study (USFWS, 2010).				

As mentioned in **Section 3.4.7.3**, NDD data is maintained to support determinations of potential species occurrence for geographic areas of interest and to provide specific information where available. However, an absence of NDD data for an area may not be taken as evidence of absence of a species in that area. With the exception of the Texas pigtoe mussel, no recent occurrences of federally- or state-listed threatened or endangered species have been identified in the project study area during field surveys, and no information has been received from past correspondence with the USFWS, TPWD, and other organizations considered to have special expertise related to wildlife and their habitat. Other organizations contacted regarding sensitive species issues included the Dallas Zoo, Audubon Dallas, and Rogers Wildlife Rehabilitation, Inc.

<u>Interior Least Tern</u>

Within the Trinity River basin, the interior least tern has adapted to using non-traditional nesting habitat, which includes sand and gravel pits, dirt roads, and gravel rooftops instead of expected natural habitat such as sandbars and salt flats (Lott, 2006). In the greater Dallas area, this species has been known to nest on man-made structures, and has been found nesting on top of warehouses along the Elm Fork of the Trinity River in northwestern Dallas County. Nesting terns have also been documented on spoil beds at the Southside Wastewater Treatment Plant, approximately 9 miles southeast of the project area (EOID 2874), which is near a second nesting area at a sand and gravel pit (EOID 7284). The birds spend less than half the year in the Metroplex, arriving in May and nesting until early September, and tend to return to the same sites year after year. Typical nesting sites are usually associated with calm water bodies deep enough to support fish life, which is the primary food source for the tern. However, the species is not generally known to nest in the project area (see **Appendix A-1**, page 106, Dallas Zoo correspondence).

Field surveys were conducted in July 2008 to determine if the terns were using the project area for nesting or foraging. No evidence of the interior least tern was observed at any potential nesting sites or foraging grounds within the project area (Halff, 2008). The interior least tern survey report was coordinated with the USFWS in February 2009 with a recommended effect determination of "may affect, not likely to adversely affect" for the proposed project. The USFWS concurred with the recommended effect determination on March 2, 2009 (**Appendix A-1**, page 112).

Another consideration is the possibility of construction activities attracting interior least terns to the area by creating potential nesting habitat in the form of bare open areas near the Trinity River. Monitoring construction sites during late spring would ensure that if terns begin utilizing the area during construction, appropriate measures could be taken to locate and protect nests.

Mollusk Species

The Trinity River clearly contains potential habitat for all of the mollusk species listed in **Table 4-32**. Based on the discussion of NDD records in **FEIS Section 3.4.7.3**, it may be presumed that the Texas pigtoe mussel may be found in the Trinity River within the project area. There is also a substantial likelihood that Louisiana pigtoe and Texas heelsplitter mussels may occur within the project area, and the Texas heelsplitter and three SOCs may also be present (i.e., fawnsfoot, little spectaclecase, and Wabash pigtoe). In addition, evidence of dead mollusk shells of the sandbank pocketbook mussel from several miles upstream suggest that this state-threatened species could also be found within the Trinity River or major tributaries in the project area. Additionally, mussels may also occur within the open waters within the old meanders of the Trinity River.

As shown in **Table 4-29**, fill and excavation activities associated with Alternative 3C would affect 7.03 acres of the Trinity River and tributary streams. Alternative 3C would affect approximately 0.74 acre of the old meanders of the Trinity River. In addition, indirect impacts resulting from soil erosion and sedimentation from construction sites could prove harmful to mollusks in the Trinity River, despite the implementation of erosion control measures discussed in **FEIS Section 4.13**. Based on these considerations, adverse impacts would be expected to mussel species in the immediate vicinity of any such excavation or fill sites.

In accordance with Chapters 67 and 68 (Sections 68.002, 68.015, and 65.171) of the Texas Wildlife Code (31 TAC Sections 65.175 and 65.176), appropriate survey and/or relocation activities for the proposed project would be completed prior to construction in order to minimize and/or mitigate for potential impacts to state-listed threatened freshwater mussels. As no formal mussel survey and/or relocation protocols for Texas have been issued by the TPWD or USFWS to date, it is expected that mussel survey protocols would be developed in accordance with informal TPWD guidance and with scientific protocols accepted by the TPWD on previous comparable projects. Survey and relocation methodology for the proposed project would be designed and coordinated with the TPWD prior to implementation in the mussel survey area that would be designated for the proposed project. Based on the site-specific mussel survey developed for final design of the proposed project, avoidance measures would be developed that may include relocation of mussels to designated sites upstream or downstream of the project. Accordingly, no substantial adverse impacts are expected to state-listed freshwater mussels that may be in the project area.

Alligator Snapping Turtle

The alligator snapping turtle requires perennial water bodies for habitat and, if the species occurs within the study area, the aquatic features that could provide suitable habitat for the species are the Trinity River and Cedar Creek. Alternative 3C would not impact Cedar Creek, but impacts to the Trinity River and associated perennial tributaries would occur as outlined in **Table 4-28**. The effect these disturbances could have on any alligator snapping turtles inhabiting the river channel and other aquatic habitats is difficult to predict; however, much t of the impacts for Alternative 3C (i.e., 2.80 acres) would be a result of excavation of potential borrow areas for roadway embankment. This excavation and borrow activity would involve benching excavated areas into the overbanks of the Dallas Floodway pilot channel, causing only temporary disturbances to preferred habitat within deeper areas of the river. An additional 4 acres of fill would occur to the Trinity River between the IH-35E and Corinth Street bridges for the construction of retaining walls. The primary potential adverse impact would be direct contact between construction machinery or fill material with turtles. However, as the alligator snapping turtle is completely aquatic, with females leaving the water only to nest, individual turtles would be expected to move away from excavation activity to undisturbed suitable habitat that is available upstream and downstream of the project. Access and use of such areas by the species would not be restricted by the proposed project. Accordingly, although it is possible that the proposed project could impact this species, substantial adverse impacts are not considered to be likely.

Timber/Canebrake Rattlesnake

The DFW Metroplex, including the project area, represents the far western edge of the range of the timber/canebrake rattlesnake, and is characterized by drier conditions than generally preferred for this snake. The home range of this species is large, at times encompassing in excess of 100 acres. The timber/canebrake rattlesnake is a shy animal that prefers to live in areas with high amounts of cover and available refuge. If a localized population of the rattlesnake occurs within the project area, it would most likely reside deeper within the forested floodplain as this would be preferred for den locations. Also, forested areas near permanent water sources are the most likely to be suitable for this species. As indicated in **Table 4-30**, impacts from Alternative 3C to riparian forests and forested wetlands would affect approximately 50.4 acres of forest habitat. Most of the acreage of possible habitat affected by Alternative 3C occurs between the DART and MLK Boulevard bridges, and consists of isolated areas and fringe areas located at the outer margin of wooded floodplain that extends several miles southeast of the project study area. Although it is unlikely that the rattlesnake would be found within such areas when preferred habitat is available to the south of the project area, proposed construction of Alternative 3C would not likely adversely impact this species. This is because Alternative 3C would not affect more than 10 percent of available habitat within the project area, and it is expected that this species would move deeper into the extensive riparian forests of the Trinity River floodplain to avoid construction activity. Consequently, although it is possible that the project may affect this species, adverse impacts are not likely to occur.

4.9.3.3 Migratory Bird Treaty Act

As discussed in **FEIS Section 3.4.7.3**, NDD records include several rookeries or nesting colonies of heron and egret species within a 10 mile search radius of the proposed project. Although none of the EOID records included sightings of any threatened or endangered species, these nesting areas would be subject to protection under the MBTA (see **Section 3.4.7.5**). The rookery north of IH-35E (EOID 2952) is already isolated from other potential habitat by its urban surroundings, and it is not anticipated that the proposed project would isolate it further. The location near Hutchins (EOID 1439) is approximately 4 miles away from the proposed project area, and is no longer known by local wildlife rehabilitation professionals to serve as a rookery. A nesting colony of cattle egrets (EOID 561) and two egret/heron rookeries (EOIDs 6868 and 3672) are all located more than 8 miles away from the project area and are too remotely located to be adversely affected by the proposed project. Accordingly, Alternative 3C would not directly impact any the foregoing rookeries or nesting colonies.

As noted in **Section 3.4.6**, a variety of migratory birds utilize the project area. The proposed project would not be likely to alter existing migration patterns. To ensure compliance with the MBTA, a survey of areas likely to contain migratory bird nests (e.g., forests, and bridge structures) would be conducted prior to construction to verify if any migratory birds or nests are located in the project area. Additionally, the bird nest survey should include habitat suitable for ground nesting birds, such as preferred habitat for the interior least tern (i.e., open sandy or gravelly areas, or otherwise as described above). The construction contractor would remove all old migratory bird nests between October 1 and February 15 from any structures that would be affected by the proposed project, and complete any bridge work and/or vegetation clearing. In addition, the contractor would be prepared to prevent migratory birds from building nests between February 15 and October 1. In the event migratory birds are encountered on-site during project construction, adverse impacts on protected birds, active nests, eggs, and/or young would be avoided. Due to the mobile nature of migratory bird species and the presence of suitable habitat adjacent to the study area, the proposed project is not anticipated to have any adverse effects, temporary or permanent, on migratory bird species.

4.9.3.4 Coordination with the USFWS and TPWD

As discussed in **Section 3.4.7.4**, coordination with the USFWS and TPWD is required under the FWCA for projects that propose to modify streams or other water bodies. The proposed excavation/borrow areas for Alternative 3C would trigger the FWCA consultation requirement. Initial coordination with the USFWS and TPWD occurred in 1999, and was conducted pursuant to NEPA and the FHWA scoping requirements to assess the possibility of encountering threatened and endangered species and/or potential habitat protected under the ESA and the MBTA. The USFWS and TPWD were also included in agency coordination of the DEIS (2005), SDEIS (2008), and LSS (2012). In response to these coordination efforts, letter correspondence has been received from the Department of the Interior's Office of Environmental Policy and Compliance with reference to the DEIS, SDEIS, and LSS. The TPWD has provided letter comments in response to the initial scoping request as well as the DEIS, SDEIS, and LSS. In addition, specific coordination with the USFWS occurred in 2009 regarding a proposed effect determination for the interior least tern, to which the USFWS provided written concurrence. Project sponsors have taken the comments provided by the USFWS and TPWD into consideration in the planning and design of the Trinity Parkway, and will continue to solicit input from these agencies with regard to this FEIS.

4.10 SECTION 4(f) APPLICABILITY

As discussed in **FEIS Section 3.3.1.1**, Congress has exempted the FHWA from the requirements of Section 4(f) of the USDOT Act of 1966 (49 USC Section 303 and 23 USC Section 138) with regard to any highway project in the vicinity of the Dallas Floodway. Accordingly, the Trinity Parkway is exempt from the specific analysis and documentation required by Section 4(f) for potential impacts to the various resources that would otherwise be subject to Section 4(f). However, as NEPA requirements include the analysis of all environmental impacts, discussions of potential impacts to public parks, recreation areas, wildlife or waterfowl refuges, and historic sites are included in the appropriate subsections of this chapter.

4.11 POTENTIAL MICROCLIMATE IMPACTS

4.11.1 Potential Microclimate Impacts

The influence of urbanization, including roadway construction, on climate (local or global) is difficult to predict because the exchanges of energy, mass, and momentum are very complex. A city's compact mass of buildings and pavement exhibits a complex geometry of street canyons and a large spatial heterogeneity and constitutes a profound alteration of the natural landscape, which may result in a large number of microclimates. These microclimates are often characterized by the existence of "urban heat islands," where rises in air temperature may reach several degrees above nearby rural areas (NASA, 1999). This phenomenon is of interest from an environmental standpoint in terms of impacts such as increased energy consumption to cool urban buildings, the contribution of increased ambient air temperatures in promoting the formation of atmospheric ozone, and adverse effects on the health and comfort of urban dwellers (USEPA, 2013a).

The heat island effect in urban areas is attributable to the replacement of natural landscapes by buildings and paved surfaces. As a result, solar energy is absorbed into roads and rooftops, which may cause the surface temperature of urban structures to become much higher than the ambient air temperature. **Table 4-33** shows "albedo" or reflectivity values for typical urban surfaces. The albedo is the fraction of the total amount of solar energy (i.e., light) received by a surface that is reflected away from the surface, and is sometimes expressed as a percentage. As such, low albedo values imply higher surface temperatures because relatively larger amounts of energy are absorbed into the surface.

TABLE 4-33. TYPICAL URBAN SURFACE ALBEDOS

SURFACE	ALBEDO RANGE	SURFACE	ALBEDO RANGE
Tar and Gravel Roof	0.03-0.18	Brick/Stone	0.20-0.40
Asphalt	0.05-0.20	Grass	0.25-0.30
Concrete	0.10-0.35	White Paint	0.50-0.90
Trees	0.15-0.18	Highly Reflective Roof	0.60-0.70
Colored Paint	0.15-0.35		
Source: NASA, 1999.			

The albedos in **Table 4-33** show that darker surfaces (e.g., asphalt, tar and gravel roof, and trees) have the lowest albedo values and absorb much more heat than lighter-colored surfaces. Albedo is also affected by the texture of a surface, with greater absorption (i.e., lower albedo) by rough textured surface as compared to a smooth textured surface of the same color. As a result, darker surfaces can become very hot (as much as 70°F above the air temperature). Thus, the main contributors to urban heat island effects are often dark roofs and asphalt pavements.

4.11.1.1 No-Build Alternative

The No-Build Alternative would have no anticipated impacts to the microclimate as currently affected by the combination of urban and natural surfaces throughout the project area, or as would be expected as urban development and redevelopment occurs in the project area.

4.11.1.2 Build Alternative

The proposed action may have a direct microclimate impact by increasing surface temperatures on and immediately adjacent to the roadway itself (within the ROW), especially during summer months. The expected extent of new paved surfaces within the Alternative 3C ROW would be approximately 245 acres. However, all but approximately 143 acres would replace existing urban surfaces such as buildings and pavement, so the change in albedo for such areas would be negligible. Based on the typical albedo values in **Table 4-33**, the change in albedo would be approximately 10 percent lower than the existing albedo for grassland areas in the floodway, which would be the ground cover most affected by Alternative 3C. The change in albedo as compared to riparian forest areas would be much less because the acreage affected is much less than grassland impacts and because the albedo range for trees overlaps greatly with the albedo range for concrete. The long-term contribution of excavation/borrow areas to change in albedo is expected to either have no change in albedo for these areas or possibly may increase albedo for these areas because the water surfaces that would eventually result generally have a higher level of reflectivity than do vegetated surfaces.

Overall, the shift in albedo and, therefore, the contribution of Alternative 3C to the heat island effect in the project area are not considered substantial. Moreover, Alternative 3C would be constructed within a major pre-existing urban environment surrounded by typical urban structures, such as buildings, bridges, and asphalt/concrete-paved roadways. When combined with existing conditions, the proposed action would have no perceivable impact to the urban heat island effect. Consequently, no substantial adverse microclimate impacts are anticipated.

4.12 TOPOGRAPHY, GEOLOGY, AND SOILS

4.12.1 No-Build Alternative

No impacts to topography, geology, and soils would occur in the project area under the No-Build Alternative.

4.12.2 Build Alternative

Alternative 3C would result in a change to existing surface topography (described in **FEIS Section 3.5.1**) due to cut and fill slopes, embankment material, excavation, ditching, and/or trenching. Construction of Alternative 3C may involve coordinated development with other projects (see **FEIS Sections 1.6.1.2** and **4.2**) and, therefore, require substantial modifications to the Dallas Floodway (e.g., construction of roadway embankments, levee modification, and lake excavation). A summary of the estimated excavation and/or fill quantities required for Alternative 3C is provided in **FEIS Section 4.21.2**.

As discussed in **FEIS Section 3.5.3**, the project area is considered to be free of geologic and soil conditions that would be expected to constitute potentially adverse impacts, hazards, or impediments to construction. The proposed action is located in a region of relatively low seismicity risk. Project features would be designed to incorporate provisions for mitigation of expansive soils and possible local presence of weak soils, flood control features (i.e., levees, embankments, sump areas), and high water table conditions.

Mineral resources within the project area are limited to near-surface deposits of sand and gravel. Extensive areas of sand and gravel extraction have occurred in the past along the floodplain/terrace complexes of the Trinity River. As there are no active mining areas within the project area, the Build Alternative would not impact mineral production.

During and immediately following construction, Alternative 3C would create exposed soils and the potential for stormwater runoff to cause soils to erode. The erosion potential for soils within the ROW for Alternative 3C generally ranges from slight to moderate (see **Section 3.5.3.3**). However, several former sand/gravel mines, mapped as Arents soil, are characterized by steeper slopes have severe erosion potential. The relatively flat topography in the project area reduces the potential for erosion during project construction. Erosion is expected to be limited to the immediate vicinity of the proposed roadway, new embankment slopes, and at interchanges and overpasses. As discussed in the next section, however, soil erosion would be controlled through erosion and sedimentation control measures that would be implemented prior to and during construction.

4.13 POTENTIAL IMPACTS TO WATER QUALITY AND WATER USE

This section describes potential surface water and groundwater quality impacts that may result from the proposed action. Included at the outset is a description of the regulatory requirements addressing the prevention of impacts to water quality from major construction activities.

4.13.1 Agency Coordination and Regulatory Requirements

4.13.1.1 FHWA Requirements

The proposed action would comply with the FHWA regulations regarding Erosion and Sediment Control on Highway Construction Projects (23 CFR Sections 650.201 – 650.211). The FHWA policy contained in these regulations requires construction of highway projects to be designed, constructed and operated according to standards that will minimize erosion and sedimentation from such projects. These regulations require all reasonable steps to inhibit the dislodging and transporting of soil particles by water and wind, and to limit the area of exposed soil and the time that soil is exposed to these transporting elements. The implementation of the FHWA's policies relies primarily on following state highway agency guidelines, as long as such guidelines are at least as stringent as specified drainage guidelines published by the American Association of State Highway and Transportation Officials (AASHTO, 1992). In Texas, the FHWA follows TxDOT guidelines and TCEQ regulatory requirements that address the prevention of impacts to water quality from highway construction sites.

4.13.1.2 State of Texas Permit Requirements

The Texas Pollution Discharge Elimination System (TPDES) program implements the federal National Pollution Discharge Elimination System (NPDES) program in the State of Texas. Since 1988, the State of Texas has been implementing its TPDES program under a delegation of authority from the USEPA (63 *Federal Register* 51164, September 14, 1988). As of March 2003, the TCEQ developed its own general permit for construction activities that exceed 1 acre. This general permit was renewed and issued on February 19, 2013.

As construction of Alternative 3C would disturb more than 5 acres of ground surface, the proposed project must comply with the conditions of TPDES General Permit Number TXR150000. A Notice of Intent for storm water discharges associated with construction activity would be submitted to the TCEQ in compliance with the TPDES General Permit, as well as a Notice of Termination upon completion of construction. The TPDES general permit also requires the development of a Storm Water Pollution Prevention Plan (SW3P) and a construction site notice would be posted on the construction site. The TCEQ requires each SW3P to take the following actions:

- Prepare the SW3P in accordance with good engineering practices;
- Identify potential sources of pollution that may reasonably be expected to affect the quality of storm water discharges from the construction site;
- Describe and ensure the implementation of practices that would be used to reduce the pollutants in storm water discharges associated with construction activity at the site; and
- Assure compliance with the terms and conditions of the TPDES General Permit.

4.13.1.3 Water Quality Certification

Section 401 of the CWA requires a Water Quality Certification for USACE Section 404 permit applications for the discharge of dredged or fill material into waters of the U.S., including wetlands. In Texas, such certification action by the TCEQ provides reasonable assurance that an activity that may result in discharge to waters of the U.S. would not violate water quality standards. As the proposed project would require a Section 404 Individual Permit or authorization under RGP 12, a Water Quality Certification would also be required prior to commencing construction activities.

4.13.1.4 Storm Sewer Permit

Municipalities and other designated entities have storm water permit requirements to monitor storm water during wet weather events. In north central Texas, this includes the cities of Dallas, Fort Worth, Arlington, Garland, Irving, Plano, Mesquite, and the local districts of TxDOT. In addition, the NTTA applied for its own Municipal Separate Storm Sewer System (MS4) permit that was approved by the TCEQ on February 22, 2006. The NCTCOG has been assisting these entities through a cooperative regional monitoring program designed to meet permit requirements. The primary goal of the regional sampling program, which calls for quarterly sampling within each entity's designated watershed, is to establish a baseline and determine long-term trends to assess the impact of storm water discharge on receiving stream quality. The NTTA permit would remain in effect during the course of the proposed project. The major elements of the storm water management program required as part of NTTA's permit include the following:

- Structural controls to reduce the discharge of pollutants;
- Operation and maintenance of roadways in a manner that minimizes the discharge of pollutants (including deicing or sanding activities);
- Development and implementation of controls to reduce the discharge of pollutants related to the storage and application of pesticides, herbicides, and fertilizers applied to public rights-of-way or other NTTA property;
- Programs and controls to prevent illicit discharges and improper disposal (i.e., sanitary sewer overflows into the MS4, motor vehicle fluids, household hazardous wastes);
- Spill prevention and response programs;
- Identification and evaluation of industrial and high risk runoff (i.e., landfills, TSD facilities) and implementation of control measures and a monitoring program, if necessary;
- A program to reduce the discharge of pollutants from construction sites;
- A public education program; and
- Monitoring and screening programs (i.e., dry and wet weather screening).

This project is located within the boundaries of the Phase 1 City of Dallas MS4, and would also comply with the applicable Dallas MS4 requirements.

4.13.2 No-Build Alternative

The No-Build Alternative would not have a direct impact to water quality in the Trinity Parkway project area. Increased congestion on local roadways and the resulting stop-and-go traffic may add to the build-up of pollutants on road surfaces and ROW in the project area. This has the potential for long-term adverse impacts on the quality of surface and groundwater. In addition, decreased traffic safety due to congestion may increase the potential for an accidental spill of toxic or otherwise hazardous materials along existing roadways, such as IH-35E or IH-30.

4.13.3 Build Alternative

4.13.3.1 Erosion Control and Mitigation

The major short-term water quality issues associated with construction activities are erosion and sedimentation. Erosion and sedimentation are accelerated when vegetation is cleared in preparation for the construction of the roadway. These cleared areas and any other exposed ground are susceptible to erosion. Alternative 3C requires the crossing of several water features within the project area, including the Trinity River and/or its network of drainage sumps and tributaries. The levels of potential erosion and sedimentation are dependent upon local conditions (i.e., soil type, slope, and preconstruction vegetation) and construction practices. Bridge construction also has the potential to create soil erosion, which could affect sedimentation and turbidity of water. Eroded sediment may then redeposit downstream, resulting in the disruption of the aquatic ecosystem and degradation of water quality. In addition, increased pavement area and vehicular traffic over the life of the project have the potential to discharge storm water pollutants to the water bodies and wetlands that could negatively impact the quality of surface water.

To minimize adverse effects to water quality during construction, the proposed project would utilize temporary erosion and sedimentation control practices (i.e. temporary vegetation, mulch, sod, silt fences, rock berms, grassy swales, and vegetation-lined ditches) from NTTA's *Construction Manual* which generally follows TxDOT's *Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges* (NTTA, 2011a; TxDOT, 2004). Where appropriate, these temporary erosion and sedimentation control structures would be in place prior to the initiation of construction and would be maintained throughout the duration of 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 NTTA and TxDOT plant seeding specifications for erosion control (NTTA, 2011a; TxDOT, 2006).

4.13.3.2 Evaluation of Potential Runoff Impacts on Aquatic Resources

Existing water quality data suggest that surface water quality has already been compromised by wastewater effluent, contaminated groundwater, and local urban runoff, including storm water runoff from existing roadways in the project area and beyond (see **FEIS Section 3.5.5**). Concentrations of several pollutants in water and sediment within the Trinity River, including the project area, exceed water quality and aquatic wildlife objectives established by the TCEQ and Texas Department of State Health Services (TDSHS). Furthermore, existing concentrations of contaminants (i.e., dioxin, bacteria, and PCBs) may be adversely affecting the local aquatic environment (see **Table 3-29**).

The most common contaminants in highway runoff are heavy metals, inorganic salts, aromatic hydrocarbons, and suspended solids that accumulate on the road surface as a result of regular highway operation and maintenance activities. Deicing and sanding practices may leave concentrations of chloride, sodium, and calcium on the roadway surface. Ordinary operations and the wear and tear of vehicles also result in the dropping of oil, grease, rust, hydrocarbons, rubber particles, and other solid materials on the highway surface. Although leaded gasoline is no longer in use, lead is still being deposited on highway surfaces through atmospheric deposition and sources such as paints used on roadways and railings.

The ability to predict highway runoff quality is limited by the many variables that combine to make each storm event unique. Differences in antecedent dry conditions, rainfall intensity, traffic volume, surrounding land use, highway surface type, and drainage method result in a wide range of concentrations for many of the pollutants observed in runoff.

During construction, receiving water quality may be affected as storm water runoff is transported from exposed construction areas to the receiving environment. During the operation phase of the proposed action, storm water would have elevated concentrations due to the increase in impervious surfaces. Potential impacts on receiving water quality from both the construction and operation phase may include the following:

- **Sedimentation and solids suspension:** Direct impacts may include reduction in light penetration (limiting growth of aquatic plants), alteration of geomorphology and in-stream habitat, covering of benthic communities, and reduced visibility for aquatic wildlife. Suspended solids may also be a source of heavy metals and nutrients, which may magnify the effect to the aquatic environment.

- **Gross litter accumulation:** Litter accumulation is typically unsightly and reduces the aesthetic quality of a waterway. Physically, litter accumulation may impede wildlife movement, or interfere with local drainage (i.e., clogging storm drainages) within the proposed project.
- **Hydrocarbon and toxicant contamination:** The oxidation of hydrocarbons found in runoff may contribute to the biochemical oxygen demand within a particular water feature. Together with increased nutrient loads, which may facilitate excessive macrophyte/algal growth, the ultimate effect would be the depletion of dissolved oxygen which could lead to the death of aquatic organisms.
- **Heavy metal accumulation:** Chemical reduction of heavy metals may contribute to the biochemical oxygen demand in the water column. Absorption of metals by aquatic species may also lead to immediate lethal effects, or sub-lethal effects which may eventually lead to long-term impacts on community health.

Throughout the mid-1980s the FHWA conducted extensive nationwide studies to identify highway runoff constituents, determine amounts in runoff relative to roadway types and traffic conditions, and assess the potential impacts to surface water resources (Driscoll, Shelley and Strecker, 1990). The FHWA's research concluded that pollutants in highway runoff are not present in amounts sufficient to threaten surface or groundwater where ADT volumes are below 30,000 vehicles. **Table 4-34** lists the FHWA study results for pollution concentrations in highway runoff for highways with ADT volumes less than 30,000 and more than 30,000.

TABLE 4-34. POLLUTANT CONCENTRATIONS IN HIGHWAY RUNOFF

Pollutant	Event Mean Concentration (mg/L) ADT Less Than 30,000	Event Mean Concentration (mg/L) ADT More Than 30,000
Total Suspended Solids	41.0	142.0
Lead	0.080	0.400
Zinc	0.080	0.329
Copper	0.022	0.054
Source: Driscoll, Shelley and Strecker, 1990. **Notes:** Event mean concentrations were derived by averaging from several storm events. **mg/L** = milligrams per liter (by volume) **ADT** = Average Daily Traffic (i.e., vehicles per day)		

To better put the above-noted pollutant concentrations into perspective, the USEPA acute toxicity threshold levels for human health are 0.477 milligrams per liter (mg/L) for lead, 0.800 mg/L for zinc, and 0.065 mg/L for copper. Concerning pollutant threshold levels that may cause adverse impacts to aquatic life, the FHWA study concluded that:

- Pollutants in runoff for highways with less than 30,000 ADT, and without runoff abatement, would not cause adverse impacts to aquatic life; and
- Pollutants in runoff for highways with more than 30,000 ADT have the potential, without runoff abatement, for adversely affecting aquatic life.

As described in **FEIS Section 4.6.1.1**, the projected traffic volumes for the Build Alternative would exceed 30,000 ADT. Highway runoff abatement measures would be incorporated into construction planning in accordance with TPDES SW3P permit requirements, which require the use of storm water BMPs that would control negative impacts on water quality from this project.

In consideration of the *Executive Memorandum on Beneficial Landscaping* (FHWA, 1994), landscaping activities for Alternative 3C would utilize techniques to minimize the adverse effect that landscaping may have on the local environment. In particular, this means employing landscaping practices and technologies that conserve water and prevent pollution. By using effective landscape management practices, appropriate application of pesticides and fertilizers, and runoff reduction practices, potential impacts to water quality would be minimized.

The proposed action would not affect any public water supply, water treatment facilities, or water distribution systems; however, rainfall runoff rates would increase slightly due to the increase in impervious cover. This increased runoff could have adverse impacts over the long term, which would be magnified if the possibility of overland flow is not available and proper control measures are not implemented. However, to manage the possibility of contamination of surface water due to pollutant runoff, proper control measures would be implemented during construction and operation of the proposed action.

4.13.3.3 Potential Impacts to the Quality of Groundwater

As described in **FEIS Section 3.5.4.2**, the groundwater recharge zones for the Trinity Aquifer and the Woodbine Aquifer are located 6 miles or more to the west of the project area. This geologic situation makes it highly improbable that any deep percolation of contaminants originating in the project area could affect these groundwater resources. In addition, no public drinking water supply wells are located in the project area, therefore public health concerns related to any potential groundwater impacts would be negligible. There is, however, the possibility that the introduction of contaminants within the project area could enter local soils and contaminate near-surface groundwater. The discussion below considers aspects of this type of potential impacts to subsurface groundwater contained in local soils.

During the short term, the primary impacts to groundwater are associated with increased runoff and erosion during construction. Removal of vegetation reduces infiltration of water into the soil during rainfall events, thus increasing runoff and reducing percolation of water into shallow groundwater sources. However, it is also a characteristic of the project area that water runoff from exposed earth and stockpiled materials may be eroded and transported into nearby surface water features that would slow the flow of storm water and retain water (e.g., emergent wetlands, ponds, old river meanders), and which may have the potential to recharge underground water supplies. In addition, the SW3P would deploy temporary BMPs to minimize the amount of increase in construction site runoff and erosion during storm events.

Over the long term, the main potential impact to groundwater would come from the continuing runoff of debris and pollutants that accumulate on the road surface and along the ROW, or possibly an isolated spill event. An accidental release of hazardous materials could have an adverse impact on the quality of near-surface groundwater, especially if such an accident were to occur at a bridge crossing of the Trinity River. Alternative 3C would involve a crossing of the Trinity River main stem and its associated drainage sumps and tributaries at varying locations. Groundwater is present within alluvial strata primarily associated with the Trinity River terrace deposits throughout the study corridor. These shallow groundwater resources exist in sand and gravel soils that are highly permeable, and therefore, would experience some recharge during storm events. As such, shallow groundwater would be susceptible to constituents of concern from storm water runoff associated with the proposed project. However, aeration, biodegradation, and absorption of contaminants by clay minerals are supported by the soil types and the expanse of the alluvium in the area. In addition, highway runoff abatement measures would be implemented in accordance with NTTA's MS4 permit and TPDES permit requirements.

Continued urban development, along with potential channel modifications within the Dallas Floodway, may slightly alter local groundwater inflows and outflows of the Trinity River. These flow changes are not likely to cause any substantial shallow groundwater quality problems. As previously described in **Section 2.8** and **Section 4.8.2**, lakes proposed by the City of Dallas in the Dallas Floodway as part of the BVP could provide a source of roadway embankment material for Alternative 3C. In the event the Build Alternative is selected in the anticipated ROD, the borrow sites for roadway embankment are proposed as "dry" excavations produced by benching excavated areas into the overbanks of the Dallas Floodway pilot channel in the shapes of the BVP lakes. Areas of sandy material in the Dallas Floodway may be exposed by the borrow excavations, and near-surface groundwater may be encountered in these areas. Where such conditions exist, appropriate methods of cutting off under-seepage would be required to protect the integrity of the Dallas Floodway levees. Depending on the nature of the conditions encountered during excavation, these methods may include cutoff walls and impervious membranes or liners in the potential borrow areas. While changes to the existing localized hydrogeologic regime may occur as a result of these activities, no adverse impacts to the quality of shallow groundwater quality would be expected.

4.13.3.4 Beneficial Use of Surface Water Resources

Generally, beneficial use is the use of a reasonable amount of water necessary to accomplish the purpose of an appropriation, without waste. In Texas, this refers to the amount of water that is economically necessary for purposes authorized by the Texas Water Code, when reasonable intelligence and reasonable diligence are used in applying the water to that purpose. Purposes of use include domestic and municipal, industrial, agricultural, recreational, and in-stream uses such as aquatic and wildlife habitat. Conserved water is considered a beneficial use (Texas Water Code Section 11.002(4); Texas Administrative Code Chapter 30, Part I, Section 297.43). The construction footprint for Alternative 3C would require some fill of water resources in various locations, which would include portions of the Dallas Floodway and associated flood control storage sumps and wetlands. Although fill activities would remove some aquatic features from the landscape, it is not anticipated that these activities would substantially affect the capacity of the Trinity River and its waters to provide other beneficial uses to the public downstream.

4.13.3.5 Mitigation of Long-Term Impacts

The overall mitigation structure for water quality impacts is a condition of the TPDES requirements as well as other local, state, and federal storm water runoff control and management programs. Implementation details for these mitigation measures would be developed and incorporated into project design and operations prior to beginning project construction. With proper implementation and monitoring of appropriate mitigation measures, any substantial short-term (construction-related) and long-term (operation-related) water quality impacts would be avoided or minimized. Detailed information concerning measures to minimize water quality impacts is provided in **Chapter 5**.

4.14 FLOODPLAIN IMPACTS

This section presents an assessment of impacts resulting from the proposed project to floodplains and flood control features within the project area. The discussion below builds on the definitions of terms/acronyms and the discussion of regulations governing the protection of floodplains and floodways, the flood control features within the project area, and history of the Dallas Floodway that are in **FEIS Section 3.5.6**. Floodplain impacts in this section are divided into a discussion of impacts on the “Trinity River Main Stem” and a discussion of the surrounding “Developed Areas.” This was done for clarity in comparing impacts to the applicable agency criteria. That is, conditions within the Dallas Floodway are controlled by the USACE, with the City of Dallas having local operations and maintenance authority; and hydraulic conditions within the surrounding developed areas are generally controlled by FEMA through the NFIP, and the City of Dallas through its municipal authority.

This assessment of floodplain impacts is organized as outlined below. **FEIS Section 4.14.1** addresses the No-Build Alternative and **FEIS Section 4.14.2** presents potential encroachments in the base floodplain areas for Alternative 3C. Then, **FEIS Section 4.14.3** includes hydraulic modeling results specific to the Dallas Floodway for Alternative 3C. This is followed by discussions relating to potential flood-related risks (**FEIS Section 4.14.4**), potential risks associated with levee stability (**FEIS Section 4.14.5**), and the potential for impacts to natural and beneficial floodplain values attributable to the proposed action (**FEIS Section 4.14.6**). Finally, **FEIS Section 4.14.7** discusses the concept of practicability as implemented in federal floodplain regulations, and **Section 4.14.8** addresses FEMA coordination related to floodplain modification should Alternative 3C be selected in the anticipated ROD.

4.14.1 No-Build Alternative

The No-Build Alternative would not encroach on any existing floodplains or regulatory floodways, nor would it have any effect on base flood elevations in the project area.

4.14.2 Build Alternative - Developed Area Impacts

Potential floodplain impacts on affected streams and other water bodies in the developed areas were evaluated by use of the FIRMs published by the FEMA, as well as available engineering studies for city drainage facilities. The developed areas include water courses and drainage facilities typical of an urban development, as well as the pumps, sumps and related facilities particular to the flood protection systems on the landside of the Dallas Floodway levees (see **FEIS Section 3.5.6.2**). Due to Dallas Floodway Levee accreditation issues (see **FEIS Section 1.6.**4), the 2007 DFIRM mapping affected by the Dallas Floodway levees has been placed on hold until final LAMP guidance from FEMA is released, the levees accredited, and the mapping revised based on the final LAMP guidance. Accordingly, the official version of FEMA mapping along the Dallas Floodway Levees utilized in this analysis is still the 2001 Dallas County Effective FIRMs.

The FEMA designated floodplains in the project area are shown on **FEIS Plate 3-20**. The FEMA designations within the project area are Zone AE (100-year), Zone AE (Floodway) and Zone X. Zone AE (Floodway) is a defined area of 100-year inundation for the Trinity River main stem, primarily including the Dallas Floodway, but also including sump areas landside of the levees. Zone AE (100-year) is shown in the levee-protected areas and is labeled as "Special Flood Hazard Areas Inundated by 100-year Flood - Base Flood Elevations Determined." Zone X within the project area designates "Other Flood Areas", including areas of 500-year flood, areas of 100-year flood with average depths of less than 1-foot with drainage areas less than 1 square mile, and areas protected by levees from 100-year flood. Since the Dallas Floodway levees provide in excess of 100-year protection, Zone X represents the area protected by the levees during a 100-year flood.

The potential extent of floodplain encroachment for Build Alternative 3C was calculated based on preliminary plans for the roadways shown in **FEIS Plates 2-2 (A-B)** through **2-5 (A-B)** at the end of **FEIS Chapter 2**. The outline for the Build Alternative was transposed onto the FEMA flood zone designation map as shown on **FEIS Plates 4-7 (A-B)**. Using this mapping approach, the acreage of floodplain encroachment was estimated to be 305 acres for Zone AE (Floodway) . Potential floodplain encroachment impacts are summarized below:

- <u>Zone X (Levee Protected)</u> – This is the total footprint of Alternative 3C on developed land protected from flooding by the Trinity River levee system. Because the levee already provides in excess of 100-year flood protection in Zone X, there are no additional floodplain impacts in this zone due to Alternative 3C.
- <u>Zone AE (Floodway) Trinity River Main Stem</u> – This is the calculated total footprint of the Alternative 3C ROW within the Dallas Floodway. This zone includes embankments and bridges, plus the areas of re-grading of the adjacent levees, and is described further in **FEIS Section 4.14.3**.
- <u>Zone AE (Floodway) Developed Areas</u> – This is the FEMA floodway designation applied to the sumps landside of the Dallas Floodway levees. The impact areas are calculated a full width of the Alternative 3C ROW, resulting in the areas being overstated because sump areas are proposed to be crossed with bridges. All sump crossings would be designed for no loss of water storage volumes in the sumps.
- <u>Zone AE (100-year) Developed Areas</u> – These are areas landside of the Dallas Floodway levees and generally affected by 100-year inundation from local drainage. If portions of Zone AE (100-year) actually contribute to sump system storage, they would be subject to no loss of storage volume. Otherwise, the final design would be coordinated with the City

of Dallas and FEMA, and might involve bridges or embankments, plus other drainage improvements needed to maintain a 100-year system.

4.14.3 Build Alternative - Trinity River Main Stem Impacts

Build Alternative 3C is located within the Dallas Floodway and potentially impacts hydraulic conditions on the Trinity River Main Stem. Hydraulic impacts for Alternative 3C were assessed based on criteria in the USACE 1988 TREIS ROD criteria, which are described in **FEIS Section 3.5.6.4**. The ROD hydraulic criteria, as applicable to future projects along the Trinity River Main Stem and major tributaries, are summarized below:

- There should be no rise in the 100-year or SPF elevation for the proposed condition;
- The maximum allowable loss in valley storage capacity for the 100-year discharge is 0 percent, and for the SPF discharge is 5 percent;
- Alterations of the floodplain may not create or increase an erosive velocity on or off-site; and
- The floodplain may be altered only to the extent permitted by equal conveyance reduction on both sides of the channel.

Alternative 3C was evaluated for hydraulic and hydrologic impacts within, upstream of, and downstream of the Dallas Floodway. The analysis was performed using the USACE's Hydrologic Engineering Center – River Analysis System (HEC-RAS) program, a computer program in wide use in hydraulic modeling applications (USACE, 2013a). The primary focus of hydraulic modeling is to aid in designing the proposed project to meet the first two criteria in the list above, as water surface elevations and valley storage are values calculated by the HEC-RAS model for each of the nearly 200 cross sections depicting the geometry of the Trinity River in the project area and upstream reaches. The velocity of floodwaters in the main stream channel is also calculated by the model, and used to assess whether erosive velocities should be anticipated. The fourth of the ROD criteria seeks to ensure property owners on either side of a floodplain are equitably affected by proposed changes in the floodplain. As the City of Dallas owns the entirety of the floodplain areas within the Dallas Floodway, this criterion is not discussed further in this FEIS.

4.14.3.1 Existing Conditions

The ROD criteria basically require a comparison of existing flood event conditions along a stretch of the river to the proposed conditions if a particular project is built. The below text describes the existing conditions models used for Alternative 3C.

The existing conditions model was based on the Base Condition Risk Assessment Trinity River Corridor Dallas Floodway model obtained from the USACE in August 2012 (USACE, 2012). This model incorporates all existing and proposed features of the authorized DFE Project, including the proposed Lamar Street Levee from the end of the current Dallas Floodway to SH-310, the proposed Cadillac Heights Levee, and the chain of wetlands. Additional notable projects included in this model are as follows: the Standing Wave Project, the Santa Fe Trestle Trail Project, and the Sylvan Avenue Bridge (currently under construction). For evaluation purposes, the existing conditions model was modified to include the Horseshoe Project (future bridges at IH-30 and IH-35E [South R.L. Thornton Freeway]), based on data received from the USACE in February 2013.

The existing conditions model utilizes flood discharges that reflect future (year 2050) land uses in the 6,100 square mile Upper Trinity River Basin, and is therefore believed to be conservative with respect to flows and computed flood depths. Additional assumptions related to hydraulic modeling of Alternative 3C are outlined in **FEIS Section 1.6.1.2** (as part of the Dallas Floodway Project subsection). The above assumptions were used to create a corresponding existing conditions model, which was then utilized in the hydraulic analysis. Summary tables and other output from the existing conditions model are provided in **FEIS Appendix F**.

4.14.3.2 Proposed Conditions

The existing conditions model described above was used to build a proposed conditions model reflecting the addition of proposed roadways, bridges and embankments from Alternative 3C, which is proposed to occupy land within the Dallas Floodway levees. The assumed geometry of these features is based on the proposed alignment provided in **FEIS Plates 2-4 (A-B)** at the end of **FEIS Chapter 2**. In addition, excavation/borrow areas are incorporated into the model to provide a source for the required embankment fill material for the roadways. These borrow sites also offset the hydraulic encroachments and valley storage losses introduced by the embankments. The hydraulic model reflects the geometry for all cross sections spaced (generally approximately 200 feet apart) along the Trinity River in the project area and upstream reaches of the Elm Fork and West Fork, and calculates predicted floodwater characteristics at each of the cross sections.

The assumed borrow sites in the proposed conditions model for Alternative 3C are shown on **FEIS Plate 4-8**. These borrow sites are consistent with the conceptual layout of lakes in the City of Dallas BVP (2003a). For the Trinity Parkway model, these sites are assumed to be "dry" excavations, produced by benching excavated areas into the overbanks of the Dallas Floodway pilot channel in the shapes of the BVP lakes, but without the additional construction needed to fill the lakes with water (see **FEIS Section 2.8.3**).

The model is intended to produce a sustainable end-point condition, which meets the ROD criteria and can exist in the floodplain indefinitely in the event that the city's BVP is cancelled or delayed. The city does not anticipate delay in implementation of the BVP and the layout of borrow sites is compatible with separate environmental clearance permitting and construction of the BVP improvements, including lake impoundments, pilot channel meanders, and other features.

4.14.3.3 Modeling Results

Results for the 100-year flood are summarized in **Table 4-35A** and for the SPF in **Table 4-36A**. These tables reflect modeled data relevant to the 1988 ROD criteria (see **Section 4.14.3**) for representative cross sections throughout the Main Stem Trinity River, as well as for upstream reaches along the Elm Fork and West Fork. The information in **Tables 4-35B** and **4-36B** summarizes hydraulic modeling results in terms of meeting the ROD criteria for the 100-year flood and the SPF, respectively. The tables provide a maximum water surface elevation increase in the Dallas Floodway (wherever it occurs for Alternative 3C) as well as the water surface elevation at the Elm Fork/West Fork confluence at the upper end of the Dallas Floodway. The "Project Area Volume" valley storage calculations are based on the total Trinity River flood volume in the reach starting approximately 900 feet downstream of Martin Luther King, Jr. Boulevard and ending at the Elm Fork/West Fork confluence. The "Project Area Including Upstream Reaches" valley storage includes additional volumes along the Elm Fork and West Fork reaches, calculated up to a point where differences in water surface elevations between existing conditions and Alternative 3C returned to zero for more than one cross section on each of the reaches modeled.

TABLE 4-35A. REPRESENTATIVE HYDRAULIC MODEL RESULTS AT SELECTED LOCATIONS FOR THE 100-YEAR FLOOD EVENT

Location along Trinity River	Water Surface Elevation (feet)			Cumulative Volume[1] (acre-feet)			Average Channel Velocity (feet/second)		
	Existing	Alt. 3C	Change	Existing	Alt. 3C	Change	Existing	Alt. 3C	Change
MAIN STEM									
BNSF RR Trestle	411.5	411.5	0.00	111,770.8	111,770.7	-0.1	5.90	5.90	0.00
AT&SF RR Trestle	413.62	413.57	-0.05	116,595.4	116,556.2	-39.2	7.29	7.80	0.51
Corinth Street Bridge	414.22	414.3	0.08	118,376.0	118,175.5	-200.5	5.72	6.19	0.47
IH-35E SB Bridge	415.04	414.99	-0.05	122,208.5	122,151.6	-56.9	6.27	6.70	0.43
Houston St. Bridge	415.41	415.38	-0.03	123,415.5	123,195.5	-220.0	6.53	7.24	0.71
Commerce St. Bridge	416.86	416.91	0.05	126,781.1	126,709.2	-71.9	7.22	5.49	-1.73
M. Hunt Hill Bridge	417.56	417.42	-0.14	128,174.8	128,215.0	40.2	6.73	5.80	-0.93
Sylvan Ave. Bridge	418.92	418.93	0.01	133,204.3	132,803.4	-400.9	5.79	6.25	0.46
700 feet Upstream of Hampton Rd. Bridge (maximum rise) [2]	420.44	420.71	0.27	140,725.1	140,001.8	-723.3	5.91	5.18	-0.73
Elm/W. Fork Confluence	423.27	422.75	-0.52	153,051	154,296.1	1,245.1	5.32	5.54	0.22
ELM FORK									
Royal Lane Bridge	432.97	432.9	-0.07	33,540.5	32,802.7	-737.8	6.76	6.80	0.04
WEST FORK									
MacArthur Blvd. Bridge	436.1	436.1	0	19,438.4	19,136.9	-301.5	4.77	4.78	0.01

Notes:
1. For the Main Stem, this is the cumulative volume in the reach between approximately 7,300 feet downstream of Dowdy Ferry Road and the location listed. For the Elm Fork and West Fork, each number reported is the cumulative volume in the reach between the confluence and the structure listed.
2. This cross section location is where the maximum rise in water surface elevation occurs.

TABLE 4-35B. SUMMARY OF 100-YEAR FLOOD HYDRAULIC CHARACTERISTICS

1988 ROD Criteria[1]	Alternative 3C	
	Existing Conditions[2]	Modeling Results
FLOOD WATER SURFACE ELEVATIONS		
Maximum Increase	n/a	0.27 feet
Meets ROD Criteria? (No Rise)		No
VALLEY STORAGE		
Project Area Volume	41,280 acre-feet	42,525 acre-feet (+1,245 acre-feet)
Project Area Including Upper Reaches	107,237 acre-feet	107,404 acre-feet (+167 acre-feet)
Meets ROD Criteria? (0% Loss)		Yes (0.4% gain)
MAXIMUM VELOCITY		
Trinity River Channel	8.31 fps	8.83 fps[3]
Meets ROD Criteria? (Non-erosive)		Yes

Abbreviations/units used in Table: fps = river flow velocity in feet per second; n/a = not applicable; an acre-foot is a measure of volume (i.e., 1 acre-foot = 43,560 cubic feet).
1. See **FEIS Sections 3.5.6.4** and **4.14.3** for a listing of the 1988 ROD criteria.
2. See **FEIS Section 4.14.3.1** for a description of the existing conditions model.
3. This increased channel velocity occurs within the armored channel section of the Standing Wave Project. The next highest velocity in the main stem portion of the project reach is 8.35 fps.

TABLE 4-36A. REPRESENTATIVE HYDRAULIC MODEL RESULTS AT SELECTED LOCATIONS FOR THE SPF EVENT

Location along Trinity River	Water Surface Elevation (feet)			Cumulative Volume[1] (acre-feet)			Average Channel Velocity (feet/second)		
	Existing	Alt. 3C	Change	Existing	Alt. 3C	Change	Existing	Alt. 3C	Change
MAIN STEM									
BNSF RR Trestle	421.56	421.56	0.00	186,257.4	186,257.4	0.0	7.94	7.94	0.00
AT&SF RR Trestle	424.62	424.06	-0.56	194,248.3	194,189.1	-59.2	10.31	10.34	0.03
Corinth Street Bridge	425.45	425.09	-0.36	197,170.1	196,903.1	-267.0	8.00	8.04	0.04
IH-35E SB Bridge	426.55	426.11	-0.44	203,346.1	203,088.2	-257.9	8.99	9.27	0.28
Houston St. Bridge	427.22	426.81	-0.41	205,313.0	204,963.8	-349.2	9.09	8.43	-0.66
Commerce St. Bridge	429.02	428.37	-0.65	210,958.7	210,838.2	-120.5	9.34	7.76	-1.58
M. Hunt Hill Bridge	429.87	429.00	-0.87	213,303.5	213,308.0	4.5	8.83	7.96	-0.87
Sylvan Ave. Bridge	431.49	430.87	-0.62	221,771.7	220,932.2	-839.5	7.23	7.85	0.62
700 feet Upstream of Hampton Rd. Bridge	432.99	432.77	-0.22	234,887.7	233,244.2	-1,643.5	6.67	6.35	-0.32
Elm/W Fork Confluence	435.40	434.79	-0.61	257,356.4	257,481.2	124.8	6.17	6.34	0.17
ELM FORK									
SH-183/Carpenter Freeway Bridge	437.04	436.54	-0.5	15,978.8	15,628.8	-350.0	5.37	5.49	0.12
Loop 12 Bridge	438.45	438.03	-0.42	37,639.6	36,846.1	-793.5	4.17	4.33	0.16
SH-348/NW Hwy Bridge	440.52	440.25	-0.27	57,115.5	55,907.9	-1,207.5	2.98	3.06	0.08
IH-635/LBJ EB Bridge	441.89	441.71	-0.18	82,113.8	80,502.2	-1,611.6	5.57	5.65	0.08
WEST FORK									
MacArthur Blvd. Bridge	444.12	443.91	-0.21	40,594.0	39,886.9	-707.1	7.92	8.05	0.13

Notes:
1. For the Main Stem, this is the cumulative volume in the reach between approximately 7,300 feet downstream of Dowdy Ferry Road and the location listed. For the Elm Fork and West Fork, each number reported is the cumulative volume in the reach between the confluence and the structure listed.

TABLE 4-36B. SUMMARY OF SPF HYDRAULIC CHARACTERISTICS

1988 ROD Criteria[1]	Alternative 3C	
	Existing Conditions[2]	Modeling Results
FLOOD WATER SURFACE ELEVATIONS		
Maximum Increase	n/a	0.00 feet
Meets ROD Criteria? (No Rise)		Yes
VALLEY STORAGE		
Project Area Volume	71,099 acre-feet	71,224 acre-feet (+125 acre-feet)
Project Area Including Upper Reaches	289,608 acre-feet	286,787 acre-feet (-2,821 acre-feet)
Meets ROD Criteria? (Max. 5% Loss)		Yes (4.0% loss)
MAXIMUM VELOCITY		
Trinity River Channel	9.89 fps	10.01 fps
Meets ROD Criteria? (Non-erosive)		Yes

Abbreviations/units used in Table: fps = river flow velocity in feet per second; n/a = not applicable; an acre-foot is a measure of volume (i.e., 1 acre-foot = 43,560 cubic feet).
1. See **FEIS Sections 3.5.6.4** and **4.14.3** for a listing of the 1988 ROD criteria.
2. See **FEIS Section 4.14.3.1** for a description of the existing conditions model.

As shown in the tables above, Alternative 3C results in water surface elevation increases for the 100-year flood event at three separate locations within the Main Stem of the Trinity River, but would not result in any water surface elevation increases for the SPF event. These increases occur at the following locations: from DART to approximately 300 feet downstream of the IH-35E Northbound Bridge with a maximum increase of 0.19 feet; from approximately 250 feet upstream of the Houston Street Bridge to approximately 300 feet upstream of Commerce Street Bridge with a maximum increase of 0.25 feet; and from approximately 450 feet upstream of the Sylvan Avenue Bridge to approximately 1,700 feet downstream of Westmoreland Boulevard Bridge with a maximum increase of 0.27 feet. The hydraulic modeling results further indicate that water surface elevation increases do not occur upstream of the Elm Fork and West Fork confluence with the Main Stem of the Trinity River for either the 100-year or the SPF events. Summary tables from the hydraulic model output with additional details are provided in **FEIS Appendix F**. Model output is shown graphically on **FEIS Plate 4-9**, which compares the surface water elevations for the 100-year and SPF floods for Alternative 3C with the hydraulic modeling results for existing conditions**.**

4.14.3.4 Discussion of Hydraulic Modeling Results

The ROD criteria for the 100-year flood and SPF water surface elevations and valley storage preservation effectively require four primary targets for the hydraulic modeling to be met, in addition to considerations for erosive flow velocity. It is challenging to design a roadway alignment with impacts to such a large project reach so as to meet all four of the primary hydraulic ROD criteria at every point along the project reach, as well as offsite. The results presented in **Tables 4-35A/B** and **4-36A/B** reflect concerted efforts to design Alternative 3C to meet the ROD hydraulic criteria. As shown in the tables, Alternative 3C meets each point of the criteria except for a maximum rise of 0.27 feet for the 100-year flood event. It should be noted that the maximum 100-year water surface rise for Alternative 3C (0.27 feet) is located within the Dallas Floodway levees and would present no increased risk of flood damage to existing structures. Alternative 3C would not result in water surface elevation rises beyond the limits of the Dallas Floodway levees both upstream and downstream of the proposed tollroad. Should Alternative 3C be selected in the anticipated ROD, this increase in 100-year flood levels would be accounted for during the Trinity Parkway's design phase by adjusting the design crest of the flood separation wall protecting the roadway by a few inches to account for the rise. Alternative 3C effectively meets the ROD criteria for the SPF event as it would not result in a rise in water surface elevation above the SPF.

Tables 4-35A/B and **4-36A/B** show that Alternative 3C results in a total valley storage gain for the 100-year event and a total valley storage loss for the SPF event. Generally, valley storage losses due to the project produce negative downstream flooding impacts by slightly increasing the computed peak flow and the downstream flooding risk. Valley storage gains will generally produce the opposite effect. It is for this reason that the ROD criteria limit the valley storage to no loss for the 100-year and minimal losses for the SPF flood events. Alternative 3C produces a lowering of the SPF water surface elevation at the Elm Fork/West Fork Confluence and no rise occurs upstream of that point, which results in a valley storage loss offsite. This loss is calculated and combined with the onsite valley storage change to produce the total valley storage change; and this is expressed as a percent change (percent loss or gain) compared with the pre-project onsite valley storage.

Note the majority of SPF valley storage losses presented in the **Table 4-36A** are not due to encroachment, because the Trinity Parkway embankments are offset by the borrow sites in the Dallas Floodway. Rather, the reported loss of valley storage is largely due to the computed drop in water surface between existing and proposed conditions. In concept, if the Dallas Floodway stores 71,099 acre-feet at the existing conditions SPF levels (see **Table 4-36B**), the computed storage for the proposed conditions SPF is reduced if the computed water surfaces are lower on average than existing (i.e., the Dallas Floodway is holding less water). The USACE HEC-RAS computer program has been utilized for comparing existing conditions storages to the Alternative 3C storages, and calculating the percent changes in the above tables. A detailed description of the methodology used for determining impacts to valley storage and supporting calculations is included in **FEIS Appendix F-1**, and the general analytical approach is described below.

The ROD hydraulic criteria require that valley storage changes be expressed in terms of percentage, but does not outline a specific methodology for computing valley storage loss. The valley storage comparison methods used in the analysis reported above are based on guidance from and coordination with the USACE Fort Worth District. To express the valley storage gain or loss as a percent, a pre-project or on-site amount of storage must be computed, typically over a defined project footprint. The interpretation of on-site (pre-project) valley storage for Alternative 3C differs somewhat from the typical project in that all of the floodplain on both sides of the river channel from the project's most upstream limits to the downstream limits has been included as part of the project footprint. This includes areas in the floodway where alteration due to the Trinity Parkway does not occur. For the typical project, the on-site valley storage is interpreted as the actual pre-project valley storage that exists directly above the proposed development or all contiguous land areas in which the landowner/developer has controlling interest. This strict interpretation allows adjacent undeveloped lands (usually other landowners) the same opportunity for development with the same allowance for valley storage loss. This project is unique in that there is a single controlling entity within the project reach of the river floodplain and all future proposed floodplain modifications will be intertwined with the proposed project. As it would be extremely difficult to hydraulically separate this proposed project from future proposed projects within this project reach for comparison to the ROD criteria in the traditional way, future projects proposed for construction within the same on-site valley storage area will be evaluated in terms of both individual project impacts as well as the cumulative impacts (i.e., in combination with other planned projects) for comparison to the ROD criteria and will use the same existing conditions hydraulic model as a baseline comparison.

As shown in **Tables 4-35A** and **4-36A**, Alternative 3C exhibits small changes in velocity compared to existing conditions for floodwaters traveling through the Dallas Floodway. For Alternative 3C during a 100-year flood event, the maximum velocity changes from 8.31 feet per second (fps) (existing conditions) to 8.83 fps. It is important to note that the increase in erosive velocity to 8.83 fps for the 100-year flood occurs within the armored channel section of the Standing Wave Project. The next highest increase is 8.35 fps, which is slightly higher than that reported for existing conditions. These results indicate that erosion protection needs are minor, and would most likely be limited to transitions at bridges and excavation areas. A detailed comparison of channel velocities for Build Alternative 3C is provided in **FEIS Appendix F-2**. The maximum channel flow velocities shown in the tables for both the 100-year and SPF events would generally be considered erosive flow velocities for average soils. However, these flow velocities are typical of channel flow velocities for high flow events for both existing and proposed conditions. Alternative 3C has been regarded as meeting the ROD criteria based on very small increases in the channel flow velocity. Some localized erosion within the channel would be expected for such rare events and would not represent an increased risk to the safety of the levee system or significant maintenance concern over the life of the project.

In conclusion, minimizing impacts resulting from floodplain encroachment has been a major area of emphasis throughout Trinity Parkway project development. Ongoing coordination has been occurring with the USACE and the City of Dallas to ensure that schematic design of Alternative 3C would be compatible with the flood conveyance mission of the Dallas Floodway. Iterative hydraulic modeling has been conducted to ensure that proposed embankments are offset by excavations and other design aspects so that the project will be sufficiently close to the 1988 ROD criteria to warrant a variance. As stated in the 1988 ROD, the purpose of the ROD and the ROD criteria for assessing the hydraulic impacts of future planned projects is to serve the “best overall public interest” when applying those criteria (see **Appendix E**, pages 13 and 14). Accordingly, the 1988 ROD requires that a “Variance from the criteria would be made only if public interest factors . . . overwhelmingly indicate that the 'best overall public interest' is served by allowing such variance." The likelihood that a project or group of projects would affect the risk of flooding and public safety is discussed in **FEIS Section 4.26.8.7** regarding cumulative impacts to floodplains, which would be the primary consideration in ultimately determining whether Alternative 3C would warrant a variance.

4.14.4 Flooding Risk

4.14.4.1 Developed Areas

As described above, the term "developed areas" is used to describe the levee protected areas surrounding the Dallas Floodway in the project area. Based on the FEMA mapping, this is predominantly Zone X (levee protected) with scattered areas of Zone AE (Floodway) in drainage sumps, and Zone AE (100-year) in areas subject to local flooding. Based on NTTA usual design standards, the proposed roadway would be designed to be protected from the 100-year storm event. The Zone X levee protected area exceeds 100-year event protection. Therefore, the roadway would not require additional elevation or other special treatment to protect it in Zone X. Zones AE (Floodway) and AE (100-year) would require specific measures to protect the roadway from base flooding.

Zone AE (Floodway) includes the drainage sumps found within the developed areas. Avoidance of flooding impacts is proposed by bridging over these sumps. Any potential impacts to storage (such as displacements by columns or abutments) would be offset by providing additional excavated areas to ensure no net loss of floodwater storage capacity; any excavation areas to offset displacements by columns or abutments affecting drainage sumps would be relatively small and would occur within project ROW. Zone AE (100-year) in the developed areas comprises minor areas of local ponding from rainfall events. These areas would either be bridged over or filled by embankments to assure 100-year flood protection.

In accordance with the FHWA hydraulic design standards, bridge structures would be designed to avoid the base floodplain, where practicable (23 CFR Part 650, Subpart A). As currently proposed, bridge structures in developed areas would be supported with concrete piers and the decks elevated above 100-year flood levels to avoid interference with flood flows. Using this design approach, the proposed structures would have no substantial effect on the base floodwater surface elevation, and there would be a low risk of water overtopping the roadway or causing additional damage to adjacent property. Since the proposed structures would displace only a small portion of Zone AE, the encroachment into the floodplain is considered minimal. In the event the final design requires any substantial encroachment of base flood zones, detailed analysis and design would be required in compliance with FEMA guidelines, local regulations, and the FHWA hydraulic design standards. Analysis of the proposed project design for Alternative 3C and recommended mitigation measures indicates this project would not constitute a significant encroachment into the base floodplain in developed areas (outside of the Floodway) and does not create a significant risk as defined by the FHWA design regulations (23 CFR Part 650, Subpart A).

4.14.4.2 Trinity River Main Stem Areas

Along the Trinity River Main Stem within the Dallas Floodway, Zone AE (Floodway) has a base floodplain elevation ranging from approximately 414 feet above msl near MLK, Jr. Boulevard to approximately 423 feet at the Elm Fork/West Fork Confluence. As described in **FEIS Section 2.8.4**, Alternative 3C is designed to be protected from inundation from the 100-year flooding event, a level of protection commensurate with other roadways in the NTTA system. The profile grade of the alignment and the proposed flood separation walls associated with Alternative 3C would be constructed at or above base (100-year) floodwater elevations. There would be a low risk of floodwaters overtopping the roadway/flood separation walls or causing damage to adjacent property at these locations, and no substantial effect on the base floodwater surface elevation. In accordance with the FHWA hydraulic design standards, the design of encroachments would be consistent with standards established by FEMA, state, and local governmental agencies for the administration of the NFIP (23 CFR Part 650, Subpart A).

Bridge structures within the Dallas Floodway would typically be placed with their top deck elevations about 2-feet above the 100-year water surface. This is required to reduce longitudinal blockage of river flow under SPF conditions, where the road would be inundated. It is preferred to keep the bridges around the same elevation as the usual roadway surface to not present additional obstruction to SPF flows. This positioning of the bridges requires the superstructures to be partially submerged by the 100-year flood USACE criteria for construction within federal flood protection projects would apply to all construction within the Dallas Floodway, including bridge structures (see USACE Pamphlet SWFP 1150-2-1, in **FEIS Appendix E**).

Additionally, the roadway would be protected by walls and pump stations at low points under existing bridges. In the event of a pump failure, the sags would fill with water after continual rainfall; however, this would be a gradually deepening condition and not a flash flood. In the event of a wall overtopping from the river water levels (which would result in rapid inundation of the road), the Trinity Parkway should have already been closed down under the directives of the

Emergency Action Plan. A draft Emergency Action Plan is included in **FEIS Appendix H-3**, which outlines alarms, notification, and roadway closure procedures in the unlikely event of a flood in excess of the 100-year event in the Dallas Floodway. All proposed flood protection features are reflected in the estimated costs for Alternative 3C.

In light of the foregoing, Alternative 3C does not constitute a substantial risk of increased flooding since any adverse impacts associated with the probability of flooding are mitigated through compensating hydraulic design.

4.14.5 Risks Associated with Levee Stability

The risks discussed in this section focus on levee stability issues. In this context, there is always some level of inherent geotechnical "risk" of a levee failure, based on the physical layout of the levee, the materials and care used in its construction, the degree of maintenance, the underlying soil strata, and the consequences of overtopping. This risk analysis for the levees should answer whether these conditions would be unchanged, made worse, or made better in segments where Alternative 3C comes in contact with a levee. The risk analysis for Alternative 3C focuses on the segment from approximately Hampton Road to the DART crossing where the roadway embankments and the levees would be conjoined.

