expected to decrease over time due to the EPA's vehicle and fuel regulations. Based upon this assessment, air quality impacts do not appear to be a major practicability constraint for Alternative 2B.

This project is located within Dallas County, which is part of the EPA's designated nine-county serious nonattainment area for the 2007 eight-hour ozone standard; therefore, the transportation conformity rule applies. The proposed project is included in the area's financially constrained long-range MTP (*Mobility 2035*) and the 2011-2014 TIP, as amended. The USDOT (FHWA/FTA) found the MTP and the TIP to conform to the SIP on July 14, 2011. Analyses for the subsequent FEIS will be conducted based on the current MTP at that time. During the FEIS preparation process and prior to issuance of a ROD by the FHWA, appropriate measures would be taken to ensure that the proposed project is consistent with the conforming MTP and the TIP/STIP.

4.1.5.12 Traffic Noise Impacts

As discussed in the **SDEIS Section 4.15 (Noise Impacts)**, existing and predicted traffic noise levels were modeled at receiver locations that represent the land use activity areas adjacent to Alternative 2B that may be impacted by traffic noise and may potentially benefit from feasible and reasonable noise abatement. The following paragraphs describe the impacts:

The southern terminus is an existing heavy traffic area with south US-75 connecting with US-175. Land use is single-family residential with a few retail/commercial facilities. In this area, 106 residences would have noise levels that exceed NAC criteria in the design year.

The northern terminus is an existing heavy traffic area at the IH-35E and SH-183 split. Land use is retail/commercial with a residential neighborhood known as Arlington Park located approximately 300 feet east of the existing freeways. In this area, Alternative 2B provides connecting ramps to the existing freeway system. Nineteen residences and one small playground/park (Sleepy Hollow Park) near the northern terminus would have noise levels that exceed NAC criteria in the design year.

In the central corridor from the Lamar Street and Starks Avenue intersection, Alternative 2B follows Lamar Street, Riverfront (Industrial) Boulevard, and Irving Boulevard toward the northern terminus. Land use is primarily retail/commercial/industrial along the corridor with the exception of a residential neighborhood located adjacent to Lamar Street between MLK and Starks Avenue. There are no predicted noise impacts to the retail/commercial/industrial areas adjacent to Alternatives 2B. A portion of the residential neighborhood (between IH-45 and Hatcher Street) is designated as the Colonial Hill Historic District. In addition to the impacts at the northern and southern termini, 76 residences primarily located along Lamar Street between MLK and Starks Avenue would have noise levels that exceed NAC criteria in the design year.

A noise wall analysis was performed for the impacted areas. Based on the analysis, noise walls were determined to be both feasible and reasonable only at the residential neighborhoods located at the southern terminus of the project. Noise walls in this area would reduce noise levels by at least 5 dBA at impacted receivers. Noise walls to mitigate impacts to the areas further north along Lamar Street between MLK and Starks Avenue and at the northern terminus would not be reasonable and feasible. **SDEIS Plate 4-33** shows the noise impacted areas. The noise analysis and discussion regarding noise impacts and feasible and reasonable abatement measures will be updated in the FEIS in accordance with TxDOT's (FHWA approved) April 2011 Guidelines for Analysis and Abatement of Roadway Traffic Noise.

4.1.5.13 Impact of Floods on Human Safety

The subject of flooding is addressed in **SDEIS Section 4.13 (Floodplain Impacts)**. Alternative 2B would be located generally landside of the Dallas Floodway levees on land protected from river flooding by the levees, and protected from localized flooding by a system of sumps and pump stations which are part of the Dallas Flood Control District. The floodplain in the project area includes the floodway zone within the levees, as well as designated floodplain or floodway acreage not within the levees. **Table 4-17** summarizes the floodplain impacts of Alternative 2B.

TABLE 4-17. ALTERNATIVE 2B POTENTIAL IMPACTS TO FLOODPLAIN FROM FEMA FLOOD MAPPING

FEMA Flood Zone	Floodplain Impact (Acres)
Zone X (Levee Protected)	264
Zone AE (Floodway) Trinity River Main Stem	37
Zone AE (Floodway) Developed Areas	23
Zone AE (100-year) Developed Areas	16
Note: Calculated areas are estimates only.	

For Alternative 2B, the Zone X acreage reported in the table consists of lands protected from Trinity River floodwaters by the Dallas Floodway levees. In this case, FEMA defines Zone X (shaded) as "areas protected by levees from 100-year flood" (FEMA, 2007a-i). Such areas are not Special Flood Hazard Areas (inundated by 100-year flood). The various Zone AE acreages (76 total acres) reported in the table are sump and watercourse crossings, and a portion of the Dallas Floodway land crossed in the southern segment of the study area. These areas are designated by FEMA as Special Flood Hazard Areas. All of these crossings are elevated bridge crossings, and will be designed for no loss of floodwater conveyance or storage.

The effective CDC hydraulic models for the Main Stem of the Trinity River, which are used to evaluate project impacts for compliance with the 1988 USACE ROD criteria (USACE, 1988) and CDC requirements (NCTCOG, 2009a), reflect the federally authorized DFE project (Cadillac Heights and Lamar Levees) in the reach of the Trinity River downstream of the AT&SF Railroad bridge. Alternative 2B would be located within the levee protected area on the landside of the existing Dallas Floodway east levee and the proposed Lamar Levee, except for elevated bridge crossings in the southern segment that would be designed to avoid increases in flood elevations and loss of valley storage. Therefore, it has been determined that Alternative 2B meets the 1988 ROD hydrologic and hydraulic criteria.

4.1.5.14 Risks Associated with Implementation of the Action

As discussed in **LSS Section 4.1.4.12**, the "risks" discussed in this section focus on levee stability issues. Alternative 2B, as presented in the SDEIS, would cross the very south end of the Dallas Floodway east levee while crossing over the DART and AT&SF bridges. However, a design refinement developed since the publication of the SDEIS for avoidance of historic resources (see **LSS Chapters 2 and 5**) also avoids contact with the levee at this location; therefore, there is no discussion of risk associated with this particular Build Alternative.

4.1.5.15 Incompatible Development

The potential for induced development resulting from Trinity Parkway is presented in **SDEIS Section 4.24.1 (Indirect Impacts)**. The analysis identifies areas where natural, governmental, or other constraints would make future change in land use unlikely. **SDEIS Plate 4-38** is a "constraints map" depicting areas that would be unsuitable or unlikely for future development or redevelopment activities. The constraints map identifies the Dallas Floodway in its entirety and the related landside sump areas as being unsuitable or unlikely for development. The Indirect Impacts analysis is based on the presumption that any 100-year floodplain areas in the study area (including areas in the Dallas Floodway and the surrounding levee-protected lands) would be unavailable for development. Generally, the majority of the wetlands in the project area are within the Dallas Floodway and would unlikely be developed.

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 City ownership generally extends at least to the landside levee toes on both sides of the Dallas Floodway, and the regulatory interest may extend further landside based on actual public ownership or other development constraints, including building setbacks to assure levee stability. In the sump areas, the City's land ownership extends at least from top of bank to top of bank. Accordingly,

there will be no induced incompatible development in floodplains in the project area due to the implementation of Alternative 2B.

4.1.5.16 Aesthetics

LSS Chapter 2 (Alternatives Considered) describes the routes and configurations of Alternative 2B, and **LSS Plates 2-3A** and **2-3B** present engineering plans, roadway profiles and typical sections of Alternative 2B. **SDEIS Section 4.16 (Visual Impact Analysis)** provides a visual analysis for Alternative 2B following the FHWA visual impact assessment protocol (FHWA 1988). Additionally, visualizations of Alternative 2B were displayed (as videos) at the Public Hearing for the Trinity Parkway DEIS in Dallas on March 29, 2005, and at the public hearing for the Trinity Parkway SDEIS in Dallas on May 5, 2009.

Alternative 2B would be predominantly "at-grade," except at interchanges where the mainlanes would overpass existing cross streets. Considerable visual impacts would change the community setting in the areas along Riverfront (Industrial) Boulevard near Woodall Rodgers Freeway. Residents, business employees, business patrons, and motorists would experience strong visual changes due to the highly visible roadway that would obscure views and greatly alter the character of the landscape, as shown in **Figure 4-3**.

FIGURE 4-3. VIEW ALONG RIVERFRONT (INDUSTRIAL) BOULEVARD ADJACENT TO ALTERNATIVE 2B

Note: Looking northwest toward the Market Center Boulevard Intersection.