The geotechnical design conditions related to Alternative 3C are discussed in **FEIS Section 2.8.1.1**. Generally, the roadway design includes features at critical crossing and adjacency points to at least maintain the current strength and stability of the levees. The Trinity Parkway design is proposed to be constructed on embankments alongside the Dallas Floodway levees. The embankments would be offset sufficiently from the existing levee face to allow for the future raising of the levees by the City of Dallas/USACE, as outlined in the Flood Risk Management Plan of the Dallas Floodway Project (see **FEIS Section 2.8.1.1**). These levee raises planned by the City of Dallas/USACE include raising the levees at various locations to contain the SPF, which is estimated to produce flow of 277,000 cfs with an annual probability of occurrence of 0.04 percent (i.e., 1/2,500 chance per year). The Trinity Parkway schematic designs to date have assumed raising the levees to a height equivalent to SPF flood elevation plus two feet. In addition, the crown of the improved levees to date has been assumed to be 16-feet wide, and the riverside slopes have been assumed to be 4:1 (horizontal: vertical). The USACE Fort Worth District determined these assumptions to be compatible with the anticipated future levee geometry (see **FEIS Appendix A-2**, pages 62-63). Additionally, in areas where roadway embankments are adjacent to a levee, the roadway embankment would be designed to incorporate a potential levee widening up to at least the level of the top of the embankment, should the USACE/City of Dallas final plans include such a measure.

Generally, the geotechnical work in the Levee Remediation Plan (see **FEIS Section 2.8.1.1**) is intended to prove that the city can address all levee deficiencies cited by the USACE Periodic Inspection Report, and further to prove the Trinity Parkway embankment would do no harm to the adjacent levee segments. However, an incremental benefit to levee stability is expected to occur in segments with adjacent roadway embankments (which are shown in **Figure 2-22** of **FEIS Section 2.8.1.2**). This benefit would accrue for the following reasons: (1) for events up to the 100-year level, the flow path distance for seepage under the levee would be increased substantially due to the addition of the roadway embankment, resulting in lower seepage flows and more gradual transitions of pore pressure; (2) due to the buttressing effect of the embankment (see **Figure 2-22**) the effective height of the levee slope would be reduced, reducing the potential severity of surface slides; and (3) in the worst case scenario of an overtopping of the levee, the roadway embankment and paving would likely act to stop any erosion failure of the levee structure, leaving the 100-year level embankment to hold back at least some of the floodwater from entering the city. The final point demonstrates the concept of "resilience" as a tool for mitigating the effects of natural and man-made disasters.

The risks associated with implementation are not considered critical due to the design features related to embankment and levee stability. These features are included in the estimated costs for Alternative 3C.

4.14.6 Consideration of Floodplain Values

Alternative 3C encroaches into the Trinity River Main Stem Zone AE (Floodway) by approximately 305 acres. Part of the FHWA's policy relating to the design of encroachments on floodplains (23 CFR Part 650, Subpart A) is to restore and maintain the "natural and beneficial" floodplain values, which include a variety of enumerated values such as fish, wildlife, plants, open space, outdoor recreation, and natural moderation of floods. The FHWA's policy also requires studies pertaining to the location of highways to discuss impacts to natural and beneficial floodplain values "commensurate with the significance of the risk or environmental impact" (23 CFR Section 650.111(c)(2)). The discussion of potential impacts to such floodplain values occur throughout this chapter of the FEIS, and the sections containing discussions of the natural and beneficial values relevant to the floodplain resources applicable to the Dallas Floodway are shown in **Table 4-37**. Some of the values listed in the FHWA's regulation, such as agriculture, aquaculture, and forestry, are not included in the table because neither private nor government-sponsored enterprises of this nature occur within the project area. Similarly, the FHWA regulation includes scientific study as a potential value for floodplains, but this value is not discussed because no known long-term scientific studies are underway in project area floodplains that could potentially be affected by Alternative 3C. In addition to the FEIS sections addressing potential direct impacts to floodplain values in **Table 4-37**, these same resources are considered from the standpoint of potential indirect impacts in **FEIS Section 4.25**.

TABLE 4-37. FEIS SECTIONS ADDRESSING FLOODPLAIN VALUES

Floodplain Value from 23 CFR Part 650, Subpart A	FEIS Section(s) Addressing Potential Impacts to this Value
Fish and wildlife	Sections 4.9.2, 4.9.3, and 4.21.3
Plants (all habitat included)	Sections 4.8.1, 4.9.1, and 4.21.3
Open space and natural beauty	Sections 4.17 and 4.21.8
Outdoor Recreation	Section 4.7.3
Natural moderation of floods	Section 4.14 and 4.21.5
Water quality maintenance	Section 4.13 and 4.21.4
Groundwater recharge	Section 4.13.3.5

4.14.7 Significant Floodplain Encroachment

The discussion in **FEIS Section 3.5.6.1** outlines the essential elements of EO 11988 (Floodplain Management) regarding federal policies on the protection of floodplains and floodways. As applied to the Trinity Parkway, proposed floodplain area encroachment exceeding 300 acres and 5.2 miles of longitudinal encroachment by Alternative 3C are considered significant, thus triggering a practicability analysis required by the EO and by the FHWA regulations that implement the EO (23 CFR Part 650, Subpart A). These and other federal policies require that a finding of no "practicable alternative" must accompany the selection of any project that results in a significant or longitudinal floodplain encroachment. The preparation of the LSS was completed in part to satisfy the requirements of the EO and the FHWA regulations; **FEIS Section 2.8** provides information on the practicability of Trinity Parkway Build Alternatives, leading to the identification of Alternative 3C as the FHWA-recommended alternative.

4.14.8 FEMA Coordination Related to Floodplain Modification(s)

As Alternative 3C involves modification of floodplains the project would need to be further coordinated with FEMA prior to construction, if this alternative is selected in the anticipated ROD. The FEMA process would be expected to be started with preparation and submittal of a Conditional Letter of Map Revision (CLOMR) to the City of Dallas and FEMA after the ROD is completed and during final project design. The CLOMR submittal process would consist of the following steps:

- Contact FEMA to obtain or confirm the current effective floodplain and floodway model for the Trinity River in the area of the project.
- Create a revised existing condition model from the above model (as appropriate) by adding additional cross sections and updating existing cross sections based on new topography, and updated bridge information.
- Create a proposed condition model based on the selected alternative.
- Prepare a report with exhibits, tables, required FEMA forms, and supporting models.
- Notify affected property owners, if necessary.
- Submit a CLOMR application report to City of Dallas for review and approval.
- Submit the CLOMR application to FEMA after City of Dallas approval.
- Coordinate with FEMA during the review process.

It should be noted that current effective models from FEMA are based on existing (1991) land use conditions, while the models which support the hydraulic results in the SDEIS, LSS and this FEIS are based on future (2050) land use conditions. Furthermore, the future conditions model may have a greater level of detail (especially at bridges) than that of the current effective FEMA models, and may include modeling enhancements by the USACE that have not been submitted to FEMA for review and approval. Therefore, these details may have to be incorporated into the FEMA existing condition models at the time the CLOMR submittal is prepared. Other projects in the area that are underway or recently completed at the time of CLOMR submittal, and have been submitted independently to FEMA for CLOMR or Letter of Map Revision (LOMR) approval, would also need to be included.

Successful permitting of the project through approval of the CLOMR by FEMA would be required before project construction could begin. After construction, a final LOMR would be submitted to the City of Dallas and FEMA, including details of as-built conditions of the completed work. An approved LOMR would evidence FEMA's acceptance of the project and would result in FEMA Flood Hazard Mapping reflecting the floodplain modifications made by the project.

Coordination with FEMA has been occurring throughout the development of the proposed Trinity Parkway. The FEMA Region 6 Office responded to initial project scoping coordination in 1999 with a request to coordinate with the local government (City of Dallas) floodplain administrator regarding a floodplain development permit (**Appendix A-1**, page 18). In 2000, FHWA invited FEMA to participate in project coordination meetings and to become a cooperating agency on the project (**Appendix A-1**, pages 19-20). Although FEMA has not become a cooperating agency for NEPA purposes, coordination on major project developments has continued to occur. FEMA received copies of the DEIS, SDEIS, and LSS for review, and informal coordination with FHWA has been ongoing. For example, on July 22, 2008, FEMA Region 6 received a preliminary draft SDEIS when representatives were briefed on the Trinity Parkway, and FEMA expressed the expectation that it would eventually receive a CLOMR application if a floodway alternative is selected in the FEIS ROD and final project design was underway. After receiving a copy of the LSS, FEMA Region 6 provided a response indicating that local floodplain administrators should be contacted regarding possible permit requirements; the response also requested that the proposed project comply with EO 11988 (Floodplain Management) and EO 11990 (Protection of Wetlands) (**Appendix M-5**, page 30).

4.15 AIR QUALITY IMPACTS

FEIS Section 3.6 provided details concerning air quality regulatory requirements (see **FEIS Section 3.6.1**) and existing project area air quality (see **FEIS Section 3.6.2**).

4.15.1 No-Build Alternative

Implementation of the No-Build Alternative would lead to increased traffic congestion and decreased mobility, resulting in decreased vehicular speed and increased stop-and-go traffic. The No-Build Alternative is inconsistent with the *Mobility 2035 – 2013 Update*, which contains specific projects, programs, and policies intended to improve mobility, access, and air quality in the DFW region.

4.15.2 Build Alternative - Air Quality Conformity Statement

This project is located within Dallas County, which is part of the DFW area that has been designated by the USEPA as a moderate non-attainment area for the 8-hour ozone NAAQS; therefore, transportation conformity rule applies.

The proposed project is consistent with the area's financially constrained *Mobility 2035 – 2013 Update* and the 2013-2016 TIP, as amended, which were found to conform to the TCEQ SIP by the FHWA on July 19, 2013 and November 1, 2012, respectively. Copies of the MTP and TIP pages are included in **Appendix I-2**, in addition to a MTP/TIP consistency analysis spreadsheet. All projects in the TIP, as revised, 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.

4.15.3 Build Alternative - Traffic Air Quality Analysis

Build Alternative 3C traffic data for the design year 2035 include estimated AADT volumes ranging from 92,400 to 135,000 vpd, depending on the tollway segment (CDM Smith, 2013). A prior TxDOT modeling study and previous analyses of similar projects demonstrated that it is unlikely that a CO standard would ever be exceeded as a result of any project with an AADT below 140,000. The AADT projections for the project do not exceed 140,000 vpd; therefore a TAQA is not required according to TxDOT guidelines. However, as the public and resource agencies have expressed concern regarding potential air quality impacts resulting from the project, a TAQA was conducted to demonstrate that CO concentrations would not exceed the NAAQS under Alternative 3C in 2020 (estimated time of completion year) or 2035 (design year). The TAQA is presented in **FEIS Section 4.15.4** below. In addition, because the project adds SOV capacity, a discussion of the Congestion Management Process (CMP) is required (see **FEIS Section 4.15.4**).

Topography and meteorology of the area in which the project is located would not seriously restrict dispersion of the air pollutants. The traffic data used in the analysis was obtained through the NTTA (CDM Smith, 2013). For the Trinity Parkway segment from SH-183 to Woodall Rodgers Freeway, traffic for the estimated time of completion year (2020) and design year (2035) is estimated to be 54,000 vpd, and 135,000 vpd, respectively. For the segment from Woodall Rodgers Freeway to I-45, traffic for the estimated time of completion year (2020) and design year (2035) is estimated to be 39,600 vpd, and 108,800 vpd, respectively.

CO concentrations for the proposed action were modeled using CALINE3 and MOVES and factoring in adverse meteorological conditions and sensitive receptors at the ROW line in accordance with the TxDOT Air Quality Guidelines. The results of the TAQA analysis are presented in **Table 4-38**. Based on these TAQA modeling results, local concentrations of CO are not expected to exceed national standards at any time.

TABLE 4-38. PROJECT CARBON MONOXIDE CONCENTRATIONS

Year Modeled by TAQA	TAQA Results for 1-Hour CO NAAQS*		TAQA Results for 8-Hour CO NAAQS*	
	1-hour CO Level (ppm)	CO Level as % of the 1-Hour NAAQS	8-hour CO Level (ppm)	CO Level as % of the 8-HR NAAQS
2020 (ETC)	3.9	11.1%	2.4	26.9%
2035 (Design Yr)	4.1	11.7%	2.5	28.2%

Notes:
* The NAAQS for CO is 35 parts per million (ppm) for the 1-hour standard and 9 ppm for the 8-hour standard. Analysis includes a 1-hour background concentration of 3.7 ppm and an 8-hour background concentration of 2.3 ppm.

4.15.4 Build Alternative - Congestion Management Process

The CMP is a systematic process for managing congestion that provides information on transportation system performance and on alternative strategies for alleviating congestion and enhancing the mobility of persons and goods to levels that meet state and local needs (NCTCOG, http://www.nctcog.org/trans/cmp/). The project was developed from NCTCOG's operational CMP, which meets all requirements of 23 CFR 500.109. On June 13, 2013, the RTC adopted *Mobility 2035– 2013 Update*, which received a positive determination of air quality conformity in July of 2013 and which contains elements of the CMP.

The region commits to operational improvements and travel demand reduction strategies at two levels of implementation: program level and project level. Program level commitments are inventoried in the regional CMP, which was adopted by the RTC; they are included in the financially constrained 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) that details type of strategy, implementing responsibilities, schedules, and expected costs. At the project's programming stage, travel demand reduction strategies and commitments will be added to the regional TIP or included in the construction plans. The regional TIP provides for programming of these projects at the appropriate time with respect to the SOV facility implementation and project-specific elements.

Committed congestion management strategies and operational improvements within the project area boundary will consist of signalization, intersection improvements, bridge construction, new road construction, and freeway downgrade (SM Wright Parkway). Individual projects are listed in **Table 4-39**.

TABLE 4-39. OPERATIONAL IMPROVEMENT PROJECTS WITHIN THE PROJECT AREA

Project Location	TIP Project Code	Project Type	Implementing Agency	Year of Implementation	Total Project Cost
SM Wright Blvd (US-175) from Budd St. to IH-45/ Julius Schepps	20062	Freeway Downgrade *	TxDOT-Dallas	2010	$45,800,000
IH-45 at Lamar	20135.0152	ITS	Dallas	2011	$3,032,000
Existing Trailhead at Moore Park; on Santa Fe Trestle to the north Trinity River Levee, downtown	52365	Bike/ Pedestrian	TxDOT-Dallas	2012	$5,705, 000
IH-35E at Brazos St. and Trinity River NB	51066	Addition of Lanes	TxDOT-Dallas	2014	$56,111,288
Riverfront Blvd from Cadiz St. to Continental Ave.	11726	Addition of Lanes	Dallas	2011	$3,032,000
Jefferson Memorial Bridge from 8th Street/IH-35 to Young St.	20214	Bridge Construction *	TxDOT-Dallas	2010	$500,000
Bounded by Tilden St. on the north, Beckley Ave. on the west, and Zang Blvd. to the southeast	20239	Bike/ Pedestrian	Dallas	2011	$2,187,500
IH-35E at IH-30	53012	Interchange	TxDOT-Dallas	2012	$284,932,000
Commerce at Justice Center	20135.1397	ITS	Dallas	2011	$3,032,000
Industrial at Justice Center	20135.1398	ITS	Dallas	2011	$3,032,000
Industrial at Woodall Rodgers	20135.1399	ITS	Dallas	2011	$3,032,000
Spur 366 (inside levee) from IH-35E to Beckley/Singleton	11232.1	New Roadway	TxDOT-Dallas	2008	$51,433,729
Dallas Design District TIF – Walking And Bicycling Improvements	11361	Bike/ Pedestrian	Dallas	2009	$1,037,236
Katy Trail from McCommas to Skillman at Sandhurst	11018.1	Bike/ Pedestrian	Dallas	2010	$2,000,000
Trinity Strand Trail from west of IH-35E (in between Oak Lawn and Motor); on Trinity Strand to Motor Street	20067	Bike/ Pedestrian	Dallas	2009	$5,670,049
Conveyor/Lupo at Inwood	20135.1581	ITS	Dallas	2011	$3,032,000
Commonwealth at Iron Ridge	20135.1366	ITS	Dallas	2011	$3,032,000
Commonwealth at Iron Ridge	20135.1367	ITS	Dallas	2011	$3,032,000
Commonwealth at Stemmons EB	20135.0767	ITS	Dallas	2011	$3,032,000
Commonwealth at Stemmons WB	20135.0766	ITS	Dallas	2011	$3,032,000
Halifax at Mockingbird	20135.135	ITS	Dallas	2011	$3,032,000
Ambassador at Mockingbird	20135.0855	ITS	Dallas	2011	$3,032,000
Carpenter SB at Mockingbird	20135.0649	ITS	Dallas	2011	$3,032,000
Mockingbird at Stemmons	20135.0032	ITS	Dallas	2011	$3,032,000
Mockingbird at Stemmons SB	20135.0643	ITS	Dallas	2011	$3,032,000
Trinity Parkway from IH-35E/SH-183 Split to US-75/175	11538	New Roadway	NTTA	2015	$803,196,836
SH-183 from west end of Elm Fork Trinity River Bridge to IH-35E	54066	Addition of Lanes	TxDOT-Dallas	2013	$129,600,000

Source: NCTCOG: *TIPINS* Interactive Map (on-line), accessed October 29, 2012.
Notes: The projects listed above include transportation improvements within the project area. These do not include regional or city-wide projects or programs, such as alternative fuels, TDM, or traffic signal improvements.
* Operational improvements to these facilities are described in **FEIS Section 2.9.1.2** (SM Wright Boulevard) and **Section 2.9.1.4** (Jefferson Memorial Bridge).

In an effort to reduce traffic congestion and the need for SOV lanes in the region, TxDOT and NCTCOG will continue to promote appropriate congestion reduction strategies through the Congestion Mitigation and Air Quality program, the CMP, and the MTP. The congestion reduction strategies considered for the proposed project would help alleviate congestion in the SOV study boundary, but would not eliminate it. Therefore, the proposed project is justified. The CMP analysis for added SOV capacity projects in the Transportation Management Area is on file and available for review at NCTCOG.

4.15.5 Build Alternative - Project-Specific MSAT Analysis

A quantitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the No-Build and Build Alternatives. The quantitative assessment presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*, found at:
http://www.fhwa.dot/environmental/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.pdf.

For the Build Alternative 3C the amount of MSAT emitted would be proportional to the VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for the Build Alternative is slightly higher than that for the No-Build Alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions for the recommended Alternative 3C along the highway corridor compared to the No-Build Alternative, 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 USEPA's MOVES2010b model, emissions of all of the priority MSAT decrease as speed increases. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of USEPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the USEPA-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 Alternative 3C would have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, there may be localized areas where ambient concentrations of MSAT could be higher under the Build Alternative as compared to the No-Build Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the roadway section with the highest estimated AADT (i.e., between Continental Avenue and Wycliff Avenue). However, the magnitude and the duration of these potential increases compared to the No-Build alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. In sum, when a highway is created or widened, the localized level of MSAT emissions for the Build Alternative could be higher relative to the No-Build Alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT would be lower in other locations when traffic shifts away from them. However, on a regional basis, USEPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

4.15.5.1 MSAT Modeling

The MSAT study area for the quantitative analysis is composed of the model area located within the North Central Texas Metropolitan Planning Area. The MSAT study area is comprised of the affected transportation network determined by the plus or minus 5 percent change in traffic threshold for the proposed project. The plus or minus 5 percent threshold and other modeling parameters (i.e., scenario years) were determined per coordination among the FHWA, TxDOT, and the NCTCOG. The approach used in the analysis of MSAT considers the on-road sources for the seven priority MSAT (i.e., acrolein, benzene, 1,3 butadiene, diesel particulate matter [DPM], formaldehyde, naphthalene, and polycyclic organic matter [POM]). This analysis is based on existing or base year (2013), interim year (2028) and design year (2035) volumes of traffic that have been projected by the NCTCOG travel model, and is consistent with the current MTP, *Mobility 2035 – 2013 Update*. An affected transportation network was derived from the 2035 No-Build Alternative scenario compared to the 2035 Build Alternative scenario to determine which roadway links in the model have a plus or minus 5 percent volume change. The affected transportation network was then compared to the 2013 and 2028 models separately in order to extrapolate the affected transportation network for the base year and interim year. See **Appendix I-3** for the Trinity Parkway Alternative 3C Affected Transportation Network (years 2013, 2028 and 2035). The MSAT emissions shown in **Table 4-40** were calculated using annual emission factors provided by NCTCOG for each roadway link in the affected transportation network. These inputs are appropriate to the North Central Texas Metropolitan Planning Area, and are consistent with those used for other modeling activities in the area (e.g., SIP inventories, conformity analyses).

The resulting annual emission inventory for the seven priority MSAT and the annual VMT in the transportation network were compiled as summarized in **Table 4-40** and **Figure 4-4** below.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE 4-40. MSAT EMISSIONS OF TRINITY PARKWAY BY SCENARIO

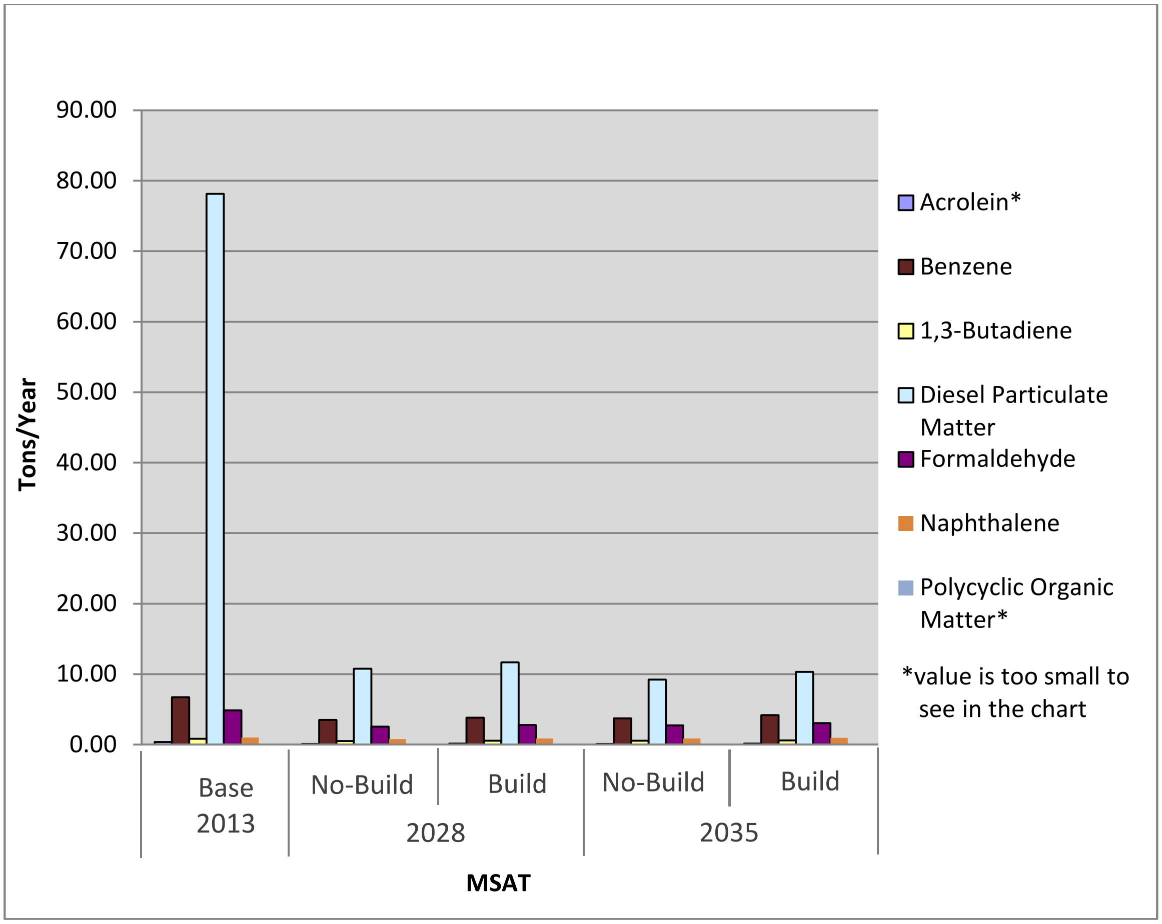
Compound (Tons/Year)	Year / Scenario					Percent Difference			
	2013 Base	2028 No-Build	2028 Build	2035 No-Build	2035 Build	2013 to 2028 No-Build	2013 to 2028 Build	2013 to 2035 No-Build	2013 to 2035 Build
Acrolein	0.37	0.12	0.13	0.12	0.14	-68	-65	-68	-64
Benzene	6.73	3.50	3.83	3.73	4.20	-48	-43	-45	-38
1,3-Butadiene	0.83	0.51	0.56	0.54	0.61	-38	-33	-35	-27
Diesel Particulate Matter (DPM)	78.14	10.75	11.70	9.23	10.31	-86	-85	-88	-87
Formaldehyde	4.88	2.57	2.80	2.72	3.05	-47	-43	-44	-37
Naphthalene	1.03	0.77	0.85	0.85	0.97	-26	-18	-18	-7
Polycyclic Organic Matter (POM)	0.023	0.013	0.014	0.014	0.016	-44	-40	-40	-31
Total MSAT	**92.01**	**18.22**	**19.88**	**17.20**	**19.29**	**-80**	**-78**	**-81**	**-79**
Total VMT (Miles/Year)	**1,975,947,955**	**2,682,576,537**	**2,986,106,369**	**3,010,895,680**	**3,448,273,136**	**36**	**51**	**52**	**75**
Source: NCTCOG (August 2013).									

THIS PAGE INTENTIONALLY LEFT BLANK

The analysis indicates a substantial decrease in annual MSAT emissions can be expected for both the Build and No-Build scenarios in year 2028 and year 2035 compared to the base year 2013 (**Figure 4-4**). Compared with 2013 levels, annual emissions of total MSAT are projected to decrease by approximately 80 percent in 2028 No-Build scenario, 78 percent in 2028 Build scenario, 81 percent in 2035 No-Build scenario and 79 percent in 2035 Build scenario. If emissions are plotted over time, a substantially decreasing level of MSAT emissions can be seen (**Figure 4-5**), even though overall VMT in the affected transportation network continues to rise.

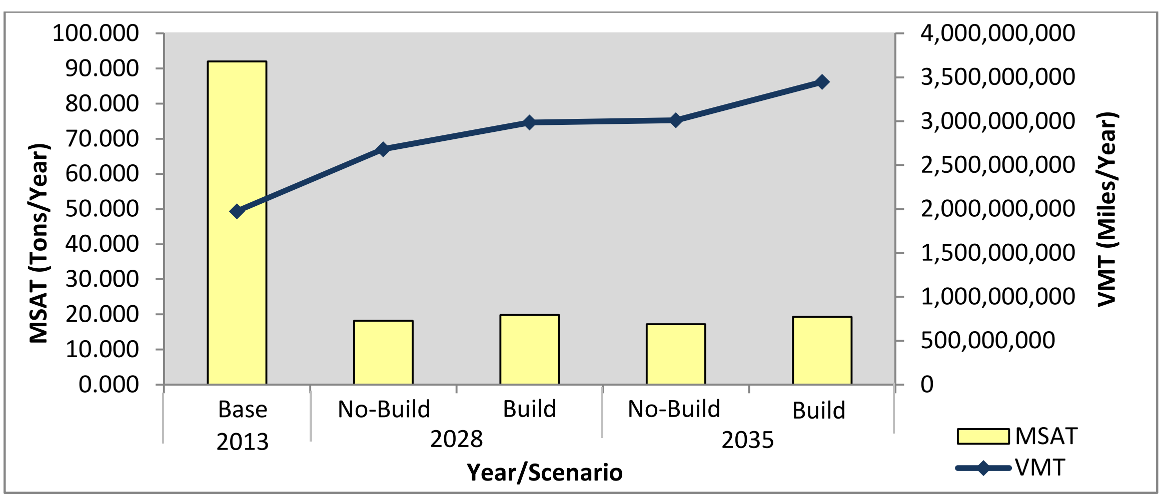
Of the seven priority MSAT compounds, benzene and DPM contribute the most to the emissions total for the 2013 base year. In future years, a substantial decline in benzene is anticipated (a 48 percent reduction from 2013 to 2028, No-Build scenario; 43 percent reduction from 2013 to 2028, Build scenario; 45 percent reduction from 2013 to 2035, No-Build scenario and 38 percent reduction from 2013 to 2035, Build scenario), and an even larger reduction in DPM emissions is predicted (a 86 percent decrease from 2013 to 2028, No-Build scenario; 85 percent decrease from 2013 to 2028, Build scenario; 88 percent decrease from 2013 to 2035, No-Build scenario and 87 percent decrease from 2013 to 2035, Build scenario).

FIGURE 4-4. TOTAL MASS OF MSAT EMISSIONS IN TONS/YEAR



Source: NCTCOG data and Project Study Team (2013).

FIGURE 4-5. COMPARISON OF TRINITY PARKWAY MSAT EMISSIONS VS. VMT



Source: NCTCOG data and Project Study Team (2013).

Increased roadway usage, which will occur either under Build scenario or No-build scenario in year 2028 and 2035, will not necessarily lead to increases in emissions (NOx, VOCs, PM, or MSAT). Such emissions from vehicles are expected to continue the current pattern of decrease, even with continuing increases in VMT. Although the VMT for the proposed project Build scenario would increase approximately 51 percent by 2028 and 75 percent by 2035 when compared to 2013, total MSAT emissions for the same scenarios would decrease an estimated 78 percent by 2028 and 79 percent by 2035. In 2028, total MSAT loads for the Build scenario would be 1.66 tons/year higher than the No-Build scenario. In 2035, total MSAT loads for the Build scenario would be 2.09 tons/year higher than the No-Build scenario. Technology is improving at a pace that exceeds the effect of increased 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 USEPA 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 (HDDV) standards and low sulfur diesel fuel, and the USEPA'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 USEPA's Tier II Regulatory Impact Analysis (RIA) and USEPA's HDDV RIA; Regulatory Impact Analysis (USEPA, 2001a; USEPA, 1999f).

4.15.5.2 Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

In the FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The USEPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The USEPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the IRIS, which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (USEPA, http://www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude (USEPA, 2013b).

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of the FHWA's Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are; cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The USEPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the USEPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires USEPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld USEPA's approach to addressing risk in its two step decision framework.

Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable. Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

4.15.5.3 Conclusion

In this document, a quantitative MSAT assessment has been provided for Alternative 3C, and has acknowledged that the Build scenarios may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain. Due to this uncertainty, the health effects from these emissions cannot be estimated.

4.16 NOISE IMPACTS

4.16.1 No-Build Alternative

Traffic noise is a primary component of the existing noise level in the project area. The predicted increase in future volumes on project area roadways would likely increase future noise levels along and near those roadways. Areas within the project area that are not near high volume roadways would likely have generally the same noise levels as today. No additional traffic noise impacts are anticipated to occur under the No-Build Alternative.

4.16.2 Build Alternative

This analysis was accomplished in accordance with TxDOT's (FHWA approved) *Guidelines for Analysis and Abatement of Roadway Traffic Noise* (2011).

Sound from highway traffic is generated primarily from a vehicle's tires, engine and exhaust. Sound 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 "dB(A)." 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) (**see Table 4-41**) for various land use activity areas that are used as one of two means to determine when a traffic noise impact would occur.

TABLE 4-41. NOISE ABATEMENT CRITERIA

Activity Category	FHWA dB(A) Leq	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)	Residential.
C	67 (exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52 (interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A-D or F.
F	--	Agricultural, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	--	Undeveloped lands that are not permitted.
Source: TxDOT, 2011.		

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 1 dB(A) below the NAC. For example: a noise impact would occur at a Category B residence if the noise level is predicted to be 66 dB(A) 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 dB(A). For example: a noise impact would occur at a Category B residence if the existing level is 54 dB(A) and the predicted level is 65 dB(A).

When a traffic noise impact occurs, noise abatement measures must be considered. A noise abatement measure is any positive action taken to reduce the impact of traffic noise on an activity area.

The FHWA traffic noise modeling software was used to calculate existing and predicted traffic noise levels. The model primarily considers the number, type and speed of vehicles; highway alignment and grade; cuts, fills and natural berms; surrounding terrain features; and the locations of activity areas likely to be impacted by the associated traffic noise.

Existing and predicted traffic noise levels were modeled at receiver locations (**Table 4-42** and **FEIS Plate 4-10**) that represent the land use activity areas adjacent to Alternative 3C that might be impacted by traffic noise and may potentially benefit from feasible and reasonable noise abatement.

TABLE 4-42. TRAFFIC NOISE LEVELS DB(A) LEQ

Representative Receiver	NAC Category	NAC Level	Existing	Predicted 2035	Change (+/-)	Noise Impact
R1 La Quinta	E	72	64	68	+4	No
R2 CW 33 (TV Station)	D	52	40	44	+4	No
R3 Budget Suites (Pool)	E	72	62	65	+3	No
R4 Candlewood Inn (Pool)	E	72	62	67	+5	No
R5 Radisson Motel	E	72	61	65	+4	No
R6 Comfort Inn	E	72	61	70	+9	No
R7 Residence Inn	E	72	61	64	+3	No
R8 Single Family Residence	B	67	62	62	0	No
R9 Proposed Ball Field	C	67	52	51	-1	No
R10 Trinity Levee Trail	C	67	60	69	+9	Yes
R11 Crow Park	C	67	61	62	+1	No
R12 Proposed Whitewater Run	C	67	64	64	0	No
R13 Proposed Pavilion	C	67	52	58	+6	No
R14 Proposed Promenade Area	C	67	67	61	-6	No
R15 Proposed Promenade Area	C	67	68	63	-5	No
R16 Proposed Promenade Area	C	67	69	69	0	Yes
R17 Proposed Amphitheater	C	67	62	60	-2	No
R18 Hickory House BBQ	E	72	65	62	-3	No
R19 Fuel City Tacos	E	72	65	69	+4	No
R20 Santa Fe Trestle Trail Trailhead	C	67	64	60	-4	No
R21 The Standing Wave	C	67	64	52	-12	No
R22 Single Family Residence	B	67	59	64	+5	No
R23 Single Family Residence	B	67	59	65	+6	No
R24 Single Family Residence	B	67	71	67	-4	Yes
R25 Single Family Residence	B	67	69	62	-7	No
R26 Single Family Residence	B	67	72	70	-2	Yes
R27 Single Family Residence	B	67	67	63	-4	No
R28 Single Family Residence	B	67	72	65	-7	No
R29 Single Family Residence	B	67	72	64	-8	No
R30 Single Family Residence	B	67	73	63	-10	No
R31 Single Family Residence	B	67	72	65	-7	No
R32 Single Family Residence	B	67	72	64	-8	No
R33 Single Family Residence	B	67	72	63	-9	No
R34 Single Family Residence	B	67	70	65	-5	No
R35 Single Family Residence	B	67	62	64	+2	No
R36 Future Dallas Police Station	F	--	68	69	+1	--
R37 Single Family Residence	B	67	69	71	+2	Yes
R38 Single Family Residence	B	67	66	70	+4	Yes
R39 Single Family Residence	B	67	69	70	+1	Yes
R40 Single Family Residence	B	67	66	69	+3	Yes
R41 Single Family Residence	B	67	63	68	+5	Yes
R42 Single Family Residence	B	67	63	68	+5	Yes
R43 Single Family Residence	B	67	62	67	+5	Yes

As indicated in **Table 4-42**, Alternative 3C would result in traffic noise impacts and the following noise abatement measures were considered: traffic management, alteration of vertical and horizontal alignment, acquisition of undeveloped property to act as a buffer zone and the construction of noise barriers.

Before any abatement measure can be proposed for incorporation into the project, it must be both feasible and reasonable. In order to be "feasible," the abatement measure must be able to reduce the noise level at greater than 50% of impacted, first row receivers by at least 5 dB(A); and to be "reasonable," it must not exceed the cost-effectiveness criterion of $25,000 for each receiver that would benefit by a reduction of at least 5 dB(A) and the abatement measure must be able to reduce the noise level at least one impacted, first row receiver by at least 7 dB(A).

Traffic management: control devices could be used to reduce the speed of the traffic; however, the minor benefit of 1 dB(A) per 5 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 ROW 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.

Noise barriers would not be feasible and reasonable for the following impacted receivers and, therefore, are not proposed for incorporation into the project:

R10: this receiver represents a portion of the Trinity Levee Trail that is located along the top of the Dallas Floodway east levee. The trail utilizes the existing levee maintenance road. A noise barrier adjacent to the trail would not be feasible because the USACE would not allow the longitudinal penetrations of the levee required for the construction of the noise barrier footings. Additionally, a noise barrier along the trail would restrict City of Dallas Maintenance Department's access to the levee.

R16: this receiver represents a floodway location adjacent to a proposed promenade facility along the east levee. The proposed Alternate 3C lanes are behind a flood separation wall that is approximately 8-feet in height at the R16 location. The prominent noise influence at this location is nearby IH-30. A noise barrier that would achieve the minimum feasible reduction of 5 dB(A) at this receiver while achieving a 7 dB(A) noise reduction design goal for at least one receiver would exceed the reasonable, cost-effectiveness criterion of $25,000.

Noise barriers would be feasible and reasonable for the following impacted receivers and, therefore, are proposed for incorporation into the project.

TABLE 4-43 NOISE BARRIER PROPOSAL (PRELIMINARY)

Barrier	Representative Receivers	Total # Benefited	Length (feet)	Height (feet)	Total Cost	$/Benefited Receiver
1	R24	4	380	10	$68,400	$17,100
2	R26	7	860	12	$185,760	$26,537
3	R37, R39, R40	12	750	16	$216,000	$18,000
4	R38, R41, R42, R43	12	840	16-23	$256,410	$21,368
	Total	**35**	**2830**	**--**	**$726,570**	
			Average Cost per Benefited Receiver			**$20,759***

Notes:
*Calculated per TxDOT Cost Averaging for Common Noise Environments methodology(4-19-2013), Barriers 1, 3, and 4 are cost-effective stand alone and Barrier 2 is cost-effective cumulative.

Any subsequent project design changes may require a reevaluation of this preliminary noise barrier proposal. The final decision to construct the proposed noise barrier will not be made until completion of the project design, utility evaluation and polling of adjacent property owners.

To avoid noise impacts that may result from future development of properties adjacent to the project, local officials responsible for land use control programs must ensure, to the maximum extent possible, no new activities are planned or constructed along or within the following predicted (2035) noise impact contours.

Limits	Land Use	Impact Contour	Distance from ROW
Undeveloped areas of the Trinity River Floodplain	NAC categories B & C	66 dB(A)	Within ROW
Undeveloped areas of the Trinity River Floodplain	NAC category F	71 dB(A)	Within ROW

Construction Noise

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

A copy of the traffic noise analysis will be available to local officials to ensure, to the maximum extent possible, future developments are planned, designed, and programmed in a manner that would avoid traffic noise impacts. On the date of approval of this document (Date of Public Knowledge), FHWA, TxDOT, and NTTA are no longer responsible for providing noise abatement for new developments adjacent to Alternative 3C.

4.17 VISUAL IMPACT ANALYSIS

The visual impact assessment conducted for the Trinity Parkway was completed in accordance with the FHWA's guiding document: Visual Impact Assessment for Highway Projects (1988). According to the FHWA, visual impacts result from the modification of existing visual resources (but not necessarily changes in visual quality) as seen in views to and from the proposed roadway. These impacts are particularly important for projects in visually sensitive urban settings where design and planning considerations include methods for avoiding, minimizing, or reducing impacts. Aesthetic perceptions also include the senses of taste, smell and sound. However visual perception or sight is generally the most prominent. In this section, the impacts to the visual resources of the study area as a result of Alternative 3C are discussed, with limited reference to impacts on sound. The existing visual and aesthetic qualities of the study area are described in **FEIS Section 3.8**. A discussion of potential measures to minimize adverse visual impacts is provided in **FEIS Chapter 5**.

4.17.1 Visual Assessment Methodology

Assessing the visual impacts of a large-scale project like the Trinity Parkway is the result of two primary assessments: the evaluation of changes in visual resources and the consideration of projected viewer group responses to those changes. Assessing changes in visual resources can be described as recording the probable visual impacts of differing alternatives, not predicting the actual changes in the quality of what viewers see. However, from combining the probable visual impacts with the response to visual changes by the four viewer groups (motorists, residents, recreational users, and business employees/patrons, as described in **FEIS Section 3.8.1**), changes in visual quality can be inferred.

In order to evaluate changes in visual resources, photographs were taken at multiple key observation points (KOPs) to depict the current visual character of the project area. KOPs were derived from a list of 26 points identified with the assistance of the CAWG. The location and viewshed of each KOP is shown on **FEIS Plate 4-11** at the end of this chapter.

Photos of select observation points throughout the project area were then digitally altered to show the appearance of the proposed project (if visible from the KOP). The altered photos were compared to the originals to predict the change in visual resources, which are graphically represented herein and are quantitatively assessed based on the prominence that Alternative 3C would have in the view. For example, if the resulting photograph appears to focus on the proposed roadway or the roadway obscures the original view, the roadway is considered prominent in the view; if the roadway is visible, but does not constitute a significant portion of the photo, it is considered minimally prominent. Prominence was measured during the quantitative assessment as the overall change in the form, line, color, and texture of the visible landscape in each view, as well as the roadway's dominance and scale in the view and the resulting diversity and continuity of the landscape. While this approach presents a more analytical rating system for impacts, it is important to keep in mind that this is a very limited approach to measuring visual changes.

The visual impact for each KOP was assessed and rated according to the level of the roadway's visual impact (i.e., none, weak, moderate, and strong impacts). The summary of the impacts derived from the assessment is depicted below in **Table 4-44**. Several KOPs were not assessed and rated for every viewer group. Rather, KOPs were rated only for applicable viewer groups; that is, those which would view the project from the KOPs specific location.

TABLE 4-44. VISUAL IMPACT ASSESSMENT

Viewer Group	KEY OBSERVATION POINTS																								
	1	4	5	9	17	19	20	23	24	26	29	30	31	34	41	42	49	51	55	57	58	59	61	62	63
3C – Combined Parkway (Further Modified)																									
Recreational Users	NA	NA	NA	NA	M	S	M	S	NA	S	S	NA	NA	M	S	W	NA	NA	NA	W	NA	NA	M	NA	N
Residents	NA	NA	NA	NA	W	NA	NA	NA	N	NA	NA	NA	NA	NA	NA	NA	N	S	W	W	NA	N	NA	NA	NA
Business Employees/Patrons	S	S	S	N	NA	NA	NA	NA	N	NA	NA	NA	N	NA	S	NA	N	S	W	NA	N	NA	NA	NA	NA
Motorists	S	S	NA	N	NA	NA	NA	NA	N	NA	S	N	N	NA	NA	NA	N	S	W	NA	N	N	NA	W	NA

Visual Impact		Visual Items
N	None	No Visual Change
W	Weak	Minimal Visual Change - Somewhat visible, but consistent with existing landscape.
M	Moderate	Moderate Visual Change - Considerably visible, but does not obscure the view of the landscape.
S	Strong	Strong Visual Change - Highly visible, obscures view, greatly alters character of the landscape.
NA	Not Applicable	Not Applicable to this Viewer Group - This view applies only to specific viewer groups because of its location.

4.17.2 No-Build Alternative

There would be no visual change and, therefore, no visual impacts to the views or other aesthetic conditions within the project area as a result of the No-Build Alternative.

4.17.3 Build Alternative

4.17.3.1 Northern and Southern Termini

The project's northern terminus is located near the IH-35E/SH-183 interchange. Construction of Alternative 3C in this area would include elevated structures. Although not relevant to visual impacts as experienced by existing viewer groups, views from the northern terminus of Alternative 3C by motorists would include short-range vistas of the immediate landscape. Long-range vistas would be evident from the elevated sections of Alternative 3C. Views toward Alternative 3C in this location would be largely from motorists traveling roadways in the surrounding area. Visual impact on nearby businesses or residents near the northern terminus would be minimal to moderate; while new elevated ramps would be constructed, businesses and residents are already exposed to views of the existing freeways and associated elevated ramps.

The southern terminus of Alternative 3C intersects US-175 at SH-310. An at-grade section proposed for the southern terminus would link Alternative 3C to the US-175/SH-310 interchange.

Views from Alternative 3C by future motorists would provide limited long-range vistas of the adjacent residential and commercial developments. The southern terminus of Alternative 3C would be a dominant visual feature for adjacent residential and commercial viewers. For many of the adjacent residents, Alternative 3C and/or associated noise barriers would serve as a visual screen and physical barrier running through their neighborhood.

4.17.3.2 Views to Adjacent Areas

The most common view for future motorists from Alternative 3C would be of the east levee and the flood separation wall along the southern edge of the roadway. The east levee would limit the views from this alternative towards many of the commercial businesses and residential neighborhoods on the other side of the levee and of the Dallas CBD. Because of its height, the Margaret Hunt Hill Bridge would be highly visible.

4.17.3.3 Views from Adjacent Areas

Outside of the Dallas Floodway levees, Alternative 3C would be visible at both termini and where access ramps provide connections with other roadways. Topographic relief (namely the east levee) would restrict most views of this alternative from the north. Inside the Dallas Floodway levees, Alternative 3C would be visible to recreational users between the levees; in some cases, the roadway itself and access ramps would be visible while in other cases, the roadway would be hidden from view behind the Trinity Parkway's flood separation wall. The topographic relief, east levee, and numerous large buildings would restrict the Trinity Parkway's visibility to the immediate vicinity, other elevated roadways, and buildings in the Dallas CBD. The Build Alternative would not substantially limit the views of most commercial businesses and residential neighborhoods beyond the immediate corridor. The west levee would restrict most of the views toward this alternative from the west and southwest of the Dallas Floodway.

View looking northwest on top of the east levee toward the Commerce Street Viaduct alongside Alternative 3C (KOP No. 29).

4.17.3.4 Aesthetic Description

In the northern and southern segments of the corridor, Alternative 3C would exist outside of the Dallas Floodway levees, running through the industrial, commercial, and residential districts. The at-grade portions of this alternative would be visible from businesses and residences in the immediate vicinity. Overpasses, ramps, and other elevated structures of this alternative would be visible to more viewers, including recreational users and residents. Proposed noise barriers adjacent to residences in the southern terminus area would provide visual screening of the roadway. For many of the adjacent residents near the southern terminus, Alternative 3C and/or noise barriers associated with this alternative would serve as a visual screen and physical barrier running through their neighborhood.

Within the Dallas Floodway, Alternative 3C would be visible to recreational users between the levees; in some cases, the roadway itself and access ramps would be visible, while in other cases, the roadway would be hidden from view behind the Trinity Parkway's flood separation wall. The flood separation wall itself would be visible in some locations, but in most places, an earthen embankment would be built against the riverside face of the flood separation wall. In these locations, the combined flood separation wall/embankment would visually resemble the levees.

From within the Greater Trinity Forest, Alternative 3C would impact aesthetics in terms of visual and noise intrusion. Forest trees would minimize the visual impact from a distance, while noise would extend further into the forest.

Due to the roadway that would cross over Cedar Crest Bridge at its northern end, the visual impact as experienced by pedestrians walking along the bridge is anticipated to be strong.

The screening provided by the east levee would restrict the Trinity Parkway's visibility from adjacent landside properties and buildings in the Dallas CBD. Alternative 3C would not substantially limit the views of most commercial businesses and residential neighborhoods beyond the immediate corridor.

The most common view for future motorists using Alternative 3C would be of the east levee and the flood separation wall along the western edge of the roadway. The east levee would limit the views from Alternative 3C toward many of the commercial businesses and residential neighborhoods on the other side of the levee and toward the Dallas CBD.

Alternative 3C would not restrict views of the “signature” Margaret Hunt Hill Bridge. The issue of visual intrusion was one of the reasons for modification of the Combined Parkway Alternative during project development. Loop ramps from the Combined Parkway were modified to delete a southern pair of loop ramps, and to modify the northern pair to screen the ramps from the Margaret Hunt Hill Bridge by placing them landside of the levee top. Alternative 3C includes the ramp modifications.

4.17.3.5 Trinity Parkway Design Enhancements

Design guidelines developed by NTTA for the Trinity Parkway would be applied to the design and construction of the roadway to produce infrastructure that would be more attractive than a typical urban highway. These design enhancements would be consistent with the FHWA’s context-sensitive approach and the standards established by the NTTA’s *Design Guidelines* (NTTA 2012) and would be accommodated within the proposed ROW. Design enhancements would consist of context-sensitive landscaping, foreground elements (i.e., toll gantries, toll gantry landscaping, and foreground colors unique to the corridor), and background elements (i.e., background color, roadway and pedestrian lighting, sign structures, wall texture, logo wall panels, bridge railing, right-of-way fencing, and cross street identification). Design enhancements and quality landscaping would help soften, and partially shield, the Trinity Parkway and may help maintain the property values of businesses and residential areas adjacent to the facility. For additional details, see **FEIS Section 5.1.2.4.**

4.17.3.6 Toll Road Impacts

It is anticipated that the designation of the Trinity Parkway as a toll road would not create any greater visual impact than if the facility was a non-tolled roadway. If conventional toll facilities are used, the construction materials, structural design, and size of the facilities would exhibit appropriate color, scale, and texture and would exude a visually pleasing character in keeping with NTTA’s System-Wide Design Guidelines.

4.18 HAZARDOUS/REGULATED MATERIALS

This section summarizes the potential impacts of the No-Build and Build Alternative with regard to hazardous and regulated materials. Hazardous and regulated materials impacts are anticipated primarily during construction activities. Thus, additional detail regarding these potential impacts is presented in **FEIS Section 4.21.**

The construction of the proposed action poses little risk of hazardous waste contamination of the environment. Hazardous waste impacts associated with the proposed action are more likely to be associated with present and past sites and facilities that have already impacted the environment or have the potential to impact the existing environment if contaminants are mobilized (e.g., through airborne dust or water runoff from construction sites). Such facilities that are located within the ROW of the Build Alternative would be acquired by NTTA and secured in accordance with the FHWA policies and applicable state and federal laws to minimize the risk of a contaminant release to the environment.

Environmental liabilities may be associated with the acquisition of contaminated properties. However, CERCLIS can hold past and present owners and/or operators of real property liable for the costs of site investigations and remediation. CERCLIS as amended by the Small Business Liability Relief and Brownfields Revitalization Act (the "Brownfields Amendments") of 2002 provides liability protection if the owner or operator complies with specific provisions outlined in the statute, which include conducting all appropriate inquiries (40 CFR Part 312) into the condition of the property prior to acquisition.

Table 3-40 in **FEIS Section 3.9** and **FEIS Plate 3-24** lists 67 sites within 500 feet of the ROW for the proposed project that were identified as hazardous waste/material sites of potential environmental concern. The table also identifies the regulatory ID number, status, and other information about each site. Examples of hazardous waste/material sites with potential environmental concerns are landfills, active Superfund sites, RCRA sites with reported violations, and reported LPST sites that have not attained closure status.

4.18.1 No-Build Alternative

The No-Build Alternative would have no impact on existing hazardous waste/materials sites.

4.18.2 Build Alternative

The 67 sites within 500 feet of the ROW for Alternative 3C were further segregated to identify only those sites that are located within or adjacent to the alternative ROW. **Table 4-45** provides a summary of the identified hazardous waste/material sites within or adjacent to the proposed ROW boundaries for Alternative 3C. **FEIS Plate 4-6 (A-B)** show the location of these sites.

TABLE 4-45. SUMMARY OF HAZARDOUS WASTE/MATERIAL SITES AND POTENTIAL IMPACTS FROM ALTERNATIVE 3C

ID No. [1]	Regulatory Database [2]	Facility Name/Address
15	RCRIS-SQG, ICIS, IHW	TU Electric Payne Street Service Center (Dallas Power and Light Materials Reclaim), 100 Payne Street
21	LPST, PST, GCC	Kwik Stop (Diamond Shamrock), 418 Corinth Street
22	LPST, PST	Texaco Service Station (Gulf/Chevron/Metro Cost Plus), 201 Corinth Street
24	VCP, AUL, Spills	Atlas Scrap Iron and Metal Company, 2209 S. Industrial Boulevard
25	ENF, RCRIS-SQG, PST	Faubion Associates, Inc. (Dresser Industries Guiberson Div.), 1000 Forest Avenue
26	ICIS, LPST, RAATS, RCRIS-SQG, RCRIS-TSD, PST	Praxair, Inc. (Union Carbide Corp./Linde Gases of the South/Airgas Southwest), 1001 Forest Avenue
28	LPST, RCRIS-SQG, PST	Procter and Gamble Manufacturing (Dallas Public Schools Transportation Dept. facility), 1301 McDonald/3701 S. Lamar
29	ICIS, LPST, RCRIS-SQG, PST, VCP, IHW, ERNS	Beall Concrete (Tri Gas, Inc. /Chemetron Corp.), 3301 S. National Street
30	RCRIS-LQG, PST, ERNS, ENF, Spills, IHW, GCC, IOP, CERC-NFRAP	Occidental Chemical Corp. Dallas Plant (Diamond Shamrock Corp. Dallas Silicate/Oxychem), 1100 Lenway Street
31	RCRIS-LQG, PST	Okons Iron and Metal Co. (Trinity Recycling), 4801 S. Lamar Street
32	CLI - Closed Landfill	Herman Gibbons, 5003 S. Lamar Street
33	LPST, PST, GCC	Vacant Station, 5006 S. Lamar Street
35	RCRIS-SQG, VCP, IOP, PST, SWF/LF, GCC	Brookhollow Warehouse (RS Used Oil Svcs., Inc. and Kroger Distribution Warehouse) 3191 Commonwealth Drive
36	SWF/LF - Closed Landfill	City of Highland Park Landfill, 1261 Conveyor Lane
40	CLI - Landfill closed in 1930s	Unnamed Landfill, E. Side of Trinity River, S. of MLK
41	Not Registered (PSTs)	Former Wrecking Company, 4901 S. Lamar Street
42	Not Registered - Abandoned Landfill	Forest Avenue Landfill, North of MLK on east side of Trinity River
44	IOP, VCP	Dover Elevator, 7017-7021 Carpenter Freeway
56	ICIS, PST, IHW	Ram Automotive (First Choice, Greenleaf), 5311 S. Lamar Street
58	ENF, ICIS	Big City Crushed Concrete (Recycle Concrete Plant, Downtown Dallas Ready Mix), 1005 Forest Avenue
62	ICIS	Okon Metals, Inc., 2110 S. Industrial Boulevard
64	LPST	Commonwealth Center, 3141 Irving Boulevard
65	IHW, PST, RCRA	Dallas Freightliner – Western Star, The ATC Freightliner Group, L.P., 3040 Irving Boulevard
66	VCP, GCC	Star Wholesale Florists (0233), 8383 North Stemmons Freeway
67	AUL, VCP, GCC	Star Wholesale Florists, 8223 North Stemmons Freeway

Notes:
1. Plate ID numbers correspond to the locations on **Plates 4-6 (A-B)**.
2. **Table 3-40** of **FEIS Section 3.9** provides additional details about each site and the USEPA and TCEQ regulatory reference numbers.

As shown in **Table 4-45**, a total of 24 hazardous/regulated material sites were identified along or within the ROW of Alternative 3C.

During the preliminary design stage for the proposed project, the project engineers attempted to minimize the total amount of ROW crossing the various landfills and other hazardous/regulated materials sites, thereby reducing the degree of impacts from these areas. Based on preliminary design schematics, these areas could not be avoided during the planning and construction of the transportation facility; geotechnical considerations, vehicle speed, ramp and structure locations, and design geometry limit the opportunities to avoid the various landfills and other hazardous/regulated materials sites.

All of the sites listed in **Table 4-45** were identified as environmental concerns located adjacent to or within the Alternative 3C alignment. The majority are RCRA sites with reported violations or LPST sites that have not yet attained closure status. Seven sites (ID Numbers 24, 29, 30, 35, 44, 66, and 67) are sites where contamination of soils and/or groundwater has been documented, and as a result, have voluntarily been entered into a state regulatory program. Four sites (ID Numbers 32, 36, 40, and 42) are landfills. **Table 3-40** provides additional details. Two sites (ID Numbers 28 and 30) are industrial sites with known on-site disposal areas. Alternative 3C is located on structure (elevated bridge) where it would encounter the above-mentioned landfills and industrial disposal areas.

In addition to the sites listed in **Table 4-45**, previous environmental investigations performed by others have identified the presence of potential constituents of concern in a limited number of samples of soils and sediment at locations within the Dallas Floodway. Additional details are presented in **FEIS Section 3.9.3**. Based on these investigations, which are summarized below, the potential for encountering constituents of concern (COC) in soils within the Dallas Floodway would be a consideration for Alternative 3C.

A Phase II Environmental Site Assessment was completed in the Dallas Floodway by CH2M Hill for the USACE in February 2008 (CH2M Hill, 2008). The investigation was conducted to characterize the floodplain soils near bridges and utilities and to evaluate the potential use of soils within the Dallas Floodway for levee construction. The soils were investigated in the Dallas Floodway at areas where utilities cross the levees, along bridges, and in the areas of the Trinity Lakes that area planned by the City of Dallas. The investigation included the installation of 96 boring locations and collection of 192 soil samples for laboratory analysis. A total of 14 of the soil samples collected during the CH2M Hill Phase II were collected from the roadway embankment borrow sites planned for the Trinity Parkway. The TCEQ has established the Texas Risk Reduction Program (TRRP) for the evaluation of sites where COCs have been identified in environmental media (i.e., soil, groundwater, sediment). The TRRP rule establishes regulatory human health protective concentration levels and Ecological Benchmarks (regulatory levels) to determine if environmental media are affected by COCs. The TRRP establishes Texas-Specific Soil Background Concentrations (background) for selected naturally occurring metals. The analytical results of the CH2M Hill investigation were compared to the TRRP Residential regulatory levels and/or background. According to the CH2M Hill report, concentrations of the organic compounds and metals were identified in the soil samples that exceeded the most conservative residential regulatory levels. CH2M Hill stated that the metal exceedances were mostly at low concentrations and were most likely the result of airborne deposition from human activity.

HVJ Associates, Inc. (HVJ) completed a Phase II Environmental Site Assessment for the Trinity River Bridges and Utilities project area in October 2008 (HVJ, 2008). The HVJ Phase II included the collection of 58 soil samples from 29 soil borings for laboratory analysis. The objective of the environmental investigation was to determine the presence of metals and/or organic compound affected soil within the proposed borrow areas in the Dallas Floodway. The City of Dallas is pursuing a Municipal Setting Designation (MSD) for the Dallas Floodway. A MSD would restrict the use of shallow groundwater beneath the Dallas Floodway and eliminate ingestion of groundwater as a potential exposure pathway.

In accordance with TRRP guidelines and procedures outlined in the Evaluation of Dredged Material Proposed for Discharge in Waters of the U.S. – Testing Manual (USEPA, 1998), soil analytical data from the CH2M Hill and HVJ investigations were reviewed and the concentrations of COCs were compared to TRRP regulatory levels with a MSD, background, site specific background concentrations (SSBC), and/or Ecological Benchmarks. None of the soil samples collected from the borrow areas contained concentrations of potential COCs exceeding the TRRP human health regulatory levels. Only four soil samples from the dredge and fill material borrow areas contained concentrations of potential COCs exceeding the TRRP Ecological Benchmarks. Localized areas within the borrow sites exceeding the Ecological Benchmarks would require special handling or management in order to eliminate potential unacceptable ecological exposure. Details regarding the locations and concentrations of COCs identified in the fill and dredge areas and mitigative measures to eliminate potential exposure to ecological receptors during future construction and operation of the roadway are included in **FEIS Appendix G-1, Section 3.5** and the attached *Technical Memorandum - Trinity Floodway Borrow Area Environmental Evaluation*.

Based on the absence of COCs exceeding human health regulatory levels and the mitigative measures identified for fill and dredge borrow areas with COCs exceeding Ecological

Benchmarks, adverse effects on the physical, chemical, or biological characteristics of the aquatic ecosystem are not anticipated. Further investigation may be necessary to characterize soils within the proposed construction limits in the Dallas Floodway, including potential borrow areas for roadway embankment (see **FEIS Plate 4-8).**

Should Alternative 3C be selected in the anticipated ROD, prior to ROW acquisition, it is anticipated that a Phase I Environmental Site Assessment (in accordance with 40 CFR Part 312 and the most current American Society for Testing and Materials [ASTM] Standard) would be performed for ROW acquisitions that have known or potential occurrences of hazardous materials. Based on the results of the Phase I Environmental Site Assessment, sampling and analysis activities and potential remedial activities can be evaluated for the selected alternative. Additional information is provided in **FEIS Chapter 5**.

4.19 UTILITIES

This section describes the potential impacts to various utility systems located throughout the project area. As previously described in **FEIS Section 3.1.2**, several major utilities are located within the project area, which are shown on **Plates 3-4** through **3-6** and **Plate 3-21** at the end of **Chapter 3**. Should any utility relocation be necessary, NTTA would comply with the FHWA utility relocation regulations found in 23 CFR Part 645 (*Utilities*) including Subpart A (*Utility Relocations, Adjustments, and Reimbursement*) and Subpart B (*Accommodation of Utilities*). NTTA would also follow the procedures involved in Public Utilities Commission of Texas (PUCT) *General Order 131-D*, dated August 11, 1995.

4.19.1 No-Build Alternative

Impacts to utilities would not occur under the No-Build Alternative.

4.19.2 Build Alternative

4.19.2.1 Assessment of Potential Impacts to Major Utilities

Details about precise impacts resulting from the proposed Trinity Parkway to major utilities depends on the particular location and design requirements for both the proposed roadway and the utility involved. In general, however, utilities which cross a planned roadway at or near a right angle to the roadway may need to be adjusted vertically to avoid conflicts. Further, facilities such as sewer lines passing under a roadway would be modified to encase the pipeline in metal and/or concrete to protect the pipeline. Utilities which are oriented parallel to Alternative 3C would be relocated to the edge of the ROW, if the utility can be accommodated under the roadway's design requirements and site conditions. Otherwise, such utilities would be required to be relocated to an easement beyond the ROW. Applying these general principles to the known major utilities associated with the proposed project, potential impacts in terms of relocating utilities that are parallel or near-parallel with the Alternative 3C alignment are presented in **Table 4-46**. Utilities that would only cross Alternative 3C but which are not parallel within proposed ROW are noted with an asterisk in the table.

TABLE 4-46. POTENTIAL IMPACTS TO MAJOR UTILITIES

Plate ID	Description of Major Utilities	Alternative 3C
Plate 3-4: Water Lines | *Key to Symbols:* R = Relocation (number of linear feet); -- = No Impact		
1	48-inch concrete water line	R (1,600)
2	36-inch water line	--*
3	24-inch water line	--*
4	24-inch water line	--*
5	24-inch water line	--*
6	24-inch water line	--
7	20-inch cast iron water line	--
8	24-inch concrete water line	--
9	66-inch concrete water line	--
10	30-inch concrete water line	--
11	36-inch water line	--
12	30-inch water line	R (250)
13	24-inch water line	--
14	30-inch water line	--
Plate 3-5: Sanitary Sewer Lines | *Key to Symbols:* R = Relocation (number of linear feet); -- = No Impact		
1	24-inch sanitary sewer	--*
2	21 – 27-inch sanitary sewer	--*
3	48-inch sanitary sewer	--
4	78-inch concrete sanitary sewer	--
5	90-inch concrete sanitary sewer	--
6	48-inch sanitary sewer	--
7	48-inch sanitary sewer	--
8	24-inch sanitary sewer	--
9	48-inch sanitary sewer	--
10	60 - 72-inch sanitary sewer	--
11	120-inch sanitary sewer	--
12	60-inch pressurized sanitary sewer	--*
13	60-inch pressurized sanitary sewer	--*
14	36 - 42-inch sanitary sewer	--
15	60-inch sanitary sewer	--
16	24-inch sanitary sewer	--
17	42-inch sanitary sewer	--
18	48-inch sanitary sewer	--*
19	48-inch sanitary sewer	--
20	36-inch sanitary sewer	--
21	24-inch sanitary sewer	--*
22	24-inch sanitary sewer	--*
23	21-inch sanitary sewer	--*
Plate 3-6: Natural Gas Lines | *Key to Symbols:* R = Relocation (number of linear feet); -- = No Impact		
1	24-inch Oncor natural gas line	R (1,700)
2	16-24-inch United natural gas line	--*
3	24-inch Oncor natural gas line	--*
4	16-inch Oncor natural gas line	R (1,300)
5	24-inch Oncor natural gas line	--
6	20-inch Atmos natural gas line	--*
7	20-inch Gulf South natural gas line	--*
8	24-inch Oncor natural gas line	--*
Plate 3-6: Fuel Lines | *Key to Symbols:* R = Relocation (number of linear feet); -- = No Impact		
n/a	3.5-inch gasoline line (by Empire Central Dr.)	--*
n/a	6.63-inch jet fuel line (west edge project area)	--
n/a	12.75-inch refined petroleum line (west edge)	--

TABLE 4-46. POTENTIAL IMPACTS TO MAJOR UTILITIES

Plate ID	Description of Major Utilities	Alternative 3C
Plate 3-6: Electrical - Overhead Transmission Lines | *Key to Symbols:* R = Relocation (number of towers); A = Adjustment (number of towers); -- = No Impact; kV = kilovolts		
1	Oncor 138 kV transmission line (1)	R (2); A (2)
2	Oncor 138 kV transmission lines (2)	R (2); A (2)
3	Oncor 138 kV transmission line (1)	R (6); A (3)
4	Oncor 345 kV and 138 kV transmission line (1)	--
5	Oncor 138 kV transmission line (1)	A (3)
6	Oncor 138 kV transmission line (1)	R (1); A (2)
7	Oncor 138 kV transmission line (1)	R (1)
8	Oncor 138 kV transmission line (1)	--
9	Oncor 345 kV transmission lines (4)	--
Plate 3-6: Electrical – Substations | *Key to Symbols:* R = Relocation; -- = No Impact		
1	West Network Substation (Oncor)	--
Plate 3-21: Storm Drainage - Pump Stations | *Key to Symbols:* S = Station Reconstruction; -- = No Impact		
A	Pump Station A	--
B	Pump Station B	--
C	Pump Station C	--
D	Pump Station D	--
H	Hampton Pump Station	--
P	Pavaho Pump Station	--
Plate 3-21: Storm Drainage - Storm Water Sewers/Outfalls | *Key to Symbols:* E = Extension; B = Bridge (over outfall); -- = No Impact		
PS 1	Turtle Creek Pressure Sewer	B
PS 2	Woodall Rodgers Pressure Sewer	E
PS 3	Dallas Branch Pressure Sewer	E
PS 4	Bellevue Pressure Sewer	B
PS 5	Old Coombs Creek Pressure Sewer	--
PS 6	Coombs Creek Pressure Sewer	--
PS 7	Lake Cliff Pressure Sewer	--
A	Pump Station A Outfall	E
B	Pump Station B Outfall	B
C	Pump Station C Outfall	--
D	Pump Station D Outfall	--
H	Hampton Pump Station Outfall	--
P	Pavaho Pump Station Outfall	--
Plate 3-21: Storm Drainage - Storage Sumps | *Key to Symbols:* B = Bridge (over sump, minor impact possible); -- = No Impact		
1E	Sump 1E	B
2E	Sump 2E	--
3E	Sump 3E	--
1W	Sump 1W	--
2W	Sump 2W	--
3W	Sump 3W	--
4W	Sump 4W	--

Sources/Notes: Utility information – **Plates 3-4, 3-5, 3-6, and 3-21**, as indicated in the table; Build Alternative ROW corridors – **Plate 2-1**.
* = Build Alternative is crossed by the utility at or near a right angle; vertical adjustment may be needed.
-- = No horizontal relocation of utility is anticipated (i.e., utility is neither parallel nor nearly parallel to ROW).
n/a = Not Applicable (i.e., utility location is depicted in **Plate 3-6**, but does not have a specific identifier number).

4.19.2.2 Summary of Impacts by Type of Utility

Water Lines

Alternative 3C would require the relocation of an estimated 1,850 linear feet of water lines.

Sanitary Sewer Lines

Alternative 3C would not require relocation of any portion of major sanitary sewer lines.

Natural Gas and Fuel Lines

Alternative 3C would potentially require the relocation of approximately 3,000 linear feet of major natural gas lines; it would not require relocation of any portion of fuel lines in the project area.

Electrical Facilities

Alternative 3C would require the relocation/adjustment of six major lines and 24 associated support towers; it would not impact any of the electrical substations in the project area. In addition to electrical transmission lines, relocation/adjustment of overhead electrical, telephone, and television cables would likely be necessary. Likewise, underground cables or fiber-optic lines would be identified during final project design and would be relocated as determined necessary for specific locations. An inventory of these relatively minor electrical utilities has not been made at this stage of project design and planning, but plans to relocate or adjust these utilities would be included final design plans if a Build Alternative is selected in the anticipated ROD.

Storm Drainage Facilities

Alternative 3C would not impact pump station facilities, but would require bridges over storage sumps at several locations. Bridges constructed over storage sumps are not expected to result in substantial impacts to the functioning of the sumps or the natural resources associated with the sumps. Additionally, Alternative 3C would require bridges and/or extensions to several pump station outfall channels and pressure sewers, to varying degrees.

4.20 ENERGY AND MINERAL IMPACTS

4.20.1 Impacts on Fuel Consumption

A detailed energy analysis has not been conducted for this FEIS because the expenditure of resources to do so would be unlikely to provide information that would be meaningful in the selection of an alternative in the anticipated ROD. However, certain generalizations can be applied to the project area to estimate future effects of the proposed action with respect to energy expenditures. Transportation-related energy use is usually separated into two main categories: fuel consumed by traveling vehicles on the roadway and the energy associated with the construction, operation, and maintenance of the roadway itself. In light of the generally qualitative information available, most of which is applicable to both the No-Build and Build Alternative, the discussion of this topic is not separated into subsections for the No-Build Alternative and the Build Alternative.

Alternative 3C would require energy consumption during construction activity. Energy would be consumed during the mining and production of construction materials such as steel, cement, and aggregate, and when transporting materials and equipment to the construction site. Operating construction equipment and providing construction lighting would also consume energy resources. The amount of energy used during construction of a project would be roughly proportional to the size of the project. However, under the No-Build Alternative, these one-time construction impacts to energy resources would not occur.

The amount of fuel consumed by traveling vehicles on a transportation facility is a major source of energy use and is a function of several variables including vehicle miles of travel, average speed, vehicle mix, and the amount of congestion and delay. Excessive idling and stop-and-go traffic conditions associated with traffic congestion reduces fuel efficiency and substantially reduces fuel economy. A discussion of future traffic conditions under the No-Build Alternative is in **FEIS Sections 1.3.3 and 1.3.4**, which provide information regarding modeled daily travel demand performance for the region and for the project area. The forecasted increase in regional and local traffic congestion is expected to result in a 10 percent increase in regional travel time for the No-Build Alternative as compared to the scenario that includes construction of transportation improvements in the region by the year 2035, including the Trinity Parkway (see **Table 1-4**). This equates to an increase in the amount of time vehicles are idling in traffic. However, the increase in fuel consumption attributable to congestion would be offset by the projected increase in vehicle miles of travel per day under the regional scenario that assumes the completion of planned transportation projects. This regional projection of vehicle use and transportation performance measures indicates that fuel consumption in the region would be similar when comparing the 2035 No-Build scenario from a regional perspective to the 2035 Build scenario.

The designation of the Trinity Parkway as a toll road is not expected to result in an adverse impact to energy resources. The Trinity Parkway is expected to be an ETC facility. An ETC system provides operational efficiencies and would reduce the stop-and-go conditions that are associated with conventional cash booths at toll plazas, resulting in lower consumption of energy resources. The toll designation would allow the roadway to be built sooner than with traditional funding; therefore, network congestion reduction would occur sooner. This would result in energy consumption reductions as compared to localized conditions of greater congestion that would occur without the proposed project.

Operation and maintenance of Alternative 3C would require additional energy resource consumption. These typically include electrical use associated with lighting along the facility and the electronic equipment needed for toll collection stations, in addition to fuel associated with everyday use of operation and maintenance vehicles. If Alternative 3C is selected in the anticipated ROD, given its location within the Dallas Floodway, additional energy use would be required in the event of a flooding event. The road may be shut down, in part or whole, for a period of time to allow unhindered access for flood fighting activities. Closure and evacuation of the roadway may be required in the event of expected inundation of the roadway itself. Additional maintenance, repair, and clean-up actions would be required. Operations and maintenance costs associated with Alternative 3C are included in **FEIS Chapter 6**.

4.20.2 Mineral and Energy Extraction Impacts

There are no mineral or energy resource impacts anticipated by implementation of Alternative 3C. No gravel or other type of mineral mining operations would be interrupted, nor would any oil or gas wells be displaced under the No-Build Alternative or the Build Alternative.

4.21 TEMPORARY IMPACTS DURING CONSTRUCTION

Temporary impacts have been included in the discussions of the various categories of environmental impacts thus far in this chapter. This section summarizes key aspects of temporary impacts previously discussed, and provides some additional discussion relating to mitigation planning to minimize the impacts most acutely experienced during project construction. Because the No-Build Alternative would not involve any project-related construction, the discussion of each topic is this section is focused only on the Build Alternative.

Roadway construction activities would result in a variety of inconvenience-causing actions that affect a variety of resources or environmental conditions. In general, these actions or impacts fall within one of the major impact categories in the following list:

- Airborne dust due to clearing, grubbing, hauling, and construction activities;
- The use of local and regional streets and arterials to haul materials and equipment to and from the construction site;

- Temporary materials and equipment storage;
- Increase in noise levels and exhaust emissions due to construction activities and equipment;
- Temporary utility rerouting;
- Temporary traffic detours; and
- Storm water runoff and soil erosion due to rainfall and winds.

In general, the potential for disruptive construction impacts corresponds to the type and location of activities proposed in each construction stage, and the duration of the overall construction process associated with the proposed project. The discussion in this section generally focuses on the nature and duration of construction-related work. Some of measures to minimize construction-related impacts are summarized in this section, and are discussed further in **FEIS Chapter 5**.

4.21.1 Community Impacts

This section reviews potential construction period impacts to residents and businesses within the project area.

4.21.1.1 Traffic Disruptions

Construction activities would result in some traffic disruption on major freeways and arterials in the project area, thereby affecting human activity associated with nearby land use. Construction would temporarily affect local streets providing access to businesses and residents in the project area, and motorists and pedestrians in areas near construction zones would experience delays and detouring. Some streets may be temporarily closed during construction and others would be subject to periodic lane closures. In addition to such temporary traffic disruptions, construction traffic would be noticeable on area roadways and could contribute to periods of congestion in the vicinity of the construction areas. Overall, traffic disruptions are anticipated to be minor for a large portion of Alternative 3C given its location primarily within the Dallas Floodway.

4.21.1.2 Safety and Security

Safety and security issues associated with construction activities include potential disruption of traffic movements and access constraints for emergency and law enforcement vehicles. Heavy vehicle movements, possible hazardous waste excavation and transport, and construction site activity would also create potential safety concerns.

4.21.1.3 Construction Employment

Economic activity generated by the Trinity Parkway is anticipated to benefit the DFW region and would also follow the labor and material markets for roadway and bridge construction. A description of construction-related employment associated with the proposed action is included in **FEIS Section 4.5.2**.

4.21.2 Construction Excavation and Fill Requirements

Alternative 3C would require excavation and fill on land, in water and/or floodplain areas, to allow construction equipment access to construction sites. The estimated volume of fill for roadway embankment is 4.3 million cubic yards. The approximate locations of the potential borrow areas are shown on **Plate 4-8** at the end of this chapter. As previously described in **FEIS Section 2.7.1**, excavation of areas consistent with the location of lakes proposed by the City of Dallas in the Dallas Floodway could provide sufficient suitable material to build the roadway embankments for the Build Alternative.

4.21.3 Natural Resources

The discussion of direct impacts to water resources (**FEIS Section 4.8**) and vegetation (**FEIS Section 4.9**) emphasized the impacts caused by earth moving equipment, much of which would be temporary impacts. Excavated areas, embankment slopes, and other areas not paved by roadway construction would be planted with a native grass-dominated seed mixture during or after construction activities for a given site. Such planned disturbance and restoration activities are part of the planned response to construction impacts that are readily foreseeable.

Investigation activities were completed in the borrow areas required for construction. Four isolated areas within the borrow sites contained COCs exceeding TCEQ Ecological Benchmarks. Mitigative measures to manage and prevent exposure of aquatic and terrestrial resources to unacceptable concentrations of constituents of concern in soils are detailed in **FEIS Section 4.18**, **FEIS Appendix G-1** (see the Technical Memorandum attached to **Appendix G-1**).

In addition, Alternative 3C may potentially impact wetlands and other aquatic resources by temporarily increasing sedimentation from land clearing activities and altering wetland hydrology by changing drainage patterns. Some sediment movement is inherent in any large construction project. The actual amount of sedimentation and impacts to natural resources that may occur would be difficult to predict because the change in drainage patterns, hydraulics of flow during the construction phase, and identification of specific settling areas for any sediment loss cannot be determined at this stage of the proposed project. In addition, the efficiency of many BMPs varies. Another consideration is that isolated events of accidental damage to structural controls from construction equipment may occur during earthworks activities, which could result in some loss of soil/sediment from the construction area and potential impacts to natural resources. The frequency and duration of such events are unpredictable. Generally, direct impacts of increased sediment loading in storm water runoff may include reduction in light penetration (limiting growth of aquatic plants), alteration of geomorphology and in-stream habitat, covering of benthic communities, and reduced visibility for aquatic wildlife. Suspended solids may increase concentrations of contaminants and nutrients in downstream water bodies, which could magnify the effect to the aquatic environment. Construction activities may also result in displacement of wildlife due to noise and human activity or cause barriers to wildlife movement. Impacts to these resources would be avoided and/or minimized during the design phase.

4.21.4 Water Quality

As indicated in the previous section, potential impacts to aquatic resources are largely associated with potential degradation of water quality due to erosion of soil from construction sites and sedimentation of surface water bodies. The project engineer would ensure that appropriate steps are taken to control erosion and other water pollution during construction. As noted above, isolated areas in the borrow sites contain concentrations of COCs. Mitigation measures to manage and prevent potential impacts of aquatic resources by COCs are discussed in **FEIS Section 4.18**, **FEIS Appendix G-1** (see the Technical Memorandum attached to **Appendix G-1**). The amount of disturbed earth would be limited so that potential for excessive erosion is minimized and sedimentation outside of the ROW is avoided. Existing vegetation would be preserved wherever possible. As described in the SW3P, which would be developed prior to construction, temporary erosion and sedimentation control measures such as silt fences, rock berms, sedimentation basins, and/or soil retention blankets would be implemented as needed prior to the initiation of construction. Permanent soil erosion control features would be constructed as soon as feasible during the early stages of construction through proper sod placement and/or seeding techniques. Disturbed areas would be restored and stabilized as soon as the construction schedule permits, and temporary sod would be considered where large areas of disturbed ground would be left bare for a considerable length of time.

With respect to potential surface water contamination due to erosion and sedimentation, the critical time period occurs between the removal of existing vegetation to begin site work and the completion of construction and revegetation. There are numerous activities associated with construction that accelerate the rate of erosion. Virtually all of these activities involve the removal of vegetation and/or the movement of soil to provide a construction site.

Waterways adjacent to and downstream from construction sites can be adversely impacted by erosion and sedimentation. The most obvious damage is physical, where the effect can be seen as gullies or rills that form across the affected area. Sediment loss resulting from erosion can provide a medium for unwanted vegetative growth in the waterway, resulting in slowing of the natural flow of water and deposition of more sediment. Ultimately, the ecological relationships in the water and the substrate may be disrupted or destroyed. Protection of the water quality, ecological functions, and other functions of the natural and man-made drainages adjacent to the Trinity Parkway would be a high priority in the detailed engineering design, construction, and operation and maintenance phases for the proposed action.

4.21.5 Potential Construction Impacts on Flooding

For Alternative 3C, which is located within the Dallas Floodway, construction activities would be suitably staged and implemented to avoid impacts (including temporary impacts) on the integrity of the levees, the safe and efficient operation of the floodway, or on the overall capability of the Dallas Floodway to convey its design floods. For example, stockpiling of excavated material would be minimized to avoid interference with the ability of the floodway to convey floodwaters. Such measures would be part of ensuring compliance with USACE flood control regulations (33 CFR Part 208), which include the requirement that construction activities within a flood control project "will not adversely affect the functioning of the protective facilities" at any time (33 CFR Section 208.10(a)(5)). Indeed, to ensure the detailed regulatory safeguards in these flood control regulations would be maintained during construction periods, USACE approval is required before construction may begin. The USACE Fort Worth District has issued guidance (USACE Pamphlet SWFP 1150-2-1, see **Appendix E**) that further implements the USACE flood control regulations at the local level by prescribing criteria for construction within floodways. In essence, this guidance (or any future superseding guidance) describes specific project design criteria and construction management measures that are preconditions to receiving USACE approval for construction. Additionally, construction activity within the Dallas Floodway subject to USACE construction phase oversight to ensure that flood conveyance attributes are maintained (see also **Section 2.7**).

In areas outside the Dallas Floodway, the construction activity would be arranged to avoid temporary impacts to local drainage and waterways. Existing drainage facilities would be maintained in proper working order during construction, until such time those facilities are replaced by permanent facilities. Site drainage would be maintained through proper organization of the construction sequence and storage areas, maintenance of cross slopes and ditches, and installation of temporary drainage facilities where necessary.

4.21.6 Construction Period Air Quality

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

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

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 would have any significant impact on air quality in the area.

4.21.7 Construction Period Noise

Noise associated with the construction of the project is difficult to predict. The heavy vehicles and other motorized equipment, the major sources of noise during construction, are constantly moving in unpredictable patterns. However, construction normally occurs during daylight hours, although some construction may occur at night. None of the noise receivers evaluated in **FEIS Section 4.16** is expected to be exposed to construction noise for a long duration; therefore, any extended disruption of normal activities is not expected. Provisions would be included in the plans and specifications that require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems.

4.21.8 Construction Period Visual Changes

Impacts to the visual landscape would occur during the construction of Alternative 3C. The excavation and movement of fill material from potential borrow pit excavations and placement/grading of the material for roadway embankments near levees would cause a visual change in the Dallas Floodway because heavy machinery is not typically present there. The creation of cut and fill areas in combination with the staging of construction materials and equipment in the project area would further change the visual character in some areas. The location of these areas would be determined during final design should Alternative 3C be selected in the anticipated ROD. Demolition of displaced buildings within tollway ROW would also be a visual change experienced during construction of the portions of Alternative 3C outside the Dallas Floodway.

4.21.9 Hazardous/Regulated Materials

The impacts from hazardous/regulated material use and handling during construction activities associated with the proposed action pose a minimal risk of impacts to the environment. Temporary ASTs and equipment, vehicles, and machinery that contain oil and use diesel fuel are typically utilized during major construction projects. Typical impacts would include leaking valves, hoses, or small spills that may occur during refueling activities associated with ASTs or small leaks that may occur from equipment, vehicles, and/or machinery. Should a leak or spill of hazardous materials/substances occur during construction activities, steps would be taken to protect personnel and the environment in accordance with applicable federal, state, and local regulations. Cleanups of leaks or spills of hazardous materials would be performed in accordance with appropriate procedures and corrective actions will be performed to eliminate unacceptable exposure to human health and ecological receptors.

4.22 LIST OF ANTICIPATED FEDERAL, STATE, AND LOCAL PERMITS AND ACTIONS

Table 4-47 provides a summary of the required federal, state, and local actions and approvals anticipated for the proposed action.

TABLE 4-47. ANTICIPATED MAJOR PERMITS AND APPROVALS

Required Permit or Approval	Regulated Activity	Issuing Agency
Record of Decision	Compliance with NEPA process.	The FHWA and TxDOT - joint lead agencies USEPA and USACE - cooperating agencies
Clean Water Act Section 404 permit / Clean Water Act Section 401 certification / Rivers and Harbors Act Section 10 permit	Discharge of dredged or fill material into waters of the United States, including wetlands, and obstructions to navigable waterways.	USACE - issues Section 404 permit USEPA - concurrence required TCEQ - issues Section 401 certification
National Historic Preservation Act Section 106 approval	Impacts to structures listed or eligible for inclusion in the NRHP.	TxDOT - lead agency The FHWA - makes final determination of adverse impacts SHPO - consulting agency ACHP - consulting agency Mitigation MOU required between FHWA, TxDOT, and SHPO
Clean Air Act conformity determination	No federal financial assistance is to be made available unless the project conforms to the State Implementation Plan.	USDOT (FHWA/FTA) - makes determination NCTCOG/RTC - conducts analysis TCEQ, TxDOT, USEPA - consulting agencies
General Permit for storm water discharges associated with construction activities	Required for projects that will disturb more than 1 acre.	TCEQ
Municipal Separate Storm Sewer System (MS4) Permit	Required for operating a MS4.	TCEQ
Implementation of BMPs to minimize impacts to impaired waters	For projects which encroach upon threatened or impaired stream segments designated under Section 303(d) of the Clean Water Act.	TCEQ
Navigational Airspace and Obstruction Marking and Lighting approval	Acknowledgment required that structures associated with the toll road are not a hazard to navigation.	FAA
Corridor Development Certificate (CDC)	Required for development in the Trinity River Corridor.	City of Dallas - approves issuance of CDC USACE - conducts technical review
Fill Permit	Required for development activities in floodplain.	City of Dallas Floodplain Administrator
Conditional Letter of Map Revision (CLOMR) and Letter of Map Revision (LOMR)	Required for development activities in a floodplain.	FEMA
Toll Agreement	Agreement to operate a federal-aid highway as a toll road.	The FHWA TxDOT The NTTA
Interstate Access Agreement	Access to Interstate Highway system.	The FHWA TxDOT The NTTA
Compliance with 33 U.S.C. Section 408 and USACE Pamphlet No. 1150-2-1	Authorization needed to cross over the levees into the Dallas Floodway.	USACE City of Dallas

4.23 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

4.23.1 No-Build Alternative

The No-Build Alternative would not require the commitment of any resources associated with the construction of the proposed action.

4.23.2 Build Alternative

Constructing Alternative 3C involves the commitment of a range of natural, human, physical, and fiscal resources. Land used in the construction of the proposed facility is considered an irreversible commitment during the period the land is used for transportation purposes. However, if a greater need arises for use of the land, or if the highway facility is no longer needed, the land can be converted to another use. At present, there is no reason to believe such a conversion would be necessary or desirable. Should Alternative 3C be selected in the anticipated ROD, a MOU is proposed to be drafted to establish the rights and responsibilities for use of City of Dallas floodway land. The MOU would acknowledge the primacy of the flood control function and would provide the City of Dallas Flood Control District unhindered access for operations and maintenance (see **FEIS Section 2.7**).

Considerable amounts of fossil fuels, labor, and highway construction materials such as steel, cement, aggregate, and bituminous material would be expended for Alternative 3C. In addition, large amounts of labor and natural resources would be used in the fabrication and preparation of construction materials. These materials are not generally retrievable. However, the types of resources that would be used are not in short supply and their use would not have an adverse effect upon continued availability of similar resources. Any construction would also require a substantial one-time expenditure of state, federal, and private funds, which are not retrievable. The commitment of these resources is based on the concept that residents in the immediate area, region, state, and nation would benefit by the improved quality of the transportation system. These benefits would consist of improved accessibility and safety, savings in time, fuel savings, and greater availability of quality services, which are anticipated to outweigh the commitment of these resources.

4.24 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

4.24.1 No-Build Alternative

The short-term impacts associated with the No-Build Alternative are inconsistent with the maintenance and enhancement of long-term local, state, and national productivity. Short-term impacts include increasing levels of traffic congestion on IH-35, IH-30, and other major transportation facilities; a continuation of poor mobility; and a continuation of limited accessibility for important public facilities within and adjacent to the project area. These impacts are not consistent with national trade policy (NAFTA) objectives. Moreover, such impacts hinder the growth patterns and policies of local jurisdictions, and limit the functionality of major public facilities such as Dallas Love Field, DFW International Airport, and other important intermodal transportation facilities.

4.24.2 Build Alternative

The construction phase of the project would cause short-term adverse impacts on the environment. Adverse impacts have been evaluated and mitigation (i.e., avoidance or minimization) measures have been identified (see **FEIS Chapter 5**). Careful attention would be given to these identified adverse impacts during the design phase. Proposed mitigation measures would minimize adverse short-term impacts as well as any long-term damage.

This project, with its desirable design characteristics, would provide for safe and efficient vehicle operation for future traffic volumes. The benefits, such as anticipated reduction in operating costs, reduced travel time, reduced traffic accidents, and general economic enhancement of the area offered by the long-term operation of this project, are expected to offset the short-term inconvenience and adverse impacts on the human environment.

4.25 INDIRECT IMPACTS

This section presents a project level analysis of the potential indirect impacts related to the proposed Alternative 3C for the Trinity Parkway.

The CEQ defines indirect "effects" (synonymous with "impacts") 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(a))

Indirect impacts differ from the direct impacts associated with the construction and operation of the proposed project, and are caused by other actions that have an established relationship or connection to the proposed project. These induced actions are those that would not or could not occur except for the implementation of the proposed project.

The National Cooperative Highway Research Program (NCHRP) in Report 466 *Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects* (TRB, 2002) suggests indirect impacts can occur in three broad categories:

1. Encroachment-Alteration Impacts - Alteration of the behavior and functioning of the affected environment caused by project encroachment (e.g., physical, biological, socio-economics);
2. Induced Growth Impacts - Project-induced development impacts (i.e., the land use effect); and,
3. Impacts Related to Induced Growth - Impacts related to project-induced development impacts, (i.e., impacts of the change of land use on the human and natural environment).

For transportation projects, Category 1 impacts include project ecological impacts such as fragmentation of habitat by a roadway or dispersal of pollutants onto adjacent lands. Another important aspect of Category 1 impacts includes socio-economic factors such as neighborhood cohesion and stability, and changes in the local economy. Indirect impacts from Categories 2 and 3 are typically encountered outside of the project ROW, and may result from actions taken by other parties not directly associated with the project, such as private land developers. Indirect impacts are therefore subject to some level of conjecture as to the extent of changes which might be expected in the project corridor, with and without the project in place. The CEQ regulation cited above states that the EIS must identify all the indirect impacts that are known, and make a good faith effort to explain the impacts that are not known but which are "reasonably foreseeable." The CEQ has issued guidance that further explains "reasonably foreseeable" as events that must be "probable," even though there may be some uncertainty about those events (*Forty Most Asked Questions Concerning CEQ's NEPA Regulations*, 46 FR 18031, March 23, 1981). Guidance documents on this subject published by the FHWA and others, including the *Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact Considerations in the NEPA Process* (FHWA, 2003), provide further discussion on the analytical process for identifying probable indirect consequences of a proposed project.

Applying the foregoing principles, the Indirect Impacts Analysis has focused initially on the potential for ecological and socio-economic encroachment altering impacts of the proposed project. The discussion then turns to whether the proposed project would be likely to induce land development or redevelopment in those areas available for such changes. The stepwise process suggested in NCHRP Report 466 for assessing indirect impacts, as tailored by TxDOT's *Revised Guidance on Preparing Indirect and Cumulative Impact Analyses* (TxDOT, 2010a), has been used as the structure for the analysis, and considers the aspects summarized in the following seven steps:

1. Scoping (including identification of the location and extent of the Study Area).
2. Identify the Study Area's Direction and Goals.
3. Inventory the Study Area's Notable Features.
4. Identify Impact-Causing Activities of Proposed Action and Alternatives.
5. Identify Potential Indirect Impacts for Analysis.
6. Analyze Indirect Impacts and Evaluate Analysis Results.
7. Assess Consequences and Develop Mitigation.

It is important to note at the outset that, with regard to encroachment-alteration impacts (Category 1, as described above), that the scope of the direct impacts analysis presented earlier in **FEIS Chapter 4** necessarily includes a discussion of the impacts of some resources/issues that virtually always extend beyond the project construction/operation footprint. This is true for air quality impacts, water quality impacts, noise impacts, and potential contamination from nearby hazardous materials sites. This observation also applies to most aspects of potential impacts to sensitive populations (e.g., EJ and LEP) in areas that would be adjacent to or near proposed roadway facilities. The discussion of indirect aspects (i.e., encroachment-alteration impacts) of these topics is traditionally combined with the discussion of direct impacts because both the direct and indirect aspects of project-related impacts for these topics are so closely interwoven. Therefore, limited specific reference to these topics is made in the indirect impacts analysis that follows because it would repeat the discussions of indirect impacts extending beyond the project construction footprint that were already fully addressed in the direct impacts discussions of the same topics earlier in this chapter.

4.25.1 Step 1 - Scoping and Determination of a Study Area

The initial step in this analysis examines the attributes of the project and the surrounding area to focus the analytical approach and identify an appropriate area for analysis of indirect impacts. Currently, the Trinity Parkway Corridor is already substantially developed except for the Trinity River floodplain. As stated in **FEIS Section 1.2**, the purpose of the Trinity Parkway is to manage congestion on IH-35E and IH-30, as well as on other major transportation facilities within the Trinity Parkway project area, improve mobility and safety, and increase accessibility to businesses and public facilities (see also **FEIS Section 1.5**).

As stated above, the project has been planned and designed to respond to existing and future traffic demands, and the need to improve mobility, access, and safety. The Trinity Parkway is also only one of several land development and redevelopment projects already planned for the project corridor (see **FEIS Section 1.6.2**). In light of the existing network of major roads in and near downtown Dallas, the roadway is not primarily intended to be a catalyst for new development, though it could be expected to provide congestion relief to the existing network of major roadways adjacent to major developments, and provide some additional access to park and recreational amenities and economic opportunities proposed for the Trinity River Corridor.

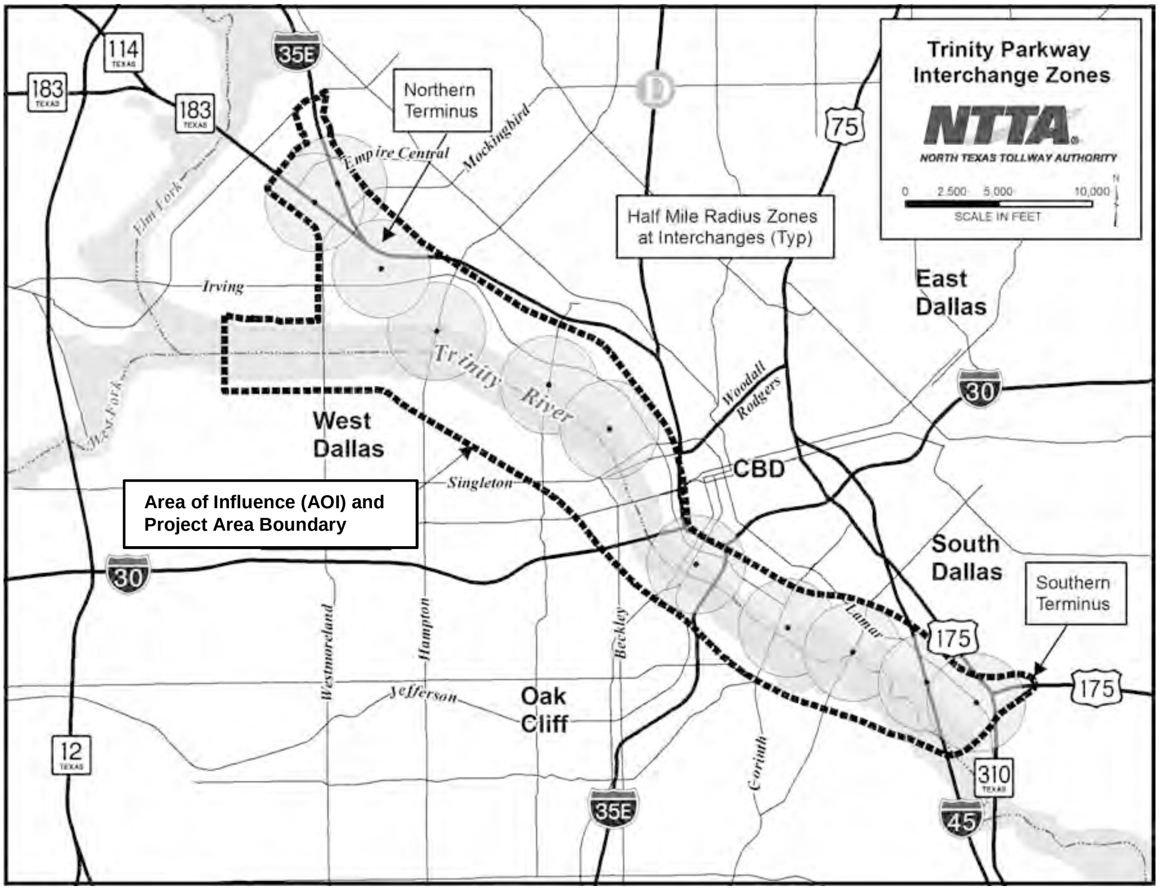
There are two major geographic features that help to define the conceptual boundary where project-related indirect impacts would attenuate to a negligible level. First, IH-35E is a major transportation corridor that is generally within one-half mile to the east of Alternative 3C. This man-made facility represents a physical barrier that would likely intercept attenuating impacts to resources such as water runoff or habitat, but also produces its own indirect impacts (i.e., noise and mobile source air pollutants) that would overshadow similar but diminished impacts that may extend to it from the Trinity Parkway. Second, the Trinity River and the west levee of the Dallas Floodway lie to the west of Alternative 3C, and provide hydrologic and physical barriers that would serve to intercept or otherwise buffer the westward radiating effects of the Trinity Parkway. Similarly, as most of the length of Alternative 3C would be located beyond the east levee toe of slope in the Dallas Floodway, the east levee would serve as a physical barrier for eastward radiating environmental impacts (in addition to IH-35E, as noted above). As the foregoing considerations were primary factors in defining the Trinity Parkway Project Area, it was determined that these same geographic features should weigh heavily in defining the "Area of Influence" or AOI for purposes of assessing indirect impacts.

Additional but secondary considerations relevant to defining the AOI is the generally-accepted principle that access-controlled roadways, such as the proposed Trinity Parkway, would be unlikely to affect land redevelopment other than near access points (see, NCHRP Report 466, page 27). Consequently, the most probable type of indirect impacts would be transportation-related development/redevelopment at or near interchanges. NCHRP Report 466 (page 62) indicates that development impacts are most often found up to 1 mile around a freeway interchange. Although this may be the case in an undeveloped corridor, the 1 mile radius appears overly large for a dense urban corridor such as the Trinity Parkway Corridor, where there are other freeways/interchanges and the Dallas Floodway are in close proximity (as discussed above). A 1-mile influence radius would substantially overlap IH-35E, implying the Trinity Parkway would have a development effect on property that already has Interstate access. A half mile radius is therefore considered a more reasonable point of reference for the Trinity Parkway setting.

Half-mile radius circles were drawn around the Build Alternative interchange locations as illustrated in **Figure 4-6**. Using the half-mile radius as a guide, the anticipated zone of potential indirect impacts for Alternative 3C generally does not overlap other controlled-access highways and encompasses the substantial barrier to land development represented by the Dallas Floodway. Accordingly, the foregoing evaluation of the likely zone of indirect impacts influence resulted in defining an AOI that is co-extensive with the Trinity Parkway Project Area (**Figure 4-6**), and serves as the representative area to aggregate indirect impacts for the Trinity Parkway throughout the remainder of this discussion.

Because indirect effects manifest after completion of a project, a temporal boundary is necessary in order to accurately identify impacts related to the proposed project. For the Trinity Parkway, the temporal boundary extends from the anticipated completion of the parkway in 2020 to the year 2035, which is the end of the *Mobility 2035 – 2013 Update* and encompasses all time frames identified in other core planning documents.

FIGURE 4-6. TRINITY PARKWAY INDIRECT IMPACTS AREA OF INFLUENCE



4.25.2 Step 2 – Area of Influence Direction and Goals - Development Trends

4.25.2.1 Direction and Goals

Because the AOI is project-specific, there are no goals outside of the transportation arena that are associated with only this area. In order to identify and present the goals for the AOI, various City of Dallas development plans and programs that affect areas within the AOI were reviewed and researched. These include the *Trinity River Corridor Comprehensive Land Use Plan* (CLUP), *forwardDallas!*, TIF Districts, CityDesign Studio guidelines, Public Improvement Districts (PIDs) and Neighborhood Investment Programs. A discussion of the intentions of each of these documents/programs is presented below.

The Indirect Impacts Analysis has been developed in part based on the CLUP, a study commissioned by the City of Dallas (2005a). The CLUP was initiated in June 2000, and concluded with adoption of study recommendations by the Dallas City Council on March 9, 2005. The plan is intended by the city to "guide future development of the neighborhoods and business areas along the Trinity River corridor, and to ensure the greatest benefit from the significant investment in public facilities." The plan has also been used by the city to identify appropriate zoning changes in the corridor incorporated in the *forwardDallas!* citywide comprehensive plan, adopted by Council on June 14, 2006 (City of Dallas, 2006b). The maps associated with the CLUP and the project area discussions were used in this Indirect Impacts Analysis as a key tool in evaluating the likelihood that an existing land use would be subject to redevelopment in the future, and the type of future land use to anticipate.

This analysis also relies on expected development/redevelopment trends associated with TIF Districts identified by the City of Dallas' Office of Economic Development (2012e - j). The purpose of the TIF Districts is to stimulate private development in order to increase tax revenues so that those revenues can be reinvested in the TIF District through public improvement projects. Four TIF Districts intersect the AOI and are noted on **FEIS Plate 4-12**. These TIF Districts are comprised of the following: Design District, Fort Worth Avenue, Oak Cliff Gateway, and TOD TIF Districts. Additionally, the Office of Economic Development works in conjunction with the Dallas CityDesign Studio (formed in 2009) to direct city development efforts in neighborhoods along the Trinity River Corridor. The focus of the Dallas CityDesign Studio is to increase awareness about urban design within Dallas neighborhoods in order to enhance livability for all Dallas residents (City of Dallas, 2012n). Conceptual guidelines meant to support the city's shifting perspective concerning development and redevelopment in West Dallas with emphasis on the La Bajada neighborhood area (**FEIS Plate 3-10**) were adopted by the City Council on March 9, 2011 (CityDesign Studio, 2011c).

Finally, the analysis incorporated information from PIDs and Neighborhood Investment Programs, which are additional development tools used by the City of Dallas to implement improvements for local neighborhoods (City of Dallas, 2012e - j). The City of Dallas has created a current total of ten PIDs, two of which are within the indirect impacts AOI. PIDs function by assessing special taxes to property owners in the area which then can be used for various infrastructure and cultural/recreational improvements beyond existing city services. The Neighborhood Investment Program was implemented in the fall of 2003 as a way to concentrate 60 percent to 80 percent of affordable housing funds and Community Development Block Grant Public Improvement funds within five targeted areas of the city. These two programs invest in local neighborhoods to improve public infrastructure and provide affordable housing.

Based on these city plans for the corridor, and other plans outlined in **Table 3-10** (e.g., the city's BVP and the USACE's DFE Project), much of the future development in the project area would be influenced by City of Dallas urban plans and policies, as well as city and USACE plans for development of park and recreation resources, in addition to Dallas Floodway bridge and levee structures.

4.25.2.2 Trends

Section 1.3.2.1 of this FEIS presents past, present, and future regional population and employment data, which reveal a steady increase in both despite the recent economic recession. The average annual population growth rate for the Dallas/Fort Worth region is 2.3 percent and the population is expected to increase 48 percent between 2012 and 2035. As the population increases, the number of jobs is expected to increase as well with an expected total of 6.2 million jobs in 2035 compared to 4.2 million jobs in 2012. For population trends specific to the AOI, **Table 3-3** presents 2000 and 2010 Census data for the 15 census tracts which encompass the project area. Overall the population in this area increased between the 2000 Census and the 2010 Census although the population of some Census tracts actually decreased. Employment data specific to the AOI is not available; however, **Table 3-6** indicates that the City of Dallas employment trends have fluctuated over the past 12 years and are not recovering as quickly as the Metropolitan Statistical Area from the most recent economic recession.

The population and employment trends within the region, the City of Dallas, and the AOI indicate constant growth over the long-term even though there are periods of reduced or negative growth.

4.25.3 Step 3 - Inventory of Notable Features

The third step in the indirect impacts assessment framework focuses on reviewing existing data to adequately identify the AOI's notable features or resources. Notable features are those social, ecological, or historical resources which are considered valuable and/or unique and which may be less able to bear impacts from a transportation improvement. Because of the nature of the AOI – primarily floodplain adjacent to older urban areas under redevelopment – the valuable/unique features associated with the Trinity Parkway AOI include ecological resources, historical structures, and elements important to the redevelopment of Dallas. These notable features are discussed in **FEIS Chapter 3** and listed below:

- The Trinity River with associated floodplain and flood control system (i.e., Dallas Floodway [NRHP-eligible]), and open areas (**FEIS Plates 3-16**, **3-17**, **3-20**, and **3-21**);
- The Great Trinity Forest (**FEIS Plate 3-16**, Map ID K);
- The Margaret Hunt Hill Bridge (**FEIS Plate 3-15**);

- National Register of Historic Places (NRHP-listed or -eligible resources) – all shown in **FEIS Plate 3-15** (Map ID numbers shown below)
    - Colonial Hill Historic District (NRHP-listed) (Map ID 1);
    - The Houston Street Viaduct (NRHP-listed) (Map ID 2);
    - The Corinth Street Viaduct (NRHP-eligible) (Map ID 4);
    - The Continental Avenue Viaduct (future pedestrian bridge and NRHP-eligible) (Map ID 7);
    - Commerce Street Viaduct (NRHP-eligible) (Map ID 8);
    - Three railroad bridges over Trinity River (NRHP-eligible) (Map IDs 3, 5, and 6);
- The Design District (**FEIS Plate 3-10**); and,
- South Dallas neighborhoods (**FEIS Plates 3-10** and **3-15**).

4.25.4 Step 4 - Identify Impact-Causing Activities of Proposed Action

This step summarizes the impact-causing activities of the proposed project from the beginning of construction to maintaining the operating facility. The objective of this step is to identify direct impacts of the proposed action which could conflict with the goals and trends identified in **Step 2** and the notable features identified in **Step 3**. As noted in NCHRP Report 466 (page 54), documented direct impacts "can be viewed as potential catalysts for indirect effects." Descriptions of potential impact-causing activities are summarized in **Table 4-48.** This assessment of impact-causing activities is based on the assumption that construction and operation of the proposed facility would be in accordance with current industry standards and practices, and consistent with the experience from previous transportation projects. The various types of activities noted in **Table 4-48** are based on the examples provided in the TxDOT Indirect and Cumulative Impact (ICI) Guidance and NCHRP Report 466, and have been tailored to fit the design and environmental context of the proposed project.

TABLE 4-48. IMPACT-CAUSING ACTIVITIES OF THE PROPOSED PROJECT

ACTIVITY	RELEVANT DETAILS ABOUT PROJECT SPECIFIC ACTIVITY
Modification of Regime	233 acres of Dallas Floodway would either be permanently elevated above the 100-year floodplain or require a flood wall to protect the roadway from flooding during high water events. Four types of habitat would be permanently impacted by the proposed project footprint: 492 acres of grassland; 49 acres of riparian forest; 1.4 acres of forested wetland; and, 50.3 acres of emergent wetland. Pump stations would be provided where the roadway would be depressed in order to provide stormwater discharge.
Land Transformation and Construction	Approximately 66 acres of Dallas Floodway grassland would be transformed to concrete roadway. Approximately 4.3 million cubic yards of fill would be required to construct the proposed Trinity Parkway on embankment within the Dallas Floodway.
Resource Extraction	Approximately 4.3 million cubic yards (317 acres) would be extracted from borrow pits located within the floodway to provide roadway embankment soil. The extraction would occur at the site of proposed future lakes.
Processing	Temporary on-site materials and equipment storage may occur during construction of the proposed project.
Land Alteration	Approved BMPs would be employed during construction to reduce water quality impacts from stormwater runoff. Both structural and non-structural BMPs would be considered to address post-construction water management. Approximately 65.6 acres of waters of the U.S., including wetlands, would potentially be filled by the proposed project.
Resource Renewal Activities	No resource renewal is proposed as part of the proposed project.
Changes in Traffic	No changes in traffic would occur during construction of the proposed project. Operation of the facility would allow additional north-south movements currently conducted on IH-35E.
Waste Emplacement	No sanitary waste discharge is anticipated. Packing materials would be disposed of by a certified contractor.
Chemical Treatment	Periodic applications of fertilizer and herbicide may occur during the maintenance phase of the proposed project.
Access Alteration	The proposed Trinity Parkway would provide additional access to local roadways, highways and regional destinations that are currently accessible via IH-35E. Permanent access to Trinity Park from five local arterial streets would be provided via ramps between Trinity Parkway and the river from the arterial street bridges to the park.

4.25.5 Step 5 - Identify Potential Indirect Impacts for Analysis

The objective of this step is to screen the various types of potential indirect impacts for those impacts considered substantial. As noted in TxDOT's ICI Guidance (TxDOT, 2010a), "Whether an impact is substantial is a function of the context, the likelihood of the impact, and the reversibility of the impact." The guidance also points out that evaluating impacts in light of area goals is important because impacts that conflict with area goals would likely be considered substantial. Impacts affecting any of the notable features within an AOI would also likely be considered substantial.

In the discussion that follows, relevant aspects of area goals and notable features are considered for each of the three categories of indirect impacts. The method for this screening step applied the qualitative inference technique discussed in NCHRP Report 466 (page 66) which uses "professional judgment of the possible changes that the proposed project would entail." This approach draws heavily upon an understanding of ecological, economic, demographic, and social information developed during the analysis of direct impacts. This step of the analysis assesses whether notable features within the AOI would likely receive indirect impacts attributable to the proposed project. Potential indirect impacts identified in this step as substantial are then evaluated further in **Step 6**. For those types of potential indirect impacts that are not considered to result in substantial impacts, a brief statement of rationale is provided.

4.25.5.1 Ecological Encroachment-Alteration Impacts

In order to identify indirect impacts to ecological resources, it is necessary to assess the extent of the direct impacts on ecological resources and determine if these impacts would extend further from the proposed project in space or time. As noted in **Step 3**, the Trinity River with associated open areas and the Great Trinity Forest within its floodplain are notable ecological resources within the Trinity Parkway's AOI. Direct impacts identified in **Table 4-30** indicate that maintained grass areas would receive the greatest impact from the proposed Alternative 3C and forest impacts would be relatively small in comparison to grassland impacts. The maintained grass areas are completely within the confines of the levees flanking the Trinity River. The loss of maintained grass areas in the floodplain would not result in indirect impacts because it would not extend beyond the construction limits and would not further encroach upon the floodplain or alter the effectiveness of the floodplain as habitat or flood storage. However, the construction of the tollway within the levee would result in dividing the Trinity River from the east levee, which may limit the movements of ground-dwelling creatures.

Some wooded habitat would be removed southeast of the DART Bridge, but this removal of bottomland and riparian forest would primarily affect the edge of contiguous bottomland forests and would not result in substantial habitat fragmentation impacts. As compared to the riparian forest habitat within the AOI, the expected loss of habitat would represent less than ten percent of this type of habitat. As with grassland impacts, project-related impacts to vegetation are not expected to extend to any substantial distance away from the area of impacts directly affected by construction activity; therefore, indirect impacts to the Great Trinity Forest and other notable ecological resources are not anticipated.

In **FEIS Chapter 5**, mitigation efforts are discussed for impacts related to construction of the Trinity Parkway. These would be considered in order to decrease the impact the Trinity Parkway would have on the surrounding environment. Efforts made to decrease the direct impacts would naturally alleviate pressure on the natural environment that could lead to indirect impacts near the proposed project.

Encroachment-Alteration and Air Quality

The analysis of the "direct" impacts of the proposed project to air quality is essentially a study of encroachment-alteration indirect impacts because the impacts are realized after the project is constructed and impacts occur away from the construction footprint. No substantial impacts are expected in terms of air quality, as air pollutants of concern either attenuate quickly as they move away from the roadway (e.g., CO and MSAT) or are included in air emission budgets that are part of regional ozone abatement plans. Further consideration of potential indirect impacts of MSAT, CO, and other vehicle emissions relating to vulnerable elements of the local population would not be warranted.

Conclusion

Substantial ecological encroachment-alteration effects from the Build Alternative are not anticipated; therefore, this category of potential indirect impacts will not be addressed in **Step 6**.

4.25.5.2 Socio-Economic Encroachment-Alteration Impacts

Alternative 3C would be located primarily within the levees of the Trinity River; however, the southern portion of the alternative would pass through existing South Dallas neighborhoods and the TOD TIF District. The summary of impacts in **FEIS Chapter 4** (**Table 4-3**) indicates that Alternative 3C would cause relocations, proximity impacts, noise impacts to residences, visual intrusion, and increased traffic on local streets in that part of the AOI. These direct impacts could lead to substantial socio-economic encroachment-alteration impacts; therefore, this aspect of indirect impacts will be addressed in **Step 6**.

4.25.5.3 Project-Induced Land Use Change

The objective of this step is to estimate the extent to which the Build Alternative may affect future changes in land use within the AOI. The approach for this step is to first identify the important economic and social factors affecting land development/redevelopment decision-making within the AOI, and then determine how the proposed Alternative 3C would be likely to affect those factors. This approach necessarily relies heavily on an analysis of past trends in urban development and future development plans to infer the key economic and social factors driving development/redevelopment.

The methodology for identifying specific properties where induced development would be most likely to occur involved applying a “qualitative inference” technique relying on professional planning judgment in concert with a case study analysis of specific areas of concern to identify possible changes spurred by the proposed project. Using “planning judgment” is an acceptable methodological tool discussed in both NCHRP Report 466 (TRB, 2002), which discusses the analysis of indirect land use impacts of transportation projects more broadly, and the adjunct NCHRP Report 25-25 (Task 22) (TRB, 2007), which supplements the approaches discussed in NCHRP Report 466 and provides additional guidance on selected methodologies for the assessment of indirect land use impacts. General circumstances influencing the likelihood of induced development shifts (which accounts for many of the factors that motivate investors to develop or redevelop a particular parcel of real estate) were evaluated as suggested by NCHRP Report 466 (page 62). As applied to the proposed project, these circumstances include such items as: the extent and maturity of existing transportation infrastructure to include access improvements proposed by the Trinity Parkway; existing trends in land development; land availability and price; land use controls; local political/regulatory conditions; location attractiveness; state of the regional economy; and area vacancy rates.

In addition to the analysis of general influences, local plans and policies were identified and reviewed to ascertain the level of influence they would have on development and redevelopment within the AOI. Varied plans and policies exist within the project area to encourage, guide, monitor, and evaluate various development activities ranging from regional transportation infrastructure to residential, commercial, or industrial activities. These include planning and policy documents sponsored by the NCTCOG, DART, and the City of Dallas. The policies most likely to influence development and redevelopment within the indirect impacts AOI include DART’s *2030 Transit System Plan* (DART, 2006) which includes express rail and improved bus routes through the AOI, the *Trinity River Corridor CLUP* (City of Dallas, 2005a), the Trinity River Corridor Bond Program that was approved by Dallas residents in May 1998 (City of Dallas, 1998a), *forwardDallas! Let's Build our Future* (City of Dallas, 2006b), TIF district investments, and CityDesign Studio’s *Urban Structure and Guidelines* (City of Dallas, 2011c).

Interviews of City of Dallas planners were conducted to help the study team understand the development trends occurring within and around the Trinity River Corridor. Discussions with City of Dallas public officials and agency staff in June 2008 revealed the belief that the overwhelming catalyst for land use change would be attributed to the proposed park and recreational amenities proposed in the Trinity River Corridor Balanced Vision Plan (see **FEIS Plate 3-13**). These officials pointed out that changes were occurring within the west Dallas region as investors began to purchase hundreds of properties, many near the west end of the Margaret Hunt Hill Bridge. Investors have purchased more than 500 properties in West Dallas between the Trinity River and Interstate 30, a possible sign of future planning efforts responding to the multitude of planned projects (e.g., parks, lakes, trails) in the Trinity River Corridor area (Brown, 2008). In 2008 the officials acknowledged that induced land use change would be experienced to varying degrees, which would be largely dependent on the access the Build Alternative provided to the Trinity Parkway facility from local streets and arterials, and on how well it would facilitate pedestrian/bicycle and automobile access to the Trinity River Corridor amenities. Proposed access improvement, such as frontage road access adjacent to the Trinity Parkway's southern terminus, is an example of a Trinity Parkway design aspect that could have indirect land use impacts. Currently, neighborhoods located in South Dallas and Rochester Park have formed a reasonable expectation that frontage road access to the Trinity Parkway would encourage future commercial and retail investment.

Finally, discussions with city planners, public works officials, and staff from the Office of Economic Development and CityDesign Studio in October 2012 upheld the belief that land use change in the area would be attributable to the proposed park and recreational amenities. The goal of city planners is to have walkable urban areas which tie downtown Dallas to the Trinity River through pedestrian facilities, bike paths and trolley access. For the City of Dallas, the Trinity River Corridor is a destination that will be accessible from adjacent neighborhoods, local businesses, and the Dallas Central Business District without the use of a car. The CityDesign Studio was created specifically to guide development around the Trinity River in order to protect local neighborhoods while enhancing livability through urban design initiatives. Recent developments include adaptive re-use facilities which maintain the integrity of existing structures while updating them to new uses; multi-family residential developments providing an urban experience in West Dallas; and mixed-use developments that support office, retail and residential uses. Although development and redevelopment are expected and encouraged by the city within the indirect impacts AOI, future plans and developments are highly dependent on market viability. As noted above, investors have purchased numerous properties in West and South Dallas but until the economy indicates support of new developments at this location, these properties will likely remain in their existing conditions, with or without the Trinity Parkway.

Even so, this indirect impacts analysis will consider whether construction of Alternative 3C would be likely to cause a shift in the way investors and land owners view the economic attractiveness of developing or redeveloping land that would be near the proposed roadway.

Given that the Trinity Parkway is proposed as a limited access, tolled facility intended to relieve local and regional congestion, the most likely areas where future land use and/or development changes could occur would be limited to proposed interchanges with major cross streets. The interchanges associated with the Trinity Parkway Alternative 3C are depicted in **Figure 4-6**. In addition to impacts near Trinity Parkway access points, land redevelopment would be a natural objective of property owners affected by ROW acquisition. The ROW acquisition process may, on certain tracts, convert ownership for only a portion of a property adjacent to the highway ROW footprint, leaving the remainder for potential redevelopment. However, based on input from city planners regarding this aspect of indirect impacts, the amount of project-related land use change indirectly related to access points and ROW acquisition is not expected to be substantial because other market forces are primarily responsible for local land use investment decision-making.

Conclusion

This aspect of indirect impacts will be examined as part of **Step 6** because the proposed interchanges between the Trinity Parkway and existing cross streets could lead to induced development.

4.25.5.4 Impacts Related to Induced Growth

As indicated above, an evaluation of induced development and redevelopment from the Trinity Parkway Alternative 3C is included in **Step 6**. As changes in land cover and other potential impacts to the natural and human environment would necessarily accompany changes in land use, such potential impacts will also be discussed in **Step 6**.

4.25.6 Step 6 - Analyze Indirect Impacts and Evaluate Results

4.25.6.1 Socio-Economic Encroachment-Alteration Impacts

Alternative 3C would primarily be an elevated structure passing through the South Dallas HOA neighborhood except as it passes under IH-45 and then again as it joins with US-175. Displacements would occur at the intersection with US-175, where the Trinity Parkway would pass through an area that is mixed residential and commercial uses. The displacements and the presence of the Trinity Parkway would isolate approximately 6 acres of land from the remainder of the South Dallas HOA. This 6-acre area would be bound by the proposed Trinity Parkway, SH-310, and Lamar Street. This isolation, in combination with the presence of major highways and the fact that two-thirds of the parcels in the area are either undeveloped or commercial, could lead to a change in the composition of the area. Residents may decide to leave the area in favor of a more desirable community and commercial enterprises could increase. The socioeconomic encroachment-alteration effects could alter the existing community at the US-175 intersection; however, the magnitude of these alterations would be small.

4.25.6.2 Project-Induced Land Use Change

This evaluation for project-induced land use change follows the NCHRP Report 25-25 (Task 22), *Forecasting Indirect Land Use Impacts on Transportation Projects* (TRB, 2007). Of the six land use forecasting tools provided in the NCHRP Report 25-25 (Task 22), the "Planning Judgment" forecasting tool was utilized as the framework for the analysis. The steps provided for this specific methodology come from *A Guidebook for Evaluating the Indirect Land Use and Growth Impacts of Highway Improvements* prepared by ECONorthwest and Portland State University for the Oregon Department of Transportation (2001).

Though the Trinity Parkway is an important element in the long range vision for the Trinity River Corridor, which includes plans for park and recreational amenities, flood protection, environmental restoration and management, and community and economic development, the potential indirect land use impacts assessed for the Trinity Parkway are purposely isolated from the other corridor components to determine the Trinity Parkway's influence on land use.

The key variables suggested by the NCHRP Report 25-25 (Task 22) that might contribute to measurable changes in local development patterns in response to a transportation improvement include:

- Change in Accessibility - measured in travel time or delay, if available; or ratio of volume/capacity or change in access.
- Change in Property Value - likelihood of changes in land price that would influence development.
- Forecasted Growth - measured as population, employment, and land development; for a region, city, or sub-area. Forecasted population and employment trend may indicate the demand for land development where access and other public services may be available.

- Relationship between Supply and Demand - measured as population, employment, and land development. Determine how much vacant, buildable land is available within a reasonable sub-area.
- Availability of Non-Transportation Services and Other Market Factors - determine the existing factors that would promote or limit development or possible barriers to service.
- Public Policy - determine whether land use plans are closely followed and enforced such that development pressures can be resisted.

These variables will be analyzed and discussed for the Trinity Parkway AOI in order to develop an appropriate land use change sensitivity baseline. This baseline is necessary to determine how susceptible the AOI is to land use change. The level of influence on the AOI attributable to each variable will be determined and noted before discussing how the introduction of the Trinity Parkway would affect the influence of the variables on land use change. It is possible that the result of this analysis will demonstrate that the AOI's sensitivity to land use change would be the same with or without the Trinity Parkway. By determining the possible influence on land use change, induced development can be identified and quantified as an indirect effect.

Change in Accessibility

Changes in accessibility are most readily analyzed by comparing differences in travel time, congestion delay, levels of service, and average speed along a particular facility or project area. For the proposed project, changes in accessibility were analyzed for the 2035 No-Build and Build scenarios in **FEIS Section 4.6.1**. The predominant increase in average loaded speed indicates that the average trip times on the various roadways generally would be less in the Build scenario as compared to the No-Build scenario.

Change in Property Value

The Dallas Central Appraisal District 2011 Annual Report provides information on appraisal operations, taxpayer assistance programs, financial stewardship, the appeals process, and statistical comparisons. An assessment of market values for the City of Dallas in years 2010 and 2011 indicates that total market value decreased by $800 million, which is less than a one percent change (DCAD, 2011). This decrease was attributable to reappraisals which decreased market value by $1.5 billion; however, new construction bolstered market value by $700 million.

As examined earlier in this chapter, TIF Districts have been initiated in the AOI to bolster property values and increase long-term revenue. The four TIF Districts within the AOI are at various stages of success. The Design District, Oak Cliff Gateway and Fort Worth Avenue TIF Districts have seen increased property values since their inceptions, with over $159 million, $138 million, and $47 million worth of improved taxable parcels, respectively (City of Dallas, 2012e-j). However, the TOD TIF District – Cedars West Sub-District has not seen any improved parcels since its inception in 2009 and instead has seen a decline in value for land and industrial properties.

Overall, there are lingering effects from the national economic recession that began in 2007 with reappraisals leading to decreased market values; however, the City of Dallas and the AOI are seeing improvement. New construction accounts for much of the increased market value with some re-use of existing structures providing increased market value as well. The policies put in place by the city to encourage growth have been successful and have paved the way for a continual increase in property values over time.

Forecasted Growth

The NCTCOG Demographic Forecast (February 24, 2011) provides long-range, small area population, household, and employment projections for use in intra-regional infrastructure planning and resource allocations in the metropolitan area of North Central Texas. The forecast, which is conducted for the 12 counties surrounding the Dallas-Fort Worth urban core (Collin, Dallas, Denton, Ellis, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall, Tarrant and Wise counties), predicts growth of almost 4 million persons between 2005 and 2035. This region is expected to reach 9.8 million persons by 2035, and support approximately 6.2 million jobs. The forecast was developed using a federally-recognized land-use model that allocated households and employment to the 12 counties for a regional control total, then disaggregated the totals to forecast market areas and counties. A task force of local officials from city, county, and transportation entities acted as a governing body for the process and endorsed the forecast for approval by the NCTCOG's Executive Board. **Table 4-49** summarizes the demographic forecast from 2005 to 2035 for the market areas which encompass the indirect impacts AOI (market areas 8, 21 and 28), as well as the 12-county NCTCOG MPA (NCTCOG, 2011d). Population and employment growth rates between the market areas are not consistent; however, all areas and the MPA are expected to increase in both population and employment.

TABLE 4-49. 2005-2035 REGIONAL POPULATION AND EMPLOYMENT GROWTH

Area	Population				Employment			
	2005	2035	Growth	Change (%)	2005	2035	Growth	Change (%)
12-County MPA	5,777,272	9,833,378	4,056,106	70.2	3,624,051	6,177,016	2,552,965	70.4
Market Area 7	132,009	169,304	37,295	28.2	197,061	260,833	63,772	32.3
Market Area 8	20,403	45,220	24,817	121.6	80,220	102,015	21,795	27.2
Market Area 21	82,831	109,549	26,718	32.3	37,288	68,155	30,867	82.8
Market Area 22	46,673	64,606	17,933	38.4	19,650	38,674	19,024	96.8
Market Area 28	101,429	112,939	11,510	11.3	44,223	73,507	29,284	39.8
Source: NCTCOG								

Market Area 8 encompasses approximately half of the AOI and areas further west/northwest of the AOI. Population in this area is anticipated to increase at a much greater percentage than employment. Market Areas 7 and 22 encompass each end of the AOI; the area along IH-35E in the north is part of Market Area 7 and the IH-45/US-175 interchange is included in Market Area 22. Market Area 21 encompasses one-quarter of the AOI; between IH-35E and IH-45. This market area extends south to IH-20. Market Area 28 encompasses the portion of the AOI between IH-30 and IH-35E which is primarily floodplain and the Oak Cliff Gateway TIF District. The majority of this market area is loosely bound by IH-30, Loop 12 and IH-35E. These four market areas are expected to see the reverse of Market Area 21: higher percentages of employment growth over population growth. Overall, this indicates that all five market areas have the potential for land use changes. However, these market areas extend well beyond the boundaries of the indirect impacts AOI and vacant land is available for residential or commercial development that would not be tied to the Trinity Parkway. Also, the presence and availability of existing commercial and industrial structures should be taken into account when considering employment growth. All three market areas encompass major highways with numerous facilities that may not be operating at full capacity. Employment growth does not necessitate land use changes if existing facilities are available and adequate for employers' needs.

The presence or absence of the Trinity Parkway was not taken into account when these forecasts were developed; however, an improved transportation network throughout the region was considered. It can be assumed that improved transportation influences growth but it is unknown to what degree the proposed project would influence employment and population growth.

<u>Relationship Between Supply and Demand</u>

Using data gathered from the City of Dallas and NCTCOG plus current aerial photography, vacant land available for development was identified within the AOI. According to the latest digital data available (NCTCOG, 2005b), approximately 848 acres of vacant land are located within the AOI and approximately 1,882 acres of commercial and industrial lands are found in the AOI. These lands would be considered available for development and redevelopment and constitute 2,730 acres, approximately 37 percent of the AOI (7,476 acres). This indicates there is a healthy supply of available land. Demand, as measured by population and employment growth, could be considered high because **Table 4-49** indicates continued growth in both areas through 2035.

Availability of Non-Transportation Related Services and Other Market Factors

A variety of non-transportation related services and other market factors contribute to urban development/redevelopment within the AOI. These include, but are not limited to, market viability, available workforce, local economic policies, zoning regulations, mechanisms for flood control, and public water and sewer facilities. Although a general discussion of growth potential within the AOI could be considered deficient for analyzing whether there could be measurable changes in local development patterns in response to transportation projects, because the Trinity Parkway is a proposed transportation project within the City of Dallas, which has been and continues to be a growth market, a general discussion is sufficient.

Since 2007 the U.S. has experienced an economic recession that increased unemployment, decreased local, state and federal funds, and resulted in numerous cities losing much of their economic momentum. The State of Texas and the City of Dallas have overcome the development roadblocks created by the recession. In the first quarter of 2012, the Federal Reserve Bank of Dallas stated that Texas had moved from recovery to expansion in 2011 and would continue to experience moderate growth (Federal Reserve Bank of Dallas, 2012). The Brookings Institution's *Global MetroMonitor 2012* identified the Dallas metropolitan area as one of only three metropolitan areas in the U.S. whose gross domestic product (GDP) per capita and employment levels both had recovered to prerecession levels (Istrate, 2012). These findings indicate that a positive economic climate and available workforce are present within Dallas to help drive development. Additionally, the City of Dallas has an extensive network of public utilities within the AOI and recent changes in zoning and land use have been favorable towards planned and multi-use development.

Flood control mechanisms are an important and necessary component of development within the AOI. At the southern end of the AOI where the proposed Trinity Parkway would bridge over Martin Luther King Jr. Boulevard, the railroad, and Lamar Street to join US-175, the existing available land is within the floodway and highly prone to flooding. A DFE levee is proposed east of the Trinity River, within the floodway, in order to reduce flooding in the area. This flood control mechanism is vital for any development to occur in the southern portion of the AOI. Without flood control, no new development is possible.