As it approaches downtown Dallas, Alternative 2B would elevate to more than 50 feet above grade to clear Woodall Rodgers Freeway, and then would be lowered to underpass Houston-Jefferson and

IH-35E. **LSS Plates 4-6** through **4-10** at the end of this chapter provide bird's eye views of Alternative 2B in the areas of (i) Hampton Road, (ii) Sylvan Avenue, (iii) Continental Street, (iv) Houston Street, and (v) the DART bridge. These plates are freeze-frames taken from the 3-D visualizations used in the May 2009 Public Hearing.

The elevation of the Trinity Parkway mainlanes at Woodall Rodgers Freeway appears unavoidable because of the need to avoid the Lew Sterrett Justice Center and its associated parking garage, as well as the adjacent UPRR Railroad track. Elevated loop ramps connecting Alternative 2B to the Woodall Rodgers Freeway may be a concern to the City concerning the MHH Bridge approaches, as this design is inconsistent with the City's plans to showcase this unique signature bridge. See discussion in **LSS Section 4.1.4.14**.

Motorists using Alternative 2B would predominately see the sides of commercial businesses and a few residential neighborhoods and would have intermittent views of the downtown skyline. In locations of bridges, skyward views would be limited and expose the top of the previously mentioned buildings in some locations. The east levee and the buildings in the Dallas CBD would be more visible to existing motorists because of the widened corridor and more set-back building frontages. However, Alternative 2B would not promote visibility from the new road to the proposed Trinity River Floodway Park, which is important to the City of Dallas. The views of the proposed park from the at-grade facility would be obstructed by the levee.

The southern terminus would be a dominant visual feature for adjacent residential and commercial viewers. For many of the adjacent residents, Alternative 2B and/or noise walls associated with this alternative would serve as a visual and physical barrier running through their neighborhood.

4.1.5.17 Historic Values

SDEIS Section 4.7 (Cultural Resources and Parklands) and **Chapter 5 (Draft Section 4(f) Evaluation)** provide an evaluation of potential impacts to cultural resources with historic significance. **LSS Chapter 5** provides additional discussion of historic values. The discussion is not repeated here. Numerous historic-age resources are located within the Trinity Parkway project area, including properties, bridges, and districts that are listed in or eligible for the NRHP. Alternative 2B, as presented in the SDEIS, would involve potential adverse impacts to such resources. As part of the Section 106 process discussed further in **LSS Chapter 5**, an analysis of measures to avoid and minimize impacts to these resources was performed, which involved the development of design refinements to either completely avoid the resources or minimize impacts such that they are not considered to be adverse.

4.1.5.18 Summary of Practicability Assessment for Alternative 2B

Based on the individual assessments in **LSS Sections 4.1.5.1** through **4.1.5.17** above, the performance of Alternative 2B with respect to five factors summarized below may substantially affect its practicability. It is noted the alternative would be located outside the Dallas Floodway, and therefore would have the benefit of reduced impacts to floodplains and wetlands. Nevertheless, there are several disadvantages that could be impediments (either individually or collectively) for Alternative 2B to be considered a practicable alternative.

Project Costs: The total estimated cost of Alternative 2B is $1.87 billion (2011 dollars). NTTA has not stated an amount that can be funded by toll-based revenue bonds on the Trinity Parkway. However, a very preliminary estimate in the $0.5 to 1.0 billion range could be made, assuming 100,000 vehicles per day at a $0.15 per mile toll rate at start-up, and escalating traffic, tolls and O&M costs over a 30 year period. Project costs that exceed the amount that can be financed through toll-based revenue bonds would have to be funded from other sources.

Logistics: A constraint influencing the practicability of Alternative 2B is the length of time from startup of engineering/construction activities until the Trinity Parkway could be fully open to traffic. This length of time is estimated to be unusually long (9 years) because of the large-scale, sequential tasks which comprise the schedule. The time to completion is a critical element of the financing of a toll project because of the impact of the "interest clock" on construction bonds, which would accumulate until toll collections begin. The major component of the project affecting logistics and schedule is the relocation of electric transmission lines in the corridor, particularly the Oncor 345 kV line. While the project schedule would be refined during final design, it is not anticipated that such refinement would result in a significantly shorter schedule or affect the opening of the tollway.

Locational Disadvantages: The physical location of Alternative 2B in close proximity to the mainlanes of the Mixmaster causes restrictions on ramp access at the connections to South RL Thornton Freeway (IH-35E) and the Houston-Jefferson couplet. Alternative 2B would have no connections to Houston-Jefferson or South RL Thornton Freeway. The lack of connection to South RL Thornton Freeway would be a shortcoming, meaning that commuters on South RL Thornton Freeway could not connect to Trinity Parkway and bypass the downtown Mixmaster interchange. This lack of a connection would be particularly critical in the event of a traffic incident in the Mixmaster. The lack of connection also conflicts with certain Dallas Council actions and community desires dating back to 1997 calling for provision of access from South RL Thornton Freeway to Trinity Parkway. Additionally, the location of Alternative 2B (outside the floodplain) may also restrict development in some areas of the corridor because of its influence on the size and depth of developable land remaining in the corridor. For instance, the

Alternative 2B ROW would occupy nearly all available developable land between Riverfront (Industrial) Boulevard and the east levee from Reunion Boulevard almost to Corinth Street, a distance in excess of 2 miles.

Needs and Welfare of the People: Alternative 2B would not provide compatibility with local development plans. Acceptance of Alternative 2B by the City is not assured, and would be contrary to citywide votes held May 2, 1998 and November 6, 2007 in which Dallas citizens supported a Trinity Parkway location within the Dallas Floodway. Alternative 2B is inconsistent with the majority of voters' opinions expressed in these elections. Alternative 2B would require the acquisition of 206 acres of privately owned land and 245 buildings. Opposition to Alternative 2B was communicated during the official comment period for the SDEIS from March 20, 2009 to June 30, 2009. There were 165 statements submitted by the general public expressing concern that Alternative 2B would have "devastating impacts" (or similar) to the established businesses and residential communities in the area. Four council members and the Mayor submitted public comments opposed to Alternative 2B. Eight business associations also submitted comments in opposition to Alternative 2B.

Aesthetics: As it approaches downtown Dallas, Alternative 2B elevates to more than 50 feet above grade to clear Woodall Rodgers Freeway. The Alternative 2B mainlanes in the vicinity of downtown Dallas may affect the character around the northwestern corner of the CBD. In this area, Alternative 2B would not promote visibility from the new road to the proposed Trinity River Floodway Park, which is important to the City of Dallas. Additionally, proposed loop ramps to Woodall Rodgers Freeway could introduce visual impacts to the MHH Bridge. The MHH Bridge, which began construction in 2009, was designed by internationally-known architect Santiago Calatrava, and is generally perceived as a "signature" piece and possibly a tourist attraction.

4.1.6 Practicability of Alternative 3C – Combined Parkway Further Modified

Alternative 3C is planned to be constructed in part on an embankment riverside of the east levee of the Dallas Floodway. As described in **Chapter 2**, approximately 6.2 miles or approximately 70 percent of Alternative 3C would be located within the Dallas Floodway on land owned by the City of Dallas. Alternative 3C would be approximately 8.67 miles in length, would occupy approximately 379 acres of ROW, and would cost approximately $1.42 billion (2011 dollars) to construct. Major interchanges associated with Alternative 3C include:

- Direct connections at IH-35E/SH-183 (northern terminus), US-175/SH-310 (southern terminus), Woodall Rodgers Freeway Extension, (north-side only) and IH-45;

- Full diamond interchanges at Hampton/Inwood Road, Sylvan/Wycliff Avenue, Houston/Jefferson Streets, MLK, and Lamar Street/SH-310;
- Half diamond interchanges at Commonwealth Drive, Continental Avenue, and Corinth Street;
- Direct connection to the Corinth Street/Riverfront (Industrial) Boulevard intersection via a braided ramp pair originating in the area of MLK; and
- Flood separation wall protection at major bridge underpasses, which include Continental Avenue, Woodall Rodgers Freeway Extension, UPRR Bridge, IH-30, IH-35E, Corinth Street, and DART Bridge.

See **LSS Section 2.3.4** for a detailed description, typical sections, layout map, and a computer generated rendering graphic of Alternative 3C.