As discussed in **Step 2**, four TIF Districts intersect the AOI. These Districts act as a catalyst for development/redevelopment. In December 2008, the TOD TIF District was established adjacent to eight DART light rail stations. Four sub-districts were identified within the TOD TIF District and one of these sub-districts – the Cedars West Sub-District – is located within the AOI. The Cedars West Sub-District is bound on the south by the Trinity River, on the west by IH-35, and on the north and east by the DART light rail line. Existing land use is industrial, flood control, utilities and some vacant land but the TOD TIF District is currently zoned for "planned development" with transit-oriented mixed use and transition warehouse/residential. The TOD TIF District was established to "foster the construction of structures or facilities that will be useful or beneficial to the development of transit stations along the DART light rail system in the central portion of the City." The establishment of this TIF District supports the city's goals of providing more pedestrian-friendly areas within the city and redeveloping less desirable areas through public assistance in order to increase economic growth.

The positive market viability, available workforce, local economic policies, zoning regulations, mechanisms for flood control, and public water and sewer facilities indicate that future development/redevelopment within the AOI would be heavily influenced by non-transportation factors. Collectively, these and similar factors represent natural or man-made constraints that strongly influence the decision making process that leads to land use changes. Some of the notable constraints as applied to the AOI are shown in **FEIS Plate 4-12**. For example, constraints that limit commercial development in a particular area include the proximity of the area relative to the 100-year floodplain (which contains existing and planned city parks), incompatible zoning (e.g., areas zoned as residential), or designation as a historic district, and the existing land use as public facilities or infrastructure for major utilities. In essence, the potential for the proposed project to indirectly result in development or redevelopment in such areas would be constrained by natural hazards or public policy/use of existing property that would be unlikely to change. At the other end of the constraints spectrum, the four TIF districts are shown in **FEIS Plate 4-12** to identify areas designated by the City of Dallas where development/redevelopment is encouraged and incentivized by lenient tax policies. The remaining areas within the AOI shown in **FEIS Plate 4-12** are virtually all existing commercial, industrial, transportation, or some other mixed urban land use. Such areas would be available for redevelopment depending on the variety of market forces discussed above that would apply to each individual property. In summary, the information captured in **FEIS Plate 4-12** shows areas where future commercial land development/redevelopment would be precluded by natural or other constraints, where land redevelopment is encouraged by city policies, and where development/redevelopment is possible based on prevailing market forces.

Public Policy

Numerous policies and plans already discussed in this FEIS have been put in place by the City of Dallas to guide development within the Trinity River Corridor. The focus of the city is to develop pedestrian-friendly and river-focused neighborhoods that are actively engaged in defining their individual vision while contributing to the collective goals of increased growth and improved sense of community among all parts of the city.

As discussed above, the constraints map in **FEIS Plate 4-12** identifies the Dallas Floodway in its entirety and the related landside sump areas as being unsuitable or unlikely for development. The protection of the Dallas Floodway and the related sump areas from development would be expected to be stringent because of the regulatory interest in the federal flood protection project. In the Dallas Floodway, the regulatory interest extends at least to the landside levee toes on both sides of the Dallas Floodway, and may extend further landside based on actual public ownership or other development constraints, including building setbacks to assure levee stability. Future development in the Dallas Floodway would be controlled closely by the USACE and the City of Dallas as the Dallas Floodway owner. Such development may include lakes, parks, trails and similar recreational features generally as presented in the city's BVP if the proposed features are found to be technically sound and environmentally acceptable upon evaluation by the USACE. Future floodplain development in the Dallas Floodway would be conducted in accordance with EO 11988 (Floodplain Management). The proposed BVP improvements are intended to be flood resistant in response to the Dallas Floodway setting, as are the types of parks, lakes, and trails which are generally recognized as being appropriate and compatible in floodplains. Although project coordination between the Trinity Parkway and the City of Dallas is ongoing as to the BVP and other improvements planned for the Dallas Floodway to ensure overall compatibility of the projects, all planned projects are proceeding independently and the potential construction of Trinity Parkway Alternative 3C would not induce any of the planned Floodway projects.

Land Use Sensitivity Assessment

The analysis of each variable indicates that overall the AOI has a moderate to high sensitivity to land use changes. The City of Dallas has recovered well from the national recession and has implemented policies that focus on improving specific areas through public and private investments. Population and employment growth rates are on the rise and parcels throughout the AOI are available for development and redevelopment. However, overall market value is down and some public policies are not having the desired effect on individual areas. Additionally, flooding is a problem in areas of the AOI which would benefit from land use changes. Finally, the area is urban with mixes of residential, commercial and industrial throughout and current trends are to focus on mixed-use development; therefore, changes in land use would be minimal because new developments would be consistent with existing land uses and zoning.

This moderate to high sensitivity to land use change identified in the AOI will now be analyzed qualitatively and based on both input from City of Dallas planners and local stakeholders plus general principles of urban planning.

This assessment considers two questions: (1) How likely is it that a transportation project will be followed by some noticeable change in the land use that would not have occurred in the absence of the project or sooner than anticipated? (2) If such changes did occur, would they be consistent with the comprehensive plans?

In order to answer these two questions, an analysis of whether the Alternative 3C would support or alter the land use change sensitivity baseline is presented.

Alternative 3C is unlikely to influence the land use change baseline within the AOI because the majority of the facility would be within the floodplain and commercial development is prohibited within this area by public policy, and natural and public ownership constraints. This alternative would be beneficial to property values along Lamar Street because they would be available for redevelopment once improved flood control mechanisms are in place and market forces support change in the area.

As noted previously, the availability of vacant land does not indicate definitive land use change as the result of a transportation project. Because of the presence of numerous bridges, the levees, and the floodplain, much of the Build Alternative would be elevated and removed from adjacent properties. This limits the likelihood of land use change at many of the access points.

Eight access points, which would provide either a half diamond or a full diamond interchange, are associated with Alternative 3C; however, they are unlikely to induce development. No new access is provided, and the alternative is primarily elevated over the floodplain and cross streets. Additionally, the presence of the floodplain and its associated restrictions on development prevent development/redevelopment within the Dallas Floodway.

Conclusion

Based on the analysis conducted following NCHRP Reports 466 and 25-25 (Task 22), Alternative 3C would not challenge the land use change baseline determined for the AOI through the Land Use Sensitivity Assessment. The Build Alternative would complement existing public policy by providing congestion relief around downtown while allowing existing development trends to continue. The alternative would not induce land use change because no new access would be introduced. No planned projects associated with the Build Alternative have been identified, and induced development is not anticipated. This conclusion supports the overarching purpose of the Trinity Parkway as a reliever highway to allow many travelers to navigate past the downtown area. The Trinity Parkway would provide limited access to undeveloped properties, so the roadway would not serve as a major inducement for land use change plus the regulatory constraints and government ownership of land within the Dallas Floodway would prevent the Trinity Parkway from inducing private development of land within the Floodway.

4.25.6.3 Impacts Related to Induced Growth

Typically, the discussion of impacts related to induced growth includes quantifiable data associated with impacts to the physical environment from induced development and land use changes. However, no induced growth is attributable to Alternative 3C; therefore, no indirect impacts from impacts related to induced growth are anticipated.

4.25.7 Step 7 - Assess Consequences and Develop Mitigation

This step of the indirect impacts analysis assesses the consequences of the expected indirect impacts and considers/develops strategies to address unacceptable indirect impacts.

It is not anticipated that Alternative 3C would have adverse indirect effects on the AOI. The encroachment-alteration effects on the area surrounding the intersection with US-175 would be minimal and could be mitigated by joint economic redevelopment efforts on the part of the City of Dallas and local businesses. No induced land use changes would occur because of Alternative 3C; therefore, no effects from land use changes would occur. Accordingly, there would be no need for mitigation to address indirect impacts.

4.26 CUMULATIVE IMPACTS

FEIS Sections 4.26.1 through **4.26.10** present a project level analysis of the potential cumulative impacts (or "effects") related to the Build Alternative. A system level analysis of the potential cumulative impacts of the regional toll and managed/HOV system is presented in **FEIS Section 4.27**.

4.26.1 Introduction

A CEQ regulation defines cumulative impacts (i.e., effects) as "the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions . . ." (40 CFR Section 1508.7). As this regulation suggests, the purpose of a cumulative impacts analysis is to view the direct and indirect impacts of the proposed project within the larger context of the history of each resource evaluated and the present abundance and condition of the resource, in addition to planned projects that are independent of the proposed project but which are likely to affect the same resource in the future (see **Tables 4-56** and **4-57; Figures 4-7** and **4-8**). Each environmental or social resource considered in the cumulative impacts analysis is evaluated from the standpoint of relative abundance of that resource within a larger geographic area. Broadening the view of resource impacts in this way allows the decision maker an insight into the magnitude of project-related impacts in light of the overall health and abundance of selected resources. In essence, a cumulative impacts evaluation first paints a conceptual picture of the existing or "baseline" condition of each resource which is based on historical information and an assessment of the current condition of the resource. Second, the analysis then inventories future projects in the vicinity that are planned and financed, but unrelated to the proposed project, and assesses the likely collective impacts of those projects for each resource. Third, the analysis then describes the expected future status of the resource (i.e., in terms of quantity and condition) after the combined (i.e., 'cumulative') effects of the proposed project and other foreseeable projects are fully realized. Lastly, the cumulative impacts analysis assesses the level of concern that should be associated with the expected cumulative impacts to a resource based on the scarcity or current condition of that resource. The overall focus of the analysis is on the sustainability of each resource of interest; the analysis, therefore, is not limited to the project area but takes into consideration larger areas that represents the base for sustaining the resource in that area. The evaluation process for each resource considered may be expressed in shorthand form as follows:

DIRECT IMPACTS + INDIRECT IMPACTS + FUTURE PROJECT IMPACTS = CUMULATIVE IMPACTS
(construction-related) (removed in time/space) (independent and foreseeable) (future condition of resource)

4.26.2 Methodology

The evaluation of cumulative impacts discussed in this document follows the eight-step process described in TxDOT Guidance on Preparing Indirect and Cumulative Impact Analyses (hereinafter 'TxDOT ICI Guidance'; TxDOT, 2010a). These steps are outlined in **Table 4-50**. The methodology used to prepare this evaluation is also in accordance with the requirements of controlling case law[1] (*Fritiofson v. Alexander,* 1985) and cumulative effects guidance from the CEQ (hereinafter 'CEQ CE Guidance'; CEQ, 1997b).

[1] *Fritiofson v. Alexander,* 772 F.2d 1225, 5th Circuit (1985).

TABLE 4-50. STEPS IN THE ANALYSIS OF CUMULATIVE IMPACTS

STEP	DESCRIPTION
1	Identify the resources to consider in the analysis.
2	Define the study area for each affected resource.
3	Describe the current status/viability and historical context for each resource.
4	Identify the direct and indirect impacts of the project that might contribute to a cumulative impact.
5	Identify other reasonably foreseeable actions that may affect resources in the future.
6	Identify and assess the potential cumulative impacts to each resource.
7	Report the results.
8	Assess the need for mitigation for adverse cumulative impacts.
Source: TxDOT, 2010a.	

The following sections provide the detailed methodology and results associated with each of the steps listed above.

4.26.3 Step 1 - Identify the Resources to Consider in the Analysis

A cumulative impacts analysis uses information from the evaluation of direct and indirect impacts in the selection of environmental resources that should be evaluated to determine cumulative adverse impacts. TxDOT ICI Guidance (page 56) states that "[t]he cumulative impact analysis should focus on: (1) those resources substantially impacted by the project; and (2) resources currently in poor or declining health or at risk even if project impacts (either direct or indirect) are relatively small." Similarly, CEQ Categorical Exclusion (CE) Guidance (page 12) recommends narrowing the focus of the cumulative impacts analysis to important issues of national, regional, or local significance so as to "'count what counts', not produce superficial analysis of a long laundry list of issues that have little relevance to the impacts of the proposed action or the eventual decisions." Thus, the cumulative impacts analysis should focus only on those resources that are substantially affected by the proposed project as a result of direct and/or indirect impacts, resources that are in poor or declining health or resources that are particularly scarce. Whether a resource is substantially affected by the proposed project is a function of the existing abundance and condition of the resource and includes resources that are at risk, potentially from other actions, even if the proposed project impacts are relatively small.

It is clear from TxDOT and CEQ guidance documents as well as case law that cumulative impacts should be assessed for a carefully selected group of natural resources, ecosystems, and human communities (hereinafter collectively referred to as "resources"), as opposed to every issue examined for direct and indirect impacts. The importance of limiting the analysis in this way becomes even more apparent in other steps of the analysis where understanding the nature and extent of each impact-receiving resource is critical (e.g., Step 2 - defining the “resource project area” for examining the resource within the larger context of like resources, and Step 3 - describing the abundance and health of resources). In contrast, the difficulty of exploring cumulative impacts for “non-resources” such as traffic noise levels or proximity to hazardous materials becomes apparent in light of the resource-oriented focus of cumulative impacts analyses. In summary, TxDOT and CEQ guidance documents emphasize the following two selection criteria as the basis for inclusion or exclusion from a cumulative impacts analysis:

1) Are there adverse impacts to a resource (i.e., resource, ecosystem, or human community)?
2) If so, then does either of the following apply?
   a) Are there substantial direct and/or indirect adverse impacts to the resource?
   b) If the direct and/or indirect adverse impacts expected to the resource are minor, is the resource affected either scarce or in poor or declining health?

The foregoing criteria were applied individually to all of the topics considered throughout the analysis of direct impacts in this chapter. In addition, the selection of resources for this analysis considered additional criteria suggested by the CEQ CE Guidance (page 13) which focus on the importance of a particular resource to an area, and whether a resource is protected by legislation or planning documents. The selection of resources for analysis also considered input from the agencies involved with the project and comments provided by the general public during the scoping and other public involvement processes. The results of this approach are shown in **Table 4-51**, which indicates whether a particular resource or issue was considered appropriate and practicable for evaluating cumulative impacts and provides a brief statement of rationale for either including or excluding each resource. In a few instances, it was clear that further evaluation for project impacts of some topics would not be warranted because a particular resource was not found within the project area; such topics, including Prime and Unique Farmland and Wild and Scenic Rivers, were therefore excluded from **Table 4-51**. Many of the resources or issues considered earlier in this chapter were excluded from cumulative impacts analysis because the assessment of direct and indirect impacts indicated there would either be no adverse impacts or that impacts would be insubstantial. For example, potential site contamination from hazardous materials sites is an inappropriate topic for cumulative impacts analysis because this subject does not concern a resource but instead focuses on whether the project would be adversely affected by the potential release of pre-existing site contamination in the project vicinity. Similarly, traffic noise is a category of impacts that should not be considered for cumulative impacts even though adverse direct impacts may occur. This is because the analytic model embodied in CEQ regulations and guidance for assessing cumulative impacts assumes there is a definable resource within the surrounding area that can be inventoried and meaningfully evaluated, which is a criterion this topic does not meet.

TABLE 4-51. RESOURCES/ISSUES CONSIDERED FOR CUMULATIVE IMPACTS ANALYSIS

Subject Considered for Direct and Indirect Impacts	Evaluation Criteria [1]		Included for Cumulative Impacts Analysis?	Explanation for Including or Excluding the Subject from Cumulative Impacts Analysis [3]
	Would Proposed Project Result in Substantial Adverse Impacts? [2]	Is Subject a Scarce Resource or in Poor or Declining Health? [2]		
4.1 Land Use Impacts				
Change in Land Use	No	Yes	Yes	Included because land used for additional ROW makes the land unavailable for other uses, and substantial acreage would be required for ROW in a highly urbanized corridor where land not already developed is scarce.
4.2 Compatibility with Local Plans and Policies				
Coordination re: Other Plans or Projects	---	---	No	Excluded because this subject addresses the coordination of the Trinity Parkway design and schedule with other key plans and projects, and does not involve impacts to a specific resource or environmental issue.
4.3 Social Impacts				
Community Cohesion	No	No	No	Excluded because no communities would be divided by Alternative 3C to an extent that would prohibit access or make it inconvenient for community members to continue present relationships.
Environmental Justice	No	Yes	Yes	Although the proposed project would be implemented consistent with EO 12898 and FHWA Order 6640.23A, it was carried forward for cumulative impacts analysis in light of (1) displacement impacts and the implications of this on the availability of affordable housing in and near affected areas and (2) because of an emerging regional tolling network and the potential accompanying financial impacts to potential minority and low-income users (i.e., the economic impacts of tolling or EJ/tolling). Note: The Regional Tolling Analysis presented in **FEIS Section 4.27** evaluates EJ impacts from the regional tolling system.
Community or Public Resources	No	No	No	Excluded because Alternative 3C is not anticipated to displace any community/public facilities, which are generally considered of importance and social value to the community.
4.4 Relocation and Displacement Impacts				
Relocations and Displacements	---	---	No	Included as part of the overall discussion of other community socioeconomic topics considered for cumulative impacts. Although relocations and displacements are impacts and do not represent a resource, this category is of particular importance in the evaluation of other socioeconomic aspects in this community (**FEIS Section 4.3**).

TABLE 4-51. RESOURCES/ISSUES CONSIDERED FOR CUMULATIVE IMPACTS ANALYSIS

Subject Considered for Direct and Indirect Impacts	Evaluation Criteria [1]		Included for Cumulative Impacts Analysis?	Explanation for Including or Excluding the Subject from Cumulative Impacts Analysis [3]
	Would Proposed Project Result in Substantial Adverse Impacts? [2]	Is Subject a Scarce Resource or in Poor or Declining Health? [2]		
4.5 Economic Impacts				
Local Economy	No	---	No	Excluded because the proposed project is expected to generate overall benefits for the local economy through construction spending and construction-related jobs. Also, the subject is not a resource.
4.4 Transportation Impacts				
Congestion, Traffic, and Safety	---	---	No	Excluded because proposed project is expected to manage traffic congestion, and be beneficial for vehicle utilization, roadway effectiveness, and safety. Also, the subject is not a resource.
4.7 Cultural Resources and Parklands				
Archeological Sites	No	Yes	No	Excluded because the proposed project is not expected to adversely affect any archeological resources or cemeteries. No NRHP-listed archeological sites are located in the general proximity of the proposed project. [4]
Historic Infrastructure, Bridges, Buildings and Districts	Yes	Yes	Yes	Resource included because Alternative 3C would have an adverse effect on the Continental Avenue Viaduct and because a historical trend of adverse impacts is evident in the project area regarding NHRP-listed or -eligible historic structures and districts.
Parks and Recreation Areas	Yes	Yes	Yes	Resource included because parks and recreation areas are a limited resource, and the subject of careful planning to conserve and enhance these resources in a highly urbanized area.
4.8 Waters of the U.S., Including Wetlands				
Waters of the U.S., Including Wetlands	Yes	Yes	Yes	Resource included because Alternative 3C would result in substantial impacts to wetlands in the area which have historically been adversely affected by past activities or have been in decline.
Navigable Waters	No	No	No	Excluded because, although designated by the USCG as a navigable waterway, there are no plans to develop a navigation channel in this portion of the Trinity River.
4.9 Vegetation and Wildlife				
Vegetation and Wildlife Habitat (woodlands)	Yes	Yes	Yes	Resource included because Alternative 3C could result in the loss of habitat in an area that has historically seen encroachment and loss of available habitat.
Vegetation and Wildlife Habitat (grasslands)	Yes	No	Yes	Resource included because Alternative 3C is expected to result in conversion of a substantial amount of maintained grassland area to transportation ROW.

TABLE 4-51. RESOURCES/ISSUES CONSIDERED FOR CUMULATIVE IMPACTS ANALYSIS

Subject Considered for Direct and Indirect Impacts	Evaluation Criteria [1]		Included for Cumulative Impacts Analysis?	Explanation for Including or Excluding the Subject from Cumulative Impacts Analysis [3]
	Would Proposed Project Result in Substantial Adverse Impacts? [2]	Is Subject a Scarce Resource or in Poor or Declining Health? [2]		
Wildlife Populations	No	No	No	Excluded because, while some impacts to wildlife from Alternative 3C are anticipated, these impacts are not anticipated to be significant. Inferences about impacts to wildlife are focused on changes to aquatic and terrestrial habitat (e.g., woodlands and jurisdictional waters).
Habitat for Threatened/ Endangered Species	No	Yes	No	Excluded because effect calls for federally-listed species as a result of Alternative 3C are all either “no effect” or “may affect, not likely to adversely affect.” Also, high value habitat for wildlife species is part of the analysis of other resources (e.g., waters of the U.S., including wetlands, and woodland habitat).
4.10 Section 4(f)				
Impacts to Protected Resources	Exempt	Exempt	No	Federal legislation exempts all highway projects “to be constructed in the vicinity of the Dallas Floodway” from compliance with Section 4(f) of the USDOT Act of 1966 (49 USC Section 303 and 23 USC Section 138). Cumulative impacts to the resources addressed by Section 4(f) are discussed under Cultural Resources and Parklands (**FEIS Section 4.7**).
4.11 Microclimate				
Impacts of Urbanization on Microclimate	---	---	No	Excluded because the proposed project is not expected to have microclimate impacts substantially different than other urban developments. Also, subject is not a resource.
4.12 Topography and Geology				
Topography, Geology, and Mineral Resources	No	No	No	Excluded because, although topographic changes would occur, they would not substantially affect the geologic setting or soil stability in the area. Also, the proposed project would not require the use of available mineral resources in the area.
4.13 Water Quality				
Water Quality	No	Yes	Yes	Included because Alternative 3C could result in additional degradation to local water quality in a stream segment with a history of water quality issues.
4.14 Floodplain				
Floodplain and Valley Storage	No	Yes	Yes	Resource included because it is closely regulated to maintain the flood conveying capabilities of the Dallas Floodway, and could be affected by Alternative 3C. Maximum percent increase in 100-year flood and SPF water surface elevations and changes to 100-year flood and SPF valley storage were selected as representative indicators of impacts to this resource.

TABLE 4-51. RESOURCES/ISSUES CONSIDERED FOR CUMULATIVE IMPACTS ANALYSIS

Subject Considered for Direct and Indirect Impacts	Evaluation Criteria [1]		Included for Cumulative Impacts Analysis?	Explanation for Including or Excluding the Subject from Cumulative Impacts Analysis [3]
	Would Proposed Project Result in Substantial Adverse Impacts? [2]	Is Subject a Scarce Resource or in Poor or Declining Health? [2]		
4.15 Air Quality				
Change in Air Quality	No	Yes	Yes	Resource included because of prevailing ozone non-attainment conditions, even though the proposed project is not expected to adversely affect the region's ability to comply with prevailing regulations/standards; the region is in attainment for all other NAAQS criteria, including CO, with the exception of a portion of Collin County that is in nonattainment for lead. All aspects of air quality are included in the assessment of cumulative impacts for air quality, including CO and MSAT, to provide a complete discussion based on available data.
4.16 Noise				
Traffic Noise	---	---	No	Excluded because traffic noise is a potential impact and is not a resource.
4.17 Visual and Aesthetics				
Characteristics and Trinity River Views	Yes	Yes	Yes	Resource included because the addition of a transportation facility in the area would change the visual characteristics of the Trinity River Corridor, including sightlines to and from downtown Dallas and the recreational areas within the Dallas Floodway.
4.18 Hazardous Materials				
Hazardous Waste or Materials Sites	---	---	No	While the proposed project would likely encounter sites in or near the proposed ROW, subject was excluded because it does not represent a resource.
4.19 Utilities				
Easements / Corridors and Relocations	---	---	No	Although relocations/service disruptions could occur, subject excluded because impacts would be temporary in nature. Also, while the proposed project would likely result in the increased need for utility supply, the needs are anticipated to be within existing service distribution/collection capabilities.
4.20 Energy				
Availability and Expenditure	No	No	No	Excluded because most energy demands would be temporary during the construction phase. Although energy would be consumed with operation of the proposed project, the amounts would be minimal when compared to overall consumption in the region.

TABLE 4-51. RESOURCES/ISSUES CONSIDERED FOR CUMULATIVE IMPACTS ANALYSIS

Subject Considered for Direct and Indirect Impacts	Evaluation Criteria [1]		Included for Cumulative Impacts Analysis?	Explanation for Including or Excluding the Subject from Cumulative Impacts Analysis [3]
	Would Proposed Project Result in Substantial Adverse Impacts? [2]	Is Subject a Scarce Resource or in Poor or Declining Health? [2]		

Notes:

1. Selection criteria are in accordance with TxDOT (2010a) and CEQ (1997b) guidance for limiting the scope of cumulative impacts analyses based on the magnitude of impacts and/or the scarcity or condition of specific resources.
2. "---"Represents an environmental "issue" but not a resource (i.e., natural resource, ecosystem, or human community), and does not lend itself to an evaluation of resource condition and context (i.e., amount of similar resources within a defined resource project area).
3. For each resource/issue considered, the section number in this FEIS is provided in row headings for the discussion of direct impacts. Indirect impacts for each resource/issue were also considered, and reference to indirect impacts is noted in the explanation where such impacts are considered to be substantial (see **FEIS Section 4.25**).
4. TxDOT determined with concurrence from the SHPO that the proposed undertaking would not affect archeological historic properties as defined in 36 CFR 800.16(I) (see **FEIS Appendix A-2**.

THIS PAGE INTENTIONALLY LEFT BLANK

Note that cumulative impacts resulting from the emerging regional tolling network on environmental justice populations (evaluation completed at the extent of the NCTCOG MPA, see **FEIS Plate 4-13**) is assessed in **FEIS Section 4.27,** and will not be discussed further in this section.

As recommended in CEQ guidance (1997b, page 26), specific indicators representative of each resource's condition have also been identified for each of the resources evaluated for cumulative impacts. The use of indicators of a resource's health, abundance, and/or integrity is a helpful approach to formulating quantitative or qualitative metrics for characterizing overall impacts to resources. Resource indicators are also key aspects of each resource that have already been evaluated in terms of the project's direct and indirect impacts, and facilitate greater consistency and objectivity in the analysis of cumulative impacts.

In essence, the identification of indicators relevant to each resource/issue assists in focusing attention on the aspects of the resource or issue of greatest importance in assessing cumulative impacts for that resource or issue. For example, indicators reflecting potential impacts to the SPF flood were selected because these reveal important data on how the Floodway could respond during an extreme flood event. The resource categories and indicators used in this cumulative impacts analysis are shown in **Table 4-52**. In order to reduce repetition and better facilitate the discussion of potential cumulative impacts, several resources have been grouped into similar resource categories. For example, environmental justice (loss of affordable housing) and visual impacts have been grouped under the 'community' resource category. Alternatively, the two issues carried forward associated with environmental justice have been separated into different resource categories given the need to evaluate potential impacts at different geographic scales (i.e., different resource study areas as explained in **FEIS Section 4.26.4**).

TABLE 4-52. INDICATORS ESTABLISHED FOR CUMULATIVE IMPACTS RESOURCES/ISSUES

RESOURCE CATEGORY	INDICATORS OF RESOURCE CONDITION AND POTENTIAL IMPACTS
Land Use	Consistency of the proposed project and changes in land use with local land use plans (qualitative evaluation) and the amount of land converted to transportation ROW.
Community Resources	**Environmental Justice (EJ):** impacts to minority and/or low-income populations resulting from residential displacements and the loss of affordable housing (qualitative evaluation).
	Visual: Results in a visual element that is not consistent or in conflict with the general visual characteristics of the Trinity River Corridor (qualitative evaluation).
Cultural Resources and Parklands	**Historic Infrastructure, Bridges, Buildings, and Districts:** NRHP-eligible or -listed infrastructure (Dallas Floodway), buildings, bridges, or districts affected (number).
	Parks and Recreation Areas: amount of parks and recreation areas affected (acres).
Waters of the U.S., Including Wetlands	Amount of waters of the U.S., including wetlands affected (acres).
Vegetation/Wildlife Habitat	Amount and quality of grasslands and woodlands habitat areas suitable for sustaining a diversity of wildlife species locally (acres).
Water Quality	Results in the further degradation of surface water quality in the area or hinders compliance with water quality regulations (qualitative evaluation).
Floodplains	**Flood Elevations:** change in 100-year flood and SPF water surface elevations (feet).
	Valley Storage: change (as compared to CDC criteria) in the 100-year and SPF valley storage capacities (percent change).
Air Quality	**Ozone:** the ability of the DFW ozone moderate nonattainment area to meet the eight-hour ozone standard, as modeled on a regional level (qualitative evaluation).
	MSAT: trend of emissions over time, as modeled on a regional level (qualitative evaluation).
	Carbon Monoxide (CO): indications of worsening of ambient air concentrations of this criteria pollutant, as modeled along the project ROW under worst case meteorological conditions (qualitative evaluation).

4.26.4 Step 2 - Define the Study Area for Each Affected Resource

Cumulative impacts analysis requires an evaluation of the sustainability of each resource or issue of interest as viewed from the perspective of a geographic area that is larger than the project area. The spatial frame of reference for evaluating the cumulative impacts of each of the resource categories in **Table 4-52** is referred to as a “resource study area” (RSA). The RSAs for the resources/issues evaluated for cumulative impacts were established using the criteria in CEQ/TxDOT guidance cited above. These RSAs were selectively expanded beyond the established Trinity Parkway project area to consider possible direct and indirect impacts on larger areas, taking into consideration the physical characteristics, affected institutional jurisdictions and relevant political boundaries where appropriate. The objective of this step is to identify a reference area for each resource/issue as far away from the project area as the direct and indirect impacts of the project are expected to be felt. The size of the geographic area necessary to sustain the long-term vitality of a given resource can be a function of the nature of each resource as defined on a case-by-case basis after considering the unique aspects of a particular proposed project (CEQ, 1997b, page 15). The description of the RSAs and the rationale for choosing them are discussed below.

4.26.4.1 Land Use, Community, Natural, and Cultural Resources

The RSA for all cumulative impacts resources/issues identified in **Table 4-53**, with the exception of EJ/tolling and air quality, was designated as the Trinity River Corridor, as it has been defined by the City of Dallas for a variety of resource and land use planning purposes throughout recent years. This selection of a RSA boundary emphasizes the “human communities” and “affected institutional jurisdictions” aspects of the CEQ guidance (1997b, pages 12 and 15). In this case, widespread urbanization in the area has intensified the community’s interest in the mixture of natural resources within it, a situation that has led the local community to study intensively the appropriate balance between preservation and development. The Trinity River Corridor RSA covers a geographic area of approximately 43,500 acres and is shown in **FEIS Plate 4-13**. In contrast, the Trinity Parkway project area and indirect impacts AOI (which is contained entirely within this RSA) is comprised of approximately 7,036 acres.

<u>Land Use and Community Resources/Issues</u>

Given that the Trinity River Corridor includes many of the City of Dallas’ most recognizable landmarks, downtown Dallas, numerous notable neighborhoods/districts (e.g., Design District, La Bajada, South Dallas), and artistic amenities, this geographic area is inextricably linked to community perception and quality of life for residents throughout the City of Dallas. The Trinity River Corridor represents a key management unit used by the City of Dallas in developing land use plans that focus on preserving and enhancing the socio-economic conditions and natural resources that characterize the multi-dimensional geographic area. Accordingly, selecting the Trinity River Corridor as the RSA is particularly well suited for evaluating impacts to land use, as well as community resources/issues such as environmental justice (loss of affordable housing) and visual resources, as it offers the advantage of viewing cumulative impact issues within a context that dovetails with the current and future planning efforts of the community.

The temporal frame of reference for the land use RSA begins with the time period immediately following the strengthening and enhancing of the Dallas Floodway by the USACE, which lasted from 1953 to 1959. Prior to this time period, the levees, which were originally completed in 1932, suffered from continued degradation throughout the remainder of the 1930s and interior drainage issues. This levee strengthening by the USACE allowed for urban development within the Trinity River Corridor to occur without fear of levee failure and flooding. Additionally, although population growth in the City of Dallas began booming in the early 1900s primarily as the result of railroad expansion, it was not until the 1950s and 1960s that the growth of commerce, industry, and real estate began to shape the city into a modern-day metroplex (USACE, 2010a). For these reasons, 1960 was established as the early temporal boundary for assessing cumulative impacts to land use. The design year for the proposed project, 2035, was established as future temporal limit for assessing cumulative impacts to land use and community resources/issues because it provides an adequate future frame of reference which overlaps with the planning horizons for local planning documents, as well as the regional MTP (*Mobility 2035 – 2013 Update*).

Natural and Cultural Resources

The Trinity River Corridor is also centered on natural features (i.e., the hydrology and biology of the Trinity River) and adjacent urban areas, thus forming a hybrid management unit suitable for a variety of resources of interest to the community. In this highly urbanized landscape, the Trinity River Corridor encompasses most of the natural habitat, water resources, floodplains, and open space and recreation areas to be found both upstream and downstream of the project area within the Trinity River drainage. This RSA also provides a broader context for considering impacts to historic structures, which have been identified or may be present in this urban area whose history is inextricably linked to the Trinity River. Accordingly, the Trinity River Corridor serves as the RSA for the following resource categories: water resources, biological resources, water quality, floodplains, and cultural resources and parklands.

The discussion below presents the temporal boundaries for assessing cumulative impacts to the aforementioned natural and cultural resources. The year 1984 was used as the beginning temporal boundary for biological (vegetation) resources as it corresponds to the year TPWD published its Vegetation Types of Texas MAP, indicating a point in time marking heightened awareness of the connection between wildlife populations and available habitat. The year 1972 was established as the beginning temporal boundary for water resources and water quality because it is the year Congress enacted the CWA, which expanded and strengthened earlier legislation. The year 1977 was selected as the beginning temporal boundary for floodplains because it corresponds with the issuance year of EO 11988 (Floodplain Management). Finally, the year 1966 was established as the beginning temporal boundary for cultural resources and parklands, as it is the year Congress passed the National Historic Preservation Act (16 U.S.C. 470[f]) and the Department of Transportation Act which includes a special provision for Section

4(f) (49 U.S.C. 303). The ending temporal boundary of 2035 was selected for biological resources, water resources, water quality, floodplains, and cultural resources and parklands in accordance with the MTP (*Mobility 2035 – 2013 Update*) and the design year of the proposed project.

4.26.4.2 Air Quality

The RSA for evaluating the ozone NAAQS is the ten-county moderate eight-hour ozone nonattainment area established by the USEPA for the DFW Metropolitan Area, which includes Collin, Dallas, Denton, Tarrant, Ellis, Johnson, Kaufman, Parker, Rockwall and Wise Counties. The RSA for MSAT is composed of an affected 12-county transportation network developed by NCTCOG which includes the proposed road network links and other transportation model links reflecting a plus or minus five or greater percent change in traffic volume when comparing the proposed project's Build and No-Build scenarios in the year 2035. Unlike the other resources evaluated, air quality impacts from MSAT have been evaluated qualitatively in this proposed project by the NTTA, TxDOT, and the FHWA. MSAT are regulated by the USEPA on a national basis through requirements for fuels and vehicle technology. The MSAT RSA qualitatively evaluated emission changes based upon the proposed project and national trends. As CO levels are primarily of concern at a local level and modeled accordingly, the RSA for CO was based on the ROW limits for the proposed project, which represents the locations with the highest potential for CO concentrations. These three air quality RSAs are shown on **FEIS Plate 4-13**.

In addition, the temporal boundaries for analyzing air quality cumulative impacts are the years 1990 to 2035. The earlier date was established because the CAA, as amended in 1990 (CAAA), authorized the USEPA to designate areas in nonattainment for failing to meet established NAAQS. The year 2035 was chosen as the future temporal limit in order to capture the primary impacts that would be realized by the proposed project and estimated changes in roadway traffic volumes, as well as the expected implementation of local land use plans and the *Mobility 2035 – 2013 Update*.

4.26.4.3 Summary of RSAs

A summary of the geographic RSA for each resource/issue examined for cumulative impacts is provided in **Table 4-53**.

TABLE 4-53. RESOURCE STUDY AREAS

Resource/Issue Category	RSA Temporal Boundaries	RSA Geographic Boundaries *
Land Use	1960 - 2035	Trinity River Corridor
Community		
Cultural Resources and Parklands	1966 - 2035	
Waters of the U.S., Including Wetlands	1972 - 2035	
Vegetation and Wildlife Habitat	1984 -2035	
Water Quality	1972 - 2035	
Floodplains	1977 - 2035	
Air Quality	1990 - 2035	Ten-county moderate nonattainment area for the eight-hour ozone standard; includes Collin, Dallas, Denton, Tarrant, Ellis, Johnson, Kaufman, Parker, Rockwall, and Wise Counties.
	1990 - 2035	Affected transportation network located within the NCTCOG MPA which includes roadway links with a ± five or greater percent traffic volume change (comprising a 12-county area).
	1990 - 2035	Project ROW line, which represents the locations with the highest potential for CO concentrations.
Note: * See **FEIS Plate 4-13** for visual representation of the geographical boundaries for the RSAs.		

4.26.5 Step 3 - Describe the Current Status/Viability and Historical Context for Each Resource

In order to adequately assess the potential cumulative impacts of the proposed action, a description of the current health, condition, or status of each selected resource within the project area must be provided, as well as a historical context for understanding how each resource got to its current state. This essentially establishes the baseline condition and "tells the story of the issue or resource." It is this baseline condition that will be combined with later steps to assess the cumulative impacts on each of the resources of interest. For each resource examined for cumulative impacts, each resource's abundance and quality at the present time was evaluated considering the impacts of historical activities, the resource's response to change, and the continuing stresses imposed on the resource and its capacity to withstand these stresses. Collectively, these factors capture the influences that have shaped and are shaping the amount and quality of each resource and which would continue to shape each given resource into the future. The current condition and abundance of each selected resource within the project area was determined through review of current and historical reports, studies, and mapping (including aerial photography). Key indicators were input into GIS in an effort to quantify the resource when appropriate. A major factor influencing each resource is the framework of federal, state, and local regulatory controls or measures. As these regulatory controls play an important role in the health, condition, or status of select resources, a discussion of regulatory controls is included as part of the discussion of historical context and existing condition for each resource considered in this analysis. A summary of existing conditions for each of these resources in relation to their respective RSAs is included at the end of this section in **FEIS Section 4.26.5.9**.

4.26.5.1 Land Use

Land use has been identified as a cumulative impacts subject because the proposed transportation project would have an impact on the land base available for alternative land uses. In other words, central in the decision of whether to select a Build Alternative is the tradeoff of committing land to transportation uses that could otherwise be used for industrial, commercial, residential, or open space uses (or any combination thereof). Historically, there has been a direct correlation between the use of land (development) and population growth. As a population grows, additional infrastructure and facilities are needed to adequately support the population, thus creating a constant need to balance the amount of land needed for transportation versus other land uses.

The population in the DFW region (defined as the NCTCOG 16-county north central Texas region) has been steadily increasing since 1960. According to the U.S. Census Bureau, the Dallas-Fort Worth-Arlington MSA population increased by 23.4 percent between 2000 and 2010. The region’s four core counties (Collin, Dallas, Denton and Tarrant) collectively experienced a 22.5 percent population increase within the same 10-year timeframe (U.S. Census Bureau, 2000 and 2010d). The DFW region is a major economic, social, and political center of Texas and the pattern of expanding employment opportunities and rapid population growth is expected to continue. By the year 2035, the DFW region is projected to attract over four million new residents (U.S. Census Bureau, 2010g).

The Trinity Parkway Corridor area has shown a lower growth rate over the same time period. There has, however, been a resurgence of interest in recent years in redevelopment of the central core areas of Dallas County, as evidenced by residential redevelopment in and around the Dallas CBD. This kind of redevelopment is encouraged by NCTCOG and the City of Dallas through sustainable growth initiatives. Potential redevelopment of lands within and surrounding the corridor can be expected to generally support this regional initiative.

Currently, commercial and/or industrial uses in the Trinity River Corridor total approximately 8,465 acres located throughout the corridor, along major transportation systems, and along the majority of the levees. Residential development constitutes just over 4,200 acres and can be found primarily scattered throughout the corridor, but several residential areas are located adjacent to portions of the levees. There are approximately 10,450 acres of undeveloped land outside the Dallas Floodway. The remaining acreage within the corridor comprises parks and recreation areas (primarily associated with the Dallas Floodway), surface water features, and utilities (NCTCOG, 2005b).

As stated previously, land use and development considerations in the City of Dallas have been primarily dictated by population and employment growth, accompanied by transportation, residential, commercial, industrial, and service-oriented development. The intensity, timing, and character of development have been directed by local or regional comprehensive plans, general plans, or long-range plans. The goals identified in planning documents have been implemented through a variety of tools including zoning, capital improvements, and tax incentives. Land use is regulated through the Dallas City Council according to the City's comprehensive land use plan, zoning maps, and zoning ordinances designed to minimize the adverse impacts of growth. Long-range infrastructure planning for the area is provided by NCTCOG, NTTA, TxDOT, DART, the City, Dallas County, and others to improve transportation service, along with ambitious growth and revitalization plans for the Trinity River Corridor. There are numerous developed and on-going studies and plans that attest to the intense pace of development and redevelopment that currently exists in the corridor and would exist in the foreseeable future, all controlled and managed by local government land use plans and policies.

4.26.5.2 Community Resources

Many of the communities within the RSA are characterized by a predominantly EJ population. Predominately minority neighborhoods in Dallas often started out that way or developed because of past segregation practices. Whether these communities continue to retain racial or ethnic character as a result of choice or necessity is difficult to determine. However, federal, state, and local policies and programs have evolved in recent decades into a complex network that seeks to ensure that minority and low-income families have an affordable place to live, and that members of existing communities with a high proportion of a particular race or ethnicity are not forced into different areas for want of affordable housing. As outlined in **FEIS Section 4.4.3**, the City of Dallas administers a variety of programs and funding directed toward the creation of and maintenance of affordable housing (e.g., Community Housing Development Organization Program, the Land Transfer Program, the Urban Land Bank Demonstration Program, the Dallas Mortgage Assistance Program, and the Neighborhood Investment Program) (City of Dallas, 2013a; 2013f; 2013g). There remains, however, the possibility that private developers could acquire affordable housing properties with the intent to create residential areas that would be too costly for existing residents. In such situations, the City of Dallas would continue to effectuate its affordable housing policies by negotiating the terms of development permits.

Like many places, the visual characteristics of the Dallas CBD and the Trinity River Corridor have changed drastically over time. A once open and natural landscape became a developed, urban corridor. The key factors driving this change over the years were economics and population growth. As the economic climate in the area improved, the population continued to grow. With this increasing population came an increased need for support infrastructure (e.g., new roads, rail lines, homes, commercial development, industrial development, utility lines). Development occurred throughout the CBD and along both sides of the nearby Trinity River. The flood of 1908 brought on a key event that would begin to define both the natural and developed visual characteristics of the area that would last to this day - the need for long-range city planning. To this day, the levees (which have been changed/upgraded over the years) provide the only discernible topographic relief in the area and are a major visual element in the area.

Local and regional planning documents, implemented through a variety of tools developed over the years including land use designations, zoning ordinances, and building codes, served to “guide” development of the area in a manner that has been determined by the City of Dallas to best suit the social and economic needs of its residents. This past “guidance” (and in some instances lack of guidance) has defined the current visual characteristics of the Trinity River Corridor - a substantially developed urban area interspersed with natural and man-made features, vegetation, open space, and views. Development in the corridor consists primarily of commercial/industrial facilities, residential neighborhoods, parks and open space, and transportation and utility corridors. The visual quality and characteristics in the area currently vary. A lot of the development and changes that have occurred in the corridor took place prior to implementation of various codes or ordinances; as a result, visual quality can range from low in the existing commercial/industrial areas to high in the open space and certain residential areas. Given that there are a variety of projects planned within the Trinity River Corridor, the visual characteristics of the area will undoubtedly continue to change as these plans/projects are implemented. In general, it is anticipated that the visual characteristics of the corridor would likely improve because of current codes and ordinances and due to the extensive planning that has taken place with regards to revitalization of the Trinity River Corridor area.

4.26.5.3 Cultural Resources and Parklands

Urban sprawl resulting from a post-war housing boom resulted in large housing developments and a tremendous growth in businesses throughout the City of Dallas. To meet this growth, a freeway system was designed and built during the mid-1950s. With economic prosperity, population growth, and development throughout the years, many of the City’s older neighborhoods were divided and many of the historic homes and buildings that remained from the late 19th and early 20th centuries were destroyed. The 1960s through the 1980s also saw many of the City's historic commercial buildings destroyed in favor of the construction of skyscrapers and new commercial developments. It is probable that many archeological sites in the area have also been destroyed as a result of urban development and infrastructure improvements.

Recognizing the need to document and preserve the important tangible remains of our past, both the federal government and the State of Texas passed laws to protect important historic structures and archeological sites from damage due to growth and development (e.g., NHPA in 1966; Texas Antiquities Code in 1969). The City of Dallas has long been committed to the preservation of its historic architectural resources. In 2001, the City developed the *Neighborhood Revitalization and Historic Preservation Program* (City of Dallas, 2001b) to encourage the restoration of historic buildings and the revitalization of neighborhoods throughout Dallas. Additionally, *Discover Dallas!* is a project that seeks to identify historical and architectural resources from the 19th century through the latter part of the 20th century and coordinate diverse organizations into a long-range strategic plan for their preservation. The Discover Dallas! project has surveyed 28 Dallas neighborhoods, documenting properties built before 1965 with the goal to provide residents with information that will enable them to restore and rehabilitate houses appropriately for their neighborhood and to preserve each home's distinctive characteristics (Preservation Dallas, 2013).

Although many important historical resources have been lost through the years, many still remain. This is true for the City of Dallas and particularly the Trinity River Corridor. The recognized need to preserve these resources is evident in the regulatory controls and other preservation programs enacted through the years. The City of Dallas has demonstrated its commitment through development and participation in extensive preservation efforts (e.g., restoration, neighborhood revitalization). It has been demonstrated that preserving the rich history of Dallas is important to residents, and this preservation trend can be expected to continue into the future.

In relation to parklands, urbanization has continued the long-term trend of converting available open space to urban land uses; and with continued population growth and planned development, available parks and recreation areas would be expected to decrease further. Parks and recreation areas have been recognized as an important resource, particularly in urban settings. The protection/preservation of parks and recreation areas is provided for under Section 4(f) of the USDOT Act, Section 6(f) of the LWCF Act of 1965, and the Texas Parks and Wildlife Code. Local governments also provide protection from encroachment on parks and recreation areas through development and implementation of local plans, policies, and ordinances (including land use and zoning). Local governments have long recognized the benefits of parks and recreation areas to residents of a given community and have actively sought, and continue to seek, to preserve existing opportunities and acquire additional lands in anticipation of future needs.

Parks and recreation areas add aesthetic value, contribute to enjoyment by offering relief from the harsh city landscape, and contribute considerably to prevailing property values. Currently, the Dallas PARD maintains more than 23,018 park acres, including 13 lakes with 4,400 surface acres of water, 18,618 acres of parkland, and 85.5 miles of jogging and bike trails. There are 374 neighborhood, community, and regional parks within the City of Dallas (City of Dallas, 2013h). Within the Trinity River Corridor, approximately 6,000 acres of open space within the corridor are associated with the Great Trinity Forest. Other amenities include the William Blair Jr. Park Trails, Texas Buckeye Trail, the Trinity River Audubon Center and Trails, Trinity Trails, Santa Fe Trestle Hike and Bike Trail, and the Trinity Overlook Park. Additionally, thirteen Gateway Parks are part of the plan for the Trinity River Corridor Project, several of which are either already constructed or under construction. Furthermore, construction is under way on the Elm Fork Athletic Complex and Trails that will feature a 138 acre complex with woodland and riparian plantings, a bioswale, eleven athletic fields, a soft surface trails system, boardwalks, and a bird overlook (City of Dallas, 2013i). The corridor is unique because of both the current and future open space opportunities afforded by the Trinity River and associated floodway. Although infrastructure development in support of population growth could have a negative effect on prevailing resources in the corridor over the coming years, several plans (e.g., BVP and DFE) call for the acquisition of additional lands, enhancement of existing areas, and increased recreation opportunities associated with the Dallas Floodway.

4.26.5.4 Waters of the U.S., Including Wetlands

Historically, waters of the U.S., including wetlands, have not been recognized for their ecological importance. Over time, many of these areas were filled, dredged, or developed to make the land available for use. From the mid-1800s until about 1970, approximately one-half of Texas' historic wetlands acreage was converted from natural systems in response to society's demand for urban development and sustenance. Since 1970, wetlands have been identified as providing important economic and environmental functions, such as temporarily storing floodwaters, reducing floodwater velocity, filtering sediment and pollutants, and providing important habitat for many species of plants and wildlife. A 1980 statewide inventory of forested wetlands identified 5,973,000 acres of bottomland hardwoods and 95,000 acres of swamps remaining in Texas. These acreages reflect an estimated 63 percent loss of these types of wetlands from their pre-settlement high of more than 16 million acres.

The statewide trends discussed above also reflect the local experience with historic wetland impacts. The DFW metropolitan area accounts for the most urbanized portion of the Upper Trinity River Watershed. Floodplains have been affected both directly and indirectly by urbanization which has included impacts from storm water runoff and agricultural, drainage, and mining activities. Straightening of channels, dredging and filling of streambeds, ditching and draining of wetlands, construction of levees, and removal of natural vegetation has also occurred in certain areas. The most obvious manifestation of this urban development is the increase in impervious surfaces and the corresponding loss of natural vegetation. Land clearing, soil compaction, riparian corridor encroachment, and modifications to the surface water drainage network have all accompanied urbanization of the DFW area.

These human activities are evident within the Trinity Parkway Corridor. Human use of the Trinity River in this portion of Dallas has included activities to straighten, narrow, deepen, fill, block, and otherwise encroach upon the river channel. In the corridor, the entire length of the Trinity River has been reconstructed from well upstream of Westmoreland Road to downstream of Corinth Street, with the only remnant pieces of the old river channel now existing as drainage sumps on the landside of the east and west floodway levees. Additionally, upstream, multi-purpose federal reservoirs have altered seasonal and shorter-term river flows. As a result, much of the channel system has become simplified, stabilized in position, disconnected from part of the existing stream meander corridor and floodplain, and subject to stabilized stream flows that have lost part of their flow variability. These same physical alterations of the old Trinity River channel are also responsible for the creation of wetlands in the modern Dallas Floodway in recent decades. A GIS land cover analysis revealed that the Trinity River Corridor RSA is comprised of approximately 6,659 acres of water resources, of which approximately 3,419 acres are forested wetlands, 1,143 acres are emergent wetlands, and approximately 2,079 acres are open water (Study Team, 2013).

A variety of regulatory controls have had a profound effect on waters of the U.S., including wetlands in the area. The two principal overriding controls requiring the protection of wetlands is Section 404 of the CWA and EO 11990 (Protection of Wetlands). Additionally, in 1991 the Texas Water Commission (combined in 1993 with the Texas Air Control Board to form the Texas National Resource Conservation Commission (TNRCC) and eventually the TCEQ in 2002) adopted state goals for “no net loss” of acreage or ecological function of wetlands. These goals reflect the regulatory program under the CWA that prohibits the discharge of soil into waters of the U.S., including wetlands, unless authorized by a permit issued under Section 404 of the CWA. The USACE has authority over such actions and requires the permittee to restore, create, enhance, or preserve nearby wetlands as compensation for any damage. 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 wetlands. Regulations have been enacted on a federal, state, and local level to achieve these goals.

Future trends in wetland regulation 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 wetland “functions,” rather than replacement of a total wetland area. Research of regulatory publications indicates that mitigation banking is becoming a favored means of mitigating wetland loss. Consequently, regulatory controls are expected to continue the trend of stabilizing the amount of existing wetlands and the creation of new wetlands through vigorous application of mitigation requirements under the CWA. As discussed earlier, the majority of the waters of the U.S., including wetlands found in the Trinity River Corridor are within the confines of the Dallas Floodway. As such, future development or redevelopment within the urbanized portions of the corridor would likely result in minimal impact with compensatory mitigation provided as required by prevailing regulatory controls. Projects planned within the confines of the Dallas Floodway could affect prevailing resources, however, based on trends; it is likely that the resource would benefit from future planned activities in the area.

4.26.5.5 Vegetation and Wildlife Habitat

The Trinity River Corridor is located within the most severely altered of Texas’ ecoregions - the Blackland Prairie. Most of this ecoregion has been converted from its natural condition to crops or development (TPWD, 2002). In fact, by the early 1980s, 90 percent of this ecoregion had already been converted into agricultural land or tame pasture. Many wildlife species have disappeared from the Blacklands in the past 125 years. It appears that only those species with the ability to adapt to human encroachment have been able to survive.

Of special consideration in the Blacklands has been the destruction of streamside vegetation along the major drainages that cross the region, including the Trinity River. It was along these corridors that many of the faunal elements, not adapted for life in the prairies, lived and traveled through the region. Urban development and sprawl have further served to restrict natural habitats by fragmenting the prairie into isolated islands too small to support viable populations of many species. Growth in the area has resulted in the loss of biological diversity, the introduction of invasive species, and an overall degradation of the ecosystem. Other human activities, including excessive use of pesticides and other chemicals, as well as over-hunting and animal control practices, have undoubtedly contributed to reducing many wildlife populations below their capacity to recover. All in all, the pressures of human population growth and development, associated with the excessive use of natural resources, have produced an environment in the Blackland Prairie region which now exceeds the ability of many wildlife species to survive (Sharpless and Yelderman, 1993).

Growth, development, and other related activities within the Trinity River Corridor have had a substantial impact on the vegetation composition of the area. The only remaining "natural" area within the corridor could be considered to be the lands within the Dallas Floodway levees, and even a large portion of this area has been highly disturbed throughout the years (e.g., river realignment, grassland mowing, vegetation clearing). Virtually all uplands along the Trinity River floodplain have been developed for residential or industrial use, and many of the lower lying areas have been protected from flooding by the construction of levees or flood channels.

A GIS land cover analysis revealed that the Trinity River Corridor RSA is comprised of approximately 5,009 acres of woodland area, of which approximately 3,662 acres are riparian forest and approximately 1,347 acres are upland forest. Additionally, approximately 7,959 acres are grassland.

Protection and preservation of the natural resources in the Trinity River Corridor are provided by a variety of federal, state, and local regulatory controls. There are no specific regulatory controls for woodland areas; rather, protection for the species that may comprise or that may use this habitat is afforded. The overriding federal regulation is the ESA, which is implemented by the TPWD within the State of Texas. Specific to bird populations, the MBTA was enacted to put an end to the commercial trade in birds and their feathers that, by the early years of the 20th century, had impacted the populations of many native bird species. The MBTA ensures that all listed migratory birds and their parts (including eggs, nests, and feathers) are fully protected. Additional relevant regulatory authority is provided by EO 13112 which directs federal agencies to expand and coordinate their efforts to combat the introduction and spread of "invasive species" (i.e., plants and animals not native to the U.S.). In Texas, TDA defines and regulates prohibited and restricted noxious weed seeds (TDA, 1981). In addition to these federal and state regulatory controls, local governments have also implemented policies and ordinances promoting protection and preservation of natural resources within their jurisdictions.

4.26.5.6 Water Quality

The urbanization of the Trinity River watershed has contributed to past and present water quality issues in the area. Over time, the primary sources of water pollution have changed. Historically, industrial and municipal discharges were considered the main sources of water quality impairment in the Trinity River watershed. However, pollutants-carrying storm water runoff from impervious surfaces, lawns, developed sites, and farmland is currently responsible for a substantial portion of the water quality issues in the watershed. Runoff containing pesticides, herbicides, and other contaminants, particularly in the DFW area, have combined to cause deterioration of water quality.

The DFW metropolitan area is the largest inland population center in the U.S. and has had a profound impact on water quality in the upper Trinity River basin. By 1900, the Trinity River water quality for many miles downstream from DFW was impaired. Sewage collection and treatment began in 1910 to 1920, but the situation was still odious and unhealthy (TRA, 1999). With a rapid expansion of industry and population, and only primary wastewater treatment beginning in the late 1920s and secondary treatment in the mid-1930s, water quality conditions in the area were still poor (Land, et al, 1998). Since that time, there have been major wastewater treatment improvements every decade or so, with some consequent improvement in river water quality. However in the early 1970s the river was still heavily polluted and a state survey found no fish in the river (TRA, 1999).

Substantial improvements have been made to the water quality of the Trinity River over the past several decades, and the river in many areas is returning to a more natural state. However, the basin is still affected by a variety of activities including continued urbanization, construction of reservoirs, and agriculture. All of these affect the water quality, as well as the physical and biological integrity of the Trinity River, its reservoirs, and tributaries. In several cases, these impacts result in use impairments (TRA, 2000).

Impacts from urbanization have included physical modifications and heavy management of stream and river channels for flood control; storm water runoff from residential, commercial, and industrial areas; and discharges from municipal wastewater treatment plants. Of these three types of urban impacts, those involving the physical modification of stream channels generally have the greatest impact on biological integrity, while storm water runoff has the greatest impact on use attainability based on human health concerns. Point sources from municipal discharges have the least effect on use attainability. The impacts on biological integrity within the DFW area, though not severe enough to constitute use impairment, have been documented by the USGS (TRA, 2000).

Programs, projects, and regulatory controls implemented by the USACE, USEPA, TCEQ, TRA, NCTCOG, and the City of Dallas have all led to comprehensive improvements in water quality compared to past trends. Representative examples include waste water discharge permit programs, water quality certification programs (Section 401 of the CWA), surface water quality monitoring programs (Section 305[b] of the CWA), surface water quality standards (Section 303[c] of the CWA), and the requirements of the Texas Clean Rivers Act (Clean Rivers Program [CRP]).

Despite these regulatory controls and recent trends towards improvement, Upper Trinity River Stream Segment 0805, which is the stream section within the Trinity River Corridor, is listed in the TCEQ 2012 *Texas Integrated Report* 303(d) List as being a "Category 5a" stream segment (TCEQ, 2013a). This indicates that the water body does not meet applicable water quality standards or is threatened for one or more designated uses by one or more pollutants; and a Total Maximum Daily Load (TMDL) assessment is either underway, scheduled, or will be scheduled. The reasons for inclusion in the 2012 Section 303(d) list of Stream Segment 0805, as well as Stream Segments 0822 and 0841 (located immediately upstream of Stream Segment 0805), are presented in **Table 3-29** of **FEIS Section 3.5.5.**

Future trends in water quality are likely to be affected by both the expected trends in urban development and natural resource enhancement within the Trinity River Corridor. Although the developable land in the corridor is limited, future land development would add to runoff from the area's impervious paved areas and rooftops. While any additional runoff from developed areas would be subject to regulatory oversight, this general trend would be expected to have a minor negative impact on water quality. Planned improvements to natural resources primarily within the Dallas Floodway (e.g., BVP and DFE), have the potential to beneficially affect the physical and biological integrity of the Trinity River.

4.26.5.7 Floodplains

Maintenance of floodplains is vital to the protection of property and the wellbeing of the residents of Dallas, and the potential loss or alteration can become an immediate issue of concern with regards to human safety and property damage. In their natural condition, floodplains serve vital functions, including temporary storage of floodwaters, moderation of peak flood flows, maintenance of water quality, groundwater recharge, prevention of erosion, and provision of wildlife habitat. They can also provide for recreational opportunities and establish an aesthetic quality to a given area. These functions are all best served if floodplains are kept in their natural state.

During the early settlement of the Dallas area, new development and associated infrastructure improvements within the 100-year floodplain occurred. Local floodplains have been affected both directly by urban land development within flood conveyance areas, and indirectly by increased storm water runoff from impervious surfaces, as well as past agricultural, drainage, and mining activities. Land clearing, soil compaction, riparian corridor encroachment, and modifications to the surface water drainage network have all accompanied urbanization of the area. Flood control improvements and regulatory requirements have stabilized and improved the flood conveyance abilities of floodplains in the area. Over the past several decades, major flood control measures have been implemented within the immediate area and throughout the Trinity River watershed upstream of the corridor.

Consideration of flood control and floodwater conveyance in the area began as far back as 1908 when a major flood event resulted in loss of life and extensive damage to the Dallas CBD. This event highlighted the need for flood control in the area and resulted in the construction of the Dallas Floodway. The Dallas Floodway was constructed from 1928 to 1932 through the creation of the Dallas City and County Levee Improvement District in 1926. The initial flood control improvements consisted of a series of levees along one or both sides of the river and pump stations to facilitate the movement of floodwaters to the river. As part of the project, the river was re-routed in areas and as much as 10,500 acres of land was reclaimed for development and growth of the Dallas CBD. The Dallas Flood Control District was formed in 1945 to operate and maintain the Dallas Floodway project. Primarily during the 1950s and 1960s (see **FEIS Section 3.5.6.3**), additional improvements to the Dallas Floodway were made including strengthening/upgrading of levees, clearing portions of the Dallas Floodway, increasing the capacity of pump stations, construction of new pump stations, and construction of pressure sewers, diversions, and gravity outlets to improve floodwater conveyance; these improvements utilized both federal and non-federal funding. Major flood control features within the Dallas Floodway are listed in **FEIS Section 3.5.6.2**.

The USACE, FEMA, TCEQ, and the City of Dallas have the regulatory authority necessary to control encroachment upon local floodways and floodplains, and provide compensatory mitigation as required. The protection of floodplains and floodways is required by 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 Sections 51A-5.101 through 5.106 of the City of Dallas Development Code. The intent of these 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 the EO and 23 CFR 650A, a proposed project must be designed to avoid floodplain impacts, when practicable, and to adequately mitigate unavoidable impacts.

In addition to EO 11988 (Floodplain Management) 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 impacts to floodplains within a watershed. The 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 cumulative impacts of granting multiple permits. The ROD for the TREIS was signed in 1988.

The TREIS ROD applies to all project actions requiring a permit under either Section 10 or Section 404 within the SPF floodplain. In general, the criteria developed to reduce hydraulic impacts include the provision for no rise in the 100-year flood or SPF water surface elevations from dredging and/or fill activities along the Trinity River main stem, West Fork, and Elm Fork and tributaries with drainage areas in excess of 100 square miles. TREIS ROD criteria are detailed in **FEIS Section 3.5.6.4.** The TREIS raised awareness that a large area 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, large increases in flooding frequency and extent of impacts would continue to occur in adjacent and downstream areas. Subsequently, the CDC process was established as a means to address those floodplain actions that were not within the jurisdictional areas administered by the USACE. The regional CDC process requires no net loss of valley storage due to levee or fill projects along the river and stream systems of the DFW area. This cooperative regional permit process, administered by the NCTCOG, assures that design flow rates on the area's river systems would be stabilized over time.

4.26.5.8 Air Quality

The USEPA establishes limits on atmospheric pollutant concentrations through enactment of the NAAQS for six principal, or criteria, pollutants. The USEPA designated ten counties in the DFW Region as nonattainment for the 8-hour ozone standard. The region is currently in attainment for all other criteria pollutants, with the exception of small area in the City of Frisco (Collin County) that is nonattainment for lead. Although there have been year-to-year fluctuations, the ozone trend continues to show improvement. The trend of improving air quality in the region is attributable in part to the effective integration of highway and alternative modes of transportation, cleaner fuels, improved emission control technologies, and NCTCOG regional clean air initiatives.

The amount of pollution emitted into the local atmosphere has been the net effect of population growth. The DFW Metropolitan Area has seen tremendous population growth in recent decades and the trend is for that growth to continue. With growth comes increased development, an increase in vehicles, and an increase in daily VMT 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 is a primary contributor to regional levels of ozone. Throughout recent decades, multiple regional and local initiatives have been planned and implemented in an effort to reduce emission of pollutants that lead to the formation of ozone. Several of these initiatives specific to the area's transportation system include increased capacity highways and roadways (through construction of additional travel lanes and bottleneck improvements), construction of high-occupancy vehicle lanes, and the promoting of alternative transportation (e.g., hike and bike trails, bus, and light rail). An additional initiative in the area has been the promotion of redevelopment and sustainable development (and particularly TOD). Land development patterns that encourage walking, bicycling, bus and rail use, and overall shorter automobile trips benefit the transportation systems in the area by reducing vehicles and vehicle congestion (demand) and improving air quality in the long-term. Local governments, with the support of regional transportation authorities (e.g., NCTCOG) or in joint venture projects, promote these types of land development initiatives by changing zoning to allow higher densities, expanding transit services, establishing tax increment refinance zones to support infill, promoting mixed-use development, and working with the private development community. The success of these initiatives has had a tremendous impact on the regional air quality as indicated by current trends. For example, the number of days the ozone standard has been exceeded in the DFW area over the past decade has substantially decreased.

The CAA requires states with areas that fail to meet the NAAQS prescribed for criteria pollutants to develop a 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 USEPA. One SIP is created for each state, but portions of the plan are specifically written to address each of the nonattainment areas (e.g., a "Dallas-Fort Worth SIP"). As changes are needed, the SIP is revised rather than rewritten in its entirety. Revisions are often prompted by new federal or state regulations, new modeling techniques, or a change in an area's attainment status. These regulatory controls, as well as other local transportation and development initiatives implemented throughout the DFW Metropolitan Area by the NCTCOG and local governments provide the framework for growth throughout the area consistent with air quality goals regarding ozone levels and air quality in general.

In addition to the criteria air pollutants for which there are NAAQS, USEPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries). Although no NAAQS for MSAT exist, USEPA has certain responsibilities regarding the health effects of MSAT. The USEPA controls emissions of air pollutants through one of two major strategies: NAAQS or regulatory controls that result in specific emission reductions. Both strategies provide for increased protection of human health and the environment. In order to more quickly implement MSAT emission reductions, the USEPA has focused efforts on nationwide regulatory controls, some of which are summarized below.

On March 29, 2001, the USEPA (2001) issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources (66 FR 17229). In its rule, USEPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline program, its national low-emission vehicle standards, its Tier II motor vehicle emissions standards and gasoline sulfur control requirements, and its 26 proposed heavy-duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2010 and 2050, the FHWA expects that even with a 102 percent increase in VMT, these programs will reduce on-highway emissions of the seven combined priority MSAT of (i.e., benzene, formaldehyde, butadiene, acrolein, diesel particulate matter, naphthalene, and polycyclics) by 83 percent. Additional USEPA rules, including the *Final Rules on Control of Hazardous Air Pollutants from Mobile Sources* (72 FR 8427; modified regulations in 40 CFR Parts 59, 80, 85 and 86) designed to further reduce MSAT, became effective on April 27, 2007. In these rules the USEPA adopted the following new requirements to substantially lower emissions of benzene and the other MSAT by: (1) lowering the benzene content in gasoline; (2) reducing NMHC exhaust emissions from passenger vehicles operated at cold temperatures (under 75 degrees); and (3) reducing evaporative emissions that permeate through portable fuel containers. Additional USEPA MSAT regulations include: petroleum refiners meeting an annual average gasoline benzene content standard for reformulated and conventional gasoline (beginning in 2011), implementation of USEPA standards to reduce non-methane hydrocarbon exhaust emissions from gasoline-fueled vehicles (implemented in phases based on vehicle type, beginning in 2010), evaporative requirements for portable gas containers (beginning in 2009), and more stringent evaporative emission standards for new passenger vehicles (effective in 2009 for light vehicles and 2010 for heavy vehicles).

4.26.5.9 Current Status of Resources within Cumulative Impact RSAs

Table 4-54 below summarizes the existing conditions (i.e., the No-Build Alternative) within the respective RSA's of the resources evaluated for cumulative impacts.

TABLE 4-54. SUMMARY OF EXISTING CONDITIONS

Resource Category	Summary of Existing Condition – 2012/2013 and No-Build Alternative [1]
Land Use	Plan governing the Trinity River Corridor RSA is the Trinity River Corridor Comprehensive Land Use Plan – Final Report (City of Dallas, 2005a). The intensity, timing, and character of development within the City of Dallas, and therefore, the RSA, is directed by local or regional comprehensive plans, general plans, or long-range plans. Regional transportation planning with the RSA is governed in accordance with the regional MTP and TIP. There are approximately 43,440 acres of land within the Trinity River Corridor RSA, of which approximately 9,237 acres are infrastructure.
Community Resources	
Environmental Justice	Affordable housing is available within existing communities of the RSA. Various programs exist throughout the City of Dallas to develop and match individuals with affordable housing (see **FEIS Section 4.4.3**).
Visual	The predominant feature of the Trinity River Corridor RSA is the Dallas Floodway with channelized river and adjacent maintained grass areas. The Dallas CBD, Design District, and residential areas of West and South Dallas surround this dominant feature.
Cultural Resources and Parklands	
Historic Architectural Resources	There are 59 NRHP-listed/eligible infrastructure property (the Dallas Floodway), buildings, bridges, and districts within the Trinity River Corridor RSA.
Parks and Recreation	The Trinity River Corridor RSA includes approximately 7,541 acres of parkland.
Waters of the U.S., Including Wetlands	The Trinity River Corridor RSA includes approximately 6,659 acres of water resources, broken down as follows: 3,419 acres of forested wetlands, 1,143 acres of emergent wetlands, and 2,097 acres of open water.
Vegetation and Wildlife Habitat	The Trinity River Corridor RSA includes approximately 5,014 acres of forested area, of which 3,667 acres are riparian forest and 1,347 acres upland forest. It also includes approximately 7,960 acres of grass areas.
Water Quality	Stream Segments 0805 and 0841are listed as not meeting applicable water quality standards and are threatened for one or more designated uses.
Floodplains	Flood zones A and X are located within the Trinity River Corridor RSA.
Air Quality	
CO and Ozone	Air Quality Control Region (10-county DFW area) is currently in nonattainment (USEPA classification level ("moderate") for the eight-hour ozone standard and in attainment for other NAAQS criteria pollutants (including CO), with the exception of a portion of Collin County that is in nonattainment for lead.
MSAT	No NAAQS have been established for MSAT. Instead, USEPA's regulatory efforts to reduce MSAT emissions focuses on rules that reduce MSAT from new engines and gasoline formulations. Although VMT will continue to increase in future years, the reductions in MSAT are expected to outpace that increase and result in a net reduction in MSAT.

Notes:
1. Acreages are approximate/estimates and are based on GIS analysis of the Trinity River Corridor RSA.
2. City of Dallas, 2013b.
3. City of Dallas, 2011a and 2012d.

4.26.6 Step 4 - Identify Direct and Indirect Impacts that May Contribute to a Cumulative Impact

The direct and indirect impacts expected from the No-Build and Build Alternative (Alternative 3C) for the Trinity Parkway were discussed in detail earlier in this chapter. The results of the study of direct and indirect impacts are summarized for Alternative 3C in **Table 4-55** for the cumulative impacts resources identified in **FEIS Section 4.26.3**.

TABLE 4-55. SUMMARY OF DIRECT AND INDIRECT IMPACTS

Resource Category	Impacts of 3C [1]	
	Direct Impacts	**Indirect Impacts**
LAND USE		
Consistency of the proposed project and changes in land use with local land use plans	Yes	Yes
Land converted to transportation ROW	333 acres	None
COMMUNITY RESOURCES		
EJ: Housing Impacts on Low-Income / Minority Pop.	3	None
Visual Alteration of Dallas Floodway Area	Moderate	None
Cultural Resources and Parklands		
Non-Archeological Historic Resources Affected	1	---
Change in Parks and Recreation Areas [2]	-222 acres	None
Waters of the U.S., Including Wetlands		
Change in Waters of U.S., Including Wetlands	-66 acres (-36 acres)[3]	No appreciable amounts expected
VEGETATION AND WILDLIFE HABITAT		
Change in Amount of Woodlands	-49 acres (-11 acres)[3]	No appreciable amounts expected
Change in Amount of Grass Areas	-492 acres (-271 acres)[3]	No appreciable amounts expected
WATER QUALITY		
Change to Water Quality	- Temp. minor	- Temp. minor
FLOODPLAINS		
Maximum Increase in 100-year Flood Elevation	+0.27 feet exceeds ROD	None
Maximum Increase in SPF Elevation	None	None
Change in 100-year Flood Valley Storage [4]	+3.0% [4] within ROD	None
Change in SPF Valley Storage [4]	+0.2% [4] within ROD	None
AIR QUALITY		
CO and Ozone - Change in Ability to Meet NAAQS Standards [5]	Insignificant	Insignificant
MSAT - Trend of emissions over time, as modeled on a regional level [6]	Insignificant	Insignificant

Resource Category	Impacts of 3C [1]	
	Direct Impacts	Indirect Impacts

Notes:
1. Direct/indirect impacts were derived from the results of studies reported throughout **FEIS Chapter 4**. All acreages are approximate/estimates.
2. ROW would be required from within the Trinity River Greenbelt Park, and access rights for construction, operation, and maintenance are anticipated to be established by an operating agreement with the City of Dallas. The deed records for the parkland indicate that it can be used for transportation.
3. The acreage figures reflect total expected impacts from ROW and excavation of potential borrow areas; where shown, the numbers in parentheses represents the acreage impacts from the potential borrow areas only.
4. Reported in percentage (%) of existing condition as required by 1988 USACE ROD and CDC criteria, which allow a maximum loss in valley storage 0% for the 100-year flood and of 5% for the SPF; all increases are within the ROD criteria.
5. The ten-county DFW non-attainment area is currently in nonattainment for the 8-hour ozone standard and in attainment for other NAAQS criteria pollutants (including CO), with the exception of a portion of Collin County that is in nonattainment for lead. The direct impact of each Build Alternative on the ability of the region to meet established air quality standards is considered insignificant because the project would not cause pollutants (including CO) to exceed the NAAQS. Prior to the FHWA taking final action on the proposed project, it will be consistent with a TIP and MTP that have been determined to conform to the ozone non-attainment SIP. All throughout the region, USEPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions of on-road emissions. In almost all cases, lower emissions will cause MSAT, VOC, and NOx levels to be significantly lower than they are today.
6. Direct impacts on air quality and MSAT from the project are primarily those associated with the increased capacity, accessibility and the resulting projected increases in VMT. Emission reductions as a result of the USEPA's new fuel and vehicle standards are anticipated to offset impacts associated with VMT increases. Indirect impacts on air quality and MSAT are primarily related to any expected development resulting from increased accessibility or capacity to the area. Any increased air pollutant or MSAT emissions resulting from the potential development of the area must meet regulatory emissions limits established by the TCEQ and the USEPA as well as obtain appropriate authorization from the TCEQ and therefore are not expected to result in any degradation of air quality or MSAT levels.

4.26.7 Step 5 - Identify Other Reasonably Foreseeable Actions that May Affect Resources

The next step in the cumulative impacts analysis focuses on the impacts that are likely to occur in the future through actions that are independent of the Trinity Parkway. CEQ regulations indicate that cumulative impacts analyses must include an assessment of "reasonably foreseeable future actions" affecting the issues/resources studied (40 CFR Section 1508.7). This step of the cumulative impacts analysis identifies other transportation projects and flood control projects, as well as planned large-scale residential and commercial developments within the Trinity River Corridor RSA (i.e., the RSA for Land Use, Community Resources, Cultural Resources and Parklands, Water Resources, Biological Resources, Water Quality, and Floodplains). The identification of reasonably foreseeable future actions for this assessment was based on a review of proposed and ongoing development projects located within the RSA that are reflected in materials provided by City of Dallas planners or Web sites, and from entities involved with proposed developments. Transportation projects were identified from NCTCOG and TxDOT databases and engineering documents. Planned transportation, infrastructure, and flood control projects within this RSA are described in **Table 4-56**; the general locations for these projects are graphically depicted in **Figure 4-7**. Planned land development projects within this RSA sponsored by other public agencies or private interests are described in **Table 4-57** and **Figure 4-8** shows the general locations for these planned projects. All of the reasonably foreseeable transportation, infrastructure, flood control, and land development projects listed in **Tables 4-56** and **4-57** were utilized for the analysis of cumulative impacts for the issues/resources listed in **Table 4-54**, with the exception of air quality. As described in **FEIS Section 4.26.4**, the RSAs for air quality (includes CO, ozone, and MSAT) each consist of a customized frame of reference determined to be appropriate for each air quality issue. In the case of MSAT (air quality), reasonably foreseeable future transportation projects included within the TIP and MTP (*Mobility 2035 – 2013 Update*) were considered as part of the analytical modeling studies and have been reported in this FEIS.

Details about the expected impacts associated with the projects listed in **Tables 4-56** and **4-57** are provided in **FEIS Appendix J-4**.

TABLE 4-56. REASONABLY FORESEEABLE ACTIONS – TRANSPORTATION, INFRASTRUCTURE, AND FLOOD CONTROL PROJECTS

Map ID[1]	Project Name	Project Sponsor	Summary Description
1	Medical District Drive	TxDOT/City of Dallas	Medical District Drive (formerly Motor Street) improvements from IH-35E to Harry Hines Boulevard. Reconstruct and widen from four-lane to six-lane divided roadway.
2	Able Pump Station	City of Dallas/USACE	Decommission existing Able Pump Station and outfall, and construct new pumping plant and outfall near the Belleview Pressure Sewer, located along the East Levee, south of the Dallas CBD. Install culvert connecting Sump Ponds 1 and 5.
3	AT&T Trail	AT&T/City of Dallas	Concrete trail from Audubon Center to just east of the planned Trinity Forest Golf Course.
4	Beckley Avenue	City of Dallas	Roadway widening to a four-lane divided thoroughfare with bike lanes from Singleton Boulevard to IH-30.
5	Belleview Trail Connector	City of Dallas	The City of Dallas proposes to construct a pedestrian link along Belleview Street, connecting the Cedars area and DART station with proposed future development on the south side of the UPRR, and create a vantage point toward the Trinity corridor and downtown Dallas.
6	Bernal Trail	City of Dallas	Eastern and western extension of existing trail to the proposed Trinity Levee Trail and south to Fish Trap Lake; located south of Canada Drive.

TABLE 4-56. REASONABLY FORESEEABLE ACTIONS – TRANSPORTATION, INFRASTRUCTURE, AND FLOOD CONTROL PROJECTS

Map ID[1]	Project Name	Project Sponsor	Summary Description
7	Cedar Crest Bridge Gateway and Overlook Enhancements, Trinity River Overlook, and Trailhead Parking Lot/Maintenance Access Road Improvements	City of Dallas	Proposed beautification and aesthetic gateway treatments at the Cedar Crest Bridge terminus; construction of a river overlook for the Trinity River; and construction of trailhead parking, signage, seating, and maintenance road access to the Trinity River Floodplain at the Cedar Crest Blvd. and 11th St. intersection.
8	Cedar Crest Trail	City of Dallas	Concrete trail extending from near IH-35/US-67 split to Santa Fe Trestle Trail; proposed trail also crosses Cedar Crest Bridge.
9	Continental Avenue Viaduct	TxDOT/City of Dallas	Planned conversion of this NRHP-eligible bridge to a pedestrian and bicycle facility.
10	Coombs Creek Trail	City of Dallas	Extension of existing Coombs Creek Trail to the proposed Trinity Trail, located south of IH-30 between Hampton Road and Beckley Drive.
11	Dallas – Olive Street/St. Paul Street Loop Project	City of Dallas/DART	Construction of a 0.65 mile urban streetcar track extension of the McKinney Avenue Transit Authority's (MATA) line connecting to MATA's Olive Street Extension and providing better access to DART's St. Paul Light Rail Station.
12	Dallas Floodway Extension (DFE) Project	City of Dallas/USACE	The proposed project covers approximately 9,500 acres and consists of the construction of the Chain of Wetlands, Cadillac Heights and Rochester Park Levees, and ecosystem and recreation features downstream of existing Dallas Floodway Levee System. Construction is ongoing.
13	Dallas Floodway Project (Balanced Vision Plan)	City of Dallas	An adopted plan that formulates activities within the Dallas Floodway to develop appropriate balance of multi-modal transportation, flood control, recreation and open space, environmental restoration and management, and economic and community development for the Trinity River corridor in Dallas. Adopted by City, April 2004.
14	Elm Fork Creek Trail	City of Dallas	Concrete trail connecting proposed Trinity Strand Trail to the proposed Elm Fork Trail.
15	Elm Fork Trail	City of Dallas	Concrete trail extending north from Trinity Levee Trail to the L.B. Houston Nature Area.
16	Emerald Bracelet Trail	City of Dallas	Concrete trail encircling downtown Dallas.
17	Five Mile Creek Trail (Extension)	City of Dallas	Concrete trail extending from Glendale Park Loop Trail near Ledbetter DART Station to proposed Trinity Forest Trail.
18	Horseshoe Project	TxDOT	Includes reconstruction of sections of the IH-30/IH-35E interchange or "Mixmaster" and operational improvements for IH-30 in the Canyon. Construction of the Margaret McDermott bridge (new "signature" bridge concept [long-span arch]) over IH-30 and reconstruction of the IH-35 bridge are included as part of this project.
19	IH-35E from Lombardy Lane to Spur 482 (Story Road)	TxDOT	Construct new southbound frontage road lanes and entrance/exit ramps to reduce congestion.

TABLE 4-56. REASONABLY FORESEEABLE ACTIONS – TRANSPORTATION, INFRASTRUCTURE, AND FLOOD CONTROL PROJECTS

Map ID[1]	Project Name	Project Sponsor	Summary Description
20	IH-35E from US-67 to South of IH-30 (Eighth Street)	TxDOT	Project to widen and reconstruct from 8 to 10 lanes with two reversible HOV/managed lanes.
21	Interurban Trail	City of Dallas	Concrete trail extending southeast from Cedar Crest Trail to the Loop 12/IH-45 interchange.
22	Jefferson Memorial Bridge	City of Dallas/ TxDOT	Project to realign/move the bridge 100 to 300 feet downstream. Would include demolition of existing bridge and building new bridge.
23	John C. Phelps Trail (Extension)	City of Dallas	Concrete trail extension southwest to proposed Interurban Trail.
24	Loop 12/IH-35 Corridor – Loop 12 from Spur 408 to Loop 12/IH-35E interchange then north on IH-35E to IH-635/IH-35E interchange.	TxDOT	Project to widen and reconstruct from 6 to 8 lanes with a two-lane reversible managed HOV system and six frontage road lanes.
25	Loop 12 Gateway	City of Dallas	Three-phased construction of enhanced entrance to the Trinity River Audubon Center that would include solar-powered lighting and streetscape/monument enhancements.
26	McKinney Avenue Trolley – Olive Street Extension	City of Dallas	Extension of existing trolley line for 3,400 feet along Olive Street from McKinney Avenue to Bryan Street.
27	Mill Creek Pressure Sewer System	City of Dallas	Plan calls for flood control, drainage improvements, channel restoration, and recreation for Mill Creek located in the Mill Creek sub-watershed in the City of Dallas.
28	Northaven Trail	City of Dallas	Concrete trail extending from Elm Fork Trail to Walnut Hill Lane then to White Rock Creek Trail North.
29	Pavaho Stormwater Wetland Project	City of Dallas	Proposed creation of a wetland cell consisting of four wetland areas; three within the Dallas Floodway and one outside the Dallas Floodway. The City of Dallas proposes to construct approximately 70 acres of stormwater wetlands near the Pavaho Sump Pump Station. The proposed project would create habitat for wetland flora and fauna and aid in improving the water quality of storm runoff into the Trinity River.
30	Prairie Creek Greenbelt Trail	City of Dallas	Concrete trail extending northward from Trinity Forest Trail to Crawford Memorial Park.
31	Riverfront Boulevard	City of Dallas	Roadway reconstruction to become a six-lane divided thoroughfare with bike lanes from MLK Jr. Boulevard to Commonwealth Boulevard
32	SM Wright	City of Dallas/ TxDOT	Construct direct-connecting ramps from C.F. Hawn Freeway to IH-45, and widen IH-45 to inside from Lamar Street to the SM. Wright Freeway ramps. Conversion/downgrade (fewer vehicle lanes) of SM Wright Freeway from IH-45 to Budd Street, to a six-lane arterial.
33	Trinity Forest Trail	City of Dallas	Concrete trail extending throughout Great Trinity Forest.

TABLE 4-56. REASONABLY FORESEEABLE ACTIONS – TRANSPORTATION, INFRASTRUCTURE, AND FLOOD CONTROL PROJECTS

Map ID[1]	Project Name	Project Sponsor	Summary Description
34	Trinity Levee Trail	City of Dallas	Concrete trail on Trinity River Levee linking several parks and trails.
35	Trinity Strand Trail and Connection to Dallas Floodway	City of Dallas	Hike and bike/commuter trail along original course of the Trinity River through the Design District.
36	Union Station to Oak Cliff, Dallas Streetcar	DART/City of Dallas/NCTCOG/FTA	Approximately 1.6 mile streetcar alignment from Union Station over the Houston Street Viaduct, along Zang Boulevard to Colorado Boulevard, terminating at the Colorado Boulevard and Beckley Avenue intersection. Four stops are proposed, all within existing right-of-way.
37	West Dallas Gateway	City of Dallas	A gateway to the Continental Bridge. Enhancements and features include parking, plaza/gathering space, bicycle/pedestrian access and connections to adjacent neighborhoods, development and trails, and picnic areas.

Source: City of Dallas, 2012l.
Note: Map IDs correspond to **Figure 4-7** and **FEIS Appendix J-4.**

FIGURE 4-7. REASONABLY FORESEEABLE ACTIONS – TRANSPORTATION, INFRASTRUCTURE, AND FLOOD CONTROL PROJECTS

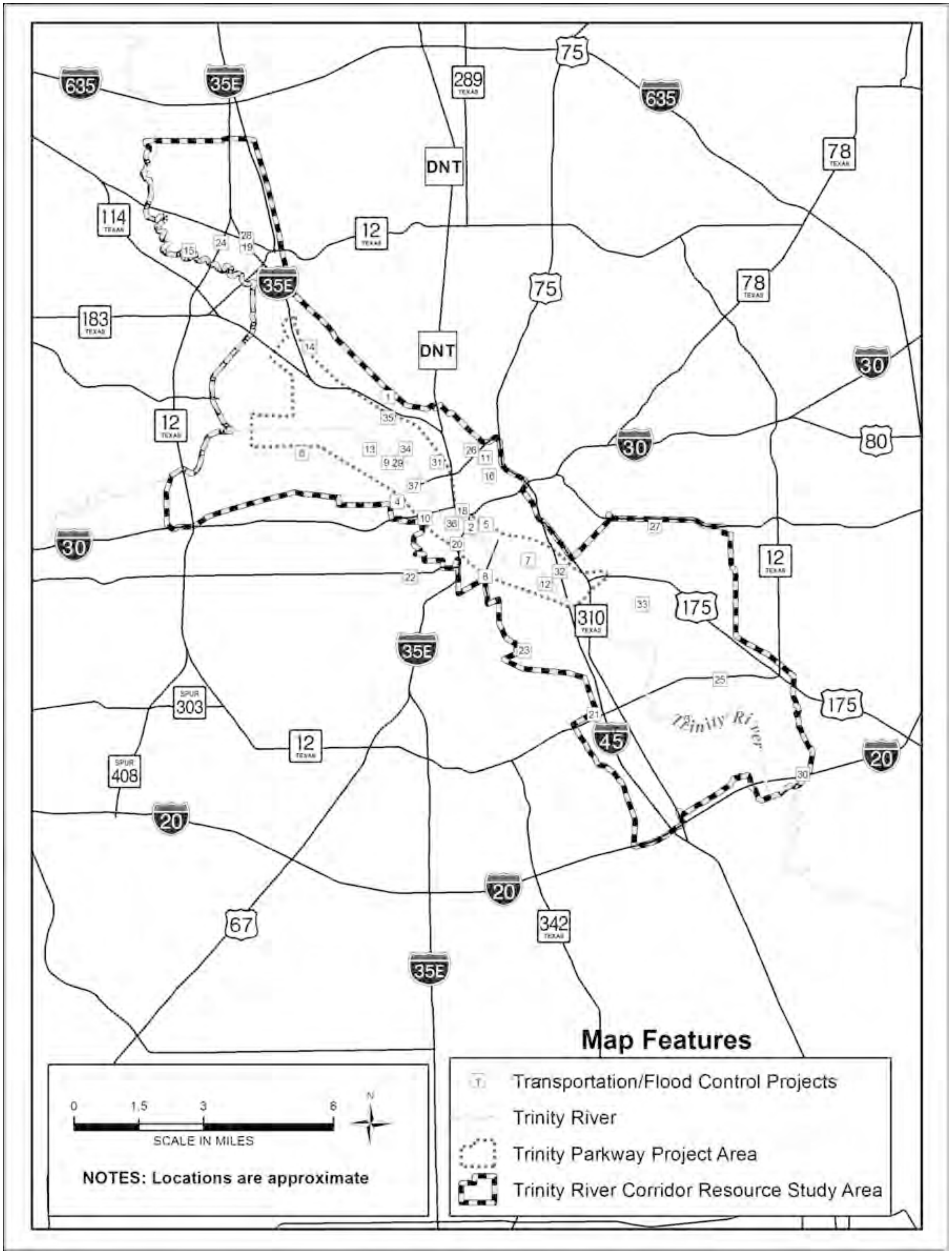


TABLE 4-57. REASONABLY FORESEEABLE ACTIONS - LAND DEVELOPMENT PROJECTS

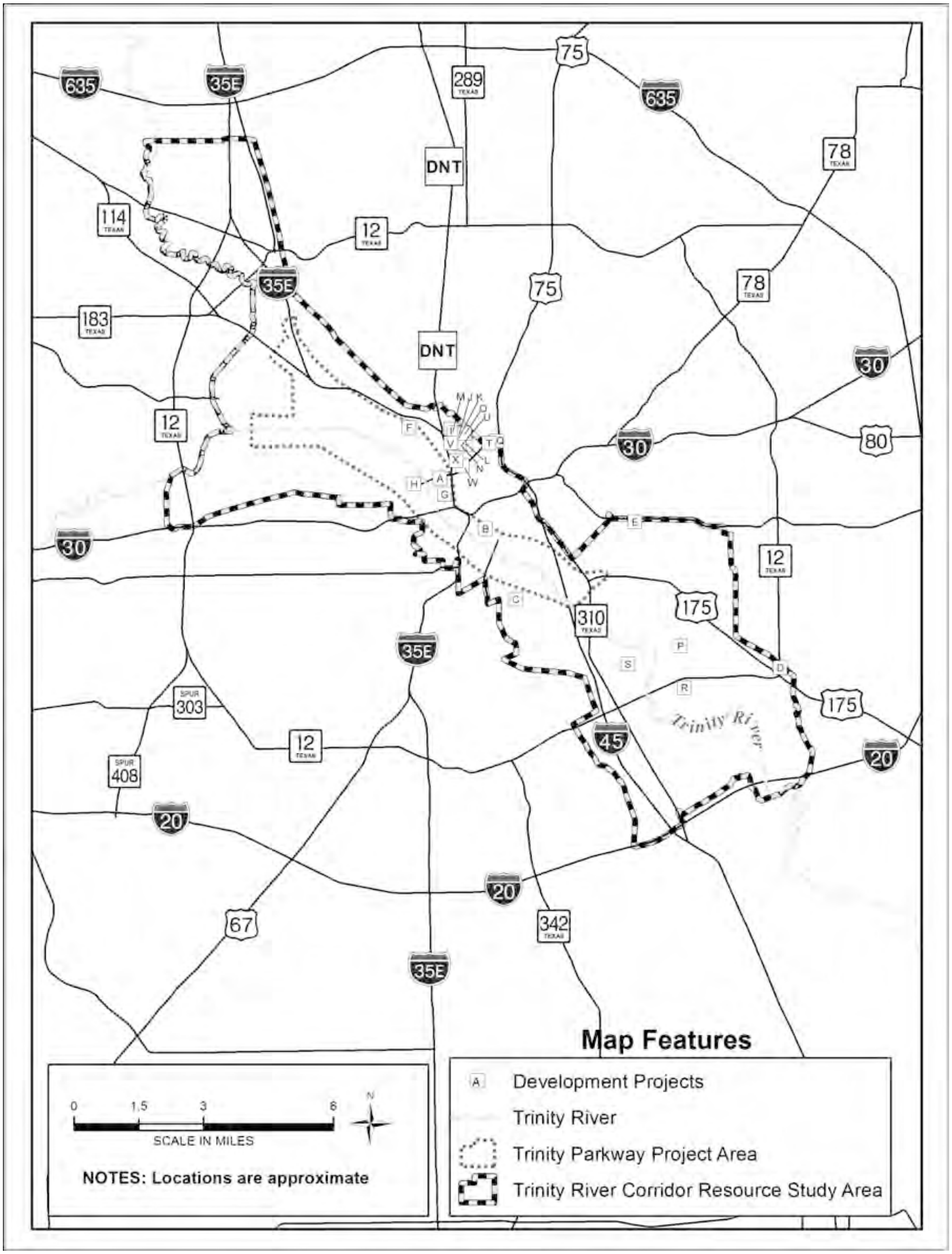
Map ID[1]	Project Name	Project Sponsor	Summary Description
A	505 Riverfront	Private Investor(s)	Planned Development District permitted primarily for retail, office, hospitality, and high-density residential uses with no density or height restrictions.
B	Cedars West Site Mixed Use Development	Private Investor(s)	Plan includes a mixed-use retail and residential community consisting of mid and high-rise apartments, condominiums, townhomes, and a hotel.
C	Dallas Police Academy	City of Dallas	Development of a new police academy and associated facilities in the Cadillac Heights neighborhood.
D	Dallas Transit-Oriented Development – Buckner Station	City of Dallas	Potential Catalytic Development sites with mixed-use development including affordable housing options, restaurants, retail, and activity centers. Construction of new facilities as well as revitalization of existing structures. Landscape and streetscape improvements. Overall, improve access for current and future residents to area transit opportunities.
E	Dallas Transit-Oriented Development – Hatcher Station	City of Dallas	
F	Future Hotel	Private Investor(s)	Proposed hotel located within the Design District along the proposed Trinity Strand Trail.
G	Future Mixed-Use Development	Private Investor(s)	The future location is located on the southwest corner of Commerce Street and Riverfront Blvd.
H	Future Mixed-Use Development	Private Investor(s)	Proposed mixed-use development located at the former Tornado Bus repair shop at the northwest corner of Singleton Boulevard and Canada Drive.
I	Harwood District – Bleu Ciel	Private Investor(s)	Residential development in two towers including apartment homes and condominiums, office, retail, and restaurant spaces.
J	Harwood District – Phase V	Private Investor(s)	Office building including retail and restaurant facilities.
K	Harwood District – The Lexi	Private Investor(s)	Mixed-use development including offices, retail, restaurants and cafes, apartment homes with terraces, and hotel rooms.
L	Harwood District – The Oliver	Private Investor(s)	Eighteen floors with residential units, two-story lobby, two-story plant area, and sky garden with pool.
M	Harwood District – The Square	Private Investor(s)	Mixed-used development including apartments, shops, restaurants and café bars.
N	Harwood District – XIII	Private Investor(s)	Unknown at this time.
O	Harwood District – Build-to-Suit/Glacier	Private Investor(s)	Build-to-suit opportunity for mixed-use, multi-family, retail, or office projects. According to the master plan for The District – Harwood Dallas, the site is also referred to as Glacier. Glacier is described as a residential facility with approximately 100 apartment homes and parking spread across 26 floors.
P	Texas Horse Park at the Trinity	City of Dallas	Project involves the development of an equestrian center within the Great Trinity Forest. The park would be located off of IH-45 and Great Trinity Forest Way at Pemberton Hill and Elam Road.
Q	Three Arts Plaza	Private Investor(s)	Project is a 25 level premier office facility consisting of 18 levels of offices and 7 levels of parking. Project is part of the Arts Plaza development in the Dallas Arts District.
R	Trinity Forest Golf Course	City of Dallas, AT&T, Southern Methodist University	Project involves the development of golf complex within the Great Trinity Forest. The complex will be located off of IH-45 and Great Trinity Forest Way.

TABLE 4-57. REASONABLY FORESEEABLE ACTIONS - LAND DEVELOPMENT PROJECTS

Map ID[1]	Project Name	Project Sponsor	Summary Description
S	Trinity/Joppa Neighborhood South Central Park	City of Dallas	Expansion and improvement of South Central Park. Gateway would connect to the proposed Trinity Trails Phase 3.
T	Two Arts Plaza	Private Investor(s)	Project is a 12 story mixed-used development including office/retail space, cafes, and parking. Project is part of the Arts Plaza development in the Dallas Arts District
U	Victory Park – Future Alamo Manhattan Apartment Development	Private Investor(s)	A five-story apartment structure over a three-level garage with 263 luxury units. Tentatively called "Victory."
V	Victory Park – Future Camden Apartment Development	Private Investor(s)	A four- or five-story project with approximately 400 apartment homes.
W	Victory Park – Future Development	Private Investor(s)	Unknown at this time.
X	Victory Park – Victory Tower	Private Investor(s)	A 25-story, 400,000-square foot office high-rise consisting of 14 floors of office space, eight-story parking structure, and three-story lobby.

Source: City of Dallas, 2012l and Harwood International, 2008.
Note: Map IDs correspond to **Figure 4-8** and **FEIS Appendix J-4.**

FIGURE 4-8. REASONABLY FORESEEABLE ACTIONS - LAND DEVELOPMENT PROJECTS



Overall, the foreseeable projects considered in this analysis would create approximately 5,467 acres of new or redeveloped urban areas. Reasonably foreseeable transportation, infrastructure, and flood control projects comprise 4,508 acres and development projects comprise 958 acres.

The sections that follow identify the impacts of reasonably foreseeable actions of the various resources/issues evaluated within this cumulative impacts analysis.

4.26.7.1 Land Use

As demonstrated by the plans/projects listed in **Tables 4-56** and **4-57**, numerous private development initiatives and public infrastructure projects would continue to shape development and redevelopment within the City of Dallas and specifically the Trinity River Corridor. The area is expected to see continued urbanization as growth is projected to continue, guided by local land use plans and policies. Based on input from City of Dallas planners, such growth and development would occur regardless of whether Build Alternative 3C is constructed. The specific impacts of continued development within the corridor cannot be determined with precision due to market forces and individual developer decisions, and could include both beneficial and adverse aspects. However, as indicated previously by various land use plans developed by the City of Dallas in recent years, anticipated beneficial impacts include new economic opportunities, housing alternatives, employment, community services, redevelopment of deteriorated buildings or areas, and recreational resources. For example, the various amenities included in the BVP would augment the attractiveness of the CBD as an area for future new development or redevelopment. Land use planning documents prepared by the City of Dallas and Dallas County seek to achieve a balance of community amenities (e.g., public services, parks/open space, and transportation routes), while maximizing the land that may be developed for various private uses.

Transportation projects play a major role in the process of achieving the appropriate balance of land uses to meet the needs of local residents and businesses. Although implementation of the planned transportation projects would result in the conversion of approximately 1,219 acres of land to transportation ROW, the projects would improve local and regional traffic circulation by providing reduced congestion/bottlenecks on local streets and highways, additional system capacity, improved regional mobility, accident reduction, travel time savings, and alternative transportation options. Transportation mobility is an essential aspect of the successful operation of any developed property. While those projects listed in **Table 4-56** would also result in impacts to the human environment, including socioeconomic, physical, and natural environmental impacts, government leaders and agencies at all levels may be expected to continue to seek the optimum balance of land use mixes to meet the needs of the local and regional populace and business community by sustaining growth throughout the region.

Implementation of those plans/projects listed in **Tables 4-56** and **4-57** promotes the strategic initiatives and long-range planning policy of the City of Dallas and other planning organizations, with a focus on providing for growth while instilling a sense of “community” through sustainable, pedestrian-friendly development. Based on the review of the land development projects listed in **Table 4-57**, approximately 958 acres of land would be affected by non-transportation related improvements that would range from transit-oriented development to complete redevelopment of existing urbanized areas. Reasonably foreseeable development actions within the RSA include public/recreational facilities (798 acres), commercial (9 acres), mixed-use development (116 acres), office (5 acres), residential (9 acres), and transit-oriented development (21 acres). When combined with the 1,219 acres for transportation projects, 2,889 acres for infrastructure/flood control projects, and 401 acres for hike/bike/recreation projects, foreseeable projects would potentially affect some aspect of land use on a total of 5,467 acres.

4.26.7.2 Community Resources

Implementation of the previously discussed reasonably foreseeable future actions could result in displacements/relocations including 117 commercial/industrial, 93 residential, eight parking lots, and six billboards. Of the 93 estimated residential displacements/relocations, approximately 75 could occur due to the construction of the Dallas Police Academy. Additionally, 88 of the 93 potential residential displacements would occur within EJ Census block groups. Construction of several multi-family residential and mixed-use developments would increase housing opportunities in the RSA; however, it does not appear that these include affordable housing options (see **Section 4.26.10.5**).

The visual resource in the Trinity River Corridor varies widely as a result of historic development patterns. Much of the area is dominated by industrial buildings and poorly maintained areas that do not offer much in the way of a visual resource. On the other hand, the Dallas Floodway has become the focus of attention as a visual resource amidst surrounding viewscapes characterized by steel and concrete. The City of Dallas has focused tremendous attention on revitalizing both the economic and visual attractiveness of the corridor, and enhancing natural resources within the Dallas Floodway is a centerpiece of those plans. Similarly, plans associated with the USACE DFE Project would create and enhance the visual quality of the Dallas Floodway. Consequently, reasonably foreseeable projects are expected to have an overall beneficial effect on the Dallas Floodway as a visual resource.

4.26.7.3 Cultural Resources and Parklands

Reasonably foreseeable actions within the RSA were compared with NRHP-listed sites to estimate potential impacts. In addition to the NRHP-listed sites, non-listed but potentially eligible historic structures are also available for the project area (as discussed earlier in **FEIS Section 4.7.2**), so these potentially eligible historic structures are included in this analysis. It is estimated that with implementation of the transportation/flood control projects listed in **FEIS Tables 4-56** and **4-57**, that possibly 13 NRHP listed/eligible properties could be affected. No development projects would affect NRHP properties. With the existing federal, state, and local regulatory controls in place, as well as other related preservation initiatives and mitigation agreements, it is likely that potential impacts to listed infrastructure (the Dallas Floodway) buildings, bridges, or districts would be minimal and overall preservation in the area is likely. As a result, no substantial impacts would be anticipated.

Implementation of several of the projects listed in **Tables 4-56** and **4-57** would likely result in impacts to parks/recreation areas (i.e., approximately 94.6 acres). However, several of the projects would result in overall benefits with the creation of additional parks/open space and improvements and enhancements to existing spaces. For example, the DFE Project includes 31 miles of recreational trails and the Dallas Floodway Project (BVP) includes 160 acres of playing fields, a 12-acre amphitheater, 9 miles of trails, 3 miles of equestrian trail, and 5,000 feet of wetland boardwalk. Additionally, the Trinity/Joppa Neighborhood South Central Park would expand and improve the existing South Central Park. As can be found in **Table J-4-1** of **Appendix J-4**, numerous trail projects are proposed within the RSA. Overall, benefits would likely be realized through increased park/open space access, new and improved hike and bike trails and linkages, new or improved recreational amenities, and the enhancement/improvement of natural/vegetated areas.

4.26.7.4 Waters of the U.S., including Wetlands

As mentioned previously, urbanization has been the primary cause of wetland loss in and around the Trinity River Corridor, and other impacts to waters of the U.S., including wetlands. Individual developments can cause direct loss of wetlands due to displacement; and primary wetland functions may be lost due to increases in impervious surfaces, which reduces groundwater recharge, may alter wetland hydrology, and may cause a decrease in overall wetland area and functional capability. Affected functions include fish and wildlife habitat, storm water retention, and sediment and toxin retention. Several of the planned transportation system improvements listed in **Table 4-56** would likely result in further negative impacts to waters of the U.S., including wetlands, within the Trinity River Corridor. Approximately 788 acres of existing waters of the U.S., including wetlands, could be impacted due to reasonably foreseeable future projects (131 acres of forested wetlands, 279 acres of emergent wetlands, and 378 acres of open water). Other planned projects (particularly the Dallas Floodway Project [BVP] and DFE Project) call for the creation of new water features, including wetlands and other habitat enhancements, within the corridor.

4.26.7.5 Vegetation and Wildlife Habitat

Continued growth and development within the Trinity River Corridor would result in further encroachment and further loss of available habitat and/or habitat fragmentation. Approximately 379 acres of existing forest could be impacted due to reasonably foreseeable future projects (36 acres of upland forest and 343 acres of riparian forest) as well as 2,851 acres of grassland. While several of the projects listed in **Tables 4-56** and **4-57** would affect existing resources, others call for the preservation, enhancement, and/or creation of new woodland or other natural areas. The DFE Project, for example, calls for 271 acres of improved habitat. Crops would be planted/harvested on the Texas Horse Park site and other appropriate sites within the Trinity River Corridor, which would serve as habitat and protective cover for some forms of wildlife. Additional projects would result in further benefits by providing small pockets of urban plantings throughout the corridor.

4.26.7.6 Water Quality

Historically, industrial and municipal discharges were considered the main sources of water quality impairment in the Trinity River watershed. However, storm water runoff carrying pollutants from impervious surfaces are responsible for a substantial portion of the water quality and use impairment issues in the watershed. As it is difficult to precisely determine from available information the effect that future development might have on prevailing water quality, several factors that influence water quality in the Trinity River Corridor are outlined here. Implementing the listed reasonably foreseeable projects would undoubtedly increase the amount of impervious surfaces in the corridor and would result in increased storm water runoff. The multiple federal, state, and local regulatory controls as well as local plans, projects, and initiatives designed to minimize the impacts of development on water quality, would ensure that with future development, potential impacts to water quality from future development projects would be minimized, but not entirely eliminated. Several of the future projects provide for water quality benefits through the improvement/enhancement of existing streams and wetlands and the creation of additional wetlands. Wetlands are an important resource that serves a variety of functions including sediment filtering, upland and aquatic wildlife habitat, and reduction of floodwater velocity. Several of the plans/projects listed in **Tables 4-56** and **4-57** also call for the enhancement of existing recreation areas and the creation of additional open space, which would also be expected to have positive impacts on water quality.

4.26.7.7 Floodplains

As evidenced by the other planned transportation system improvements, flood control projects, and development projects listed in **Tables 4-56** and **4-57**, continued infrastructure upgrades, development, and improvements would occur within the Trinity River Corridor. Several of these plans/projects would result in additional storm water runoff due to increased impervious surfaces associated with transportation system improvements and development. Several other plans/projects would result in enhancement and development within the floodplain for recreational uses such as the BVP.

Most importantly, however, the USACE-sponsored Dallas Floodway Improvement Project has undertaken a comprehensive analysis of existing conditions and reasonably foreseeable projects that could affect the floodplain characteristics in the RSA. The purpose of USACE Dallas Floodway Hydraulic and Hydrologic Analysis (DFHHA) (USACE, 2013b), was to analyze the hydraulic effects of existing and planned features in an overall effort to maintain hydraulic neutrality with the 1988 TREIS ROD criteria. The FHWA has reviewed the draft DFHHA and has adopted it for the purpose of identifying reasonably foreseeable future projects affecting the Dallas Floodway and as the analytical basis for assessing cumulative impacts relating to the Build Alternative for the proposed Trinity Parkway. Accordingly, pertinent aspects of the draft DFHHA are discussed throughout the remainder of this section.

The draft DFHHA sought to evaluate the various potential components to assist the USACE flood risk management in the Dallas Floodway, as well as Trinity River reaches immediately upstream and downstream. The objective of the analysis was to determine the cumulative effects of components of the USACE Flood Risk Management (FRM) plan, the City of Dallas BVP, and the Trinity Parkway (Alternative 3C). The draft DFHHA began with the current CDC HEC-RAS model to create the base condition, then updated the model to reflect recently-completed projects and projects under construction to define the Existing Conditions HEC-RAS model. The analysis then used the Existing Conditions model as the basis for creating the Future Without-Project (FWOP) model, which served as the standard against which the cumulative hydraulic changes attributable to the FRM plan, BVP, and Trinity Parkway could be assessed.

The FWOP model adjusted the geometry of HEC-RAS cross sections to reflect the effects of 28 reasonably foreseeable future projects with a potential to influence flood characteristics in the Dallas Floodway (USACE, 2013b). These reasonably foreseeable projects are identified below:

- Beckley Avenue Improvements
- Bellview Trail Connector
- Bernal Trail
- Charlie Pump Station
- Continental Pedestrian Bridge
- Dallas Horseshoe Project
- Dallas Watersports Complex
- Delta Pump Station
- DWU Waterlines
- EF2 Wastewater Interceptor and Laterals
- Elm Fork Flood Improvements and Parks
- Hampton Wetlands
- IH-20 Gateway Park
- Irving Northwest Levee Repair
- Jefferson Memorial Bridge
- Joppa Gateway Park
- Loop 12 Bridge
- Loop 12 Gateway Park
- MLK Gateway and Cedar Crest Bridge Improvements
- Moore Gateway Park
- Pavaho Wetlands
- Riverfront Boulevard
- Rochester Gateway Park Improvements
- SM Wright Project
- SH-183 Bridge
- Texas Horse Park
- Trinity Lakes Streetcar Loop
- Trinity Portland Pump Station

The results of the FWOP model as compared to the Existing Conditions model indicated negligible changes in surface water elevations and minor reductions in valley storage for both water surface elevations and valley storage for the 100-year and SPF floods. However, for the purpose of evaluating the cumulative hydraulic effects of the FRM plan, BVP, and Trinity Parkway, the FWOP-modeled water surface elevations and valley storage estimates for the 100-year and SPF floods were used as the standard against which the three planned projects were assessed. The draft DFHHA approached the foregoing task by cumulatively modeling changes in the geometry of floodplain cross sections in the following sequence:

- Create the With-Project model for the FRM plan; then
- Create a With-Project model for the BVP without Trinity Parkway plan; then
- Create a With-Project model for the BVP with Trinity Parkway plan.

The USACE FRM plan evaluated hydraulic impacts of the following three primary reasonably foreseeable components: (1) the proposed partial removal of the AT&SF bridge; (2) levee raise to accommodate the 277,000 cfs SPF with 3:1 riverside levee slopes on both slopes (except where 4:1 slopes already exist); and (3) the excavated borrow areas need for the levee raise construction. The FRM plan as modeled against the FWOP model showed no water surface elevation rises for both the 100-year and SPF events. This result was anticipated because the partial removal of the AT&SF bridge results in the lowering of water surface profiles upstream of the modified bridge, thereby causing a drop in valley storage. Consequently, valley storage was not reported in the draft DFHHA because there was no reasonable means of achieving hydraulic neutrality with respect to the 1988 ROD criteria for valley storage (USACE, 2013b). The draft DFHHA indicates that the FRM plan model results were reported solely to document the effects of the FRM plan alone as an interim condition. That is, efforts to redesign the FRM plan to achieve hydraulic neutrality are unwarranted in light of the anticipated construction of the city's BVP.

Hydraulic modeling to evaluate cumulative impacts of the reasonably foreseeable BVP, components of which were added to the HEC-RAS cross section geometry. In addition, the With-Project BVP model without the Trinity Parkway included the following components: (1) Able Pump Station; (2) Baker Pumping Plant; (3) Hampton 3 Pump Station; and (4) Riverside Levee Side Slope Modifications (USACE, 2013b). As discussed above, this modeling effort was cumulative in nature and included all of the projects from the Existing Conditions model, the FWOP model, and the FRM plan model. The BVP (without the Trinity Parkway) model resulted in no water surface elevation rises above the FWOP model for any of the river reaches modeled for the SPF. The model generally resulted in no water surface elevation rises for the 100-year flood with the exception a 0.27 foot rise for one reach located between Houston Street and IH-30. The draft DFHHA concluded that the modeled water surface elevations indicate that the BVP, as currently designed, would not increase flood risk for either the 100-year flood or SPF, even though the 0.27-foot rise for one reach in the 100-year flood fails to meet one of the 1988 ROD criteria. The BVP model reflected a reduction of 0.83 percent in valley storage for the 100-year flood and a reduction of 5.1 percent for the SPF, which fails to meet the ROD criteria of no loss in valley storage for the 100-year event and a maximum 5.0 percent loss for the SPF. The draft DFHHA discusses possible reasons for the loss in valley storage, highlighting the improved hydraulic efficiency of the floodway due to the modification of the Trinity River channel and extensive areas of open water associated with planned BVP lakes. The discussion noted that the lowering of water surface profiles with the simulated BVP model (as compared to the FWOP) is the result of an overall lowering of the hydraulic roughness of the floodway by the planned lakes. As noted above regarding the FPM model, an additional factor contributing to the loss of valley storage in the cumulative model is the partial removal of the AT&SF bridge, the effects of which are included within and interact with the with the floodway changes that are part of the BVP model.

The remaining phase of draft DFHHA modeling involves the BVP with the Trinity Parkway model, the results of which are discussed below as part of Step 6 of the FEIS cumulative impacts analysis.

4.26.7.8 Air Quality

Increased development and urbanization can result in increased cumulative air pollutant or MSAT emissions resulting from the proposed project and other reasonably foreseeable actions. Such actions must meet regulatory emissions limits established by the TCEQ and USEPA as well as obtain appropriate authorization from the TCEQ and therefore are not expected to result in any degradation of air quality or MSAT levels. Reasonably foreseeable actions that could impact air quality within the RSA include recommended funded freeway, tollway, and HOV/managed lane improvements and regionally significant arterials listed in Appendix E: Mobility Options of *Mobility 2035 – 2013 Update* (NCTCOG, 2013a).

4.26.7.9 Summary of Impacts from Reasonably Foreseeable Actions

Table 4-58 includes a summary of impacts from reasonably foreseeable future projects.

TABLE 4-58. SUMMARY OF IMPACTS FROM REASONABLY FORESEEABLE FUTURE PROJECTS

Resource Category	Indicator of Condition	Summary of Impacts from Reasonably Foreseeable Future Projects Other than the Trinity Parkway[1]
Land Use	Consistency of the proposed project and changes in land use with local land use plans	Land use planning documents prepared by the City of Dallas and Dallas County seek to achieve a balance of community amenities (e.g., public services, parks/open space, and transportation routes), while maximizing the land that may be developed for various private uses. The reasonably foreseeable future projects would be consistent with the various land use plans developed by the City of Dallas in recent years. Anticipated beneficial impacts include new economic opportunities, housing alternatives, employment, community services, redevelopment of deteriorated buildings or areas, and recreational resources.
	Land converted to transportation ROW	Reasonably foreseeable transportation projects within the Trinity River Corridor RSA account for approximately 1,219 acres.
Community Resources	EJ: Housing Impacts on Low-Income / Minority Pop.	Reasonably foreseeable projects would result in 88 residential displacements within EJ block groups of the RSA. With the existing federal, state, and local regulatory controls in place to protect and assist environmental justice populations and affordable housing, it is likely that potential impacts to environmental justice populations would be mitigated through these existing programs and organizations that assist the environmental justice community and provide affordable housing.
	Visual alteration of floodway area	The City of Dallas has focused tremendous attention on revitalizing both the economic and visual attractiveness of the corridor, and enhancing natural resources within the Dallas Floodway is a centerpiece of those plans. Similarly, plans associated with the USACE DFE Project would create and enhance the visual quality of the Dallas Floodway. Consequently, reasonably foreseeable projects are expected to have an overall beneficial effect on the Dallas Floodway as a visual resource.

TABLE 4-58. SUMMARY OF IMPACTS FROM REASONABLY FORESEEABLE FUTURE PROJECTS

Resource Category	Indicator of Condition	Summary of Impacts from Reasonably Foreseeable Future Projects Other than the Trinity Parkway[1]
Cultural Resources and Parklands	Affected NRHP-listed/-eligible infrastructure, buildings, bridges, and districts	It is estimated that foreseeable transportation/flood control projects could affect 13 NRHP-listed/eligible properties such as the AT&SF Bridge. No development projects would affect NRHP properties. With the existing federal, state, and local regulatory controls in place as well as other related preservation initiatives and mitigation agreements, it is likely that potential impacts to listed infrastructure (the Dallas Floodway), buildings, bridges, or districts would be minimal and overall preservation in the area is likely.
	Change in parks and recreation areas	Anticipated impacts to 94.6 acres of parks/recreation areas; Creation of approximately 4.1 acres of park. Several of the projects would result in overall benefits with the creation of additional parks/open space and improvements and enhancements to existing spaces. For example: • 31 miles of trails in the DFE Project • 160 acres of playing fields, a 12-acre amphitheater, 9 miles of trails, 3 miles of equestrian trail, and 5,000 feet of wetland boardwalk in the Dallas Floodway Project (BVP) • Trinity/Joppa Neighborhood South Central Park would expand and improve the existing South Central Park • Numerous trail projects are proposed within the RSA Overall, benefits would likely be realized through increased park/open space access, new and improved hike and bike trails and linkages, new or improved recreational amenities, and the enhancement/improvement of natural/vegetated areas.
Waters of the U.S., Including Wetlands	Change in waters of the U.S., including wetlands	788 acres of existing waters of the U.S., including wetlands, could be impacted due to reasonably foreseeable future projects. • 131 acres of forested wetlands • 279 acres of emergent wetlands • 378 acres of open water Planned projects (particularly the Dallas Floodway Project [BVP] and DFE Project) call for the creation of new water features (approximately 766 acres created), including wetlands, and other habitat enhancements within the corridor.
Vegetation and Wildlife Habitat	Change in amount of woodlands	379 acres of woodlands; Planned projects (e.g., DFE and BVP) call for approximately 1,434 acres of new woodland plantings.
	Change in amount of grass areas	2,851 acres of grassland; Planned projects (e.g., DFE and BVP) call for approximately 1,510 acres of grassland plantings.
Water Quality	Change to water quality	Implementing the listed reasonably foreseeable projects would undoubtedly increase the amount of impervious surfaces in the corridor and would result in increased storm water runoff. The multiple federal, state, and local regulatory controls as well as local plans, projects, and initiatives designed to minimize the impacts of development on water quality, would ensure that with future development, potential impacts to water quality from future development projects would be minimized, but not entirely eliminated. Several of the future projects provide for water quality benefits through the improvement/enhancement of existing streams and wetlands and the creation of additional wetlands. Several of the plans/projects also call for the enhancement of existing recreation areas and the creation of additional open space, which would also be expected to have positive impacts on water quality.

TABLE 4-58. SUMMARY OF IMPACTS FROM REASONABLY FORESEEABLE FUTURE PROJECTS

Resource Category	Indicator of Condition	Summary of Impacts from Reasonably Foreseeable Future Projects Other than the Trinity Parkway[1]
Floodplains	Maximum increase in 100-year flood and SPF water surface elevations	The USACE's draft DFHHA (USACE, 2013b) assessed the hydraulic impacts of reasonably foreseeable projects on water surface elevations as follows: • 100-year flood: no rises in water surface elevations except for a 0.27-foot rise in one reach between Houston Street and IH-30; fails to meet the 1988 ROD "no-rise" criterion. • SPF: no rises in water surface elevations; meets 1988 ROD criterion.
	Change to 100-year flood and SPF valley storage capacities	The USACE's draft DFHHA (USACE, 2013b) assessed the hydraulic impacts of reasonably foreseeable projects on valley storage as follows: • 100-year flood: loss of 0.83 percent valley storage; fails to meet the 1988 ROD criterion of no loss in valley storage for this event. • SPF: loss of 5.1 percent valley storage; fails to meet the 1988 ROD criterion of a maximum 5.0 percent loss in valley storage for the SPF.
Air Quality	Change in Ability to Meet NAAQS Standards	The USEPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions of on-road emissions. In almost all cases, lower emissions will cause VOCs and NOx levels, and CO to be substantially lower than they are today. With regard to ozone air quality conformity, reasonably foreseeable transportation projects are primarily managed through the NCTCOG and urban growth-related plans are factored into models that provide estimates of future ozone levels. For example, the NCTCOG includes in its emission modeling the operational CMP details, the type of strategy, implementing responsibilities, schedules, and expected costs of all regional project commitments.
	MSAT: Trend of emissions over time, as modeled on a regional level	The USEPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions of on-road emissions. In almost all cases, lower emissions will cause MSAT to be substantially lower than they are today. Although the health effects of MSAT from reasonably foreseeable projects are unquantifiable due to unavailable or incomplete information, the USEPA projects dramatic reductions in MSAT emissions based on its regulation of vehicle engines and fuels.

Notes:
1. Acreages are approximate/estimates and are based on information/data presented in **Appendix J-4**.
2. Of the 93 estimated residential displacements/relocations, approximately 75 could occur due to the construction of the Dallas Police Academy, directly impacted the Cadillac Heights neighborhood.

4.26.8 Step 6 – Identify and Assess Potential Cumulative Impacts to Each Resource

The below sections assess cumulative impacts associated with Alternative 3C by accounting for direct impacts, indirect impacts, and impacts resulting from reasonably foreseeable actions for each resource carried forward in this cumulative impacts analysis.

4.26.8.1 Land Use

Cumulative impacts with regard to land use have been examined using as a principal indicator the amount of land that would be converted from its existing use to transportation ROW. A total of 333 acres are expected to be converted to ROW along Alternative 3C, and other transportation projects independent of the Trinity Parkway are expected to convert approximately 1,219 acres to ROW, most of which is existing urban landscape. No conversion of existing land use to transportation ROW is anticipated from indirect impacts of Alternative 3C. The estimated cumulative impacts to land use conversion from direct and indirect impacts of Alternative 3C combined with potential impacts from reasonably foreseeable actions within the RSA is a net loss of approximately 1,552 acres. Given that land use is not a "resource" in the traditional sense, but is instead a choice that is heavily influenced by the local and regional community, the conversion of land may not categorically be said to be an adverse impact. Instead, the need for transportation corridors is the result of carefully weighing the competing potential land uses to achieve a balance that addresses the combined requirements of an urban society. This weighing of competing interests for land uses is accomplished primarily by the City of Dallas, with input from the community, as well as regional, state, and federal agencies.

The other indicator of land use impacts relates to the consistency of the proposed project and changes in land use with the local planning documents that oversee development within the RSA. Alternative 3C is consistent with the primary planning document for the RSA, the Trinity River Corridor Comprehensive Land Use Plan, as well as with the BVP, which oversees flood protection, recreation, transportation, environmental restoration, and economic development within the Dallas Floodway. The Trinity Parkway would be expected to dovetail with planned land development or redevelopment projects and city plans such as the BVP in making the CBD a more attractive place for investors to consider for future development/redevelopment. Additionally, the development and implementation of reasonably foreseeable development and transportation actions would occur only at the sponsorship and approval of municipal and/or federal and state transportation entities. As emphasized by interviews with City of Dallas planners, the contribution of the Trinity Parkway on cumulative changes in land use (beyond acquisition of ROW) would be minimal to future economic development/redevelopment of land in the CBD. With its primary purpose of helping to manage future travel demand in the CBD, the Trinity Parkway would be expected to result in a minor beneficial cumulative impact to land use by assisting to manage congestion within the CBD thereby making it a more attractive place for land development investment. Given the foregoing qualitative assessment of anticipated effects of reasonably foreseeable projects on land use, the direct and indirect effects of Alternative 3C are be expected to be effectively neutral in terms of cumulative impacts on land use in the project area.

4.26.8.2 Community Resources

Cumulative impacts to communities with minority and/or low-income populations in the project area have been assessed in terms of loss of affordable housing resulting from the displacement of residences. Alternative 3C would result in displacements in minority and/or low income neighborhoods. The three residential displacements associated with Alternative 3C would occur in the South Dallas neighborhood district. No indirect impacts are expected that would displace residences, but other foreseeable projects are expected to displace 88 residences within EJ block groups. All but 13 of these residences would result from the construction of a new Dallas Police Academy in the Cadillac Heights neighborhood. Consequently, cumulative impacts affecting affordable housing within the RSA would result in the loss of 91 residences.

Visually, the Build Alternative is expected to have a strong impact on the Dallas Floodway when considered as a visual resource. At the present time, the Dallas Floodway does not offer a substantial viewshed, but other foreseeable projects planned for the Dallas Floodway (e.g., BVP and DFE Projects) would focus on enhancing the visual quality of natural resources in the Dallas Floodway. Consequently, such projects would serve to substantially offset the visual intrusion of Alternative 3C within this greenbelt that is the subject of much planning to enhance its visual attractiveness. The City of Dallas is the primary agency with regulatory authority to influence the visual resources both in the Dallas Floodway as well as elsewhere in the corridor, and would be expected to continue to influence all construction projects that could affect visual resources.

4.26.8.3 Cultural Resources and Parklands

Alternative 3C would impact integrity of design, materials, and workmanship of the Continental Avenue Viaduct, resulting in an adverse effect on a historic property in the APE under Section 106. There are no indirect impacts to NRHP-listed or -eligible historic properties.

It is estimated that with implementation of the reasonably foreseeable transportation/flood control projects, 13 NRHP listed/eligible properties could be affected, such as the AT&SF Bridge. No development projects would affect NRHP properties.

The estimated cumulative impacts to non-archeological historic resources from direct and indirect impacts of Alternative 3C, combined with potential impacts from reasonably foreseeable actions within the RSA results in impacts to 14 non-archeological historic resources. With the existing federal, state, and local regulatory controls in place as well as other related preservation initiatives and mitigation agreements, it is likely that potential impacts to listed infrastructure (the

Dallas Floodway), buildings, bridges, or districts would be minimal and overall preservation in the area is likely. As a result, no substantial impacts would be anticipated.

Direct impacts to parks and recreational areas would include losses of approximately 222 acres for Alternative 3C. No appreciable amount of indirect impacts resulting Alternative 3C are anticipated because project induced land use change is not likely to occur on municipal-protected parkland. Implementation of reasonably foreseeable actions is expected to impact approximately 91 acres of existing park/recreational areas. Based on the above, the estimated cumulative impacts to parks and recreational areas from direct and indirect impacts, combined with potential impacts from reasonably foreseeable actions within the RSA, includes a net loss of approximately 313 park acres. Even with this anticipated loss of park acres, the vast majority of open space areas within the RSA are expected to be preserved in perpetuity because of municipal and federal regulations, plans, and policies.

4.26.8.4 Waters of the U.S., Including Wetlands

Direct impacts to waters of the U.S., including wetlands comprise losses of approximately 66 acres, of which 36 are from borrow areas for Alternative 3C. No appreciable amount of indirect impacts are anticipated because the direct impacts would likely not extend outside the construction limits and substantial project-induced land use change is not anticipated.

Reasonably foreseeable actions were assessed to account for approximately 788 acres of impacts to waters of the U.S., including wetlands; and approximately 766 acres of water features to be created from the BVP, DFE, and other anticipated restorative projects. Accordingly, reasonably foreseeable actions are anticipated to result in a net loss of approximately 22 acres of waters of the U.S., including wetlands, to be applied to the cumulative impacts analysis.

The estimated cumulative impacts to waters of the U.S., including wetlands from direct and indirect impacts, combined with potential impacts from reasonably foreseeable actions within the RSA, includes a net loss of 88 acres for Alternative 3C.

4.26.8.5 Vegetation and Wildlife Habitat

Direct impacts to riparian woodland areas include losses of 49 acres, of which 11 acres are from borrow areas. No appreciable amount of indirect impacts are anticipated because the direct impacts would likely not extend outside the construction limits and substantial project-induced land use change is not anticipated.

Similar to reasonably foreseeable impacts on water resources discussed above, impacts from reasonably foreseeable actions on woodlands were determined to result in a net increase of approximately 1,055 acres of woodlands.

Cumulative impacts to high quality wildlife habitat (woodlands) are expected to be beneficial. The estimated cumulative impacts to woodlands from direct and indirect impacts, combined with potential impacts from reasonably foreseeable actions within the RSA, includes a net gain of 1,006 acres.

Direct impacts to grass areas include losses of approximately 492 acres. No appreciable amount of indirect impacts to grass areas are expected to result given that the direct impacts would likely not extend outside the construction limits and that substantial project-induced land use change is not anticipated. Impacts from reasonably foreseeable actions on grass areas were determined to result in a net decrease of approximately 1,341 acres of grass areas for Alternative 3C.

Based on the above, the estimated cumulative impacts to grass areas from direct and indirect impacts, combined with potential impacts from reasonably foreseeable actions within the RSA, would be substantial as this would include a net loss of 1,833 acres. However, such cumulative losses of grass-dominated areas are not likely to result in an overall adverse impact to wildlife habitat; and much of the planned loss of maintained grass areas within the corridor would be for the creation of lakes, woodlands, forested wetlands, and emergent wetlands.

4.26.8.6 Water Quality

Historically, industrial and municipal discharges were considered the main sources of water quality impairment in the Trinity River watershed. However, storm water runoff carrying pollutants from impervious surfaces are responsible for a substantial portion of the water quality and use impairment issues in the watershed. It is difficult to determine the effect that future development might have on prevailing water quality, but there would likely be impacts. Implementing the listed plans/projects would undoubtedly increase the amount of impervious surfaces in the corridor and would result in increased storm water runoff. The multiple federal, state, and local regulatory controls as well as local plans, projects, and initiatives designed to minimize the impacts of development on water quality, would insure that with future development, potential impacts to water quality would likely be substantially reduced. Several of the future plans/projects provide for water quality benefits through the improvement/enhancement of existing streams and wetlands and the creation of additional wetlands. Wetlands are an important resource that serves a variety of functions including sediment filtering, upland and aquatic wildlife habitat, and reduction of floodwater velocity. Several of the plans/projects listed in **Tables 4-56** and **4-57** also call for the enhancement of existing recreation areas and the creation of additional open space. When combining this with the planned stream improvements and wetland enhancement/creation that would occur as part of several future plans/projects, it is likely that minor long-term water quality benefits would be realized.