4.1.6.1 Economic Impacts

In a typical new location roadway project, the conversion of private land to transportation use could have negative effects to the local economy both in the short and long term. **SDEIS Section 4.6.2.2 (Local Economic Impacts)** provides an analysis of the potential effects of Alternative 3C on the economy of the City of Dallas and Dallas County.

In the long term, direct impacts would occur when land and improvements are removed from the tax rolls. These relocations and displacements would impact the City tax base for some time until redevelopment occurs. Alternative 3C would require the acquisition of land from 170 parcels, including 157 acres of privately owned land, and would displace 35 buildings. **Table 4-18** below provides a summary of the buildings displaced by type. **SDEIS Appendix C (Relocation Assistance Information)** provides a more detailed tabulation of the affected properties and buildings. The number of displacements would be reduced in Alternative 3C through the use of public land in the Dallas Floodway to a level where the impact to the tax base is not considered a major economic constraint.

TABLE 4-18. ALTERNATIVE 3C ESTIMATED NUMBER AND DESCRIPTION OF DISPLACEMENTS

Type of Displacements	Number of Displacements
Residential Buildings	6
Commercial/ Industrial Buildings	29
Community / Recreation Centers	---
Pump Stations/ Levee Operations Office Buildings	---
Police and Fire Station Buildings	---
Public Health Care Facilities	---
Schools	---
DISD Facility Buildings	---
Places of Worship	---
Cemeteries	---
Total	**35**

The estimates of tax base value loss and tax revenue loss due to ROW acquisition have been updated from the estimates provided in **SDEIS Section 4.6.2.2 (Local Economic Impacts)**. The information for Alternative 3C is presented below as **Table 4-19**. The total taxable value loss due to displacements and acquisitions for Alternative 3C is estimated to be approximately $54 million (2011 dollars), affecting tax collections for Dallas County, City of Dallas, and DISD.

TABLE 4-19. ALTERNATIVE 3C ESTIMATED TAX VALUE LOST

Entity	Percent Tax Rate (%)	Annual Tax Revenue Loss (2011 $)	Total Tax Base ($)	Percent Loss from Tax Base (%)
Dallas County	0.62377	$336,925	$155,514,580,710	0.0347%
City of Dallas	0.797	$430,494	$77,295,235,801	0.0699%
DISD	1.290347	$696,971	$74,661,069,947	0.0723%
Total Tax Value Lost: $54,014,263				
Sources: Insight Research Corporation, 2011. 2011 tax rates and base property values, Dallas Central Appraisal District.				

As with other transportation projects, losses to the City tax base would accrue for some time until redevelopment occurs. The location of Alternative 3C, in the Dallas Floodway, minimizes the amount of private land and structure converted to transportation use and in effect minimizes the loss of tax revenue.

Local business owners consider construction impacts (detours, lane closures, etc.) to have very detrimental economic impacts to their businesses. This is especially true because traffic disruptions associated with a large-scale project like the Trinity Parkway would span several years and influence customer accessibility. Due to the location of Alternative 3C, construction impacts to local businesses would be minimized since the majority of this Build Alternative would be within the Dallas Floodway rather than along existing City streets.

According to information obtained from Dun & Bradstreet by the City of Dallas, Office of Economic Development, Research & Information Division (January 2010), approximately 15 to 20 businesses would be displaced by Alternative 3C. The number of businesses differs from the number of building displacements shown in **Table 4-18** as some buildings are occupied by multiple businesses and some businesses occupy a complex comprised of multiple buildings. The number of jobs affected by the business displacements would range from approximately 72 to 203 jobs. In the short-term, there would be some local jobs created by construction and operation of the tollway.

4.1.6.2 Project Costs

Cost estimates for Alternative 3C are provided in **LSS Appendix D**, and include roadway construction, engineering, utility relocations, contingencies, ROW acquisition, environmental remediation and mitigation. The total estimated cost of Alternative 3C is approximately $1.42 billion (2011 dollars).

Construction Costs: Construction cost (roadway, structures, drainage, signage, lighting, traffic control, toll gantries, etc.) is estimated to be $1.27 billion. Structures, bridges, and walls are the largest portion of construction costs (approximately $445 million). The cost of traffic control (approximately $46 million) is minimized because the majority of construction would occur within the Dallas Floodway, not existing streets. The construction cost identified above includes the costs for environmental mitigation and anticipated structural levee remediation features proposed to address pier penetrations of the Dallas Floodway levees that are discussed separately below.

Environmental Mitigation Cost: The estimated cost for environmental mitigation is $16.3 million. The cost includes vegetation enhancements ($432,900), noise wall construction ($2.8 million), mitigation for impacts to waters of the U.S. ($1.3 million), and remediation for hazardous material sites ($3.3 million). The environmental mitigation cost also includes asbestos abatement ($7.7 million) and demolition ($746,000) associated with residential and commercial displacements.

The cost of asbestos abatement and demolition of existing buildings is directly correlated to the number of displacements proposed for a project. As previously discussed, Alternative 3C minimizes impacts to buildings; therefore, the cost of these elements of environmental mitigation is also minimized.

Levee Mitigation Cost: A conservative estimate of $30 million to mitigate levee impacts from Alternative 3C has been included in the construction cost as a placeholder and will be further refined once the City and the USACE finalize the 100-year and SPF levee remediation plans (see **LSS Chapter 3**).

Right-of-Way and Utility Relocation Costs: ROW costs are considered modest for Alternative 3C since the number of displacements is minimized. The estimated cost for ROW is approximately $103.5 million. See **Table 4-18** for a list of the number and type of displacements associated with Alternative 3C. The cost of utility relocations (approximately $38.6 million) is also minimized due to the proposed location within the Dallas Floodway. Notably, Alternative 3C avoids the rebuilding and possible relocation of approximately 2 miles of the new Oncor 345 kV transmission line in the median of Irving Boulevard from Regal Row to Sylvan Avenue. See also **LSS Section 4.1.6.4 (Alternative 3C Consideration of Logistics)**.

Operations and Maintenance Cost: O&M costs are not included in the total project cost discussed above. These are separately reported in **LSS Appendix D**. The costs are estimated over a feasibility study 52-year period (2013 – 2065) based on standard NTTA O&M practices. The estimated O&M cost for Alternative 3C is $233 million (2008 dollars). **LSS Appendix D** also reports the O&M costs escalated over a feasibility study 52-year period (2013 – 2065) based on standard practices for NTTA O&M. The escalated O&M costs are estimated at $593 million assuming a 2.75 percent escalation rate over the 52-year period. These estimated O&M costs will be updated in the FEIS using current NTTA parameters.

With Alternative 3C, it is proposed that the Dallas Floodway could be used as a borrow source to produce needed material to build roadway embankments (see **LSS Section 4.1.6.4**). There would be an extra maintenance responsibility for the excavated areas in the Dallas Floodway. This maintenance responsibility would be in addition to the annual O&M expenditures. Based on preliminary coordination with the City of Dallas, it is anticipated that the City Flood Control District would take responsibility for removing sediment and reestablishing grass cover in the excavated areas, as necessary, in the event intermittent flooding causes substantial sedimentation of these features following completion of the construction of the Trinity Parkway. The estimated cost of this sediment removal is $1 million per year.

As described in **LSS Chapter 2 (Alternatives Considered)**, Alternative 3C would be protected by embankments and flood separation walls to a level above the 100-year flood event in the Dallas Floodway, an event with one percent chance of being equaled or exceeded in any one year time period. This level of protection meets or exceeds NTTA and TxDOT standards for design of highway mainlane facilities. Nevertheless, costs associated with potential damages in the event of a storm exceeding the 100-year event (sufficient to cause overtopping of the roadway) have been estimated in **SDEIS Section 6.6 (Cost Estimates for Flood Damages in the Event of a Flood Exceeding the 100-Year Event in the Dallas Floodway)**. This estimate shows aesthetic treatment replacement ($1.3 million), debris and sediment removal ($1.2 million), and administration, environmental coordination, and miscellaneous repairs ($250,000) would be necessary to restore Alternative 3C after an inundation event. These costs would total approximately $2.8 million. Assuming an average traffic volume of 120,000 vehicles per day on the Trinity Parkway and a future year toll of $2.00 for a full-length trip, a 5-day shutdown of the roadway is estimated to cost $1.2 million in lost toll revenue. This makes the total cost of shutdown and recovery around $4.0 million for Alternative 3C, per extraordinary (over 100-year level) event. **LSS Appendix F** further discusses this issue and estimates an additional $4.4 million in repair costs and downtime in the event there is physical damage to the road itself due to unforeseen flow concentrations and velocities during the inundation and recession periods for a flood in excess of the 100-year level. This assumption would increase the total repair and downtime allowance to $8.4 million. Considering the 100-year recurrence interval, this equates to an annualized cost of $84,000.