4.26.8.7 Floodplains

As discussed in **FEIS Section 4.26.8.6**, the USACE conducted HEC-RAS modeling in its draft DFHHA (USACE, 2013b) to evaluate the cumulative impacts of all reasonably foreseeable projects that may affect flood hydraulics in the Dallas Floodway. After establishing the FWOP baseline model, the USACE added reasonably foreseeable projects including its FRM plan for improving the Dallas Floodway and the City of Dallas BVP. The cumulative impacts of the Trinity Parkway combined with all other foreseeable projects are summarized below according to the four evaluation criteria used:

- Water Surface Elevations:
  - 100-Year Flood: reduction in water surface elevation at ten major cross sections of the Trinity River Main Stem; but localized rises (0.05 feet to 0.56 feet) would occur for five cross sections (these rises do not meet the 1988 ROD criterion of no rise in elevation).
  - SPF: no water surface rises (meets 1988 ROD criterion).
- Valley Storage:
  - 100-Year Flood: reduction in valley storage of 2.7 percent (does not meet 1988 ROD criterion).
  - SPF: reduction in valley storage of 5.1 percent (does not meet 1988 ROD).

The USACE emphasized in the Conclusions and Recommendations section of the draft DFHHA that the magnitude of the scale for projects like the FMP, BVP, and Trinity Parkway make it very challenging to meet the 1988 ROD criteria at every cross section modeled along the entire reach of the Trinity River and its upstream branches. Moreover, the USACE stressed that the modeling results based on preliminary design information should be viewed as indicators of potential impacts for the purpose of comparing different proposed development plans and modeling results should not be regarded as absolute predicted values. Further project design and modeling would likely affect project features and the assumptions used to conduct a hydraulic simulation model and could therefore affect modeling results. From the standpoint of flood risk, the USACE found that the predicted rise for the 100-year flood in several reaches within the Trinity River Main Stem would not increase flood risk because such areas are protected on both sides by existing levees.

The cumulative impacts of the Trinity Parkway in combination with other reasonably foreseeable projects, as assessed in the draft DFHHA, may be summarized as follows:

- For the 100-year flood event (1 percent annual chance of occurrence), the current level of design for planned projects in the Dallas Floodway has achieved a near-optimal level of compliance with the 1988 ROD criteria. The shortfall in terms of valley storage loss for this frequency of event is very minor. Although the reduction in valley storage losses and reductions in water surface rises for the 100-year flood may be achieved with additional design refinements, it is not likely that the 1988 ROD criteria could be fully achieved due to the large number of planned projects and the complexity of hydraulic modeling in the Dallas Floodway as it relates to the ROD criteria.

- The cumulative effects of planned projects on Dallas Floodway hydraulics do not indicate any likelihood that downstream areas would experience an increase in flooding.

- The Trinity Parkway and other planned projects in the Dallas Floodway would be subject to ongoing hydraulic analyses during final design of each planned project to further fine tune project design with the ROD criteria. Although such analyses would not be likely to demonstrate strict compliance with the ROD criteria, the analyses would ensure that flood risks are not increased.

After completing its draft DFHHA, the USACE found the BVP and Interior Drainage Plan projects to be technically sound following proper design and construction. Additionally, the USACE indicated the assumption that the Trinity Parkway would be constructed as described in this FEIS and completed as a Section 408 project within the Dallas Floodway. As indicated above, the DFHHA is a draft document and is undergoing review. If changes are made to the draft DFHHA in the future, the FHWA will review those changes and may update or modify its assessment of the likely cumulative effects of the Trinity Parkway on floodplains.

4.26.8.8 Air Quality

Cumulative impacts to ozone levels from the proposed project and other reasonably foreseeable transportation projects are addressed by the NCTCOG at the regional level by analyzing the air quality impacts of transportation projects in the MTP and the TIP. The proposed improvements are consistent with the MTP and the current TIP.

The DFW Metropolitan Area is expected to continue to experience substantial population growth, urbanization, and economic development. The cumulative impact of reasonably foreseeable future growth and urbanization on ozone levels would be minimized by enforcement of federal and state regulations by the USEPA and TCEQ, respectively. These agencies are mandated to ensure that such growth and urbanization does not prevent compliance with the ozone standard or threaten the maintenance of the other air quality standards, including CO. Throughout the region, USEPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions of on-road emissions including the ozone precursors (VOC and NOx) and CO. This is illustrated with reference to ozone in **Table 4-59**, which shows that although VMT in the ten-county nonattainment area is projected to increase over time, VOC and NOx on-road emission trends are expected to generally decrease substantially through 2030 before rising somewhat by 2035. Modeling results under the worst-case conditions indicate that CO concentrations would not exceed the NAAQS, and cumulative impacts regarding CO emissions are not expected. A quantitative MSAT analysis (see **FEIS Section 4.15.5**) indicates that by 2035 MSAT emissions would substantially decrease when compared to 2013 despite increases in annual VMT.

TABLE 4-59. REGIONAL TRENDS OF OZONE PRECURSORS AND VMT

Analysis Year	Ozone Precursor Emissions		Ozone Season VMT (10^6 miles)*
	NOx (tons/day)	VOC (tons/day)	
2013	176.19	78.32	176
2018	118.56	61.97	202
2028	77.34	53.71	244
2035	91.09	58.29	272

Source: Chapters 4 and 7 of NCTCOG's 2013 Transportation Conformity Analysis and Documentation for *Mobility 2035 – 2013 Update* and the FY 2013-2016 TIP for North Central Texas; see *http://www.nctcog.org/trans/air/conformity/2013TransportationConformity.asp.*
Note: * The ozone season for the DFW Metropolitan Area extends from May 1 through October 31; see *http://www.tceq.texas.gov/airquality/monops/ozoneaction.html#metro.*

In sum, any increase in ozone precursor emissions resulting from increased capacity, accessibility, and development are projected to be more than offset by emissions reductions from USEPA's new fuel and vehicle standards or addressed by USEPA's and TCEQ's regulatory emissions limits programs. Projected traffic volumes are expected to result in minimal or no impacts on air quality. Moreover, improved mobility and circulation may benefit air quality or may offset the negative effects that increasing urbanization would likely have on air quality. However, planned transportation improvements in the project area, included in and consistent with a conforming MTP and TIP, are anticipated to have a cumulatively beneficial impact on air quality. As previously stated, the FHWA will not take final action until a project is included in and consistent with a conforming MTP and TIP.

4.26.9 Step 7 - Report the Results

The data and principles discussed in **Step 1** through **Step 6** establish the basis for developing findings regarding potential cumulative impacts considering the condition and trend of each resource or issue examined herein. This step in the analysis considers the available information on direct and indirect impacts of the proposed project in addition to impacts of expected future actions in drawing conclusions as to whether there would be cumulative impacts, in addition to the relative contribution of the proposed project to cumulative impacts. The cumulative impacts expected as a result of the Build Alternative are summarized in **Table 4-60**.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE 4-60. ASSESSMENT OF POTENTIAL CUMULATIVE IMPACTS

Resource Category	Build Alternative				
	Existing Conditions	Direct Impacts	Indirect Impacts	Reasonably Foreseeable (RF) Impacts	Cumulative Impacts [1]
LAND USE					
Land Converted to Transp. ROW		333 acres	None	RF transportation projects within the RSA account for approx. 1,219 acres	1,552 acres
SOCIAL IMPACTS					
EJ: Housing Impacts on Low-Income / Minority Pop.	Affordable housing is available within existing communities of the RSA. Various programs exist throughout the City of Dallas to develop and match individuals with affordable housing	3 Residential Displacements	None	88 Residential Displacements	91 Residential Displacements; With the existing federal, state, and local regulatory controls in place to protect and assist environmental justice populations and affordable housing, it is likely that potential impacts to EJ populations would be mitigated through these existing programs and organizations
Visual Alteration of Floodway Area	Predominant feature is the Dallas Floodway with channelized river and adjacent maintained grass areas; Dallas CBD, Design District, and residential areas of West Dallas and South Dallas, surround this dominant feature.	Moderate	None	Revitalization of visual attractiveness of Dallas Floodway by enhancing natural resources is a key focus of the city; and the USACE DFE Project would create/enhance the visual quality of the Dallas Floodway. Therefore, reasonably foreseeable projects are expected to have an overall beneficial effect on the Dallas Floodway as a visual resource	Moderate [2]
CULTURAL RESOURCES AND PARKLANDS					
Non-Archeological Historic Resources Affected	59 NRHP-listed/eligible buildings, bridges, and districts within RSA	1	--	13 NRHP-listed/eligible properties impacted by transportation/flood control projects; No NRHP listed/eligible properties impacted by development projects. With the existing federal, state, and local regulatory controls, as well as other related preservation initiatives and mitigation agreements, it is likely that potential impacts to listed infrastructure (the Dallas Floodway), buildings, bridges, or districts would be minimal and overall preservation in the area is likely.	14

TABLE 4-60. ASSESSMENT OF POTENTIAL CUMULATIVE IMPACTS

Resource Category	Build Alternative				
	Existing Conditions	Direct Impacts	Indirect Impacts	Reasonably Foreseeable (RF) Impacts	Cumulative Impacts [1]
Change in Parks and Recreation Areas	Approx. 7,541 acres of parkland within RSA	-222 acres [3]	None	-94.6 acres of parks/recreation areas impacted; Creation of approximately +4.1 acres of park; result is net loss of -90.5 acres.	-313 acres
WATERS OF THE U.S., INCLUDING WETLANDS					
Change in Waters of U.S., Including Wetlands	RSA includes approx. 6,659 acres of water resources = 3,419 acres forested wetlands, 1,143 acres emergent wetlands, and 2,097 acres open water	-30 acres ROW -36 acres borrow areas (total: -66 acres)	No appreciable amounts expected	-788 acres of existing waters of the U.S., including wetlands impacted + 766 acres of waters of the U.S., including wetlands; result is a net loss of -22 acres.	-88 acres
VEGETATION AND WILDLIFE HABITAT					
Change in Amount of Riparian Woodlands	RSA includes approx. 5,014 acres forested area = 3,667 acres riparian forest and 1,347 acres upland forest	-38 acres ROW -11 acres borrow areas (total: -49 acres)	No appreciable amounts expected	-379 acres of woodlands affected; Planned projects (e.g., DFE and BVP) call for approximately +1,434 acres of new woodland plantings; result is a net gain of +1,055 acres.	+1,006 acres
Change in Amount of Grass Areas	RSA includes approx. 7,960 acres of grass areas	-221 ac. ROW -271 acres borrow areas (total: -492 ac.)	No appreciable amounts expected	-2,851 acres of grassland affected; Planned projects (e.g., DFE and BVP) call for approximately +1,510 acres of grassland plantings; result is a net loss of -1,341 acres.	-1,833 acres
WATER QUALITY IMPACTS					
Change to Water Quality	Stream Segments 0805 and 0841 listed as not meeting applicable water quality standards and are threatened for one or more designated uses	- Temp. minor	- Temp. minor	RF projects would increase the amount of impervious surfaces and would result in increased storm water runoff. Federal, state, and local regulatory controls as well as local plans, projects, and initiatives would ensure the minimization of impacts to water quality from future development. Several of the future corridor projects provide for water quality benefits through the enhancement of existing streams and wetlands, and the creation of additional wetlands. Several of the plans/projects also enhance existing recreation areas and create additional open space, which would have positive impacts on water quality.	Minor benefit

TABLE 4-60. ASSESSMENT OF POTENTIAL CUMULATIVE IMPACTS

Resource Category	Build Alternative				
	Existing Conditions	Direct Impacts	Indirect Impacts	Reasonably Foreseeable (RF) Impacts	Cumulative Impacts [1]
FLOODPLAIN IMPACTS					
Maximum Increase in 100-Year Flood Elevation	Flood zones A and X are located within the Trinity River Corridor RSA. Existing conditions for 100-year flood and SPF define the baseline for comparing hydraulic impacts of future projects.	+0.27 feet (exceeds 1988 ROD)	None	+0.27 feet (exceeds 1988 Rod)	+0.56 feet (exceeds 1988 Rod)
Maximum Increase in SPF Elevation		No increase (meets 1988 ROD)	None	No increase (meets 1988 ROD)	No increase (meets 1988 ROD)
Change in 100-Year Flood Valley Storage		+3.0% [4] (meets 1988 ROD)	None	-0.83% (exceeds 1988 ROD)	-2.7% (exceeds 1988 ROD)
Change in SPF Valley Storage		-4.0% [4] (meets 1988 ROD)	None	-5.1% (exceeds 1988 ROD)	-5.1% (exceeds 1988 ROD)
AIR QUALITY IMPACTS					
CO and Ozone - Change in Ability to Meet NAAQS Standards [5]	10-county DFW area currently in nonattainment ("moderate") for the eight-hour ozone standard and in attainment for other NAAQS criteria pollutants (including CO), with the exception of a portion of Collin County in nonattainment for lead.	Insignificant	Insignificant	Regional modeling to estimate future ozone levels include all planned and financed major transportation projects as well as other major sources of air emissions of ozone precursors (SOCs and NOx). These planned and programmed projects reflect ongoing urbanization and redevelopment within the region, and would likely have a temporary negative effect on air quality due to construction-related impacts. However, the contribution of reasonably foreseeable future growth and urbanization on air quality would be minimized by enforcement of federal and state regulations by the USEPA and TCEQ, and regional planning efforts led by NCTCOG.	The proposed project and the other reasonably foreseeable transportation projects were included in the *Mobility 2035 - 2013 Update* and the 2013-2016 TIP and have been determined to conform to the SIP. When combined, planned transportation improvements, revised USEPA fuel and vehicle regulations, and fleet turnover are anticipated to have a cumulatively beneficial impact on air quality.

TABLE 4-60. ASSESSMENT OF POTENTIAL CUMULATIVE IMPACTS

Resource Category	Build Alternative				
	Existing Conditions	Direct Impacts	Indirect Impacts	Reasonably Foreseeable (RF) Impacts	Cumulative Impacts [1]
MSAT - Trend of emissions over time, as modeled on a regional Level [6]	No NAAQS have been established for MSAT; USEPA's regulatory efforts to reduce MSAT emissions focuses on rules that reduce MSAT from new engines and gasoline formulations. Although VMT is will continue to increase in future years, the reductions in MSAT are expected to outpace that increase and result in a net reduction in MSAT.	Insignificant	Insignificant	Although increased development and urbanization would likely have a negative effect on air quality, the cumulative impact of reasonably foreseeable future growth and urbanization on air quality would be minimized by enforcement of federal and state regulations, by the USEPA and TCEQ.	Insignificant

Notes:

1. The numeric estimates and qualitative descriptions represent the direct and indirect impacts of the Trinity Parkway (as summarized in **Table 4-55**) when combined with the impacts attributed to reasonably foreseeable future projects (from **Tables 4-56 and 4-57**) in the Trinity River Corridor. All acreages are approximate estimates.
2. The use of the term “moderate” for cumulative impacts evaluated under Alternative 3C is largely due to the noticeable visual changes that would occur as a result of the proposed project and other foreseeable actions in an area (i.e., the Dallas Floodway) where a sense of open space has dominated the landscape for a long period of time.
3. ROW would be required from within the Trinity River Greenbelt Park, and access rights for construction, operation, and maintenance are anticipated to be established by an operating agreement with the City of Dallas. The deed records for the parkland indicate that it can be used for transportation.
4. Reported in percentage (%) of existing condition as required by 1988 USACE ROD and CDC criteria, which allow a maximum loss in valley storage of 0% for the 100-year flood and 5% for the SPF; all increases are within the ROD criteria.
5. The 10-county DFW non-attainment area is currently in non-attainment for the 8-hour ozone standard and in attainment for other NAAQS criteria pollutants (including CO), with the exception of a portion of Collin County that is in nonattainment for lead. The direct impact of the Build Alternative on the ability of the region to meet established air quality standards is considered insignificant because the project would not cause pollutants (including CO) to exceed the NAAQS. Prior to the FHWA taking final action on the proposed project, it will be consistent with a TIP and MTP that have been determined to conform to the ozone non-attainment SIP. All throughout the region, USEPA’s vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions of on-road emissions. In almost all cases, lower emissions will cause MSAT, VOC, and NOx levels to be significantly lower than they are today.
6. Although the cumulative health effects of MSAT are unquantifiable due to unavailable or incomplete information, USEPA’s vehicle and fuel regulations, coupled with fleet turnover, would over time cause substantial reductions of on-road emissions. In almost all cases, lower emissions will cause MSAT levels to be significantly lower than they are today.

4.26.10 Step 8 - Assess the Need for Mitigation for Adverse Cumulative Impacts

4.26.10.1 Introduction

The approach taken thus far in this analysis has been to identify and report the potential “unmitigated’ impacts to each of the resources, but this step takes into consideration mitigation that would be likely. As noted above in Step 3 of this analysis, federal, state, and local lawmaking bodies have enacted statutes, regulations, and ordinances designed to preserve and enhance the abundance and quality of natural resources. As this regulatory framework has become part of the current planning process, and would undoubtedly continue into the future, it becomes an important aspect of preparing a cumulative impacts analysis as it relates to the following key assumptions:

- All reasonably foreseeable actions would be completed as currently planned and within the timeframe specified for this analysis (i.e., by the year 2035).
- 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.
- All relevant federal, state, and local laws and regulations designed to protect each resource would not substantially change from the present.
- The cause-and-effect relationships between the key resources, ecosystems, and human communities and the various stress factors that have been identified from historical experience would continue into the future.

This step in the cumulative impacts analysis applies the foregoing assumptions and the relevant regulatory controls (discussed in Step 3) to the potential cumulative impacts outlined in **Table 4-60** and discussed in Step 7. The objective of this step is to ascertain expected cumulative impacts to each resource that would remain after full compliance with the regulatory requirements at all levels and reflect long-term impacts in light of mitigation that would likely be applied. Development and successful implementation and monitoring of mitigation measures can lessen a potential adverse impact, or in some instances, negate it in its entirety.

4.26.10.2 Mitigation Opportunities Associated with Other Planned Projects in the Trinity River Corridor

As demonstrated in **Table 4-60**, likely beneficial and adverse cumulative impacts from reasonably foreseeable future projects would be realized even under the No-Build Alternative for the Trinity Parkway. Beneficial impacts would include increases in the amount of woodlands, water-related resources, and parklands. The development and implementation of potential mitigation measures to adequately address these "predicted" adverse cumulative impacts associated with other planned activities in the corridor is generally beyond the jurisdiction of the sponsoring agency (the FHWA as Lead Agency; TxDOT and the NTTA as Cooperating Agencies). However, the FHWA, TxDOT, and the NTTA can assist through support of general planning strategies, policies, actions, or goals that would aid in reducing or lessening the likelihood of future adverse cumulative impacts associated with other planned future projects within the corridor. Representative examples of this general planning involvement could include:

- Participating in timely, coordinated transportation and development planning that includes communication with all interested parties and agencies (as appropriate)
- Promoting or supporting sustainable development initiatives in the area (as appropriate)
- Promoting or supporting the development of alternative modes of transportation in the area (as appropriate)
- Rehabilitating existing transportation systems within existing rights-of-way (as appropriate)

By supporting these initiatives, and being actively involved in these future activities (as appropriate), the potential for adverse cumulative impacts associated with continued development or redevelopment of the corridor (by others) would likely be lessened.

4.26.10.3 Mitigation as a Result of Cumulative Impacts Associated with the Trinity Parkway

In contrast to the previous discussion, selection Alternative 3C in the anticipated ROD could lead to a continuation of a trend, an increase in the trend, or in some cases, a reversal of the trend for any of the resources evaluated. For example, implementing Alternative 3C would continue the trend of converting land to transportation-related ROW, including land that might otherwise be used for establishing parks/recreation areas within the Dallas Floodway. In such cases, development and implementation of project-specific mitigation measures or environmental commitments can be appropriate in an effort to reduce or minimize (to established regulatory thresholds) these predicted adverse cumulative impacts resulting from the project.

Mitigation is typically considered to be the attempt to offset potential adverse impacts. This can be accomplished by avoiding, minimizing, repairing, rehabilitating, restoring, or compensating for likely adverse impacts. Mitigation measures are generally required or imposed by the agency with jurisdictional authority over a given resource. One example could be the USACE requiring wetland creation or enhancement to offset the potential adverse impacts of a given project. However, as stated, mitigation can also take the form of general planning strategies, policies, actions, or goals either implemented or adhered to in an effort to avoid, reduce, or minimize adverse impacts. As in this case, there is sometimes no defined agency with jurisdictional authority related to a particular cumulative impacts issue. Rather, general strategies, policies, actions, or goals can be implemented or adhered to by the Lead and Cooperating Agencies in an effort to minimize any predicted adverse impacts. By doing this, potential adverse cumulative impacts issues are disclosed to the public and other agencies, even though no "specific" mitigation can be implemented. The information can, however, be useful for future decision making in the area and to possibly identify other opportunities for avoidance and minimization of adverse cumulative impacts.

Both the general strategies, policies, actions, or goals that would be supported or promoted by the FHWA, TxDOT, and the NTTA in an effort to minimize potential adverse cumulative impacts associated with the Trinity Parkway and the "resource specific" mitigation that would likely be required by the agency with jurisdiction over a given resource are described in the following sections. The remainder of this step outlines likely Details regarding "resource specific" mitigation measures can be found in **FEIS Chapter 5** (as appropriate).

4.26.10.4 Land Use

There is not a universally-accepted hierarchy of land uses, and the choice to construct transportation projects in the Trinity River Corridor or otherwise develop or redevelop land reflects a balancing of competing land uses to meet city and regional needs. Mitigation is part of transportation planning, however, and all transportation projects are subject to an extensive environmental review process to ensure that the amount of ROW needed for a project is warranted for the proposed improvement. Similarly, municipal and private development actions are subject to established policies and procedures that allow a weighing of public interests (e.g., zoning and development ordinances). Other than the collaborative planning process involving multiple governmental agencies at the federal, state, regional, and municipal level, no additional mitigation would appear warranted to address changes in land use.

4.26.10.5 Community

A variety of institutional safeguards are in place to ensure that members of environmental justice populations that are displaced from their residences have access to affordable housing within or near the same community. Residents who would need to relocate would be entitled to the benefits and programs under the Uniform Relocation Assistance Act, which emphasizes relocation to affordable housing within a reasonable distance of the displaced property. Special relocation considerations would be made to accommodate residents in need of additional assistance. For example, Last Resort Housing would also be available in the event of a housing shortage or for residents who cannot find comparable housing within their means. This may involve the use of replacement housing payments that exceed the Uniform Relocation Assistance Act maximum amounts or the use of other methods of providing comparable decent, safe, and sanitary housing within a person's financial means (see **FEIS Section 4.4**, **FEIS Chapter 5**, and **FEIS Appendix C**).

In addition to relocation assistance, the availability of affordable housing despite the projected losses of housing is central in understanding the magnitude of cumulative impacts to housing as it relates to minority and/or low-income communities affected by the proposed project. Although data is not readily available to provide a real-time snapshot of affordable housing for specific neighborhoods, information from the City of Dallas Housing Department indicates that the variety of HUD and city-sponsored programs have resulted in an adequate supply of affordable housing that meets current demands and is expected to do so in the future (see **FEIS Section 4.4**). Moreover, many of the programs and services (e.g., Community Housing Development Organization Program, City of Dallas Land Bank, and Dallas Mortgage Assistance Program) to make affordable housing available and to assist households in finding and financing housing requirements have emphasized and continue to emphasize the neighborhoods that would be affected by cumulative impacts to affordable housing resources. Additionally, the city's future land use plan leaves unchanged the single family residential tracts in the west and south portions of the project area to preserve existing neighborhoods.

Impacts to neighborhoods could be further minimized by considering the concepts of FHWA's CSS approach in developing project-specific mitigation. CSS provides community benefits as it seeks to:

- Incorporate feedback from the local populace affected by proposed transportation facilities;
- Encourage collaboration between neighborhoods and local, state, and federal public officials;
- Enhancements to the roadway and considerations for the bicycle and pedestrian communities;
- Encourage assessments and design of alternatives consistent with local needs; and
- Help effectively merge transportation, engineering, architectural, historical, and natural environmental systems into transportation decision-making.

CSS contributes to community, safety, and mobility and considers the total context within which a transportation improvement project will exist. It is a collaborative and interdisciplinary approach to developing and redesigning transportation facilities that fit into their physical and human environment while preserving its aesthetic, historic, community, and environmental values. Coordination with City of Dallas planning departments has been ongoing and will continue to occur throughout the planning process to develop strategies for minimizing overall neighborhood disruptions and isolation of specific neighborhood areas (FHWA, 2013).

4.26.10.6 Cultural Resources and Parklands

The potential cumulative impacts to the NRHP-listed infrastructure (the Dallas Floodway), buildings, bridges, or districts would be subject to careful scrutiny by regulatory authorities at the state and local level. As noted earlier in Step 3, this regulatory oversight is designed to ensure adverse impacts of transportation or other development projects do not adversely affect the characteristics that make these properties historic. Where impacts are unavoidable, mitigation may include efforts to document non-archeological historic resources such as creation of a cultural history, a Historic American Buildings Survey, or a Historic American Engineering Record. Mitigation beyond the relevant regulatory programs would not be expected.

Cumulative impacts include numerous parks and recreation area improvements. Overall, benefits would likely be realized through increased park/open space access, new and improved hike and bike trails and linkages, new or improved recreational amenities, and the enhancement of natural/vegetated areas.

4.26.10.7 Waters of the U.S., Including Wetlands

As overall beneficial impacts are expected for waters of the U.S., including wetlands, no specific mitigation would be necessary to address this resource from a cumulative impacts standpoint. It should be noted, however, that the regulatory programs protecting wetlands mandate no net loss of wetlands on a project-by-project basis. Consequently, mitigation would be required for all adverse impacts to wetlands, even though cumulative impacts in **Table 4-60** are likely to result in dramatic benefits to the wetland inventory in the resource project area. For example, federal wetlands regulatory guidelines stress the avoidance of adverse impacts to wetlands with the goal of no overall net permanent loss of wetland functions. Project-specific aspects of direct impacts to waters of the U.S., including wetlands, are discussed further in **FEIS Chapter 5**.

4.26.10.8 Vegetation and Wildlife Habitat

As cumulative impacts to high quality wildlife habitat (woodlands) are expected to be beneficial, further mitigation should not be needed. Cumulative impacts to maintained grass-dominated areas would be substantial, but mitigation is expected to be limited. More than half of the cumulative impacts to grass areas would be caused by projects other than the Trinity Parkway that would convert grass areas to aquatic features or wooded areas that would afford a greater diversity of use by people and wildlife. No mitigation would be considered for such conversions intended to enhance scenic beauty and wildlife habitat. As there are no regulatory programs that constrain the conversion of maintained grass areas to urban uses, mitigation for such losses would not appear warranted. It should be noted that grass areas not needed for paved surfaces or buildings would be revegetated after disturbance, thereby resulting in only a temporary loss of grass areas. Otherwise, grass areas that would be replaced by urban surfaces would generally not warrant further mitigation.

4.26.10.9 Water Quality Impacts

Mitigation with reference to impacts to water quality would be implemented as part of federal, state, and local programs regulating water quality. Measures beyond regulatory programs would not appear warranted to address cumulative impacts to water quality, as the long-term impacts are expected to be beneficial. That is, several of the future plans/projects provide for water quality benefits through the improvement/enhancement of existing streams and wetlands and the creation of additional wetlands.

4.26.10.10 Floodplain Impacts

Cumulative impacts that would affect natural resources within the Dallas Floodway would also be subject to the same regulatory oversight. It is expected that continued interaction between the project sponsor and the USACE would ensure that any construction activities within the Dallas Floodway substantially comply with the 1988 ROD criteria sufficient to warrant a variance (see discussion at the end of **FEIS Section 4.14.3.4**), and any other requirements.

4.26.10.11 Air Quality Impacts

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 USEPA 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 do the following: collect information and develop an inventory of emissions; conduct research and investigations; prescribe monitoring requirements; institute enforcement; formulate rules to control and reduce emissions; 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 jurisdictions, 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 SIP. The SIP describes how the state would 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 to reduce emissions, and an attainment demonstration. The TCEQ develops the Texas SIP for submittal to the USEPA. 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 ten-county DFW ozone non-attainment area by local governments and other entities provide the framework for growth throughout the area consistent with air quality goals. As part of this framework, all major transportation projects, including the proposed project, are evaluated at the regional level by the NCTCOG for conformity with the SIP. In summary, the FHWA, NTTA, TxDOT, and NCTCOG would continue to promote appropriate congestion management strategies through the Congestion Mitigation and Air Quality (CMAQ) program, the CMP, and the MTP (*Mobility 2035 – 2013 Update*).

4.26.10.12 Conclusion

As demonstrated, implementing Alternative 3C would likely result in cumulative impacts to expected future conditions (the No-Build Alternative) for several resources throughout the Trinity River Corridor. In many cases, the cumulative impacts are expected to be neutral or beneficial. Potential adverse cumulative impacts may be expected with regard to environmental justice populations, archeological sites, historic properties, loss of maintained grass areas, impacts to parkland areas, and visual alteration of the Dallas Floodway. Mitigation measures to address the potential environmental justice impacts, impacts to cultural resources, and visual impacts would be expected to minimize the potential impacts assessed. **Section 4.27** provides additional analysis of the potential cumulative impacts of the regional toll and managed/HOV system, and provides additional conclusions.

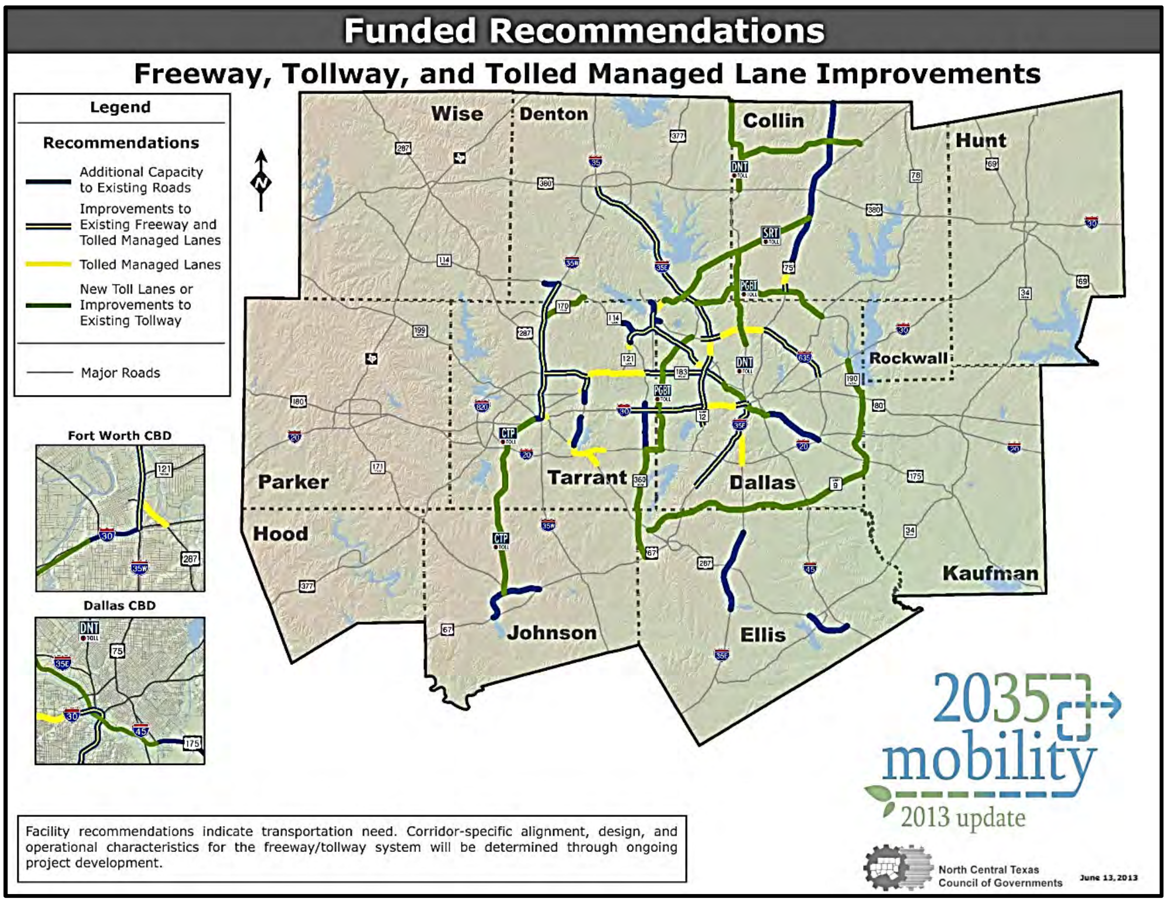
4.27 REGIONAL TOLLING ANALYSIS SUMMARY

To assess the significance of regional impacts and address the potential need for mitigation of the tolled components of the long-range metropolitan transportation plan, NCTCOG prepared the *Regional Tolling Analysis for the Dallas-Fort Worth Metropolitan Planning Area based on Mobility 2035 – 2013 Update* technical memorandum (hereinafter *Regional Tolling Analysis* or 'technical memorandum') (NCTCOG, 2014). This technical memorandum can be viewed at *www.nctcog.org/mobility2035*. The purpose of the *Regional Tolling Analysis* is to evaluate the effects of proposed expansion of the regional priced facility system in the Dallas-Fort Worth region based on the improvements included in *Mobility 2035 – 2013 Update*. The *Regional Tolling Analysis* provides the context of the transportation system, planned improvement potential effects, incomplete and unavailable information, summary, and conclusion. The following discussion summarizes the methodology, effects, and conclusion of the analysis.

4.27.1 Methodology

Section 4.0 of the *Regional Tolling Analysis* evaluates potential effects of the regional toll system elements of *Mobility 2035 – 2013 Update* on land-use, air quality, and environmental justice populations. **Figure 4-9** shows the funded recommendations for controlled access facilities from *Mobility 2035 – 2013 Update*. The land-use and demographic forecasts from *2040 Demographic Forecast* were used as the basis for all travel demand modeling in *Mobility 2035 – 2013 Update* and the *Regional Tolling Analysis*.

FIGURE 4-9. FUNDED RECOMMENDATIONS FOR CONTROLLED-ACCESS ROADS



The environmental justice analysis within the *Regional Tolling Analysis* focuses on differential impacts (see **Table 4-61**) between environmental justice populations and non-environmental justice populations at the traffic survey zone (TSZ) geography. Based on 2010 census data and 2005-2009 American Community Survey data, the *Regional Tolling Analysis* classifies TSZs into four categories: non-environmental justice TSZs, low-income alone TSZs, minority alone TSZs, and both low-income and minority TSZs. Regional traffic was modeled under the three transportation network conditions outlined below:

- 2013 network (2013 roadway and transit facilities with 2013 demographics);
- 2035 build network (all *Mobility 2035 – 2013 Update* recommended roadway and transit facilities with 2035 demographics); and
- 2035 priced facilities no-build network [all recommended transportation (roadway and transit) facilities in *Mobility 2035 – 2013 Update* except proposed facilities with any priced elements (built after 2013) with 2035 demographics].

4.27.2 Regional Toll System Effects

Table 4-61 lists the resource areas and performance metrics analyzed in the *Regional Tolling Analysis*. A more detailed analysis of each item is included in the full technical memorandum's Section 4.0.

TABLE 4-61. ANALYSIS OF POTENTIAL EFFECTS

Analysis	Section of Technical Memo	Results
Land Use	4.1	The priced facilities components of *Mobility 2035 – 2013 Update* may affect land-use by helping to enhance land development or redevelopment opportunities.
Air Quality	4.2	The regional roadway network (including priced facilities) would show a decrease in nitrogen oxides and emissions of volatile organic compounds, which are both precursors to ozone.
Environmental Justice Populations		
Access to Jobs*****	4.3.1	The 2035 build network (including priced facilities) would provide protected populations access to more jobs accessible within 30 minutes by car and more jobs accessible within 60 minutes by transit in the future when compared to the 2013 network
Regional Congestion*****	4.3.1	While congestion increases for both the protected and non-protected populations in the 2035 networks, the non-protected population sees a larger increase in localized congestion.
Daily Vehicle Miles Travelled	4.3.2	The greater percent VMT change on freeways and priced facilities under the 2035 build network would reduce the amount of congestion on arterials and collectors compared to the 2035 priced facilities no-build network.
Average Loaded Speed	4.3.2	The 2035 build network would result in a slight increase in daily roadway speed for most roadway classifications compared to the 2035 priced facilities no-build network.
Morning Peak Period Level of Service	4.3.2	Under the 2035 build network the overall proportion of lane-miles at LOS F is lower than the 2035 priced facilities no-build network.
Morning Peak Period Roadway Trip Times	4.3.3	Under the 2035 build network the average vehicle trip times are lower than in the 2035 priced facilities no-build network for both environmental justice and non-environmental justice populations.
Morning Peak Period Roadway Trip Length	4.3.3	Under the 2035 build network the average vehicle trip lengths are longer than in the 2035 priced facilities no-build network for both

TABLE 4-61. ANALYSIS OF POTENTIAL EFFECTS

Analysis	Section of Technical Memo	Results
		environmental justice and non-environmental justice populations.
Morning Peak Period Roadway Trip Speeds	4.3.3	Under the 2035 build network the average vehicle trip speed is higher than in the 2035 priced facilities no-build network for both environmental justice and non-environmental justice populations.
Morning Peak Period Transit Usage	4.3.3	Under the 2035 build network the number of transit trips is higher than in the 2035 priced facilities no-build network for both environmental justice and non-environmental justice populations.
Morning Peak Period Transit Trip Times	4.3.3	Under the 2035 build network the average transit trip times are higher than in the 2035 priced facilities no-build network for both environmental justice and non-environmental justice populations.
Morning Peak Period Transit Trip Length	4.3.3	Under the 2035 build network the average transit trip lengths are longer than in the 2035 priced facilities no-build network for both environmental justice and non-environmental justice populations.
Morning Peak Period Transit Trip Speeds	4.3.3	Under the 2035 build network the average vehicle trip speed is higher than in the 2035 priced facilities no-build network for both environmental justice and non-environmental justice populations.
Congestion Levels	4.3.4	Environmental justice TSZs are projected to have fewer no congestion and severe congestion TSZs, but more light to moderate congestion TSZs than the non-environmental justice areas. The construction of additional facilities in the 2035 build network would reduce the percentage of environmental justice TSZs with severe congestion.
Regional Origin-Destination Study	4.3.5	Under the 2035 build network, slightly more TSZs would send trips to priced facilities than under the 2035 priced facility no-build network. Proposed priced facilities would be built closer to environmental justice populations than the existing priced facility system. This would increase accessibility to these roadway facilities as shown by the slightly higher proportion of trips from environmental justice TSZs on priced facilities in the 2035 build network than in the 2035 priced facility no-build network.
Annual Toll Costs	4.3.6	The median household income in the region is about 2.7 times the HHS low-income threshold, so each dollar expended for the use of priced facilities by low-income households is a greater proportion of the household budget. Regular use of priced facilities at the base rate could cost a household at the low-income threshold approximately 3.3 to 4.5 percent of their total household income.
Transportation Benefits		
Quality of Life	4.3.7	The planned priced facility projects would help to reduce traffic congestion, improve air quality (and thereby health), improve travel time reliability, and improve safety compared to the full no-build and priced facility no-build alternatives**.
Bus Transit and Emergency Vehicles	4.3.7	An increase in service for both bus and emergency vehicles would improve the quality of life for those choosing to use or in need of those services, respectively.
Transportation System Financing	4.3.7	The revenue from priced facilities would help to finance improvements/rehabilitation of both tolled and non-tolled facilities. It would also accelerate the funding for construction as compared to traditional tax-supported highway finance, thereby reducing capital costs and making new transportation capacity available to the traveling public sooner.

Notes:

* Analysis conducted and documented within the *Mobility 2035 – 2013 Update*, summarized in the *Regional Tolling Analysis* (NCTCOG, 2014).

** *Mobility 2035 – 2013 Update* includes a 2035 full no-build network, which is defined as the 2013 roadway and transit facilities with 2035 demographics.

Section 6.0 of the *Regional Tolling Analysis* provides the results of the assessment. Based on the environmental justice analysis conducted for *Mobility 2035 – 2013 Update* and summarized in the *Regional Tolling Analysis*, it was determined that the recommended transportation projects included in *Mobility 2035 – 2013 Update* do not have a highly adverse or disproportionate impact on protected populations.

In addition, results from the performance reports prepared for the MPA showed a marginal increase in roadway speed and a slight improvement in LOS for the majority of the roadway classifications in the 2035 build network compared to the 2035 priced facilities no-build network. The 2035 build network for the MPA would generally maintain the 2013 network roadway performance conditions for freeways and toll roads throughout the NCTCOG region while accommodating the travel demands of the growing regional population.

Although environmental justice populations would see an increase in out of pocket cost for priced facility usage under the 2035 build scenario, the growth in usage by protected populations is proportional to the increased usage by the entire MPA population as the priced system expands. Almost all environmental justice TSZs are projected to generate trips along priced facilities in the 2013 network and 2035 build network. For populations (including environmental justice populations) who would choose to use non-priced facilities, the 2035 build network would provide a non-priced roadway network that would operate at better traffic conditions (slightly higher speeds and an improved LOS) on all roadways and an increased benefit over the 2035 priced facilities no-build network.

The planned transit system is the same for both the 2035 build network and the 2035 priced facility no-build network. The analysis in the *Regional Tolling Analysis* show that improved roadway performance would lead to slightly longer distance and higher speed transit trips in the 2035 build network compared to the 2035 priced facility no-build network.

While the analysis focused on the potential impacts, priced facilities are also expected to provide benefits to system users which can be categorized into two forms: quality of life and economic. The transportation system, including priced facilities, increases the number of travel options available to transportation system users. These facilities serve as bus transit corridors, improving the performance of the on-road transit system. The priced facilities will help manage congestion, improve air quality, improve travel time reliability, improve safety, and enhance health compared to the no-build and priced facility no-build alternatives. By helping to reduce overall congestion levels, improvements to the overall transportation system, including priced facilities, also contributes to the economic vitality of the region. Additionally, the revenue from priced facilities will help to finance improvements/rehabilitation of both priced and non-priced facilities. Compared to traditional tax-supported highway finance, priced facilities are implemented more quickly, thereby minimizing capital costs and making new transportation capacity (via transit, roadway, or other modes) available to the traveling public sooner.

4.27.3 Conclusion

Based on the analysis documented in the *Regional Tolling Analysis*, the 2035 build network for the MPA, including future priced facilities, would result in a fair distribution of impacts and benefits among the regional population including environmental justice communities. The 2035 build network for the MPA, including priced facilities, would not cause disproportionately high and adverse impacts on any minority or low-income populations as per Executive Order 12898 regarding environmental justice. Therefore, no regional mitigation measures are proposed at this time. This regional analysis is based on the most recent policies, programs, and projects included in *Mobility 2035 – 2013 Update*. Changes in tolling/managed lane policies could necessitate that the regional tolling analysis be revised if, after a thorough review, the changes are of sufficient magnitude. All of these elements are subject to change in future MTPs. During the development of future MTPs, new analyses of the effects of pricing to environmental justice and protected classes would be conducted.

The *Regional Tolling Analysis* concludes that *Mobility 2035 – 2013 Update* and the regional transportation planning process provide ways to avoid and minimize potential impacts that could occur due to transportation projects. It also indicates that NCTCOG has performed an environmental justice and Title VI analysis, using the best available data, to ensure that no person is excluded from participation in, denied benefits of, or discriminated against in planning efforts, including the development of the MTP. This assures that *Mobility 2035 – 2013 Update* is consistent with Title VI of the Civil Rights Act of 1964 and Executive Order 12898 on environmental justice, as well as the Civil Rights Restoration Act of 1987.

4.28 SUMMARY OF ATTRIBUTES AND IMPACTS OF ALTERNATIVES

4.28.1 Comparison of the No-Build Alternative and the Build Alternative

This chapter of the Trinity Parkway FEIS has described social, economic, and environmental impacts of the recommended Build Alternative as contrasted with the No-Build Alternative. In light of the FHWA's recommendation of Build Alternative 3C for development to a higher level of design and assessment of technical impacts as allowed under 23 U.S.C. Section 139, and in order to provide the USACE and the USEPA with NEPA documentation that would adequately inform the decisions and permitting action(s) each agency would be required to make under federal law, the foregoing information in this chapter has been updated from the SDEIS/LSS to reflect recent changes in current and projected data for the resources/issues evaluated. The preceding discussion of impacts included several categories where the impacts for both the No-Build and Build Alternatives would be negligible. In these cases, a general discussion of the impacts was presented. In other cases, specific impacts were reported for the Build Alternative that differs from the impacts estimated for the No-Build Alternative and the results of these impact assessments are summarized in **Table 4-62**.

TABLE 4-62. SUMMARY OF ATTRIBUTES AND IMPACTS OF ALTERNATIVES

Comparison Factors	Unit of Measure	Trinity Parkway Alternatives	
		1 - No-Build	3C - Floodway
Roadway Characteristics and Costs			
Total Length	Miles	---	8.79
Total Estimated Right-of-Way	Acres	---	559
Excavation/Borrow Areas	Acres	---	317
ROW and Utility Relocation Cost	2013 $ Millions	---	146
Construction Cost (includes ITS cost)		---	940
Agency Cost		---	228
Total Cost (sum of 3 cost items above)		---	1,314
Traffic Utilization			
Commonwealth to Hampton/Inwood	Average Daily Traffic (ADT)	---	145,000
Hampton/Inwood to Wycliff/Sylvan		---	121,000
Wycliff/Sylvan to Woodall Rodgers		---	127,000
Woodall Rodgers to Houston/Jefferson		---	104,000
Houston/Jefferson to Corinth		---	99,000
Corinth to MLK		---	122,000
MLK to IH-45		---	128,000
IH-45 to US-175		---	90,000
Measures of Effectiveness (Measured within the Trinity Parkway Project Area: Year 2035)[1]			
Daily VMT[2]	Vehicle Miles Traveled (M)	7,022,833	8,075,699
Daily VHT[3]	Vehicle Hours Traveled	237,528	249,205
Average Speed[4]	mph	30	32
Lane Length[5]	Miles	846	922
Congestion Delay[6]	Vehicle Hours	68,067	63,250

TABLE 4-62. SUMMARY OF ATTRIBUTES AND IMPACTS OF ALTERNATIVES

Comparison Factors	Unit of Measure	Trinity Parkway Alternatives	
		1 - No-Build	3C - Floodway
Lane Miles at LOS D, E or F[7]	Percent	47	47
Community Impacts			
Private Land Use Changed to ROW	Acres	---	333
Consistent with Local Plans and Policies (e.g., BVP[8])	Yes/No	No	Yes [15]
Residential Relocations	Number	---	3
Commercial Displacements	Number	---	27
Community/Public Facility Displacements [9]	Number	---	---
Change in Parks/Recreation Areas [10]	Acres	---	-222
Economic Impacts			
Estimated Total Tax Value Lost from Land Conversion to ROW	$ Millions	---	54
Estimated Annual Local Tax Revenue Lost from Land Conversion to ROW	$ Millions		1.4
Estimated Number of Businesses Displaced	Number	---	15 to 20
Estimated Jobs Affected Due to Business Displacements	Number	---	72 to 203
Physical Environment			
Water Quality Impacts	Yes/No	No	Yes
100-Year (Base) Floodplain Impacts	Acres	---	305
Proposed Condition Meets USACE Criteria for Valley Storage (100-Year and SPF)	Yes/No	---	Yes
Proposed Condition Meets USACE Criteria Concerning Increase in Flood Elevation (100-Year and SPF)[17]	Yes/No	---	No - 100-Year (max. rise of 0.27 feet) [17] Yes – SPF (max. rise of 0.00 feet)
Proposed Condition Meets USACE Criteria Concerning Erosive Water Velocity	Yes/No	---	Yes
Air Quality - Consistent with the conforming TIP/MTP	Yes/No	No[16]	Yes[16]
Projected CO Concentrations below the NAAQS	Yes/No	Yes	Yes
MSAT – Expected change [12]	Decrease/Increase	Decrease	Decrease
Noise Impacts	Yes/No	---	Yes
Visual Impacts	Low/Med/High	Low	Med
Effects of Hazardous Material Sites [13]	Number	---	24
Natural Environment			
All Waters of the U.S., incl. Wetlands	Acres	---	-65.6
Forested Wetlands	Acres	---	-1.4
Emergent Wetlands	Acres	---	-50.3
All Open Water Features	Acres	---	-13.9

TABLE 4-62. SUMMARY OF ATTRIBUTES AND IMPACTS OF ALTERNATIVES

Comparison Factors	Unit of Measure	Trinity Parkway Alternatives	
		1 - No-Build	3C - Floodway
Riparian Forests	Acres	---	-49.0
Maintained Grassland Areas [14]	Acres	---	-491.9
Threatened/ Endangered Species Impacts	Yes/No	No	No
Cultural Resources			
Archeological Historic Properties	Number	---	---
Non-Archeological Historic Resources [11]	Number	---	1

Notes:

M = Millions; **ADT** = Average Daily Traffic; **VMT** = vehicle miles traveled; **VHT** = vehicle hours traveled; **LOS** = Level of Service; **NRHP** = National Register of Historic Places; **EJ** = Environmental Justice; **SPF** = Standard Project Flood; **mph** = miles per hour; **---** = no impacts anticipated for this alternative.

1. MOEs focus on the identified project needs and also provide a method to determine the degree that traffic conditions, such as congestion and mobility, could be improved by the Build Alternative.
2. Vehicle Miles of Travel (VMT) = the total number of miles driven by all vehicles in the project area on an average day.
3. Vehicle Hours of Travel (VHT) = the total time spent driving vehicles in the project area on an average day.
4. Average Speed (mph) = VMT divided by the VHT.
5. Lane Length (miles) = segment length multiplied by the number of lanes
6. Congestion Delay (Vehicle Hours) determines whether vehicles are experiencing delays on the roadways and gauges the degree that congestion could be managed by the Build Alternative.
7. Percent Lane Miles at LOS D, E or F = percent of lane miles operating in congested conditions at LOS D, E or F.
8. The “BVP” is the City of Dallas Balanced Vision Plan, a master plan for parks and lakes in the Trinity Floodway.
9. The number shown is the total number of buildings displaced at these types of facilities, not the number of facilities affected.
10. ROW would be required from within the Trinity River Greenbelt Park, and access rights for construction, operation, and maintenance are anticipated to be established by an operating agreement with the City of Dallas. The deed records for the park land indicate that it can be used for transportation.
11. The number shown is the total number of NRHP-listed or eligible properties identified within the APE where there would be an adverse effect.
12. The USEPA predicts substantial future MSAT 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 (HDDV) standards and low sulfur diesel fuel, and the USEPA’s proposed Off-Road Diesel Engine and Fuel Standard). These projected air emission reductions will be realized even with the predicted continued growth in vehicle miles traveled.
13. Hazardous waste/material sites within or adjacent to proposed ROW.
14. The figures for impacts to maintained grass areas for Alternative 3C includes estimated excavation areas of 271 acres.
15. Compatibility determined based on whether the alternative is conceptually consistent with the municipal planning document, and not by precise matching of alternative labels (i.e., alternative mentioned in the city plan or a successor or variant alternative).
16. Implementation of the No-Build Alternative would require an MTP revision and new conformity determination. In regards to the Build Alternative, the MTP includes a Trinity Parkway reliever route as a key element to the functioning of the plan. The proposed project design concept, scope, and project cost are consistent with the conforming MTP and 2013-2016 TIP.
17. Hydraulic modeling results reflect updated model existing conditions and output for Alternative 3C. Any flood estimates for Alternative 3C that do not meet the 1988 ROD criteria would require a variance before a permit under Section 404 or Section 10 could be issued.
18. 559 acres for Alternative 3C reflects additional ROW needed for the transition with IH-35E and SH-183 that would apply for the Build Alternative at the northern terminus as discussed in **FEIS Section 2.6.1**.

4.28.2 Recommendation of a Build Alternative within the Dallas Floodway

4.28.2.1 Outline of Risks of Longitudinal Encroachment within a Floodplain

The significant and longitudinal floodplain encroachments of the various Trinity Parkway Build Alternatives located primarily within the Dallas Floodway have been closely scrutinized since the outset of the project development and NEPA processes. The detailed hydrologic, hydraulic, and other engineering analyses and design reported in the SDEIS and LSS provided the basis for considering the potential floodplain-related risks in the context of the EO practicability analysis in **FEIS Section 2.8**. Those considerations, combined with updated analyses addressing the risks associated with constructing Alternative 3C within the floodplain environment unique to the Dallas Floodway (e.g., **FEIS Sections 4.14** and **4.26**), are addressed collectively in this section. The purpose of this section is to review the various risks inherent in locating a roadway longitudinally within the Dallas Floodway and explain the rationale for the FHWA's recommendation of Alternative 3C.

The MTIS process in the late 1990s sought to identify a wide array of potential transportation options to manage congestion in the Dallas CBD area. The need and purpose of the project and, in some cases, concerns raised by the USACE regarding potential interference of alternatives with flood control features in the Dallas Floodway and/or exorbitant costs narrowed the focus to the four alternatives discussed in **FEIS Section 2.8**. The requirements of EO 11988 (Floodplain Management) and FHWA's implementing regulation (23 CFR Part 650) necessitated the EO practicability analysis in **FEIS Section 2.8**. That analysis resulted in the elimination of non-floodplain alternatives (Alternatives 2A and 2B) for failure to meet practicability criteria for both EO 11988 (Floodplain Management) and EO 11990 (Protection of Wetlands). The decision to recommend Alternative 3C over Alternative 4B was based on the relatively fewer impacts of Alternative 3C to floodplains and wetlands. Potential impacts and mitigation related to waters of the U.S., including wetlands, are subject to regulatory oversight by the USACE and USEPA, and considerations relating to such impacts are addressed throughout this FEIS but particularly in the preliminary Section 404(b)(1) Guidelines analysis in **FEIS Appendices G-1** and **G-3**.

The recommendation of Alternative 3C for further consideration is the result of balancing the need and purpose of the proposed project, expected costs, and environmental impacts, including the risks associated with a significant longitudinal encroachment within the Trinity River floodplain. EO 11988 (Floodplain Management) and FHWA's regulation (23 CFR Part 650) establish a requirement that a longitudinal encroachment within a floodplain should be avoided unless it can be demonstrated that such an alternative is the only practicable option available to meet the project “need.” Even then, the choice between the only practicable alternative and the No-Build Alternative must be based on further analysis and weighing of relevant risks. Ultimately, if the FHWA selects Alternative 3C in a future Trinity Parkway ROD, it must be based on a finding that the risks inherent with constructing and operating a roadway within the Dallas Floodway have been minimized to an acceptable level through project design and planning arrangements.

Most major roadways intersect floodplains to varying degrees and are therefore at risk of occasional inundation by floodwaters. Modern transportation facilities are frequently designed to be elevated above the projected water surface elevation of the 100-year flood. Accordingly, as a matter of public policy that is reflected in engineering design standards, it is generally considered acceptable for these roadways to be inundated by flooding events that occur less frequently than the 100-year flood (i.e., one percent chance of flooding in any given year). Implicit in this public policy is the understanding/expectation that roadways will be closed during periods of inundation and while debris is removed from road surfaces after floodwaters recede. In addition, flooding may result in damage such as erosion of roadway embankments or other structural components that would necessitate repairs prior to reopening the roadway to traffic. Such engineering design practices reflect a balancing of risk of roadway closings and cleanup/repair costs with the estimated frequency of roadway inundation. For example, in the case of federal Interstate highways, FHWA policy requires mainlanes to be designed to be protected from floods with a recurrence frequency of two percent per year (i.e., 50-year flood; 23 CFR Section 650.115(a)(2)). This specific design standard is representative of FHWA’s basic design policy for floodplains, which requires the design of roads encroaching within floodplains to consider “capital costs and risks” as well as “other economic, engineering, social and environmental concerns” (23 CFR Section 650.115(a)).

In keeping with the foregoing general policy regarding the intersection of roads and floodplains, FHWA policy generally discourages significant or longitudinal encroachments in floodplains “where practicable” (23 CFR Section 650.103(b) and (c)). That is, such floodplain encroachments potentially expose a greater amount of roadway to the risk of damage from flood events, along with potentially longer periods of closure for cleanup/repair. Depending on the floodplain and roadway characteristics, however, longitudinal encroachments do not necessarily increase the risk of damage to roadway facilities as compared to non-longitudinal encroachments. This is because longitudinal encroachments are aligned with the flow of water within the floodplain and pose a minor obstruction to flow whereas bridge or embankment crossings of a floodplain may be more prone to collecting debris during a flood event and obstructing the flow of water; this, in turn, may result in partial impoundment of floodwaters and could expose road facilities to the potential for greater damage. Accordingly, this same FHWA policy authorizes the substantial and longitudinal encroachment of floodplains where there are no practicable non-floodplain roadway alternatives.

As outlined above, all roadways that cross floodplains to any degree are subject to the risk of closure and damage from infrequent inundation by floodwaters from extreme events. The selection of any alternative with significant and/or longitudinal encroachments must be preceded by an agency finding (with supporting rationale) that the risk to the normal operations of the floodplains and roadway has been reduced to an acceptable level in the unlikely event of a flood event. The balancing of risks per FHWA floodplain policies in 23 CFR Part 650 requires the careful consideration of the following five risk factors:

- What are the expected effects of the proposed facility on the functioning of the floodplain?
- How likely is the roadway to be flooded?
- If flooded, what is the estimated time to make the road operational again?
- What damage is expected to occur to the roadway and ancillary features of the roadway (e.g., signage, lighting, utilities, and guardrail) and what measures, if any, have been incorporated to minimize or mitigate that damage?
- What damage is expected to occur to the roadway embankment and what measures, if any have been incorporated to minimize or mitigate that damage?

The remainder of this section discusses each of the five risk considerations outlined above.

4.28.2.2 Effects of Roadway on the Dallas Floodway

The ROW footprint for Alternative 3C would be expected to have a general floodplain encroachment of 305 acres and longitudinal encroachment of 6.2 miles along the toe of the East Levee within the Dallas Floodway. Excavation areas necessary for embankment fill and other construction purposes would affect an additional 318 acres. As these encroachments are significant, engineering design and planning measures to ensure that floodway road alternatives remain hydraulically neutral have been at the forefront of the interagency coordination throughout the development of alternatives for the Trinity Parkway. The result has been a design plan that is geared to dovetail with the physical features of the Dallas Floodway and alleviate any substantial interference with the ability of the Dallas Floodway to convey floodwaters.

All engineering and planning efforts related to the Dallas Floodway for the proposed project have been subject to ongoing coordination with the USACE and City of Dallas, the governmental agencies with primary responsibility for maintaining the ability of the Dallas Floodway to perform its fundamental mission of safely conveying floodwaters from extreme storm events past the Dallas CBD. The design approach has been to construct the embankment for the Trinity Parkway from material excavated in the floodplain, thereby neutralizing the effect on valley storage and rises in water surface elevation. The excavation areas within the Dallas Floodway have been selected based on iterative hydraulic modeling, in coordination with the USACE, of future conditions affecting the movement of water across the broad, nearly level floodplain that is flanked by levees. Also, the effect of Alternative 3C's longitudinal encroachment in the floodway has been minimized by locating it close to and parallel with the base of a floodway levee.

Much of this FEIS addresses the regulatory programs that govern the construction of a roadway facility within a federal floodway. The detailed discussion of potential floodplain impacts in **FEIS Section 4.14** (with details provided in **FEIS Appendix F**), which indicates substantial compliance with the 1988 TREIS ROD criteria based on iterative hydraulic modeling. Cumulative hydraulic modeling results discussed in **FEIS Section 4.26.8.7** further indicate the hydraulic compatibility of Alternative 3C with reasonably foreseeable projects affecting the Dallas Floodway in terms of achieving substantial compliance with the ROD metrics of hydraulic neutrality. At this point in project development, it is clear that design of the proposed project is sufficiently close to warrant receiving a variance from the USACE Fort Worth District Commander. As stated in the ROD, the purpose of the ROD hydraulic criteria is to serve the "best overall public interest", and a variance may be authorized only upon finding that "public interest factors . . . overwhelmingly indicate that the 'best overall public interest' is served by allowing such variance" (see **Appendix E**, page 14). Also, before the USACE could authorize construction within the Dallas Floodway, compliance with Section 10 of the Rivers and Harbors Act and 33 USC Section 408 would be necessary. Detailed guidance on the process and requirements for receiving Section 408 authorization are included in **FEIS Appendix E**. Accordingly, the information developed to date provides reasonable assurance that Alternative 3C would be authorized under Section 10 and Section 408 based on demonstrated hydraulic neutrality and substantial compliance with regulatory criteria.

4.28.2.3 Likelihood of Roadway Flooding

The proposed Alternative 3C would be built upon embankments that would elevate the roadway above the 100-year floodplain, so the roadway would not be inundated by a flooding event with a one percent risk of occurrence in any given year. Where the roadway passes under cross bridges, and therefore drops below the 100-year water surface elevation, it would be protected from inundation by flood separation walls. This design exceeds NTTA, TxDOT, and FHWA design standards for mainlane facilities. The design of this alternative affords approximately 2 feet of freeboard above this level of flooding, which would further decrease the likelihood of flooding to less than one percent in a given year. Hydraulic modeling indicates the roadway would be inundated by the 500-year flood, which has a probability of occurrence in any given year of 0.2 percent. Based on available information, the risk of roadway inundation in any given year is from 0.2 to 1 percent. Due to the nature of storm events, it is not possible to predict whether the proposed project would be inundated during its estimated 50-year design life.

4.28.2.4 Restoration of Roadway Operability after Flooding

In the event Alternative 3C were to be inundated by a flooding event, the road would be closed in accordance with pre-planned protocols such as are included in the Draft Emergency Action Plan in **FEIS Appendix H-3**. As discussed in **FEIS Section 6.6**, with detailed information in **Appendix F-2**, past observations of floods substantially greater than the 100-year flood indicate that Alternative 3C could be inundated for as long as 48 hours by the SPF flood (i.e., the 2,500-year flood with probability of occurrence in any given year of 0.04 percent). After floodwaters recede sufficiently to allow access to the facility, it is expected that it would take approximately one-fourth day to pump out the low points where the roadway passes under bridges and an additional 2 days to remove debris and make any necessary repairs. As the total amount of time that the roadway would be unavailable for service for the extremely rare SPF flood would be approximately 5 days, the time necessary to restore the roadway to full operability for smaller floods would be shorter. Under a worst-case scenario involving the SPF flood and unforeseen damages (e.g., localized pavement failures), it is possible that the roadway may be out of service for as long as 15 days.

4.28.2.5 Risk of Damage to Roadway Features from Flood Events

Inundation of the proposed project by flood events exceeding the 100-year event in the Dallas Floodway could result in damage to roadway features such as street lights, signage, and guardrails. Such all-weather appurtenances to the roadway would not likely be adversely affected from water inundation, but some damage is possible from large floating debris such as logs. The likelihood of this damage is less than the 100-year flood because the water depth above the roadway would need to be sufficiently deep to be able to transport large enough debris to cause appreciable damage. Depending on the extent of such damage, it may require several days to complete the necessary repairs. Such repair or replacement of appurtenances would generally not prevent the roadway from reopening after a flood event because temporary measures (e.g., signage or portable barriers) would be deployed to restore the roadway to operation. Additionally, flooding events may damage landscaping or other aesthetic treatments, which would require remedial action or replacement; such damage would not affect the operability of the roadway. General estimates of flood damage recovery costs are discussed in **FEIS Section 6.6**.

4.28.2.6 Risk of Damage to Roadway Embankment from Flood Events

Alternative 3C is designed to protect the roadway from any substantial harm from floodwaters passing through the Dallas Floodway. The embankment of the elevated roadway would effectively function in the same fashion as the floodway levees. As discussed and illustrated in **FEIS Section 2.7** (see **Plate 2-10**), the roadway embankment would generally be a broad structure that tapers at a 4:1 slope on the river side until reaching the 6-foot high security wall. The security wall would be constructed as a gravity wall (e.g., precast concrete blocks). That is, the security wall would be free-standing and would not require structural support from the embankment to hold the wall in place. For this reason, the security wall would protect the roadway embankment from any contact with floodwaters that are not at least 6 feet deep in the floodplain. This configuration would differ where the roadway passes under cross bridges, as the roadway in these areas would be protected by a cast-in-place flood protection wall.

On the rare occasions that a flooding event may exceed the 100-year flood, the flow velocities of floodwaters have been examined to determine the potential for substantial erosion of roadway embankment. As described in **FEIS Appendix F-2**, water flow velocities for the SPF were modeled at various locations along the proposed project within the Dallas Floodway. Flow velocities were found to be less than 6.0 feet per second, which is generally considered acceptable for withstanding erosion, assuming established grass and short term inundations. The velocities reported are therefore not considered to be erosive over the grassed roadside swale areas nor on the faces of the levees above the road embankment level. If selected for construction, there may be a need for further design analysis and possibly local armoring in some of the higher velocity bridge underpasses. However, the broad and relatively flat floodplain within the Dallas Floodway is not expected to result in damage to roadway embankments or other structures during water inundation from rare flooding events.

4.28.2.7 Conclusion

The FHWA's decision to recommend Alternative 3C for further evaluation is based on a unique set of circumstances that warrant favoring an alternative with significant and longitudinal encroachments of the Dallas Floodway, even though general FHWA policy (i.e., 23 CFR Part 650) would not favor such an alternative. The concept of placing a longitudinal roadway in the

Dallas Floodway has been a prominent aspect of City of Dallas planning for over four decades. Support from municipal leaders and the community in general has endured the scrutiny this alternative has received over a long period of time. Noteworthy in the history of project development are milestones such as the Stemmons deed in 1972, various city planning documents in the 1960s and 1970s, voter approval of bonds in 1998 for a Trinity Parkway reliever route, and the special election in 2007 that affirmed the continued consideration of floodway alternatives for the Trinity Parkway (see **FEIS Section 1.1.2**). The combination of the need for a reliever route to manage local traffic congestion, the absence of practicable alternatives outside the floodplain, and the general affirmation of longitudinal encroachment by elected leaders and the community in general are important considerations in FHWA's recommendation of a floodway alternative. In addition, as summarized above, the various risks that attend the proposed construction of a roadway within the Dallas Floodway have been addressed through engineering design, impacts analysis, and interagency planning to an acceptable level.

[END OF CHAPTER EXCEPT FOR PLATES]

THIS PAGE INTENTIONALLY LEFT BLANK

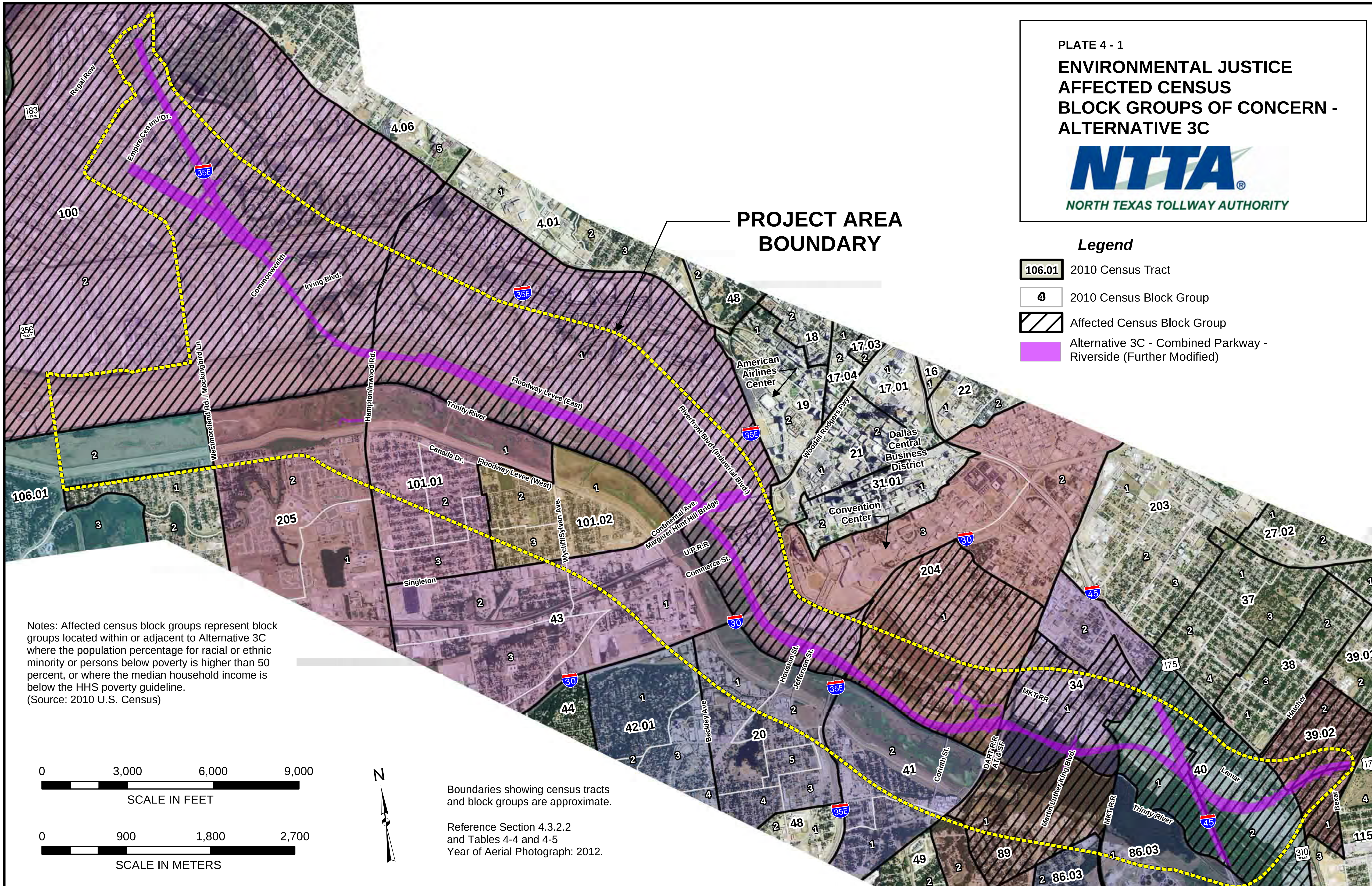


PLATE 4 - 1
ENVIRONMENTAL JUSTICE AFFECTED CENSUS BLOCK GROUPS OF CONCERN - ALTERNATIVE 3C
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
Legend
106.01 2010 Census Tract
4 2010 Census Block Group
Affected Census Block Group
Alternative 3C - Combined Parkway - Riverside (Further Modified)
PROJECT AREA BOUNDARY
Notes: Affected census block groups represent block groups located within or adjacent to Alternative 3C where the population percentage for racial or ethnic minority or persons below poverty is higher than 50 percent, or where the median household income is below the HHS poverty guideline.
(Source: 2010 U.S. Census)
0 3,000 6,000 9,000
SCALE IN FEET
0 900 1,800 2,700
SCALE IN METERS
N
Boundaries showing census tracts and block groups are approximate.
Reference Section 4.3.2.2
and Tables 4-4 and 4-5
Year of Aerial Photograph: 2012.
Regal Row
Empire Central Dr.
Commonwealth
Irving Blvd.
Westmoreland Rd. / Mockingbird Ln
Hampton/Inwood Rd.
Trinity River
Floodway Levee (East)
Floodway Levee (West)
Canada Dr.
Wycliff/Sylvan Ave.
Singleton
Continental Ave. Margaret Hunt Hill Bridge
U.P.R.R
Commerce St.
Riverfront Blvd. (Industrial Blvd.)
American Airlines Center
Woodall Rodgers Fwy.
Dallas Central Business District
Convention Center
Houston St.
Jefferson St.
Beckley Ave.
Corinth St.
DART R.R. AT&SF
Martin Luther King Blvd.
MKT RR
MKT R.R.
Lamar
Hatcher
Bexar
Trinity River
100
106.01
205
101.01
101.02
43
44
42.01
20
48
41
204
31.01
21
19
18
17.03
17.04
17.01
16
22
4.06
4.01
203
27.02
37
38
39.01
39.02
34
40
115
89
86.03
49

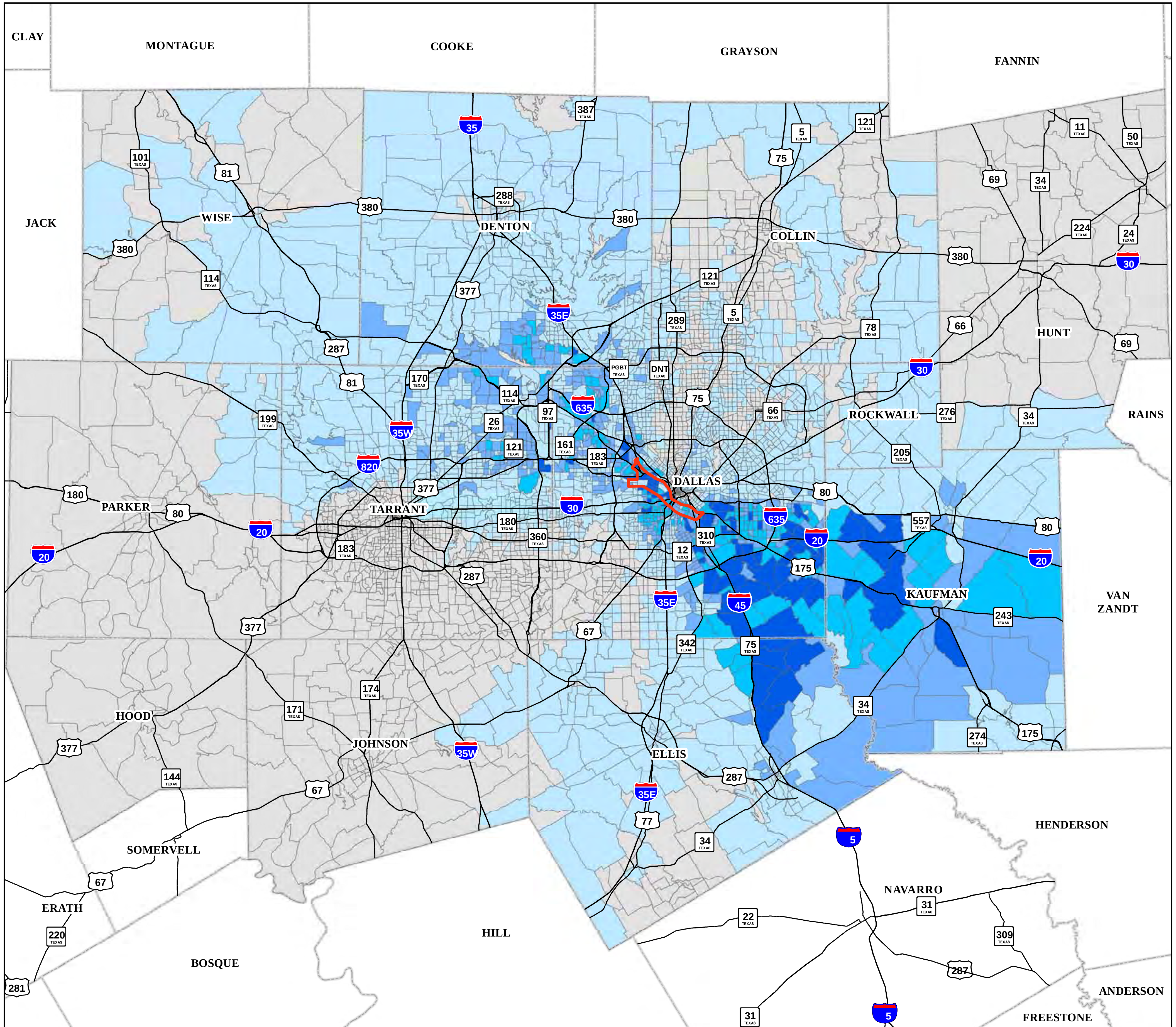


PLATE 4 - 2A

DISTRIBUTION OF TRIPS IN AM PEAK-PERIOD FROM TRAFFIC SURVEY ZONES (TSZs)

NTTA® NORTH TEXAS TOLLWAY AUTHORITY

Legend

- County Boundary
- Project Area Boundary

Number of Trips Originating from TSZs

- No Trip (2,079 TSZs)
- 1 - 14 Trips (2425 TSZs have 10,153 trips, 25% of total trips)
- 15 - 36 Trips (452 TSZs have 10,407 trips, 25% of total trips)
- 37 - 76 Trips (198 TSZs have 10,212 trips, 25% of total trips)
- 77 - 216 Trips (98 TSZs have 10,372 trips, 25% of total trips)

Total 5,252 TSZs in NCTCOG 12 Counties

3,173 TSZs have at least 1 trip

Total Trips = 41,144

All Locations Are Approximate

Reference Section 4.3.2.2

N

0 7.5 15 30

SCALE IN MILE

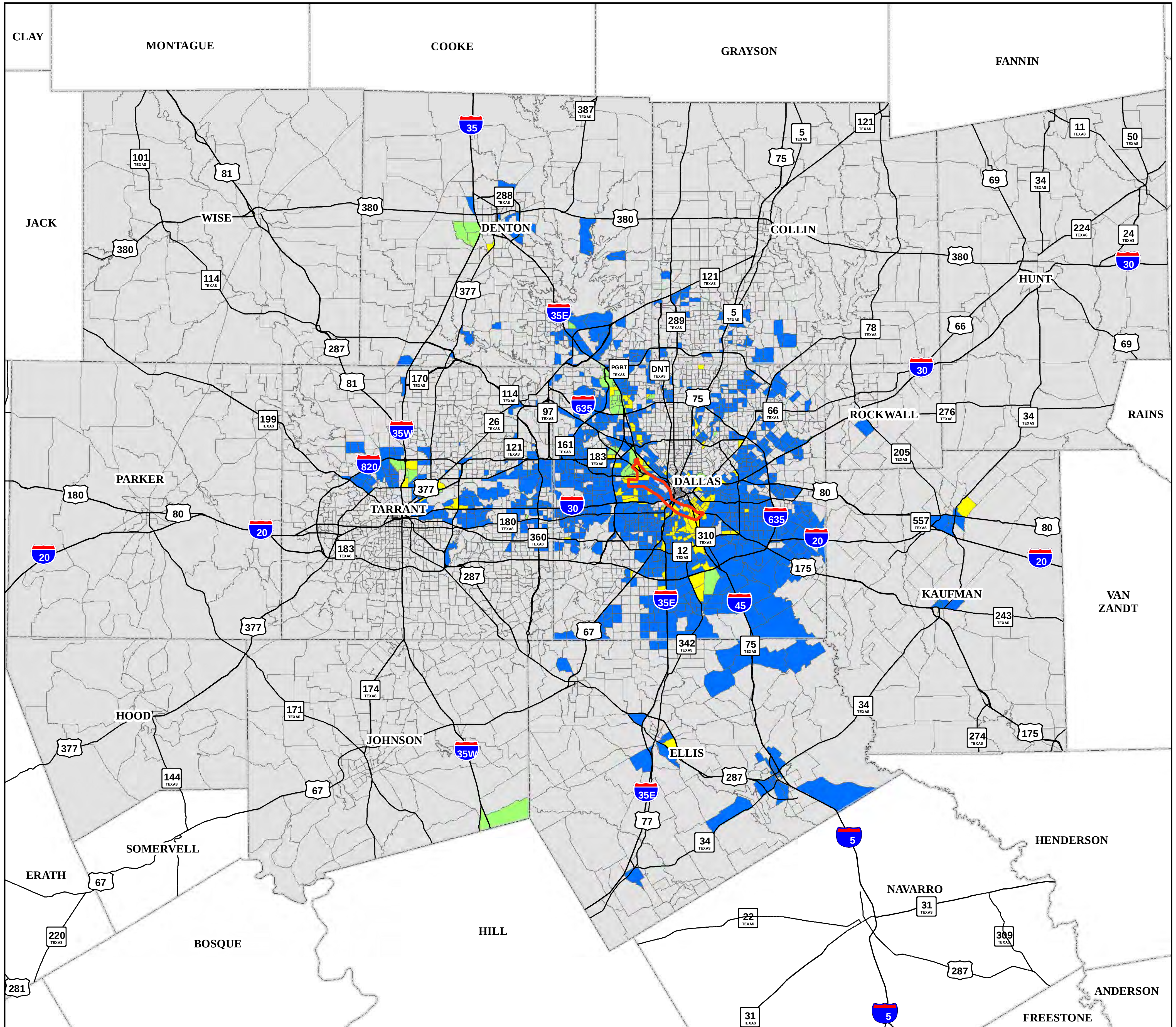


PLATE 4 - 2B

ENVIRONMENTAL JUSTICE TRAFFIC SURVEY ZONES (EJ TSZs)

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

Legend

- County Boundary
- Project Area Boundary
- TSZ

EJ TSZs Have 1 or more Trips

- Low-Income >= 51%
- Minority >= 51%
- Low Income and Minority >= 51%

Total 5,252 TSZs in NCTCOG 12 Counties

Total 2,272 EJ TSZs in NCTCOG 12 Counties

1,478 EJ TSZs have 1 or more trips.

All Locations Are Approximate

Reference Section 4.3.2.2

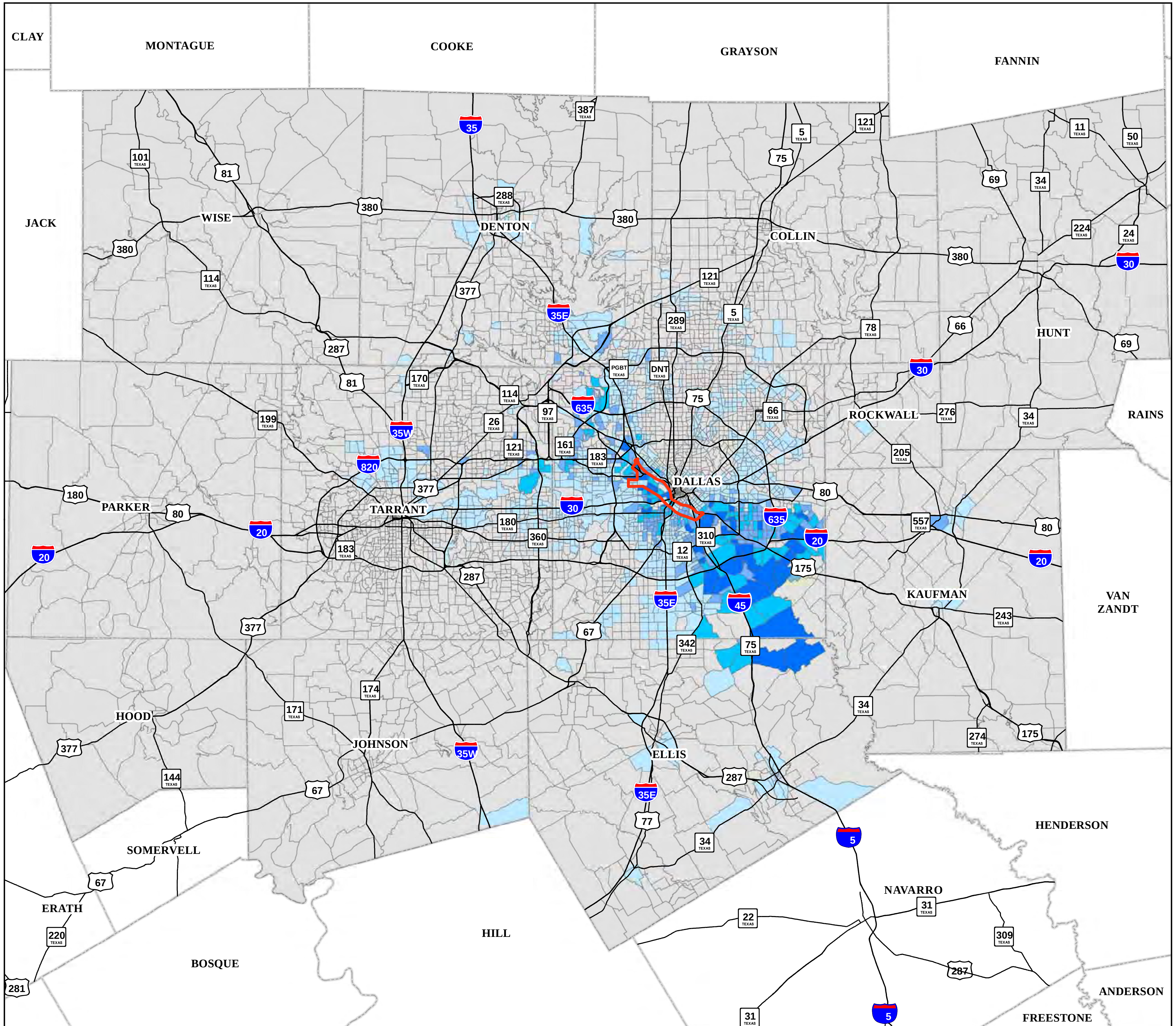
0 7.5 15 30
SCALE IN MILE

N

PLATE 4 - 2C

DISTRIBUTION OF TRIPS IN AM PEAK-PERIOD FROM ENVIRONMENTAL JUSTICE TRAFFIC SURVEY ZONES (EJ TSZs)

NORTH TEXAS TOLLWAY AUTHORITY



Legend

- County Boundary
- Project Area Boundary
- TSZ

Number of Trips Originating from EJ TSZs

- 1 - 21 Trips (1,126 EJ TSZs have 6,489 trips, 25% of total trips)
- 22 - 46 Trips (193 EJ TSZs have 6,195 trips, 25% of total trips)
- 47 - 83 Trips (103 EJ TSZs have 6,455 trips, 25% of total trips)
- 84 - 196 Trips (56 EJ TSZs have 6,220 trips, 25% of total trips)

Total 5,252 TSZs in NCTCOG 12 Counties

Total 2,272 EJ TSZs in NCTCOG 12 Counties

1,478 EJ TSZs have 1 or more trips.

Total Trips = 25,359

All Locations Are Approximate

Reference Section 4.3.2.2

0 7.5 15 30

SCALE IN MILE

N

Wall planter shall provide internal, continuous irrigation drainage.
TRS traffic barrier shall incorporate waterproofing and water stops at rail joints

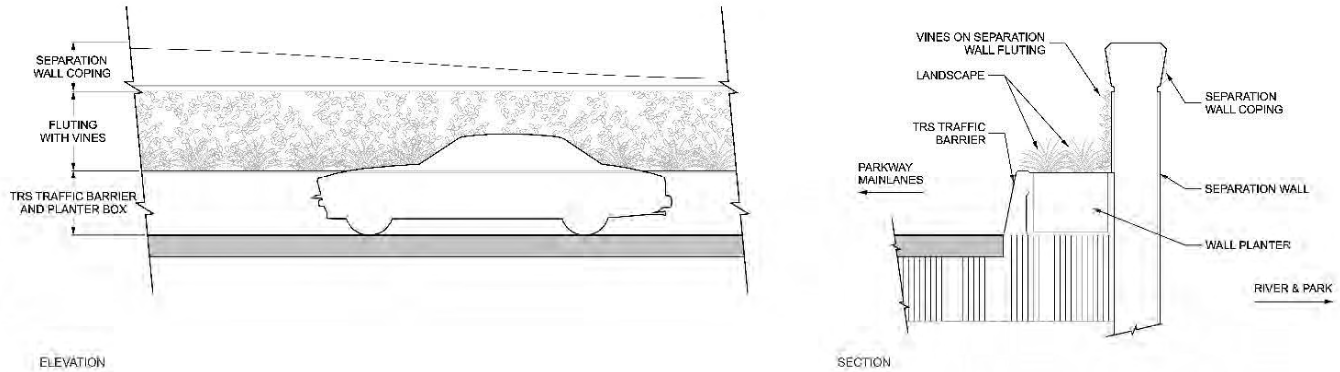
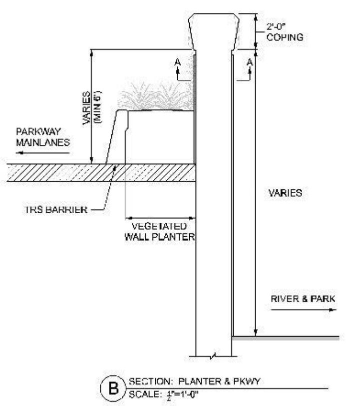
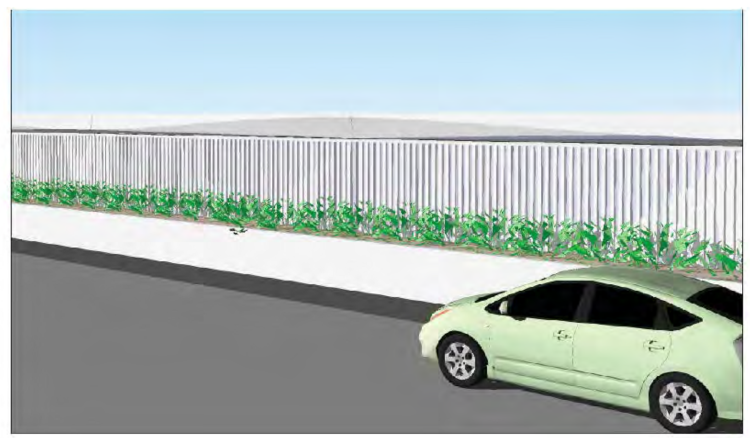


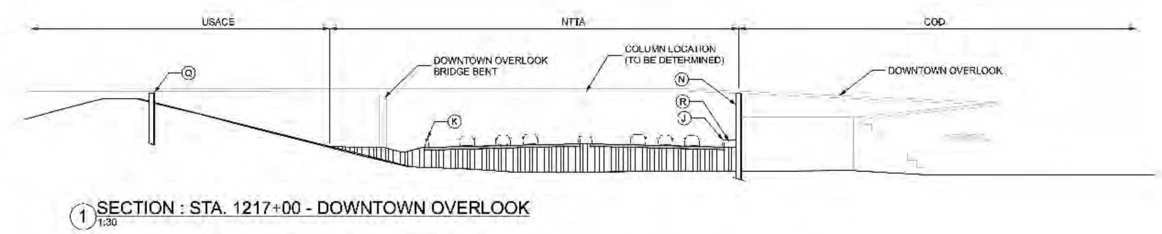
PLATE 4 - 3A

CONCEPTUAL ENHANCEMENTS OF TRINITY PARKWAY

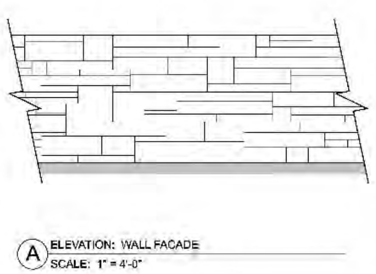
NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

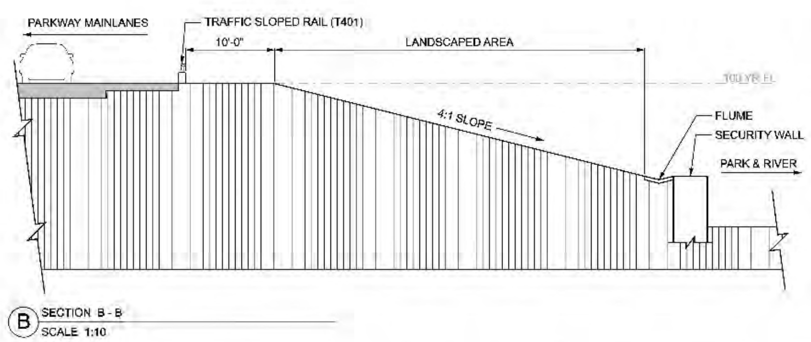


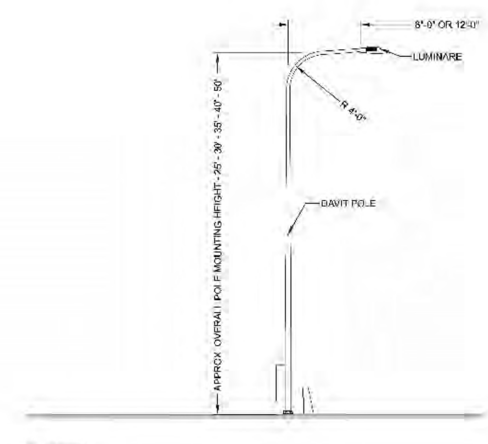




Security wall design may be cast in place or modular block system with ashlar stone face finish.







Roadway lighting to be provided on outside edge of mainlane only. (No center mounted roadway lighting)
House-side shield hardware to be installed on fixture where applicable.

High mast illumination poles located primarily in interchage conditions. (Other corridor lighting conditions may apply)
Coordinate with adjacent municipality on ordinance compliance.
Pole height to be 125', 150', or 175' height.
Refer to TxDOT HMIP standards.
Pole height and detection to comply with FAA Regulations. (if applicable)

Final materials, details, location and quantity of shown as part of this document are subject to change in final design Plans, Specifications and Estimates (PS & E).

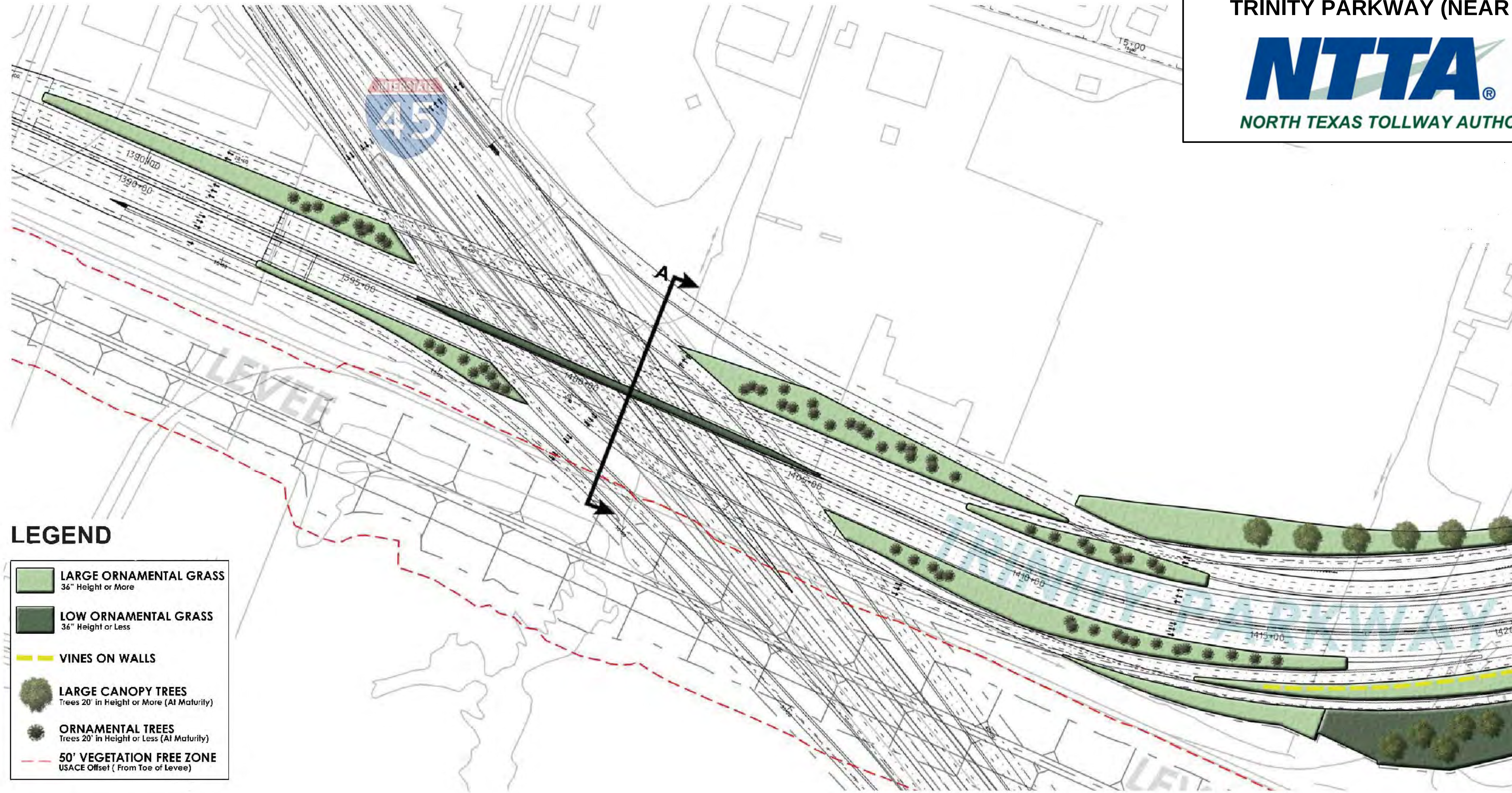
Source: Trinity Parkway Design Criteria Manual, NTTA, 2009

Reference Section 4.3.2.2 and 5.1.2.4

PLATE 4 - 3B

CONCEPTUAL ENHANCEMENTS TO SOUTHERN SECTION OF TRINITY PARKWAY (NEAR IH-45)

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



Final materials, details, location and quantity of shown as part of this document are subject to change in final design Plans, Specifications and Estimates (PS & E).

Source: Trinity Parkway Design Criteria Manual, NTTA, 2009

Reference Section 4.3.2.2 and 5.1.2.4

PLATE 4 - 3C

CONCEPTUAL ENHANCEMENTS TO SOUTHERN SECTION OF TRINITY PARKWAY (NEAR LAMAR STREET AND SH-310)

NTTA®

NORTH TEXAS TOLLWAY AUTHORITY

Final materials, details, location and quantity of shown as part of this document are subject to change in final design Plans, Specifications and Estimates (PS & E).

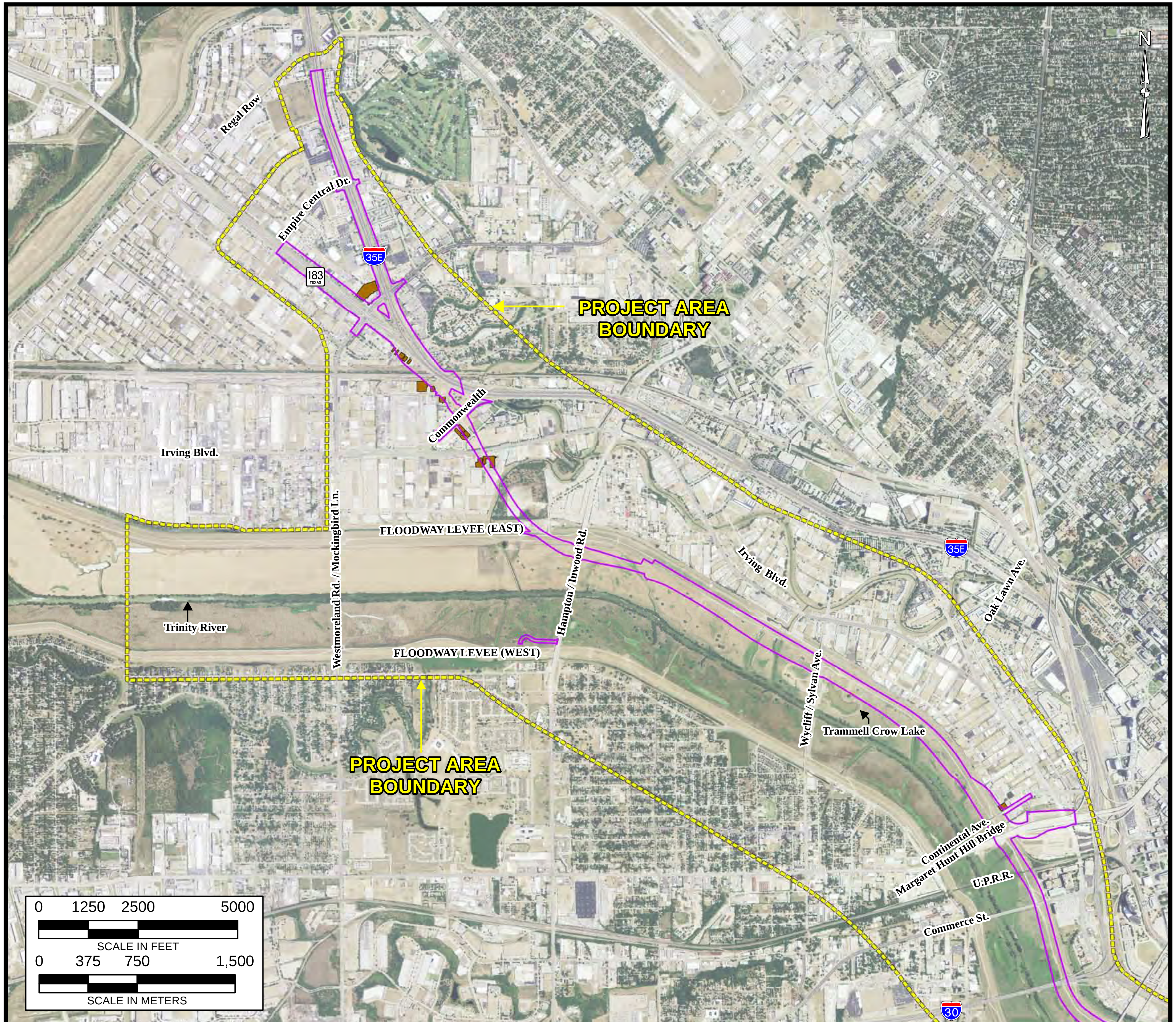
Source: Trinity Parkway Design Criteria Manual, NTTA, 2009

Reference Section 4.3.2.2 and 5.1.2.4

PLATE 4 - 4A

DISPLACEMENTS - ALTERNATIVE 3C

NORTH TEXAS TOLLWAY AUTHORITY



PROPOSED ROW AREA

ALTERNATIVE 3C -
COMBINED PARKWAY -
RIVERSIDE (FURTHER MODIFIED)

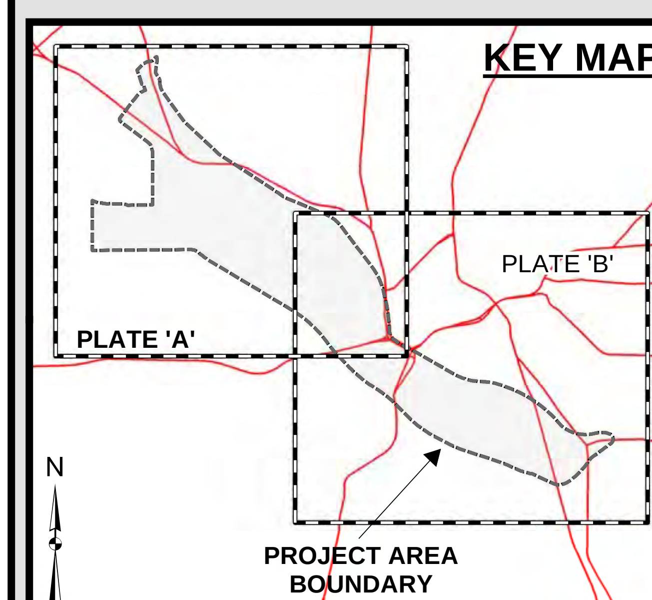
BUILDING DISPLACEMENTS

BUSINESS / COMMERCIAL DISPLACEMENT

RESIDENTIAL DISPLACEMENT

NOTES: LOCATIONS ARE APPROXIMATE
YEAR OF AERIAL PHOTOGRAPH: 2012
REFERENCE SECTION 4.4.1.2 AND TABLE 4-13

KEY MAP



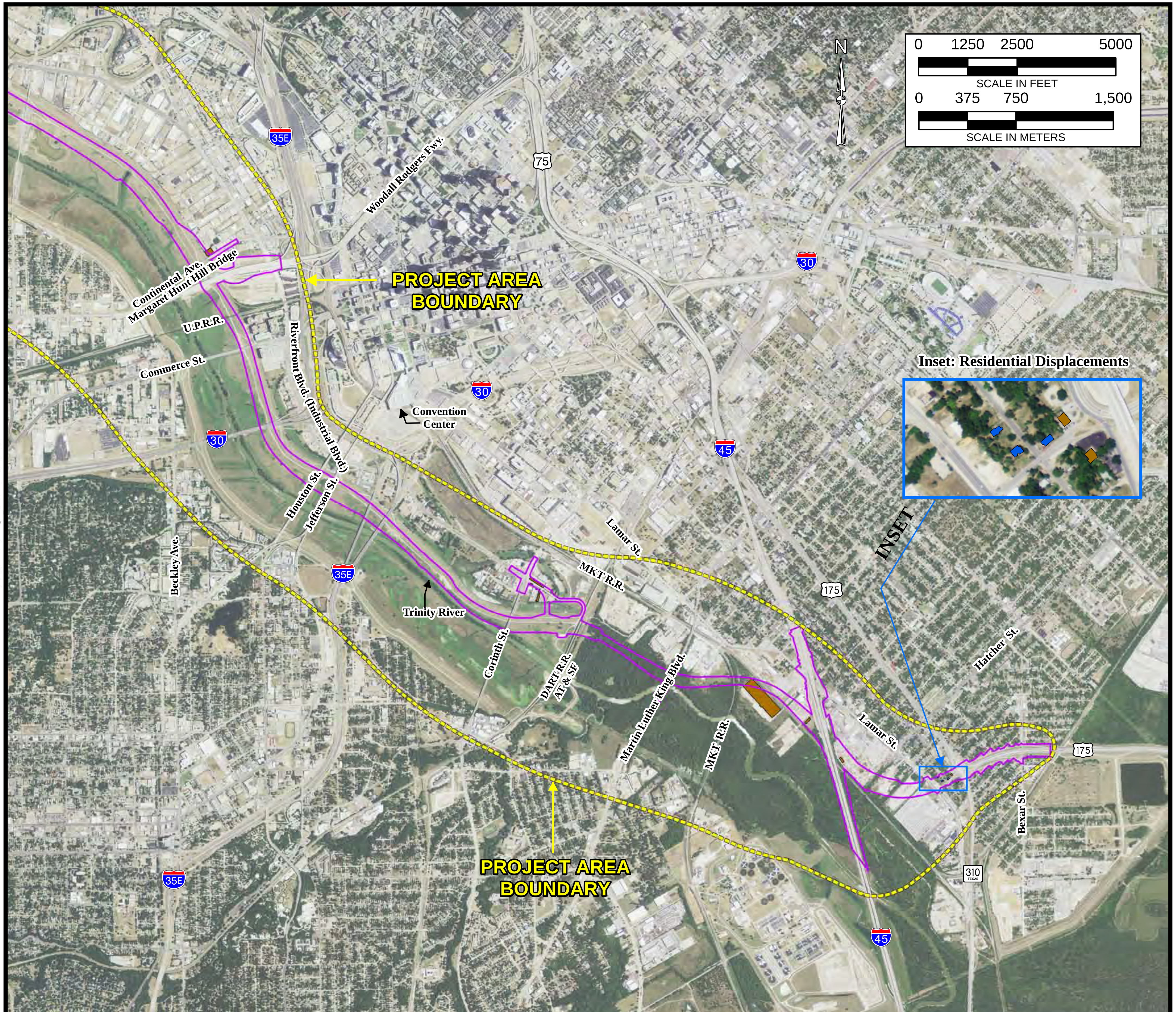


PLATE 4 - 4B

DISPLACEMENTS - ALTERNATIVE 3C

NTTA
NORTH TEXAS TOLLWAY AUTHORITY

PROPOSED ROW AREA

ALTERNATIVE 3C
COMBINED PARKWAY -
RIVERSIDE (FURTHER MODIFIED)

BUILDING DISPLACEMENTS

BUSINESS / COMMERCIAL DISPLACEMENT

RESIDENTIAL DISPLACEMENT

NOTES: LOCATIONS ARE APPROXIMATE
YEAR OF AERIAL PHOTOGRAPH: 2012
REFERENCE SECTION 4.4.1.2 AND TABLE 4-13

KEY MAP

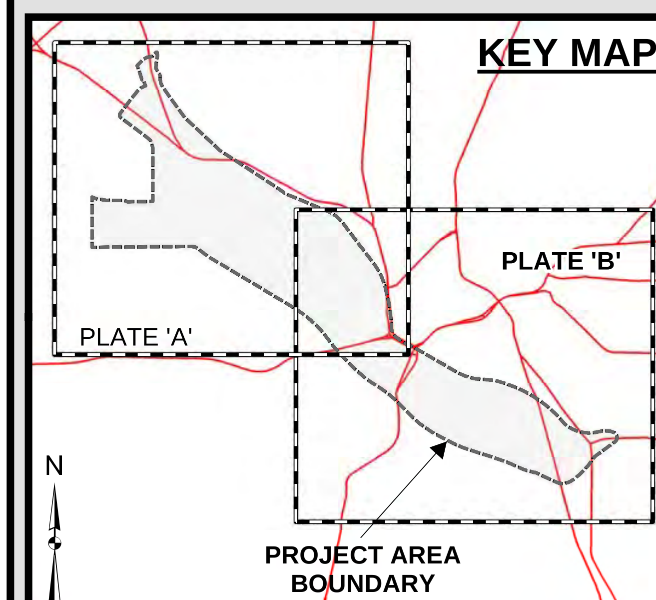
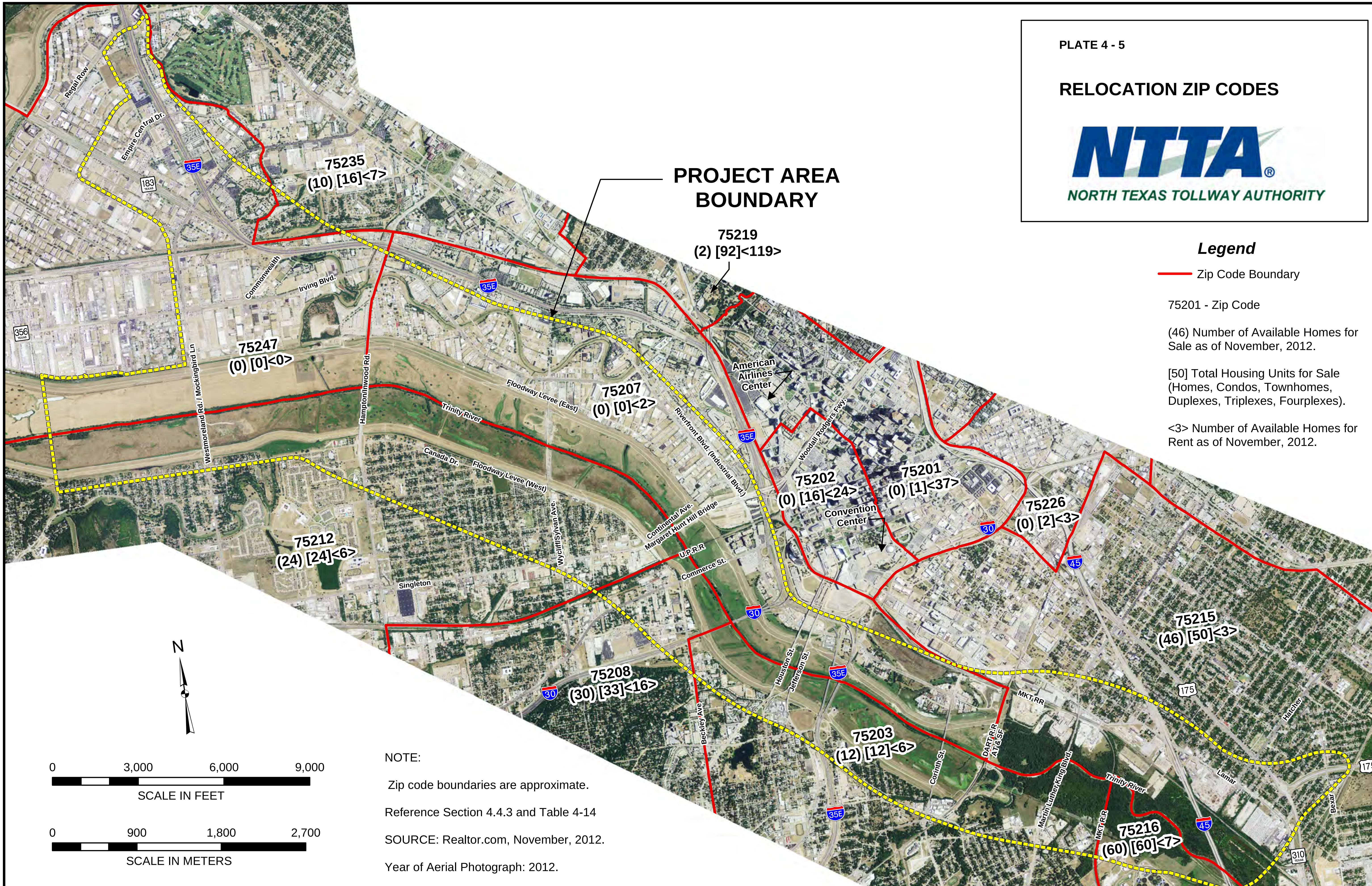


PLATE 4 - 5

RELOCATION ZIP CODES

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY



Legend

Zip Code Boundary

75201 - Zip Code

(46) Number of Available Homes for Sale as of November, 2012.

[50] Total Housing Units for Sale (Homes, Condos, Townhomes, Duplexes, Triplexes, Fourplexes).

<3> Number of Available Homes for Rent as of November, 2012.

NOTE:

Zip code boundaries are approximate.

Reference Section 4.4.3 and Table 4-14

SOURCE: Realtor.com, November, 2012.

Year of Aerial Photograph: 2012.

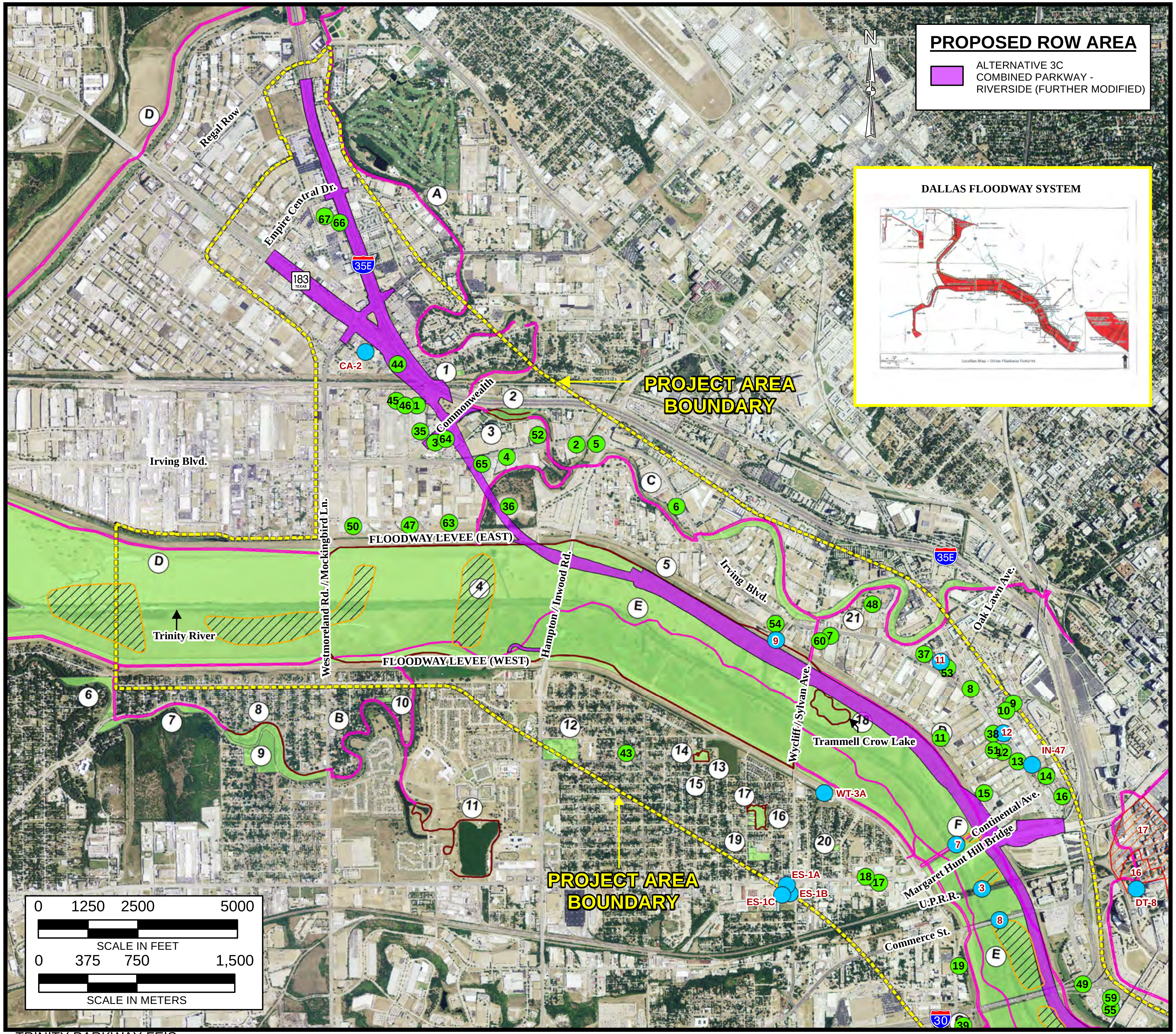


PLATE 4 - 6A

HUMAN ENVIRONMENT - ALTERNATIVE 3C

NTTA
NORTH TEXAS TOLLWAY AUTHORITY

CULTURAL RESOURCES:

- 8 — NRHP - LISTED/ELIGIBLE RESOURCES
- 1 — NRHP - LISTED DISTRICTS
- AREA OF 2006 ARCHEOLOGICAL INVESTIGATION (BACKHOE TRENCHING)
- Map — DALLAS FLOODWAY SYSTEM MAP

NOTES: LOCATIONS ARE APPROXIMATE. REFER TO SECTION 4.7.2.2 AND TABLE 4-22

HAZARDOUS / REGULATED MATERIALS SITES:

- 10 — POTENTIAL HIGH RISK HAZARDOUS / REGULATED MATERIALS SITE

NOTES: LOCATIONS ARE APPROXIMATE. REFER TO SECTION 4.18.2 AND TABLE 4-45

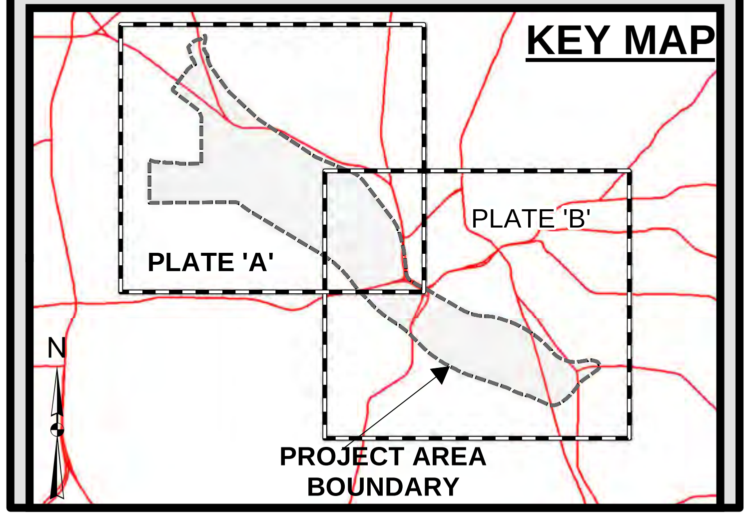
SOURCE: USEPA AND TCEQ REGULATORY DATABASES

PARKS & RECREATION AREAS:

- EXISTING TRAIL
- PLANNED TRAIL
- EXISTING PARK OR RECREATION AREA
- PLANNED PARK OR RECREATION AREA
- 10 — PARK OR RECREATION AREA FEATURE IDENTIFIER

NOTES: LOCATIONS ARE APPROXIMATE. REFERENCE SECTION 4.7.3.2 AND TABLE 4-25

SOURCE: DALLAS PARK AND RECREATION DEPT. DALLAS COUNTY OPEN SPACE PLAN



MATCH LINE

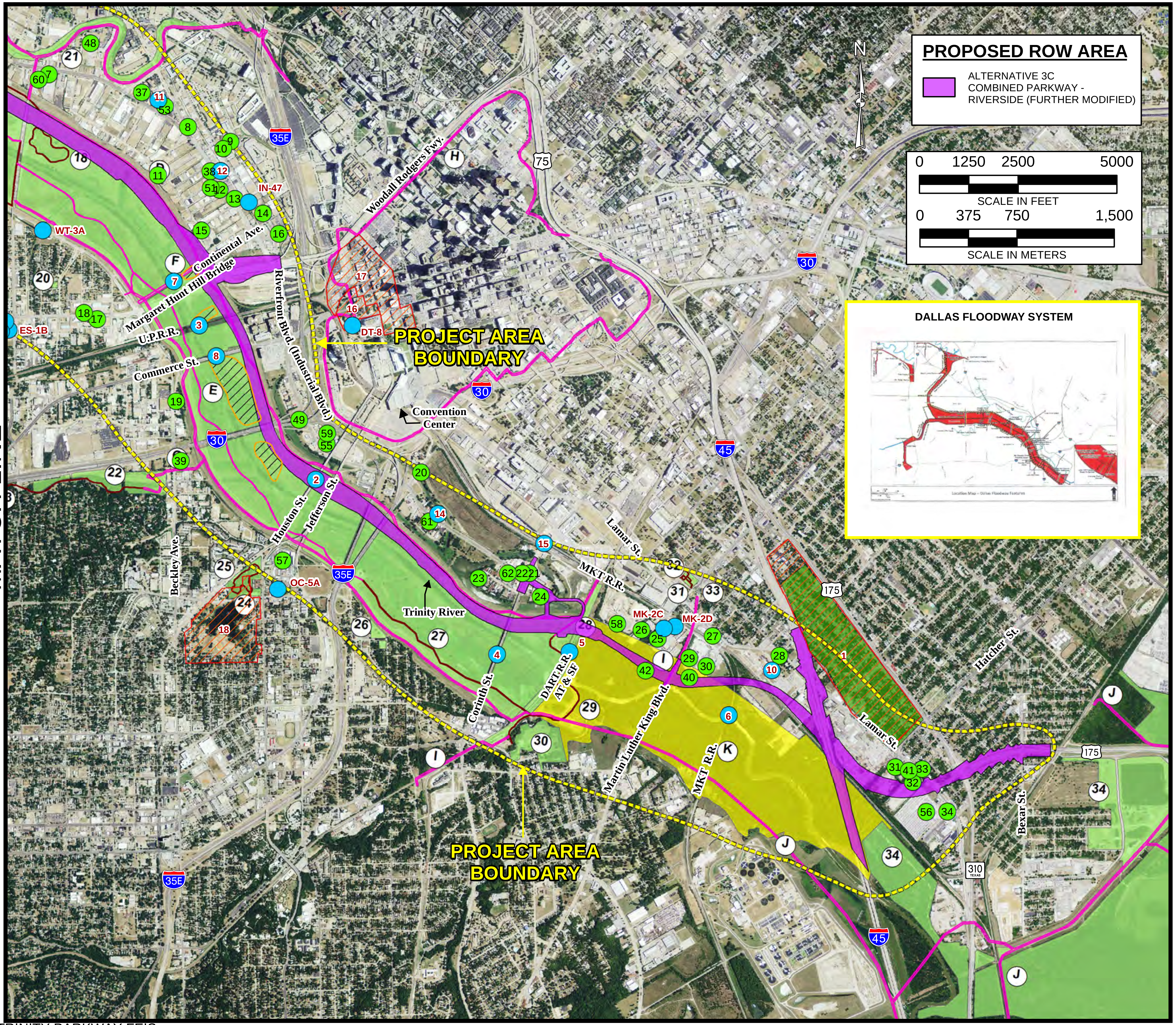


PLATE 4 - 6B

HUMAN ENVIRONMENT - ALTERNATIVE 3C

NTTA
NORTH TEXAS TOLLWAY AUTHORITY

CULTURAL RESOURCES:

- NRHP - LISTED/ELIGIBLE RESOURCES
- NRHP - LISTED DISTRICTS
- AREA OF 2006 ARCHEOLOGICAL INVESTIGATION (BACKHOE TRENCHING)
- Map — DALLAS FLOODWAY SYSTEM MAP

NOTES: LOCATIONS ARE APPROXIMATE. REFER TO SECTION 4.7.2.2 AND TABLE 4-22

HAZARDOUS / REGULATED MATERIALS SITES:

- POTENTIAL HIGH RISK HAZARDOUS / REGULATED MATERIALS SITE

NOTES: LOCATIONS ARE APPROXIMATE. REFER TO SECTION 4.18.2 AND TABLE 4-45

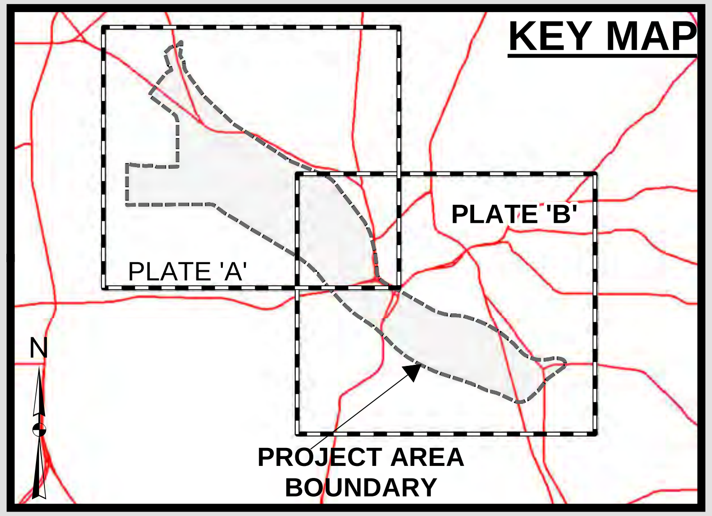
SOURCE: USEPA AND TCEQ REGULATORY DATABASES

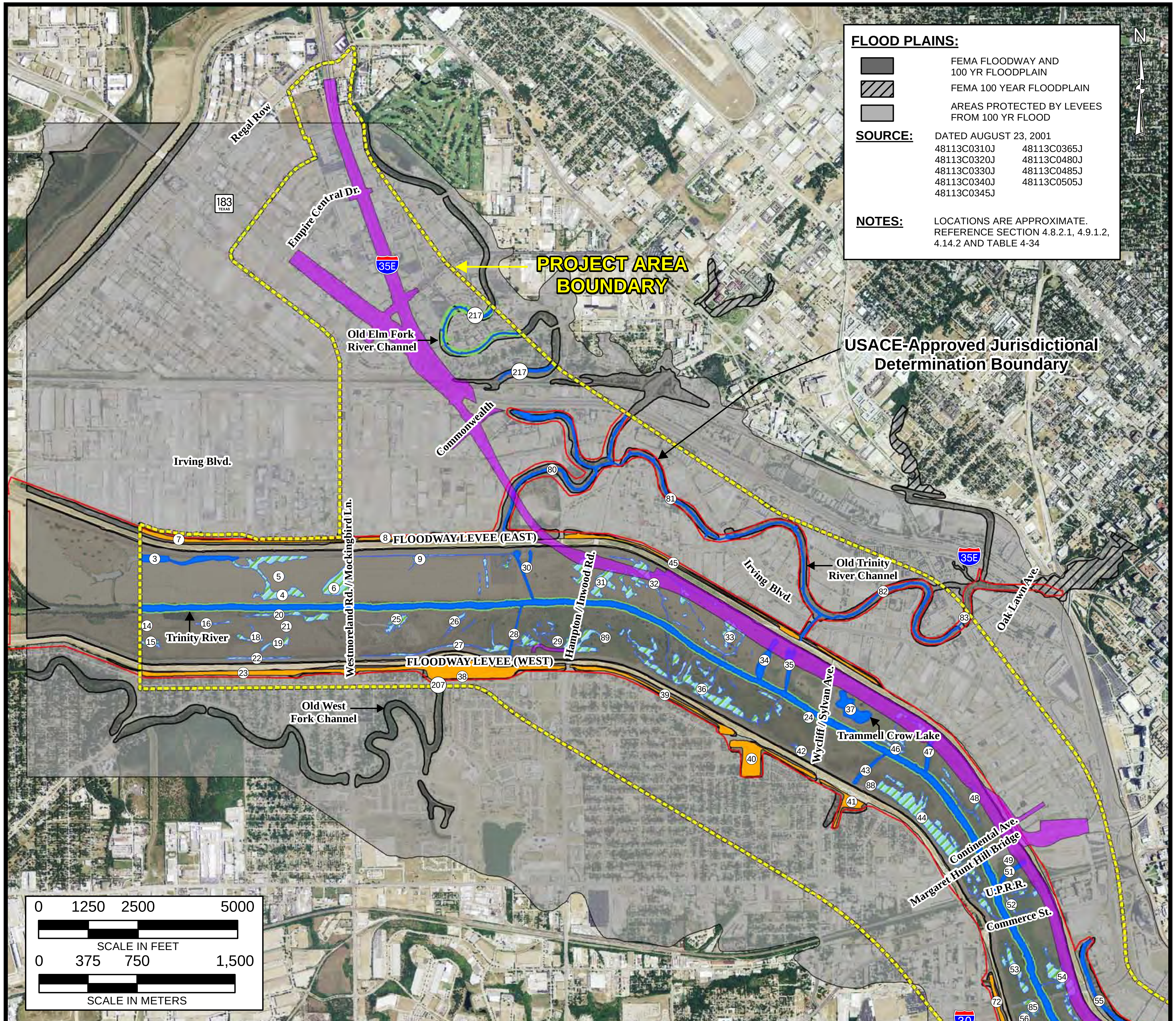
PARKS & RECREATION AREAS:

- EXISTING TRAIL
- PLANNED TRAIL
- EXISTING PARK OR RECREATION AREA
- PLANNED PARK OR RECREATION AREA
- PARK OR RECREATION AREA FEATURE IDENTIFIER

NOTES: LOCATIONS ARE APPROXIMATE. REFERENCE SECTION 4.7.3.2 AND TABLE 4-25

SOURCE: DALLAS PARK AND RECREATION DEPT. DALLAS COUNTY OPEN SPACE PLAN





MATCH LINE

PLATE 4 - 7A

NATURAL FEATURES - ALTERNATIVE 3C

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

PROPOSED ROW AREA

ALTERNATIVE 3C COMBINED PARKWAY - RIVERSIDE (FURTHER MODIFIED)

WATERS OF THE UNITED STATES, INCLUDING WETLANDS*

OPEN WATER / RIVER CHANNEL

EMERGENT WETLAND

FORESTED WETLAND

(10) WETLAND & WATERWAY FEATURE IDENTIFIER

NON-WATERS OF THE UNITED STATES

OPEN WATER (MAN-MADE SUMPS)

WOODLANDS

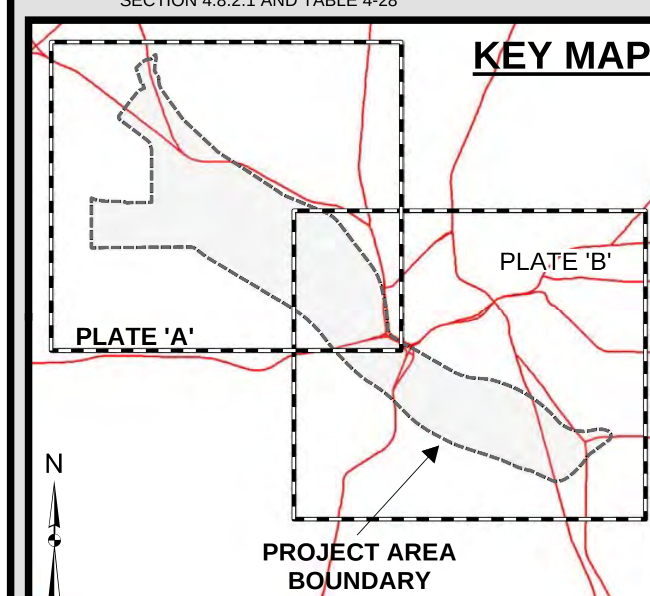
RIPARIAN FOREST

NOTES:

* WATER FEATURES LOCATED OUTSIDE THE LIMITS OF THE USACE-APPROVED JURISDICTIONAL DETERMINATION ARE FOR CONSIDERATION IN A PRELIMINARY JURISDICTIONAL DETERMINATION.