4.1.6.3 Consideration of Existing Technology

Alternative 3C could utilize current engineering technology for roadway and related construction, and there appear to be no unusual or insurmountable technological issues with this Build Alternative. There is expected to be gradual adoption of new or improved technologies in the road building and toll collection fields over time. In general, any special technology for Alternative 3C is built into the cost estimates reported in **LSS Section 4.1.6.2** above.

It is noted that Alternative 3C would be located within the Dallas Floodway for about 70 percent of its length. Within the Dallas Floodway, the mainlanes are proposed to be protected from inundation by the 100-year (one percent annual chance) flood event. This level of protection is commensurate with similar roads in the Dallas area and around the state and meets or exceeds NTTA and TxDOT standards for design of highway mainlane facilities.

4.1.6.4 Consideration of Logistics

This section identifies logistics issues related to the implementation of Alternative 3C, including impacts to project schedule and construction phasing. Information used in the discussion of logistics is taken from the **SDEIS Environmental Consequences Sections 4.5 (Relocation and Displacement Impacts)**, **4.17 (Hazardous / Regulated Materials), 4.18 (Utilities)**, and **4.20 (Temporary Impacts During Construction)**. In addition, implementation schedules have been developed for each Build Alternative in the LSS to assess time to completion. The estimated schedule for Alternative 3C is summarized below, with additional details provided in **LSS Appendix D**.

For Alternative 3C, the length of time from startup of engineering/construction activities until the Trinity Parkway could be fully open to traffic is estimated to be 6.25 years. The sequence of activities is depicted in **Table 4-20**, assuming a start date of January 1, 2013.

TABLE 4-20. ALTERNATIVE 3C LOGICAL SEQUENCE OF ACTIVITIES AFTER ANTICIPATED ROD

Activity	Begin Date	Completion Date
Preliminary Engineering[1]	First Quarter 2013	Third Quarter 2013
Select Consultant Team and Award[2]	First Quarter 2013	Second Quarter 2013
Traffic and Revenue Studies[3]	First Quarter 2013	Third Quarter 2013
Local, State and Federal Permitting[4]	First Quarter 2013	First Quarter 2014
Surveys and Preliminary Environmental Work[5]	Second Quarter 2013	Third Quarter 2015
ROW Acquisition and Relocations	Fourth Quarter 2013	Fourth Quarter 2015
Municipal Setting Designation – Application/Approval	Fourth Quarter 2014	Fourth Quarter 2015
Property Cleanup, Asbestos Abatement and Demolition	First Quarter 2014	Fourth Quarter 2018
Utility Relocations[6]	First Quarter 2014	Fourth Quarter 2014
Final Tollway Design[7]	Second Quarter 2013	Fourth Quarter 2014
Construction Bid and Award	Third Quarter 2015	Fourth Quarter 2015
Construction	Second Quarter 2016	Second Quarter 2019

Notes:
1. 95 percent Schematic Update and Review by TxDOT and the FHWA, Prepare O&M Costs, Develop Market Valuation, Final Schematic Design Preparation and Approval, Interstate Access Study, Major Project Study, Design Criteria Manual
2. Includes ROW Surveyors and Acquisition Support, Environmental Phases I and II, Section Design and Review Engineers, Corridor Managers, Contract Administration, and Geotech
3. Includes Value Engineering Study
4. Includes Section 404 and Section 408 Permits
5. Includes Set/Recover Controls, Deed Research, Parcel Map Preparation
6. Includes design of utility relocations, bid, award and construct
7. Includes select and award consultant contracts

As shown in **Table 4-20**, Alternative 3C is estimated to have a completion date of Second Quarter 2019. Activities that most influence the schedule for construction within the Dallas Floodway include ROW acquisition, building and utility relocation, and construction within the Dallas Floodway. These are discussed briefly below:

Right-of-way Acquisition, Building and Utility Relocations: As described in **LSS Section 4.1.6.1 (Project Costs)**, there would be a relatively small number of displacements (35 buildings) required for Alternative 3C. A reasonable number of parcels located outside the Dallas Floodway levees (134 parcels) would be affected by ROW taking from this alternative. It would take approximately 2 years to acquire ROW and relocate the displaced commercial and residential buildings. This 2-year time frame would also encompass preliminary environmental work that would include the investigation of 17 high risk hazardous material sites. This is considered a reasonable schedule for these activities compared to other projects of this magnitude. Property acquisition and relocations are not considered a constraint to the practicability of this Build Alternative.

There are high voltage (138 kV) electrical overhead transmission lines, storm water outfalls, one major water line, and one major sanitary sewer line, which would need to be coordinated and cleared from the

Alternative 3C ROW. No natural gas lines, storm drainage pump stations, or storage sumps would be impacted by Alternative 3C. These utility relocations are considered typical for a project of this magnitude and are not considered logistical constraints, nor would they negatively impact the project schedule. Alternative 3C would also avoid impacts to the Oncor 345 kV transmission line (completed in 2010) in the median of Irving Boulevard from Regal Row to Sylvan Avenue.

Construction within the Dallas Floodway: Alternative 3C will have scheduling risks, which are inherent with construction in areas subject to flooding. However, based on experiences of recent years, periodic flooding has not been a serious impediment to work in the Dallas Floodway. There are many examples of successfully completed projects in the Trinity River floodplains including channel widening in the Dallas Floodway by the City of Dallas in the early 2000s, the reconstruction of the Westmoreland and Hampton Road Bridge Crossings, and the current MHH Bridge construction. Additionally, various components of the USACE DFE project have been completed downstream of the Dallas Floodway. The Dallas Floodway is typically subject to intermittent rains and possible flooding in the spring and fall, but there are long periods of low flows and dry conditions, particularly in summer. It is expected the grading contractor could beneficially use low flow periods in the Dallas Floodway to complete the required excavation and embankment included in Alternative 3C. Considering an 18-month grading period, accumulated delays due to wet conditions would not be expected to exceed 6 months in the worst case. Further, once the Trinity Parkway embankments have been established, the work area would be expected to be adequately protected from flooding events.

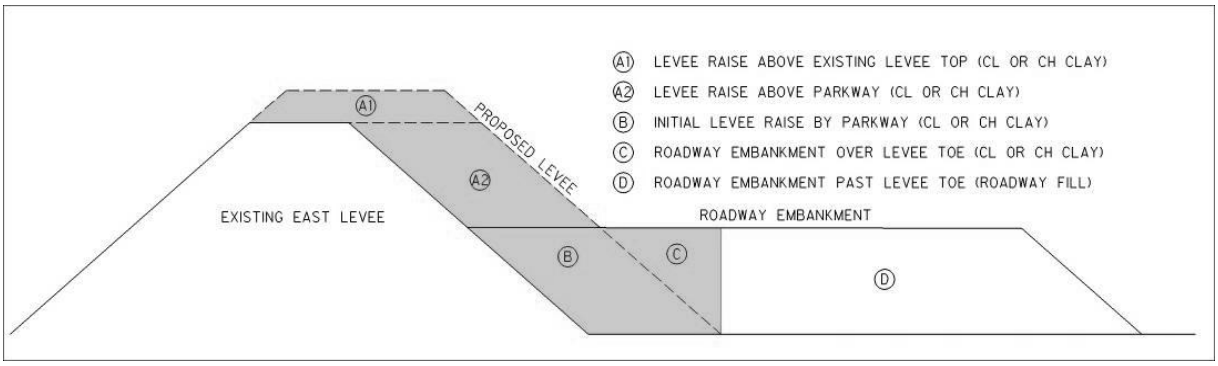
Inside the Dallas Floodway, Alternative 3C is proposed to be constructed on embankments built using material borrowed from the floodway. Contractor furnished fill could be used for any embankment needs for Alternative 3C segments located outside the Dallas Floodway. The borrow site excavation proposed within the Dallas Floodway is additionally expected to provide sufficient impervious material for expanding and raising the adjacent Dallas Floodway east levee from the DART Bridge (southern end of the Dallas Floodway) upstream to the Hampton Road bridge. The levee raise is a part of the flood damage reduction plans being considered by the USACE and City of Dallas for the Dallas Floodway and would require coordination for Alternative 3C. This work is generally described in **SDEIS Section 2.4.6 (Trinity Parkway Construction in the Dallas Floodway)** and **SDEIS Section 4.20.8 (Construction Excavation and Fill Requirements)**. Coordination with the USACE and the City on construction phasing and usage of borrow material from the floodway would continue in the event Alternative 3C is recommended by the FHWA as the preferred alternative. Results of this coordination would be presented in the FEIS. It is anticipated that usage of borrow material would depend on the timing of projects in the floodway and that agreements regarding borrow material would be made at a later date.

Since the completion of the SDEIS and in response to the USACE inquiries, further studies have been conducted to characterize the geotechnical suitability of soil materials from five proposed borrow areas identified for Alternative 3C. The soil data and analyses are documented in a 2009 Terracon geotechnical engineering report "Borrow Soil Suitability and Shrinkage Factor." The purpose of this analysis was to provide a characterization of soil materials in the borrow sites and to demonstrate an initial earthworks balance between the Trinity Parkway, the anticipated Dallas Floodway levee improvements adjacent to Trinity Parkway, and the proposed borrow excavations. The five proposed borrow areas, which correlate with the proposed location of BVP features (City of Dallas, 2003) that still must be evaluated for environmental acceptability and technical soundness by the USACE prior to implementation, were identified as:

1. Hampton Wetland Cells
2. West Dallas Lake
3. Urban Lake
4. Natural Lake
5. Corinth Swale (Oxbow Lake)

Figure 4-4 shows the basic cross section and soil type needs for the Alternative 3C embankments, including the adjacent levee improvements planned by the City of Dallas and the USACE that would need to be coordinated with construction of Alternative 3C. Levee fill sections A1, A2, B, and C (shaded) require low permeability fill to maintain a water-tight levee. The roadway embankment (section D) can incorporate higher permeability fill. Soil in the identified borrow areas was therefore classified into two applicable categories: (i) levee useable and (ii) roadway embankment useable.

FIGURE 4-4. TRINITY EARTHWORK SUMMARY



For Alternative 3C, the required volume of levee-usable soil was determined to be 1.32 million CY (Shapes A2, B, and C as shown in **Figure 4-4** from Hampton to the DART bridge). The roadway embankment-usable soil needs were determined to be 3.06 million CY (Shape D). The levee raise above

the existing levee top (Shape A1) within the proposed construction limits for Alternative 3C is assumed to be done by the City of Dallas after the Trinity Parkway is built.

The analysis of the five borrow sites shows there is enough levee-usable material to fill the Alternative 3C need shown above, plus a 3.15 million CY surplus. While a shortfall of 1.76 million CY of roadway embankment-usable soil was identified, the surplus levee-usable soil can be utilized in the embankment for Alternative 3C (Section D in **Figure 4-4**). **Table 4-21** summarizes the earthworks analysis to date.

TABLE 4-21. ALTERNATIVE 3C COMPARISON OF VOLUME NEEDS AND SUITABLE SOIL BORROW VOLUMES

Soil Suitability Type	Volume Needs[1] (CY)	Usable Excavation Volumes (CY)	Remainder (CY)
Levee	1.32 Million	4.47 Million	+ 3.15 Million
Roadway Embankment	3.06 Million	1.30 Million	- 1.76 Million
Total	**4.38 Million**	**5.77 Million**	**+1.39 Million (surplus)**

1. Includes 10% shrinkage for roadway (shapes C & D in **Figure 4-4**) and 25% shrinkage for levee raise (shapes A2 and B)

4.1.6.5 Locational Advantages

Alternative 3C would result in a significant encroachment within the Dallas Floodway; however, the facility would be designed in accordance with 23 CFR 650 Subpart A which would reduce the impacts of such encroachment to be consistent with standards established by the USACE, FEMA, and state and local governmental agencies. The locational advantages (including the functional need for locating in the floodplain) of Alternative 3C are discussed below. Alternative 3C satisfies the stated need and purpose of the project to improve mobility and provide compatibility with local plans. As shown in **Table 4-22,** Alternative 3C would provide northbound-to-westbound and eastbound-to-southbound connections to South RL Thornton Freeway (IH-35E). Other notable connections include half diamond interchanges at Commonwealth Drive, Continental Avenue, and Commerce Street, as well as a full diamond interchange at Houston/Jefferson Street. The inclusion of the IH-35E and Houston/Jefferson Street connections would be a substantial benefit to traffic flow in the event of traffic incidents in the Mixmaster.

TABLE 4-22. ALTERNATIVE 3C INTERCHANGE ACCESS

Interchange Location	Type of Interchange
Stemmons Freeway (IH-35E)/SH-183	Direct Connection via Ramps
Commonwealth Drive	Half Diamond Interchange
Hampton/Inwood Road	Full Diamond Interchange
Wycliff/Sylvan Avenue	Full Diamond Interchange
Continental Avenue	Half Diamond Interchange
Woodall Rodgers Freeway	Direct Connections (SB-EB and WB=EB)
Commerce Street	None
Houston/Jefferson Street	Full Diamond Interchange
South RL Thornton Freeway (IH-35E)	NB-WB, EB-SB Connection via Ramps
Corinth Street	Half Diamond Interchange
MLK	Full Diamond Interchange
IH-45	Direct Connection via ramps
Lamar Street	Half Diamond Interchange
SH-310	Half Diamond Interchange
US-175	Direct Mainlane Connection

SDEIS Section 2.3.12 (Access to IH-35E, US 175, and Corinth Street) lists various Dallas Council and community actions dating back to 1997 calling for provision of access from South RL Thornton Freeway (IH-35E) to Trinity Parkway. Alternative 3C would provide such access. The provision of enhanced access to critical freeways and streets by Alternative 3C provides a functional need for locating the facility in the floodplain.

The location of Alternative 3C (inside the floodplain) would not restrict development on the landside of the Dallas Floodway, and is consistent with the City of Dallas land use planning to date, including the City's BVP for the Trinity River Corridor (see **LSS Section 4.1.6.10**). Alternative 3C would generally avoid disruption of the business district situated between the Dallas CBD and the east levee, which would be consistent with the City's vision for this area.

4.1.6.6 Natural and Beneficial Values Served by Floodplains

Natural and beneficial floodplain values include fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, forestry, natural moderation of floods, water quality maintenance, and groundwater recharge (23 CFR 650, Subpart A). **SDEIS Section 3.4.6 (Waters of the U.S., including Wetlands)** provides an analysis of functions and values of aquatic features in the project area floodplains. **SDEIS Sections 4.8 (Impacts to Waters of the U.S., Including Wetlands), 4.9 (Water Body Modification; Vegetation and Wildlife Impacts), 4.12 (Water Quality Impacts), and 4.13 (Floodplain Impacts)** describe the impacts of Alternative 3C to floodplain values.

In terms of general impacts to fish and wildlife values, species diversity and density within floodplains strongly correlate with aquatic habitat and vegetation diversity considered along with the type, degree,

and frequency of disturbances. Therefore, aquatic habitat and vegetation impacts are used as an indicator of potential impacts to fish and wildlife. **SDEIS Section 3.4.3 (Vegetation within the Study Area)** provides a breakdown of land cover types in the Trinity Parkway Study Area. The total study area is 7,036 acres, of which urban areas comprise 56 percent (3,907 acres), maintained grass areas comprise 31 percent (2,198 acres), bottomland and riparian forests comprise 4 percent (290 acres), and water features or aquatic habitats comprise 9 percent of the area (641 acres). The "maintained grass" acreage primarily comprises the Dallas Floodway, a facility which has been almost entirely re-graded and realigned from its former natural floodplain condition, and which is subject to periodic mowing by the City of Dallas. **Table 4-23** below shows a summary of vegetation impacts for Alternative 3C.

TABLE 4-23. ALTERNATIVE 3C POTENTIAL IMPACTS TO VEGETATION

Assessment Area	Woodland (non-wetland)		Aquatic Habitats		Maintained Grass Areas	Total Undeveloped Area Impacts
	Bottomland Hardwoods	Riparian Forest	Waters of the U.S., Incl. Wetlands	Other		
3C Alignment**	12.8	6.7	27.4*	0.01	209.8	256.71
Potential Borrow Areas	---	13.8	63.5	---	258.3	335.6

Notes:
1. All quantities are shown in acres. Calculated areas are estimates only.
2. **---** = No impact anticipated for this alternative.