LOCATIONS ARE APPROXIMATE.
REFERENCE SECTION 3.4.3.2 AND TABLE 3-16 AND 3-17; SECTION 4.8.2.1 AND TABLE 4-28

KEY MAP



MATCH LINE

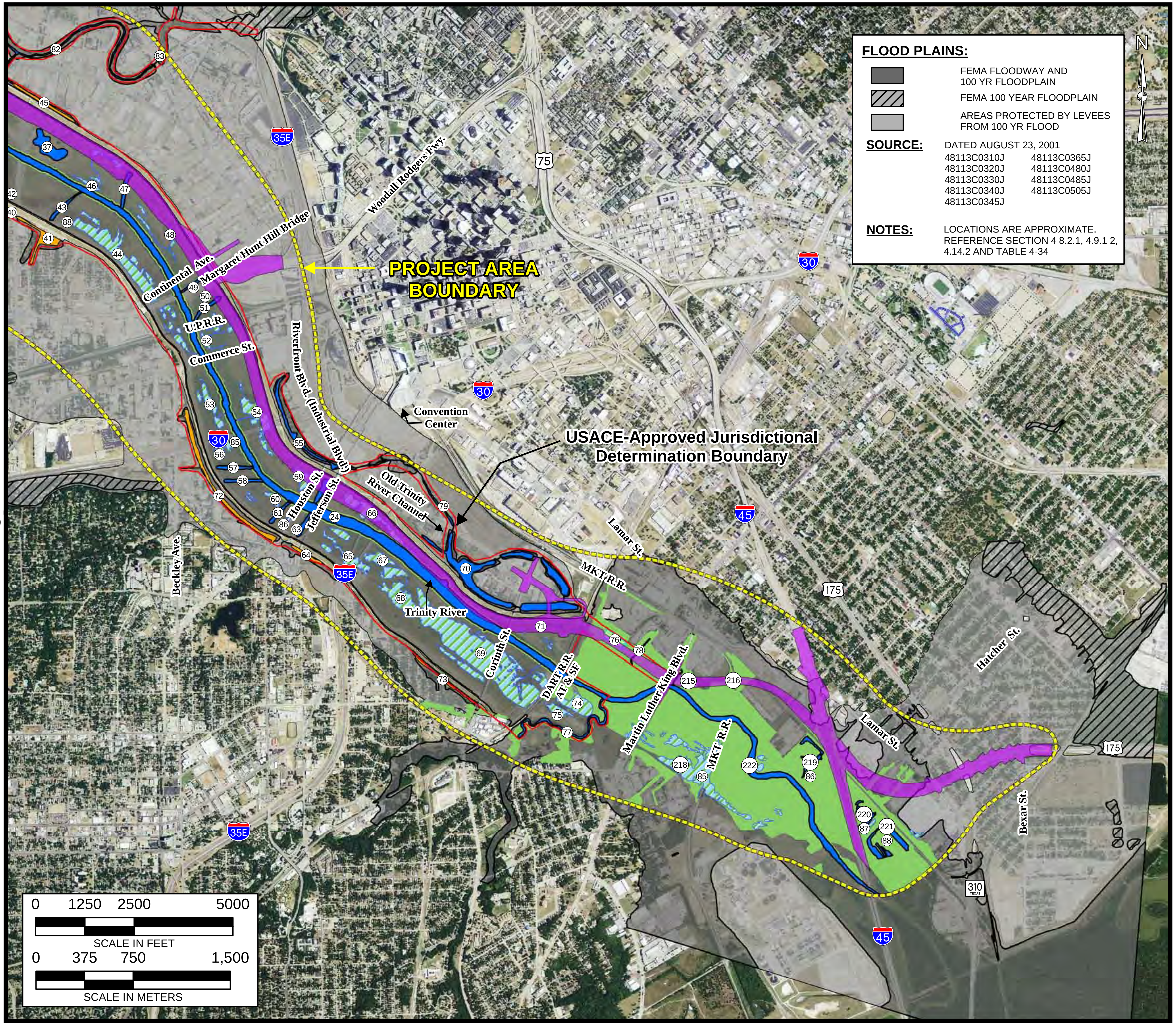


PLATE 4 - 7B

NATURAL FEATURES - ALTERNATIVE 3C

NTTA®
NORTH TEXAS TOLLWAY AUTHORITY

PROPOSED ROW AREA

ALTERNATIVE 3C COMBINED PARKWAY - RIVERSIDE (FURTHER MODIFIED)

WATERS OF THE UNITED STATES, INCLUDING WETLANDS*

OPEN WATER / RIVER CHANNEL

EMERGENT WETLAND

FORESTED WETLAND

10 WETLAND & WATERWAY FEATURE IDENTIFIER

NON-WATERS OF THE UNITED STATES

OPEN WATER (MAN-MADE SUMPS)

WOODLANDS

RIPARIAN FOREST

NOTES:

* WATER FEATURES LOCATED OUTSIDE THE LIMITS OF THE USACE-APPROVED JURISDICTIONAL DETERMINATION ARE FOR CONSIDERATION IN A PRELIMINARY JURISDICTIONAL DETERMINATION.

LOCATIONS ARE APPROXIMATE.
REFERENCE SECTION 3.4.3.2 AND TABLE 3-16 AND 3-17; SECTION 4.8 2.1 AND TABLE 4-28

KEY MAP

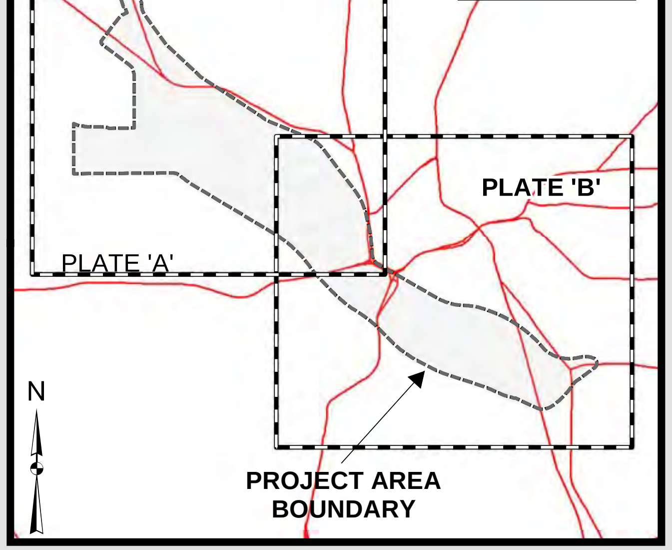
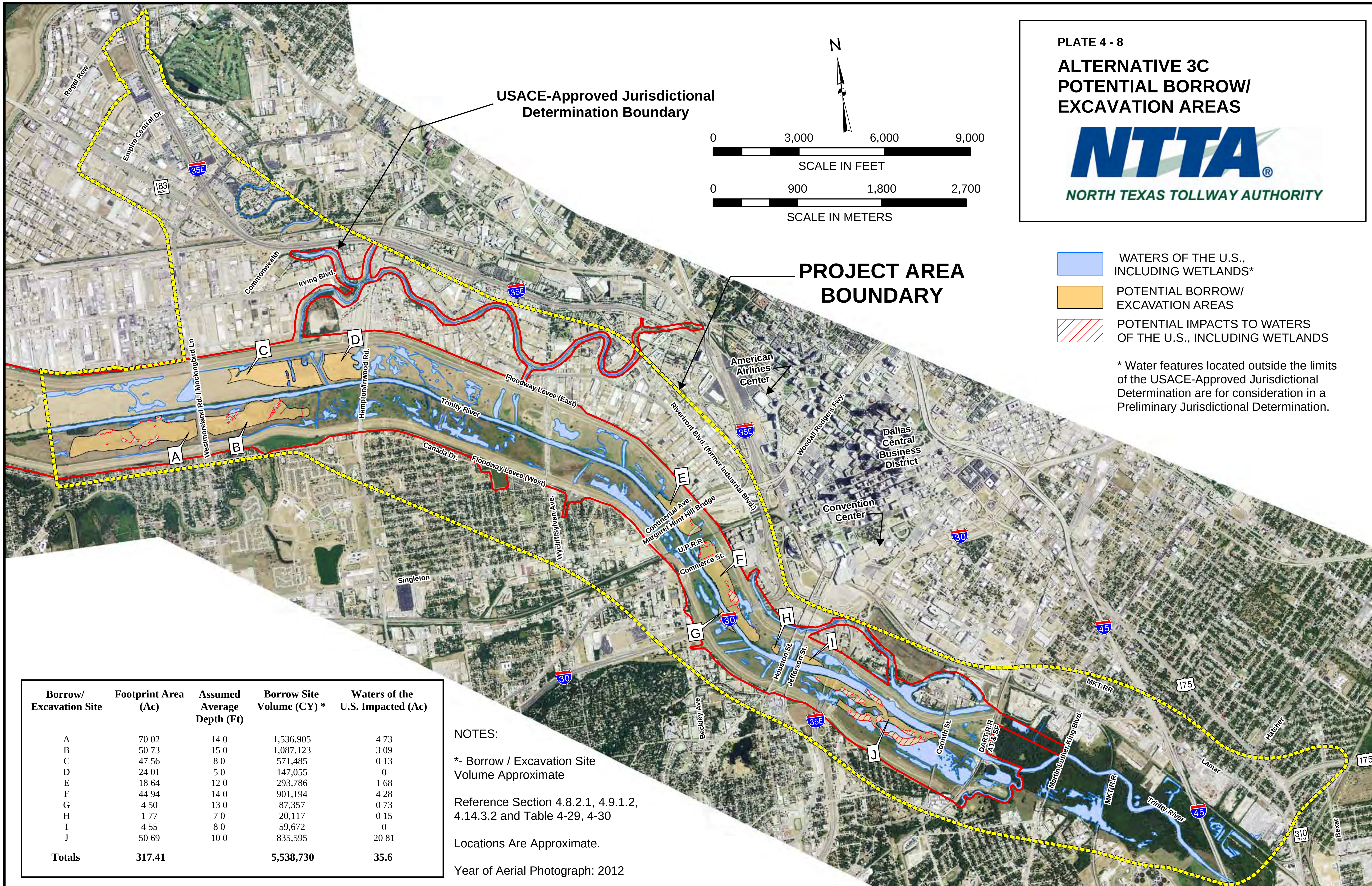


PLATE 4 - 8

ALTERNATIVE 3C POTENTIAL BORROW/ EXCAVATION AREAS

NORTH TEXAS TOLLWAY AUTHORITY



Borrow/ Excavation Site	Footprint Area (Ac)	Assumed Average Depth (Ft)	Borrow Site Volume (CY) *	Waters of the U.S. Impacted (Ac)
A	70 02	14 0	1,536,905	4 73
B	50 73	15 0	1,087,123	3 09
C	47 56	8 0	571,485	0 13
D	24 01	5 0	147,055	0
E	18 64	12 0	293,786	1 68
F	44 94	14 0	901,194	4 28
G	4 50	13 0	87,357	0 73
H	1 77	7 0	20,117	0 15
I	4 55	8 0	59,672	0
J	50 69	10 0	835,595	20 81
Totals	**317.41**		**5,538,730**	**35.6**

NOTES:

*- Borrow / Excavation Site Volume Approximate

Reference Section 4.8.2.1, 4.9.1.2, 4.14.3.2 and Table 4-29, 4-30

Locations Are Approximate.

Year of Aerial Photograph: 2012

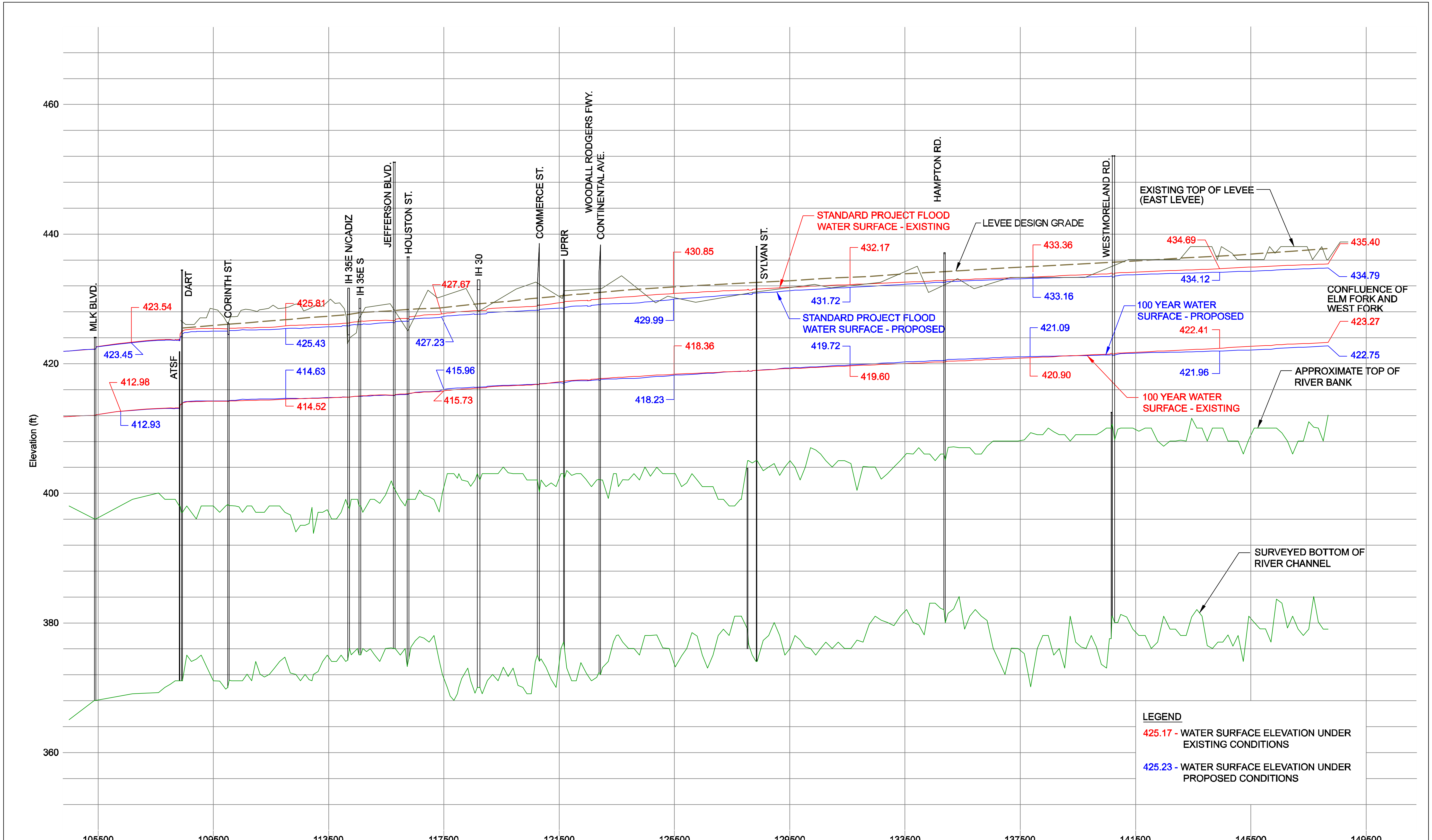


PLATE 4-27
Flood Profiles for Existing Conditions and Build Alternative 3C

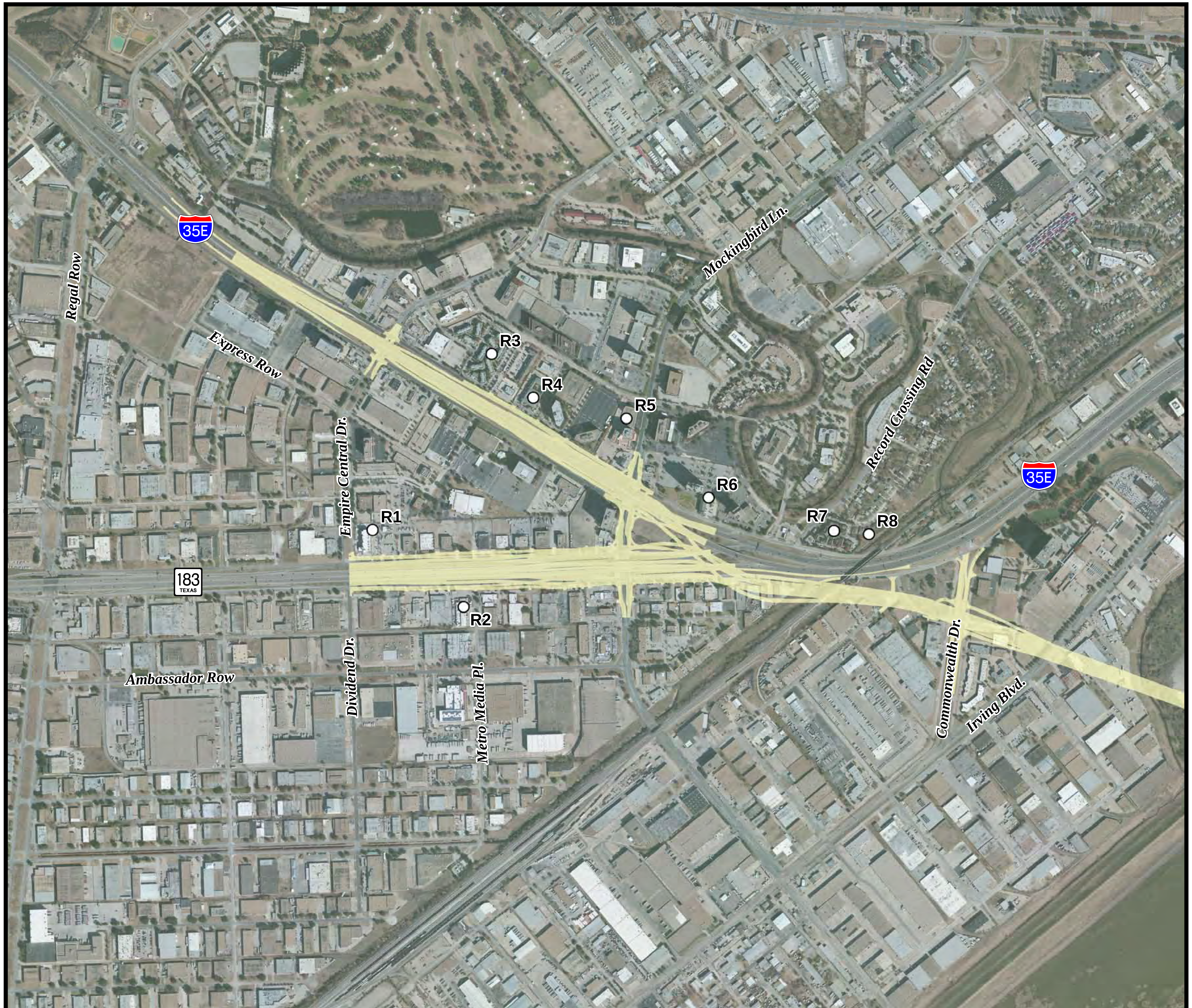


PLATE 4 - 10: Sheet 1 of 6

ALTERNATIVE 3C - NOISE ANALYSIS

NTTA
NORTH TEXAS TOLLWAY AUTHORITY

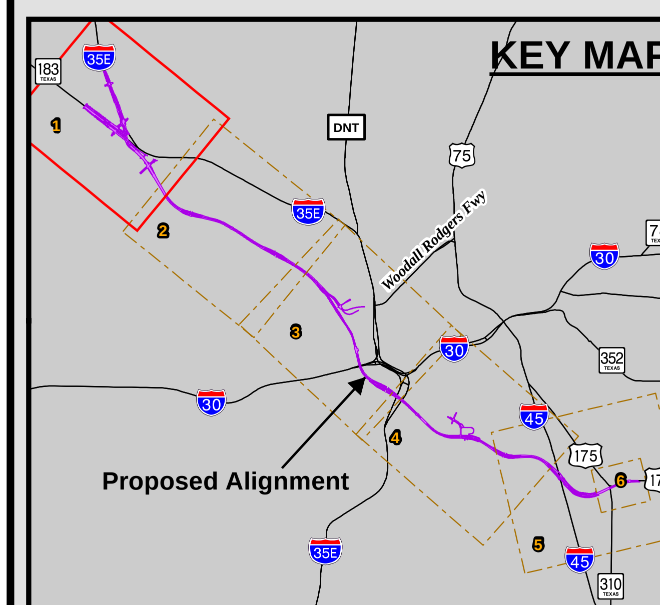
Legend

- Receiver Not Impacted
- Receiver Impacted / Benefited by Barrier
- Receiver Impacted / Not Benefited by Barrier
- 10', 12' and 16' Proposed Traffic Noise Barrier
- Traffic Noise Barriers to be Constructed for the SM Wright Project (CSJs: 0092-01-052, 0197-02-108, & 0092-14-081)

0 1,000 2,000 3,000
SCALE IN FEET

0 300 600 900
SCALE IN METERS

Reference Section 4.16.2
Year of Aerial Photograph: 2011.



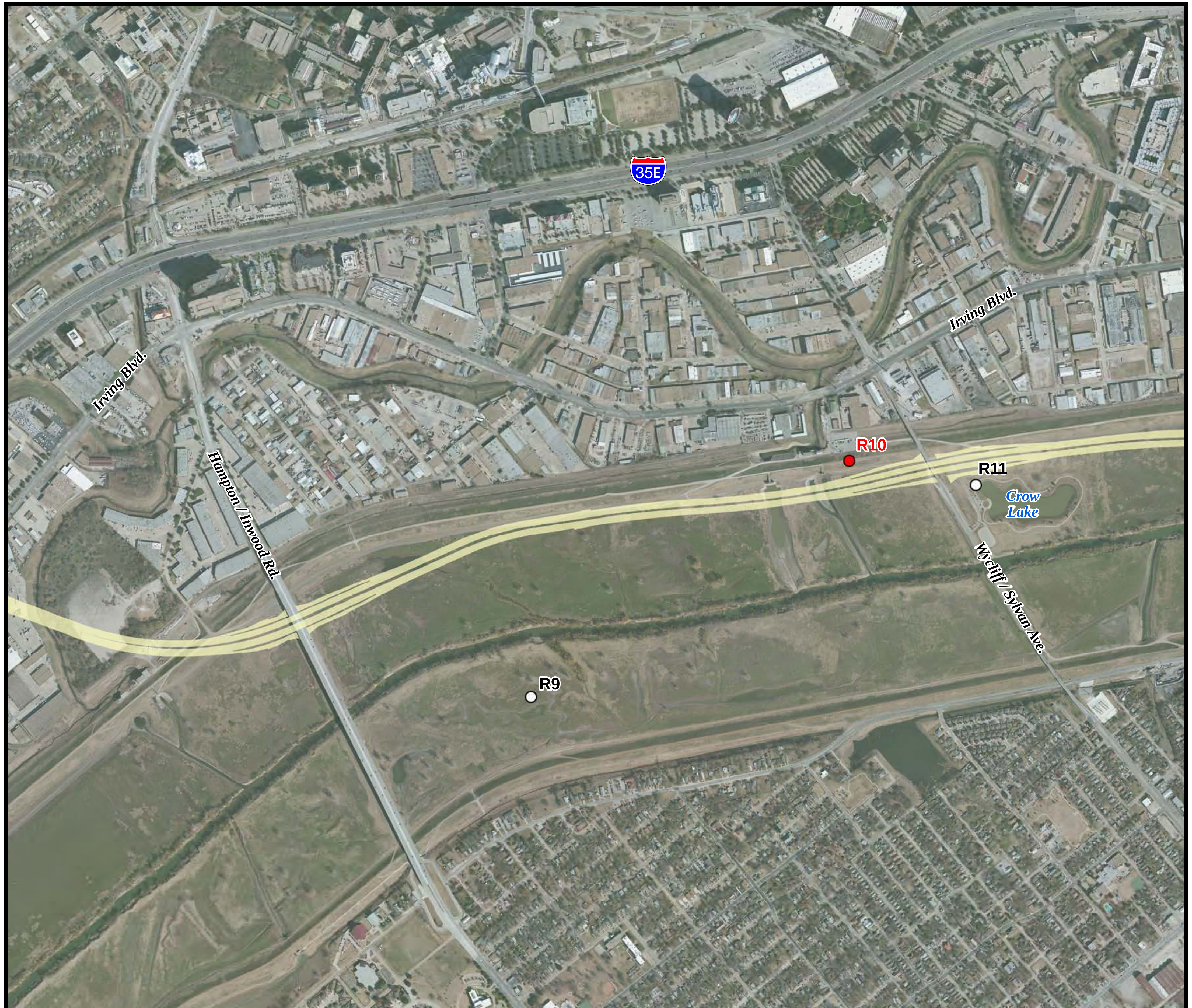


PLATE 4 - 10: Sheet 2 of 6

ALTERNATIVE 3C - NOISE ANALYSIS

NORTH TEXAS TOLLWAY AUTHORITY

Legend

- Receiver Not Impacted
- Receiver Impacted / Benefited by Barrier
- Receiver Impacted / Not Benefited by Barrier
- 10', 12' and 16' Proposed Traffic Noise Barrier
- Traffic Noise Barriers to be Constructed for the SM Wright Project (CSJs: 0092-01-052, 0197-02-108, & 0092-14-081)

N

0 1,000 2,000 3,000
SCALE IN FEET

0 300 600 900
SCALE IN METERS

Reference Section 4.16.2
Year of Aerial Photograph: 2011.

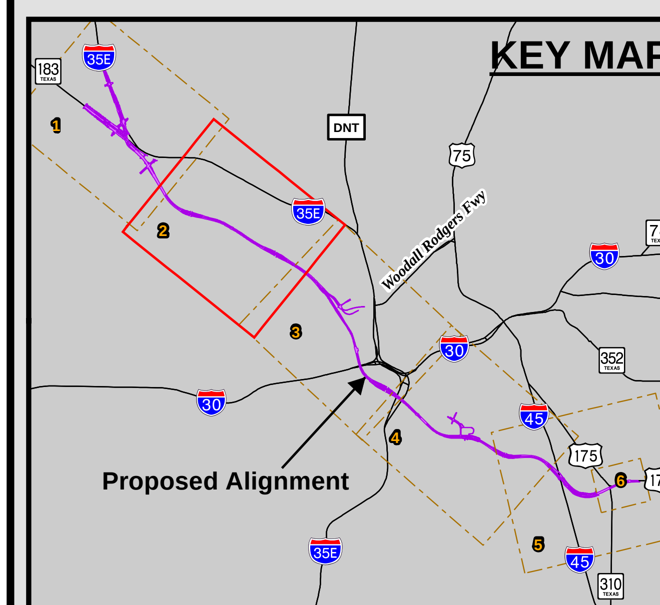
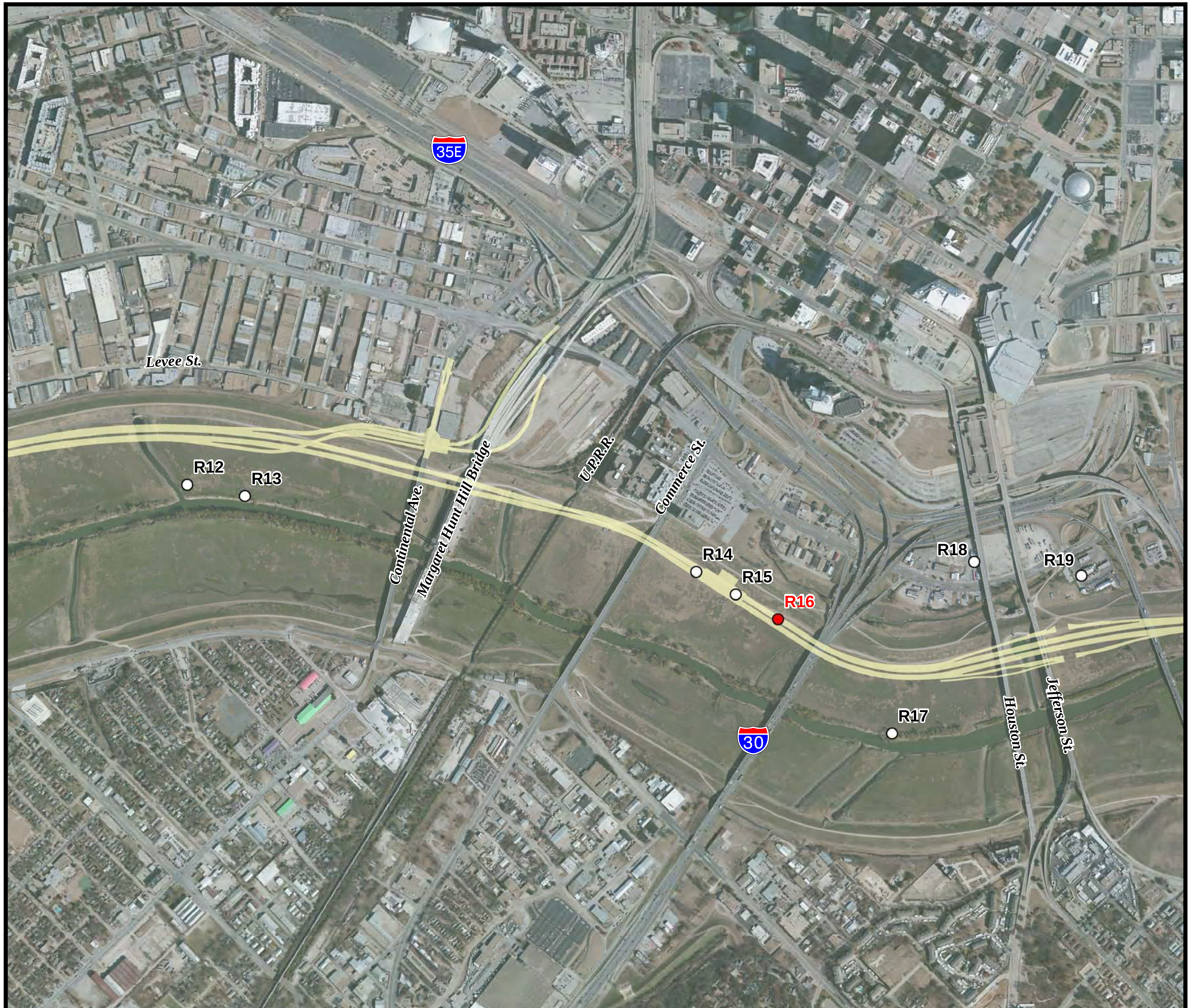


PLATE 4 - 10: Sheet 3 of 6

ALTERNATIVE 3C - NOISE ANALYSIS

NTTA
NORTH TEXAS TOLLWAY AUTHORITY



Legend

- Receiver Not Impacted
- Receiver Impacted / Benefited by Barrier
- Receiver Impacted / Not Benefited by Barrier
- 10', 12' and 16' Proposed Traffic Noise Barrier
- Traffic Noise Barriers to be Constructed for the SM Wright Project (CSJs: 0092-01-052, 0197-02-108, & 0092-14-081)

N

0 1,000 2,000 3,000
SCALE IN FEET

0 300 600 900
SCALE IN METERS

Reference Section 4.16.2
Year of Aerial Photograph: 2011.

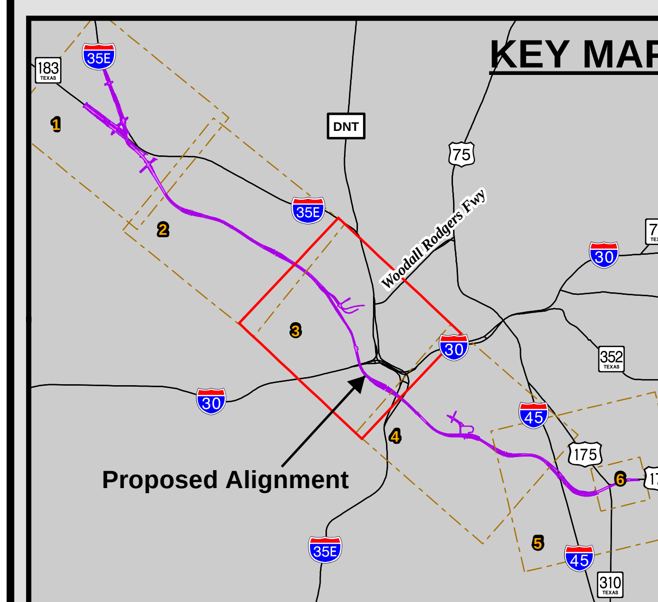
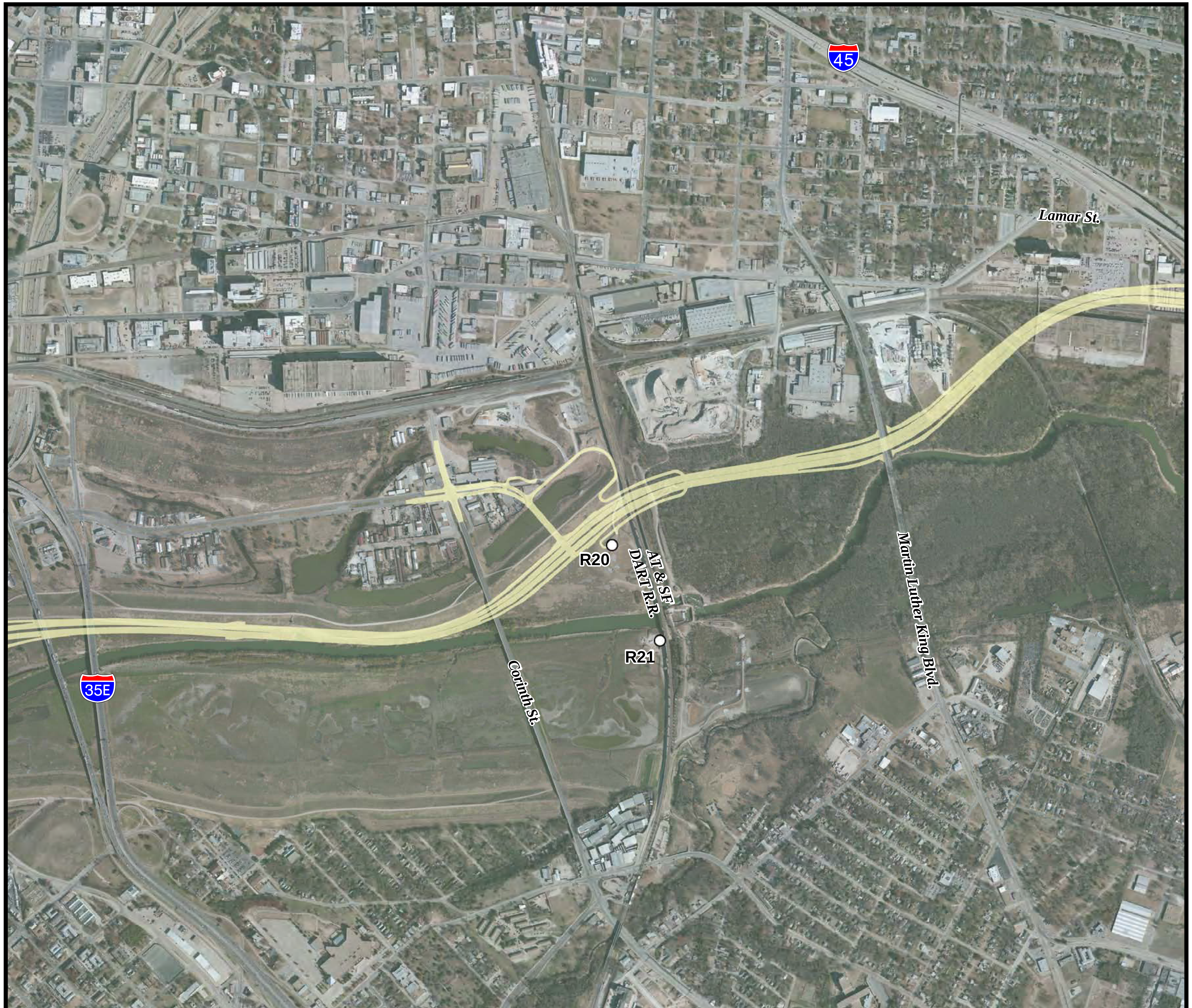


PLATE 4 - 10: Sheet 4 of 6

ALTERNATIVE 3C - NOISE ANALYSIS

NORTH TEXAS TOLLWAY AUTHORITY



Legend

- Receiver Not Impacted
- Receiver Impacted / Benefited by Barrier
- Receiver Impacted / Not Benefited by Barrier
- 10', 12' and 16' Proposed Traffic Noise Barrier
- Traffic Noise Barriers to be Constructed for the SM Wright Project (CSJs: 0092-01-052, 0197-02-108, & 0092-14-081)

0 1,000 2,000 3,000
SCALE IN FEET

0 300 600 900
SCALE IN METERS

Reference Section 4.16.2
Year of Aerial Photograph: 2011.

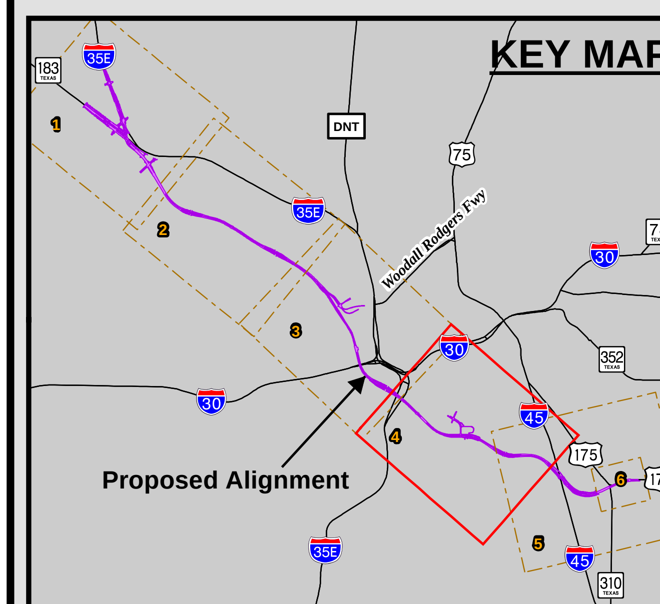
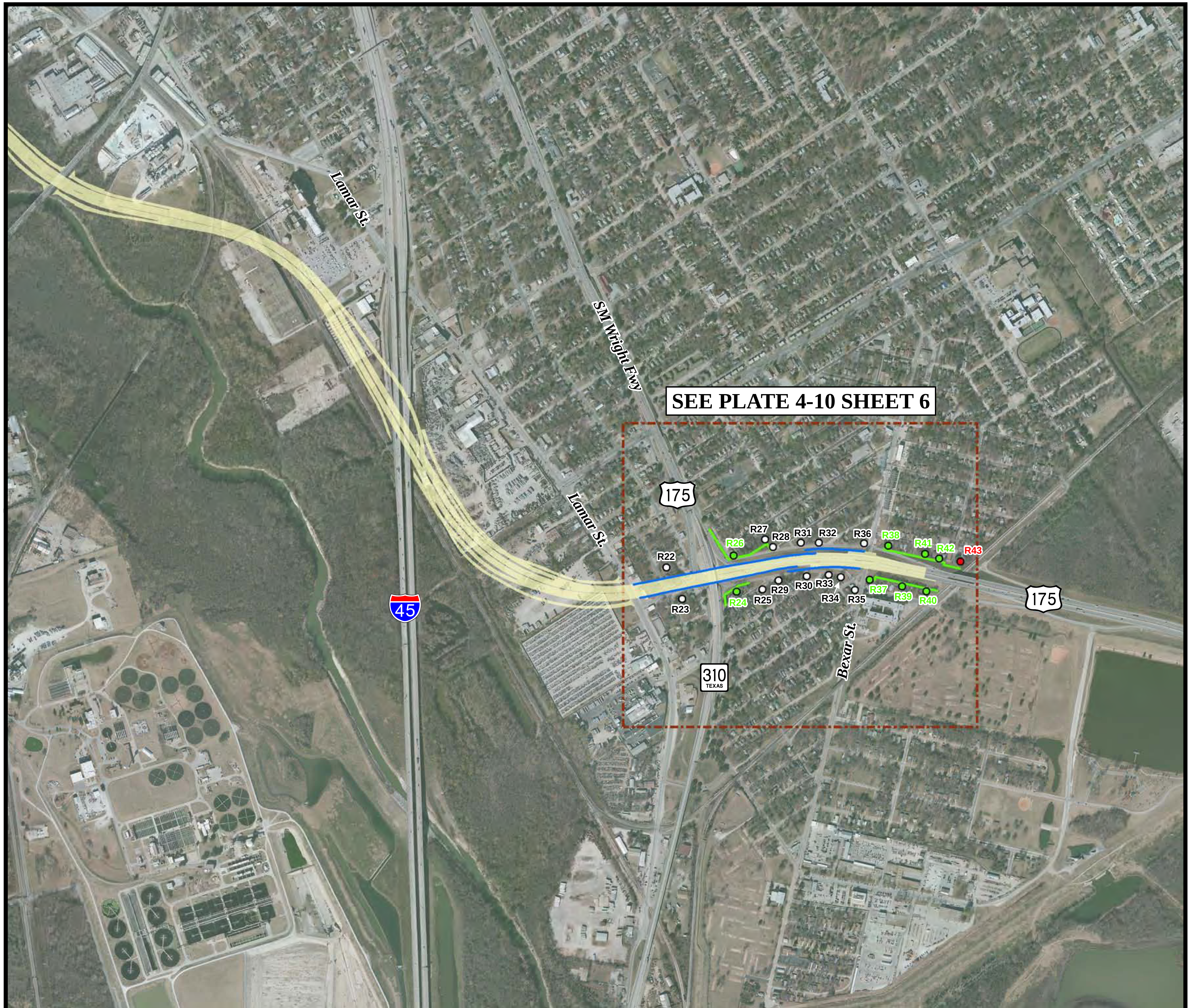


PLATE 4 - 10: Sheet 5 of 6

ALTERNATIVE 3C - NOISE ANALYSIS

NORTH TEXAS TOLLWAY AUTHORITY



Legend

- Receiver Not Impacted
- Receiver Impacted / Benefited by Barrier
- Receiver Impacted / Not Benefited by Barrier
- 10', 12' and 16' Proposed Traffic Noise Barrier
- Traffic Noise Barriers to be Constructed for the SM Wright Project (CSJs: 0092-01-052, 0197-02-108, & 0092-14-081)

N

0 1,000 2,000 3,000

SCALE IN FEET

0 300 600 900

SCALE IN METERS

Reference Section 4.16.2

Year of Aerial Photograph: 2011.

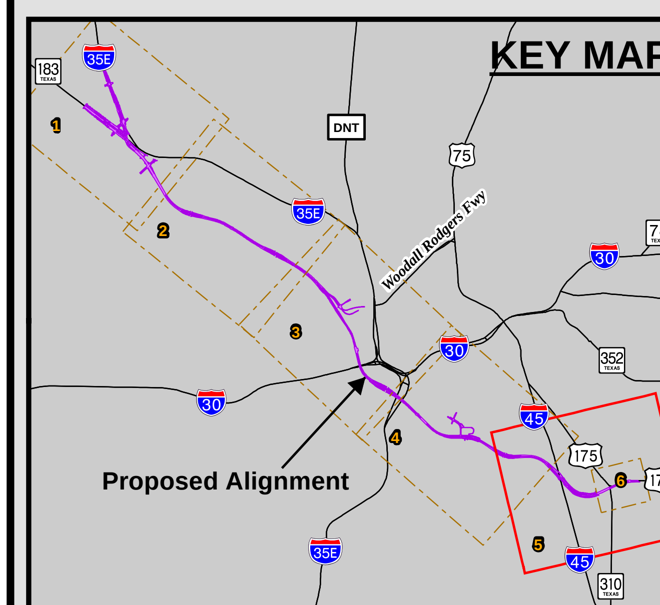
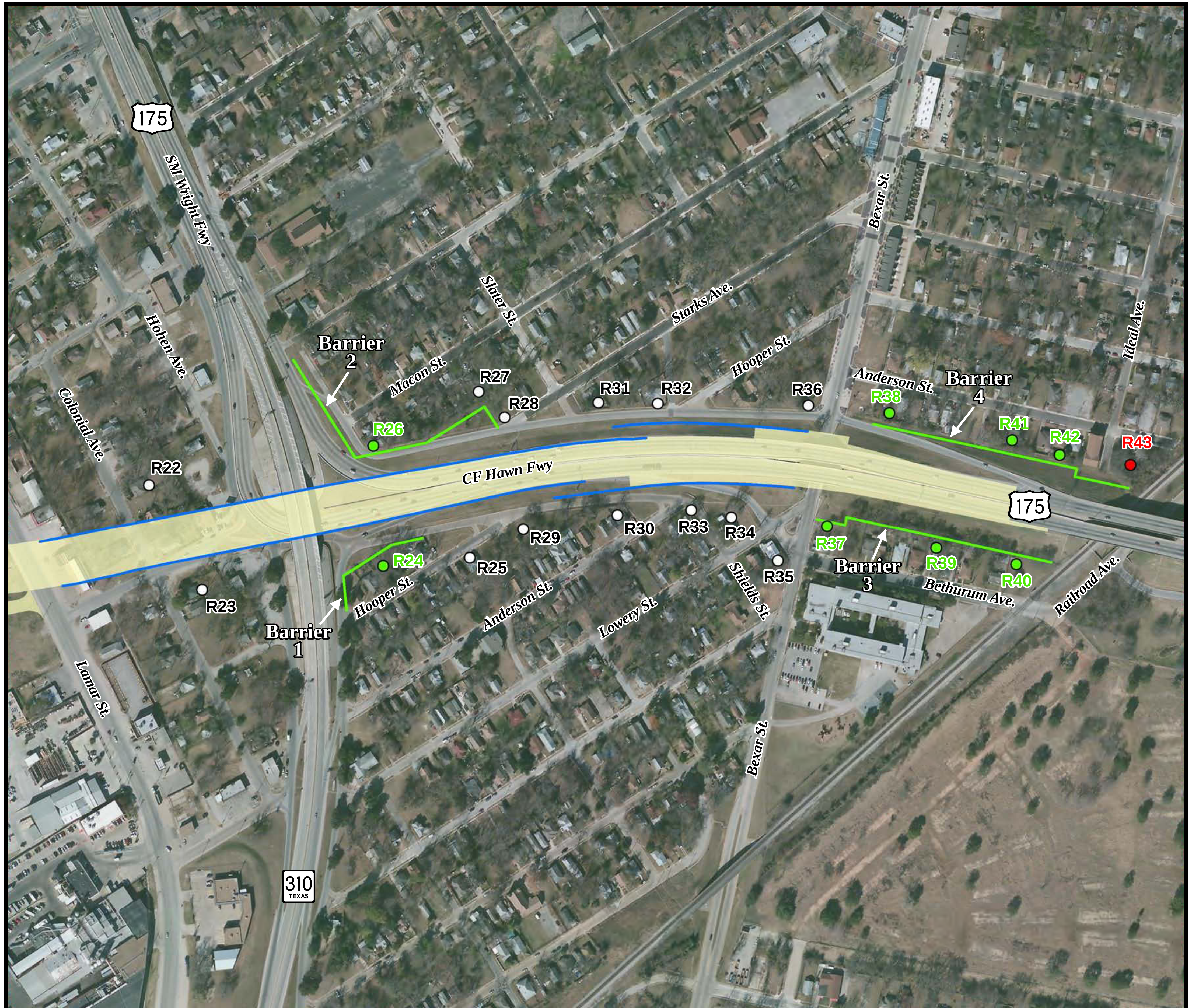


PLATE 4 - 10: Sheet 6 of 6

ALTERNATIVE 3C - NOISE ANALYSIS

NTTA
NORTH TEXAS TOLLWAY AUTHORITY



Legend

- Receiver Not Impacted
- Receiver Impacted / Benefited by Barrier
- Receiver Impacted / Not Benefited by Barrier
- 10', 12' and 16' Proposed Traffic Noise Barrier
- Traffic Noise Barriers to be Constructed for the SM Wright Project (CSJs: 0092-01-052, 0197-02-108, & 0092-14-081)

N

0 300 600 900
SCALE IN FEET

0 90 180 270
SCALE IN METERS

Reference Section 4.16.2
Year of Aerial Photograph: 2011.

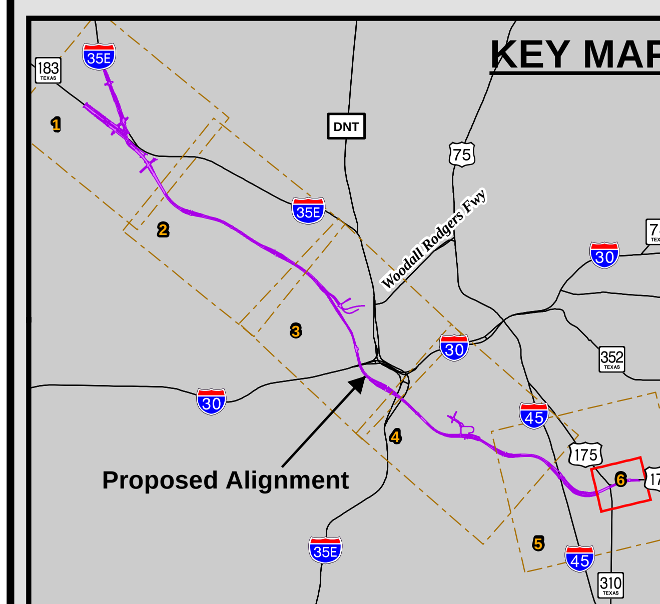
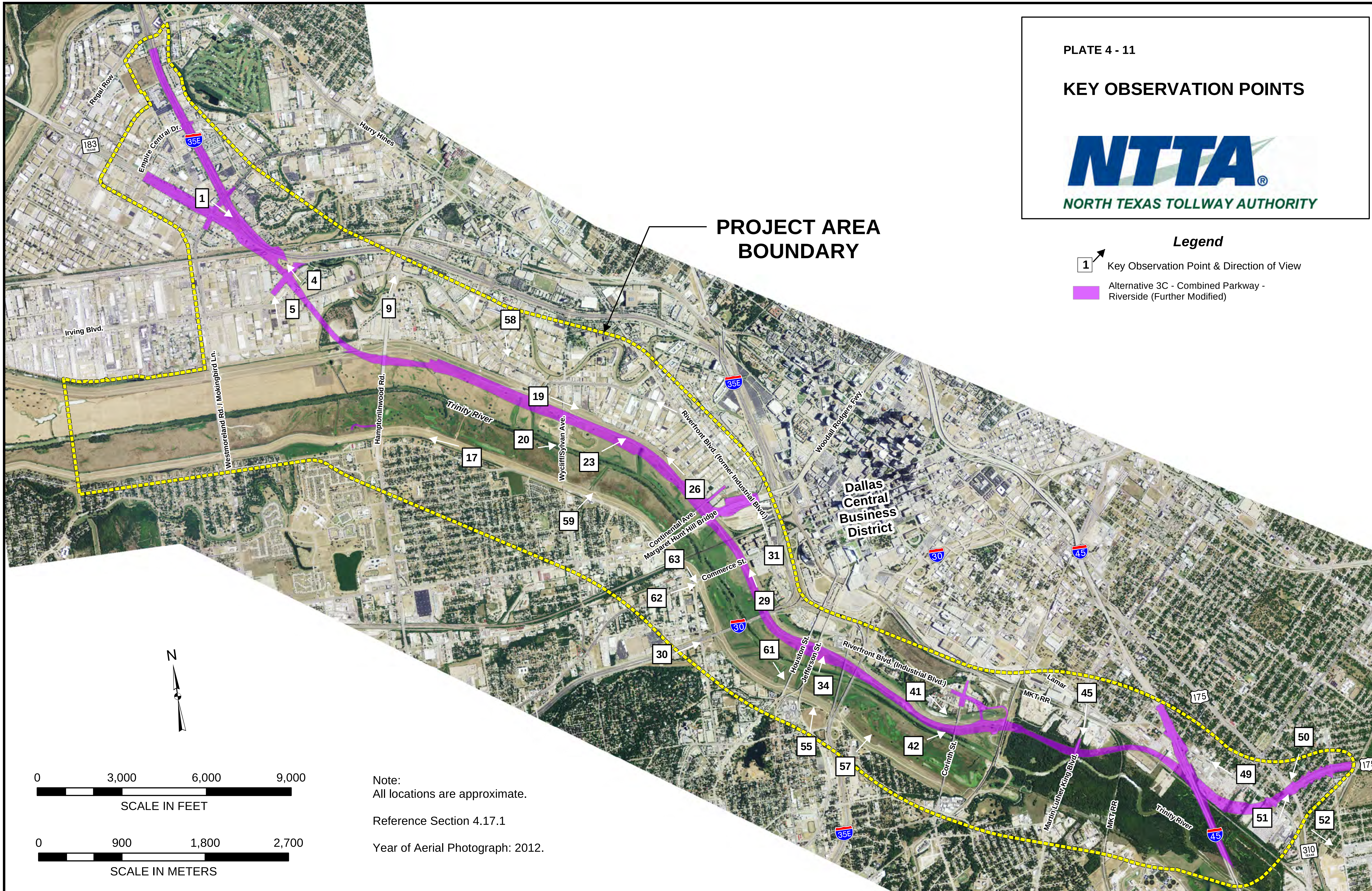


PLATE 4 - 11

KEY OBSERVATION POINTS

NORTH TEXAS TOLLWAY AUTHORITY



Legend

1 Key Observation Point & Direction of View

Alternative 3C - Combined Parkway - Riverside (Further Modified)

Note:
All locations are approximate.

Reference Section 4.17.1

Year of Aerial Photograph: 2012.

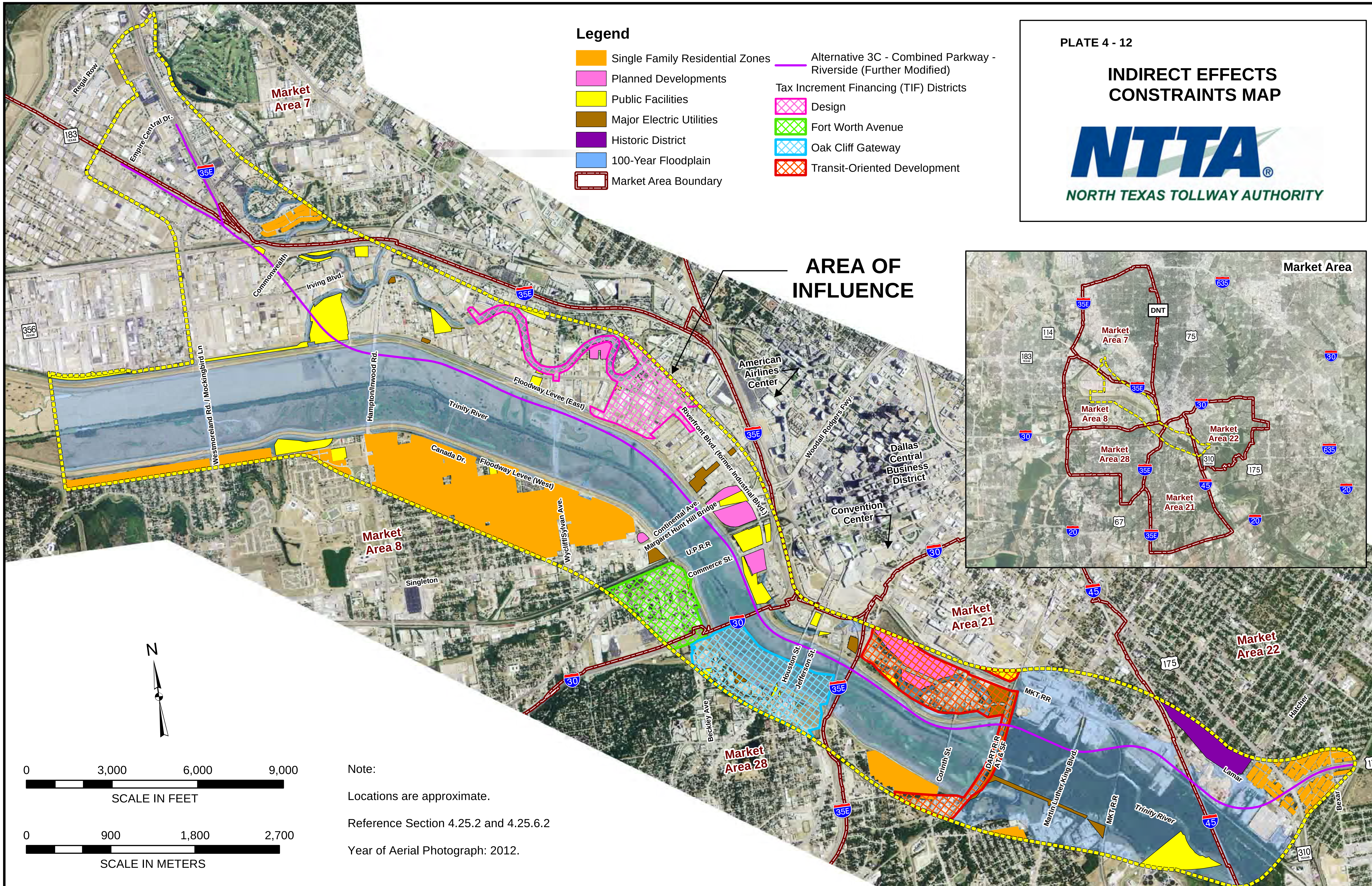
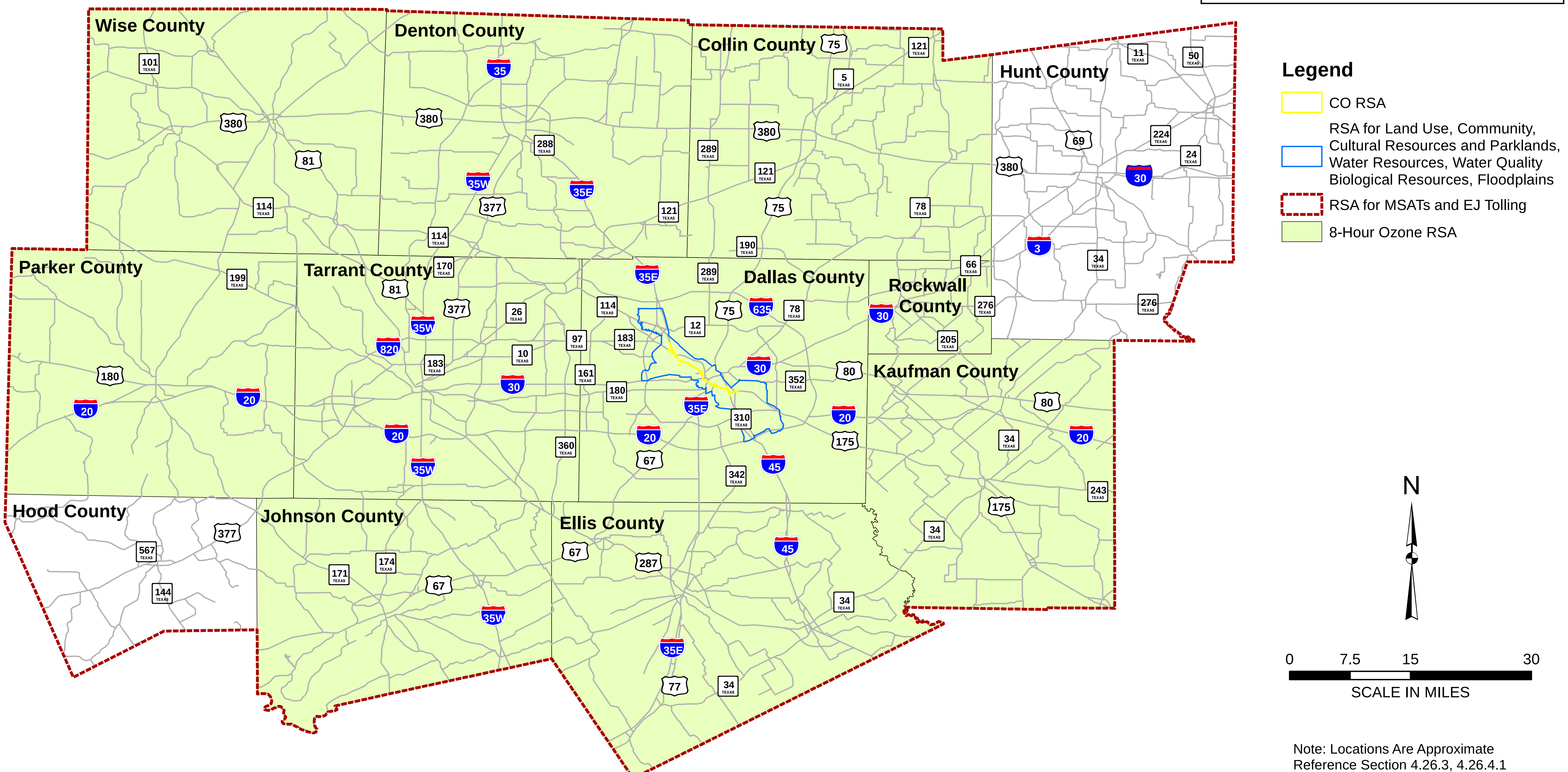

Legend
Single Family Residential Zones
Planned Developments
Public Facilities
Major Electric Utilities
Historic District
100-Year Floodplain
Market Area Boundary
Alternative 3C - Combined Parkway - Riverside (Further Modified)
Tax Increment Financing (TIF) Districts
Design
Fort Worth Avenue
Oak Cliff Gateway
Transit-Oriented Development
PLATE 4 - 12
INDIRECT EFFECTS CONSTRAINTS MAP
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
AREA OF INFLUENCE
Market Area
Market Area 7
Market Area 8
Market Area 21
Market Area 22
Market Area 28
American Airlines Center
Dallas Central Business District
Convention Center
Trinity River
Floodway Levee (East)
Floodway Levee (West)
Riverfront Blvd. (former Industrial Blvd.)
Westmoreland Rd. / Mockingbird Ln
Hampton/Inwood Rd.
Canada Dr.
Wycliff/Sylvan Ave.
Continental Ave.
Margaret Hunt Hill Bridge
U.P.R.R
Commerce St.
Singleton
Irving Blvd.
Commonwealth
Empire Central Dr.
Regal Row
Woodall Rodgers Fwy.
Houston St.
Jefferson St.
Beckley Ave.
Corinth St.
DART R.R AT&SF
MKT RR
Martin Luther King Blvd.
MKT R.R
Lamar
Hatcher
Bexar
N
0 3,000 6,000 9,000
SCALE IN FEET
0 900 1,800 2,700
SCALE IN METERS
Note:
Locations are approximate.
Reference Section 4.25.2 and 4.25.6.2
Year of Aerial Photograph: 2012.

PLATE 4 - 13

RESOURCE STUDY AREAS (RSAs) FOR THE CUMULATIVE IMPACTS ANALYSIS

NORTH TEXAS TOLLWAY AUTHORITY



Note: Locations Are Approximate
Reference Section 4.26.3, 4.26.4.1
4.26.4.2, 4.26.4.3 and Table 4-54