***** = Includes impacts associated with drainage sumps, open water, and river channel, most would be spanned by bridges.
****** = Alternative 3C would also require excavation from the potential borrow areas shown in this table.

There would be impacts from Alternative 3C on floodplain values related to wildlife movement, open space loss, and outdoor recreation potential due to the construction, operation, and maintenance of the new ROW. However, many of the natural values of the floodplain in the project area have already been altered by the creation of the Dallas Floodway levee system and the regular operation and maintenance of the system. The Dallas Floodway is not utilized for forestry or agriculture, and Alternative 3C would have no impact on these types of values that are sometimes associated with floodplains.

4.1.6.7 Waters of the U.S., including Wetlands and Water Quality

An overview of the wetlands and other jurisdictional waters (e.g., rivers, creeks, and sumps) within the Study Area is presented in the **SDEIS Section 3.4.6 (Waters of the U.S., including Wetlands)**. The effect of the Alternative 3C on wetlands is presented in **SDEIS Section 4.8 (Impacts to Waters of the U.S., including Wetlands)**. The SDEIS included a jurisdictional determination of waters of the U.S., including wetlands within the Dallas Floodway, which was approved by the USACE on June 19, 2006. In March 2011, a supplemental jurisdictional determination was submitted to the USACE requesting a reverification and time extension of the approval (Note: the delineated area for the Historic River Channel, which is currently utilized as sumps for storm water collection, increased slightly because the

2011 jurisdictional determination included drainage culverts connecting the sumps that were not included in the 2006 jurisdictional determination, resulting in a minor increase in the impacted acreage from the SDEIS). The USACE determined that there has not been a significant change in the location of waters of the U.S. from the date of the original approval and that an extension of the approved jurisdictional determination is in the public interest (see **LSS Appendix A**). As such, the approved jurisdictional determination is valid until March 24, 2016. The jurisdictional determination for the Dallas Floodway (USACE approved 2006 and 2011) was intended to provide a baseline for potential impacts to waters of the U.S. for the numerous Trinity River Corridor projects and was not limited to the scope of the proposed Trinity Parkway project. It should be noted that areas outside the geographic scope of the approved jurisdictional determination near the northern and southern termini of the Trinity Parkway project and along Irving and Riverfront (Industrial) Boulevards are occupied by urban development with low opportunity for the presence of aquatic features. However, aquatic features beyond the geographic scope of the approved jurisdictional determination were mapped in a manner consistent with USACE procedures for conducting jurisdictional determinations during the initial field investigations for the Trinity Parkway project. **Table 4-24** below shows impact data for Alternative 3C.

TABLE 4-24. ALTERNATIVE 3C POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

Emergent Wetlands		Forested Wetlands		Open Water - Intermittent*		Historic Trinity River Channel*		Intermittent Stream		Trinity River*		Total	
Fill	**Ex.**	**Fill**	**Ex.**	**Fill**	**Ex.**	**Fill**	**Ex.**	**Fill**	**Ex.**	**Fill**	**Ex.**	**Fill**	**Ex.**
17.01	20.63	1.28	--	4.45	2.53	1.55	--	0.15	--	2.98	40.35	27.42	63.51

Notes:
1. All quantities shown in acres. Calculated areas are estimates only. "**Fill**" impacts are expected from roadway construction; excavation ("**Ex**.") impacts are expected from potential borrow areas
2. Expected impacts are based on the jurisdictional determination approved by the USACE on March 24, 2011 (File # SWF-2011-00049).
3. **--** = No impact anticipated for this alternative.
4. The Historic Trinity River Channel refers to old meanders of the Elm Fork and West Fork Trinity River located outside the Dallas Floodway that consist of open channels with scattered tree growth that currently serve as sumps to collect local storm water runoff that eventually drains into the Dallas Floodway.

* Potential impacts to waters of the U.S., including wetlands, may occur from bridge column construction and can be addressed, minimized or possibly eliminated during final design.

As shown in **Table 4-24**, Alternative 3C would result in filling 27.42 acres and excavating 63.51 acres of jurisdictional waters of the U.S., including wetlands. Losses are predominately associated with a number of intermittent wetland depressions that are dry during portions of the year. Alternative 3C could also impact man-made linear drainage sumps in the study area; however, these are not classified as waters of the U.S. and are not quantified in **Table 4-24**. **SDEIS Section 7.4 (Measures to Minimize Impacts to Waters of the U.S., Including Wetlands)** provides further discussion of measures to avoid, minimize, or mitigate such impacts. A preliminary Section 404 mitigation plan is presented in **SDEIS Appendix J**. A more detailed review of impacts to waters of the U.S., including wetlands, and a refined mitigation plan for unavoidable impacts will be provided in the FEIS once a preferred alternative has been recommended. The NCTCOG entered into an agreement with the USACE in October 2008 to fund a position to expedite

Section 404 permitting for regional projects, with a priority focus on regionally significant transportation projects (NCTCOG, 2009b). This agreement allowed the USACE to assign a dedicated staff person to expedite Section 404 permits, and the USACE legislative authority to enter into these agreements was recently extended through 2016.

A functional analysis was performed for waters of the U.S., including wetlands in the project area using a hydrogeomorphic approach consistent with that described in the USACE's Wetlands Research Program Technical Report WRP-DE-11, *A Guidebook for Application of Hydrogeomorphic Assessments to Riverine Wetlands*. As noted in **SDEIS Section 3.4.6 (Waters of the U.S., Including Wetlands)**, the waters of the U.S., including wetlands in the study area provide a range of functions, with each level of function dependent on a range of variables. One function that would be affected is that of long-term surface water storage. Simply put, this function 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, of which all waters of the U.S., including wetlands in the study area are highly capable.

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 prohibits the development of riverine emergent wetlands into forested riverine wetlands, limiting the ability of the wetlands to function in general. The existing level of aquatic function associated with vegetation characteristics (e.g., vegetative communities, interspersion, and connectivity) is relatively low.

The typical water quality concerns associated with construction activities are erosion and sedimentation. The potential for erosion and sedimentation is accelerated when vegetation is cleared in preparation for the construction of the roadway, as exposed ground is susceptible to erosion. Alternative 3C requires the crossing of several water bodies within the study area, including the Trinity River and its network of drainage sumps and tributaries (see **LSS Plate 4-23**). In the area of the Dallas Floodway, the Alternative 3C construction areas would be subject to possible inundation by periodic river flooding, in addition to direct effects of rainfall and runoff. This would need to be accounted for in the Emergency Action Plan for the construction phase of the project (see **SDEIS Section 2.4.9**) to identify measures to protect exposed areas in the event of a threatened river flood. The potential erosion and sedimentation are dependent upon local conditions (i.e., soil type, slope, and vegetation) and construction practices (see **SDEIS Sections 3.4.3 Vegetation within the Study Area**; **3.5.3.3 Soils**; **4.11 Topography, Geology, and Soils**; **4.12 Water Quality Impacts**; and **4.20 Temporary Impacts During Construction**). 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 water quality degradation. 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. Water quality impacts of construction would be reduced to acceptable levels by compliance with the regulatory standards of applicable construction stormwater management permits, and water quality related impacts of the paved roadway would also be managed in accordance with appropriate permit terms specified by regulatory agencies. Detailed discussions of federal and state permits related to the abatement of water quality impacts are found in **SDEIS Section 4.12 (Water Quality Impacts)** and **Section 7.2 (Measures to Minimize Impacts to Water Quality)**. Additional discussions in the SDEIS regarding regulatory controls of water quality impacts are included in **SDEIS Section 4.13.1 (CDC Process – Trinity River Main Stem)**, **Section 7.4 (Measures to Minimize Impacts to Waters of the U.S., Including Wetlands)**, **Section 7.5 (Measures to Minimize Impacts to Floodplains)**, **Appendix H (Preliminary Section 404(b)(1) Guidelines Evaluation)**, and **Appendix I (TCEQ Section 401 Water Quality Certification Questionnaire)**.

4.1.6.8 Fish and Wildlife Habitat Values

SDEIS Section 4.9 (Water Body Modification; Vegetation and Wildlife Impacts) presents a quantitative assessment of impacts to woodlands, aquatics, and grasslands, as well as threatened and endangered species. Much of the discussion centers on impacts to vegetation with riparian woodlands and aquatic habitat identified as "highest quality wildlife habitat." As shown in **Table 4-23** above, 256.71 acres and 335.6 acres of undeveloped areas would be impacted for the Alternative 3C alignment and the associated borrow sites, respectively. Impacts to contiguous stands of mature woodlands would be associated with riparian (20.5 acres) and bottomland (12.8 acres) forests between the DART Bridge and MLK. These areas typically contain the greatest diversity of wildlife species. However, field surveys and a search of the TPWD's NDD (TPWD, 2007) found no known occurrences of rare species within the areas that would be affected by Alternative 3C. The impacted areas would consist mostly of maintained grass areas (approximately 468 acres of the total combined acreage). Approximately 258 acres of the 468 impacted acres (roughly 55 percent) of maintained grass areas are within proposed borrow locations that would return to floodplain grasslands following ground disturbing activities related to construction of Alternative 3C.

In conjunction with the proposed excavation of borrow material from the Dallas Floodway for roadway embankment material, the earth moving work for Alternative 3C would potentially affect approximately 91 acres of aquatic habitat as follows: approximately 43 acres would ultimately remain open water and would continue to serve as aquatic habitat following completion of construction activities; approximately 21 acres of emergent wetlands would be converted to maintained grass areas that could serve as habitat for terrestrial wildlife; and approximately 17 acres of emergent wetlands, 1 acre of forested wetlands, and 9 acres of open water would be lost due to fill activities. Mitigation for impacts to these habitats during

and after construction will include efforts to avoid and minimize impacts as well compensatory mitigation such as wetland restoration or creation. A detailed discussion of mitigation relating to these resources is included in **SDEIS Section 7.4 (Measures to Minimize Impacts to Waters of the U.S., Including Wetlands)**. A preliminary mitigation plan is included in **SDEIS Appendix J (Preliminary Section 404 Mitigation Plan)** which discusses protective measures to be followed during construction to avoid/minimize impacts and a mitigation planting plan, which addresses the planting of riparian trees and native grass areas for long-term compensation for habitat impacts.

As reported in **SDEIS Section 4.9.2.4 (Threatened and Endangered Species)**, no recent occurrences of federally or state listed threatened or endangered species have been identified in the project study area during field surveys. This was also confirmed through informal coordination with the USFWS, a search of the TPWD's NDD, and correspondence with other organizations considered to have special expertise related to wildlife and their habitat. In March 2009, the USFWS concurred that the proposed action is not likely to adversely affect any federally listed species.

4.1.6.9 Conservation

SDEIS Section 4.19 (Energy Requirements) and **Section 4.22 (Irreversible and Irretrievable Commitments of Resources)** include general discussions regarding transportation-related energy use and the commitment of resources. For the implementation of Alternative 3C, energy, fuel, materials consumption would occur during construction and operation. The highway construction materials that would be used are not in short supply and therein construction would not adversely affect continued availability of similar resources. This alternative would operate as an all-electronic toll collection facility, which provides operational efficiencies to reduce stop and go traffic conditions. This would result in lower fuel/energy consumption. When correlating the measures of effectiveness to energy use, managing congestion delay and vehicle hours traveled means lower fuel and energy use.

4.1.6.10 Needs and Welfare of the People

The Trinity Parkway is a high profile project that, for about the past 15 years, has involved numerous stakeholders and individuals along the corridor in the project development process. **Chapter 1** of this LSS summarizes this long process of project planning and evaluation. Effects of the proposed project on the local community could be a major factor in determining practicability of Alternative 3C. Information used in the analysis of the impact of Alternative 3C on the needs and welfare of the people is presented in **SDEIS Section 4.1 (Land Use Impacts)**, **Section 4.2 (Coordinated Planning and Design)**, **Section 4.3 (Social Impacts)**, **Section 4.4 (Transportation Impacts), Section 4.5 (Relocations and Displacements Impacts)**, **Section 4.17 (Hazardous/Regulated Materials)**, and **Section 4.20**

(Temporary Impacts During Construction). Public comments on the SDEIS are also relevant to this discussion.

Social Impacts: **Table 4-18** in **LSS Section 4.1.6.1** provides a summary of the residences, commercial buildings, and public facilities that would be relocated under Alternative 3C (a total of 35), and **SDEIS Appendix C (Relocation Assistance Information)** provides a detailed listing of the same. The relocations are comprised of two in the Design District, two in the Trinity Industrial District, four in The Cedars, 12 in the Brookhollow Industrial Park, and 15 in the South Dallas Neighborhood District. According to information obtained from Dun & Bradstreet by the City of Dallas, Office of Economic Development, Research & Information Division (January 2010), Alternative 3C would only displace 15 to 20 businesses, which would be expected to affect approximately 72 to 203 jobs. Alternative 3C generally avoids impacts to the neighborhoods and commercial districts in the project corridor, since much of the alignment is within the Dallas Floodway. In accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, relocation assistance would be provided to any person, business, farm, or non-profit organization displaced as a result of the acquisition of real property for public use (see **SDEIS Appendix C**).

Minority and low-income populations exist in the project area, and Alternative 3C has been evaluated for compliance with the EO 12898, FHWA Order 6640.23, and Title VI of the Civil Rights Act of 1964, as amended (see **SDEIS Section 4.3.3 Environmental Justice Considerations**). Beneficial and adverse impacts to minority and low-income populations have been identified, along with potential mitigation strategies, and there appear to be no disproportionately high or adverse impacts; therefore, Alternative 3C is considered to be consistent with the EO 12898 and FHWA Order 6640.23. Alternative 3C is similarly consistent with Title VI in that there is no evidence of discriminatory intent or effect.

General Public Opinion: **SDEIS Section (1.3 Project History)** describes two well publicized citywide elections in which Dallas citizens expressed support for a Trinity Parkway location within the Dallas Floodway:

(i) May 2, 1998 - Dallas voters approved the issuance of General Obligation Bonds including $84 million for the Trinity Parkway, a reliever route within the Dallas Floodway levee system (City of Dallas, 1998), and

(ii) November 6, 2007 - Dallas voters rejected a petition calling for prohibition of construction, maintenance, or improvement of certain roadways (i.e. Trinity Parkway) within the Trinity River levees from Westmoreland Road to IH-45.

Alternative 3C is consistent with the views of the electorate expressed in the citywide elections.

Stakeholder Opinions: Strong support of Alternative 3C was communicated during the official comment period for the SDEIS from March 20, 2009 to June 30, 2009. There were 199 statements submitted by the general public expressing support for Alternative 3C. Twenty-two comments were received that opposed a Dallas Floodway alternative. Four council members and the Mayor submitted public comments in support of Alternative 3C. Eight business associations, which represent hundreds of local businesses, also submitted comments in support of Alternative 3C. These groups included Dallas Regional Chamber Transportation Council, Dallas Black Chamber of Commerce, DOWNTOWNDALLAS, Stemmons Corridor Business Association, The Real Estate Council, Trinity Improvement Association, Mixmaster Business Association, and the West Dallas Chamber of Commerce. Stated reasons for support of Alternative 3C included: (i) it is the lowest cost alternative, (ii) the design is compatible with the BVP, and (iii) the alternative causes only minor impacts to the local businesses. Comments received from agencies and the public during the public comment period for the SDEIS will be included in the FEIS, along with responses to the comments received.

Future Land Use Plans: The Dallas City Council approved the renaming of Industrial Boulevard to "Riverfront Boulevard" in November 2008 and local business owners consider this a positive influence on their community that supports re-development. There is also on-going development in the corridor, although the pace may have slowed due to national economic conditions. This includes infill development of the Design District, and the infill of residential lofts and similar development along the corridor. Alternative 3C would not conflict with these development plans and would enhance mobility to developed areas.

The City of Dallas has widely publicized its "Trinity River Corridor Project," which is actually the name for a series of proposed projects that are along the main stem and Elm Forks of the Trinity River in Dallas. Since 2003, the City has planned for Trinity Parkway to have a combined parkway riverside layout, balancing the Trinity Parkway embankments with proposed excavation of lakes in the Dallas Floodway as part of the City's BVP. Since 2007, the design work of the City's Trinity Lakes Consultant Team has been based on this plan, impacting multiple design decisions such as physical layout of the lakes, trails, public spaces and access points, the hydraulic modeling, the earthworks plan, etc. The City's BVP must still be evaluated by the USACE and found to be environmentally acceptable and technically sound before the plan can be implemented. Nevertheless, Alternative 3C is consistent with current plans.

Stemmons Deed Precedent: There has been a longstanding intent in Dallas to include a major roadway in the Dallas Floodway, mostly notably derived from the Stemmons Deed Precedent. The 1972 donation of 930 acres of the Dallas Floodway land to the City by Industrial Properties included the following language in the escrow agreement: "*It is the desire of Industrial [Properties] and of the City that all such lands situated within the floodway as above described be made available for parks, open space,*

recreational, and transportation facilities as set out below," … "All of said lands so acquired… shall be used for parks, open space, recreational, transportation facilities, including roadways on and adjacent to the levees, and such uses as are necessarily incident to the navigation channel, and all of which uses shall be generally consistent with the concept of the Coordinated Plan For Open Space Development Of The Trinity River System of the Dallas Park Board dated December 9, 1969 and adopted by the Park Board and approved by the City Council on March 9, 1970." (City of Dallas Park Board Resolution 72-0126, dated January 10, 1972) Further, the 1974 purchase of remaining lands in the Dallas Floodway by the City included this same provision regarding transportation facilities. Alternative 3C is consistent with these historic and ongoing community intentions.

4.1.6.11 Air Quality Impacts

A traffic air quality analysis was performed for the proposed project to measure projected CO levels as an indicator to determine whether local air quality would be adversely affected. As discussed in the **SDEIS Section 4.14 (Air Quality Impacts),** for Alternative 3C the percentages of projected 2025 and 2030 concentrations for 1-hour and 8-hour CO would be below the NAAQS threshold. Local concentrations of CO are not expected to exceed national standards at any time. A quantitative MSATs analysis was also performed for the proposed project (see **SDEIS Section 4.14.5 Mobile Source Air Toxics**). MSATs are expected to decrease over time due to the EPA's vehicle and fuel regulations. Based upon this assessment, air quality impacts do not appear to be a major practicability constraint for Alternative 3C.

This project is located within Dallas County, which is part of the EPA's designated nine-county serious nonattainment area for the 2007 eight-hour ozone standard; therefore, the transportation conformity rule applies. The proposed project is included in the area's financially constrained long-range MTP (*Mobility 2035*) and the 2011-2014 TIP, as amended. The USDOT (FHWA/FTA) found the MTP and the TIP to conform to the SIP on July 14, 2011. Analyses for the subsequent FEIS will be conducted based on the current MTP at that time. During the FEIS preparation process and prior to issuance of a ROD by the FHWA, appropriate measures would be taken to ensure that the proposed project is consistent with the conforming MTP and the TIP/STIP.

4.1.6.12 Traffic Noise Impacts

As discussed in the **SDEIS Section 4.15 (Noise Impacts)**, existing and predicted traffic noise levels were modeled at receiver locations that represent the land use activity areas adjacent to Alternative 3C that may be impacted by traffic noise and may potentially benefit from feasible and reasonable noise abatement. The following paragraphs describe the impacts:

The southern terminus is an existing heavy traffic area with south US-75 connecting with US-175. Land use is single-family residential with a few retail/commercial facilities. Alternative 3C merges with US-175 at the southern end of the project. In this area, 106 residences have noise levels that exceed NAC criteria in the design year.

The northern terminus is an existing heavy traffic area at the IH-35E and SH-183 split. Land use is retail/commercial with a residential neighborhood known as Arlington Park located approximately 300 feet east of the existing freeways. In this area, Alternative 3C provides connecting ramps to the existing freeway system. Nineteen residences and one small playground/park (Sleepy Hollow Park) near the northern terminus would have noise levels that exceed NAC criteria in the design year.

From the southern terminus Alternative 3C would pass through an industrial area, then enter the Trinity River floodplain and levee system near the AT&SF/DART railroad bridges. The alternative would be located on embankment along the riverside of the east levee for about 5.5 miles up to its exit from the levee system near Hampton Road. In addition to the impacts at the northern and southern termini, two residences would have noise levels that exceed NAC criteria in the design year.

A noise wall analysis was performed for the impacted areas. Based on the analysis, noise walls were determined to be both feasible and reasonable only at the residential neighborhoods located at the southern terminus of the project. Noise walls in this area would reduce noise levels by at least 5 dBA at impacted receivers. Noise walls to mitigate the impacted area at the northern terminus and the two individual residences would not be reasonable and feasible. **SDEIS Plate 4-34** shows the noise impacted areas. The noise analysis and discussion regarding noise impacts and feasible and reasonable abatement measures will be updated in the FEIS in accordance with TxDOT's (FHWA approved) April 2011 Guidelines for Analysis and Abatement of Roadway Traffic Noise.

4.1.6.13 Impact of Floods on Human Safety

The subject of flooding is addressed in **SDEIS Section 4.13 (Floodplain Impacts)** and **SDEIS Appendix F**. As Alternative 3C is proposed to be located primarily within the Dallas Floodway, approximately 297 acres of the proposed alignment would be located in the 100-year (base) floodplain. Regarding Alternative 3C, the approach is to provide a hydraulically neutral design with respect to the Dallas Floodway function by balancing the Trinity Parkway embankments with corresponding excavations in the Dallas Floodway. As shown in **SDEIS Section 4.13 Floodplain Impacts**, Alternative 3C would meet the USACE criteria pertaining to valley storage and changes in floodwater velocities. In regard to changes in flood elevation, the USACE criteria state there should be no rise in the 100-year or SPF elevation for the proposed condition (USACE, 1988). Alternative 3C would result in a maximum rise of

0.41 feet for the 100-year event in the area between Houston Street and the IH-30 bridges and a maximum rise of 0.03 feet for the SPF event at the upstream face of the Houston Street Bridge. For both events, water surface elevations are below existing conditions at the confluence of the Main Stem with the West Fork and Elm Fork tributaries (see **LSS Plate 4-25**). With the maximum rises occurring within the Dallas Floodway levees and resulting valley storage showing a gain for both events there would be no increased risk of flood damage to existing structures upstream or downstream of the project if Alternative 3C is recommended as the preferred alternative for further development. These rises in 100-year and SPF elevations are considered manageable and additional measures to reduce or eliminate the increases would be evaluated during the design phase if Alternative 3C is recommended as the preferred alternative. Specific measures or refinements to the preliminary design that may reduce or eliminate the rises in flood elevations are not known at this point, but would be researched later. The associated civil engineering work would be subject to review and approval by the USACE throughout design and construction to assure compliance with the requirement for hydraulic neutrality (and other design and functional requirements). Alternative 3C has been designed not to interfere with the USACE's or City of Dallas' ability to operate and maintain the Dallas Floodway, conduct flood fighting activities, or restore or improve the flood damage reduction capability of the Federal project. A Section 404/10 permit decision on the project cannot be made until the 1988 ROD criteria evaluation is complete.

Future on-going maintenance within the Dallas Floodway is addressed in **SDEIS Section 2.4.8 (Facility Operations and Maintenance in the Dallas Floodway).** As described in this section, mowing and other maintenance operations in the Trinity Parkway operations areas would be at least as frequent as the mowing and maintenance cycles of the City of Dallas Flood Control District. Further, the City would be given unencumbered rights to operate within the Trinity Parkway area, including the ability to shut the road down to traffic operations if judged necessary by the City for purposes of the flood control function. Because of the hydraulic design approach and the requirements for no interference with floodway operations and maintenance, Alternative 3C is not expected to adversely impact human safety with respect to the Dallas Floodway's ability to carry floods.

Another issue related to human safety in floods is the possible danger to motorists of flooding over the proposed roadway. As described in **Chapter 2 (Alternatives Considered)**, Alternative 3C is proposed to be protected from inundation from the 100-year (one percent annual chance) storm, a level of protection commensurate with other roadways in the NTTA system. Alternative 3C would be primarily protected by the physical elevation of the roadway above the computed 100-year event in the Dallas Floodway. Additionally, as described in **SDEIS Section 2.4.7 (Pump Stations in the Dallas Floodway)**, 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 levels (which

would result in rapid inundation of the road), the Parkway should have already been closed down under the directives of the Emergency Action Plan (see **SDEIS Appendix K-3** for additional details regarding the Emergency Action Plan). Because of the design features, safety to motorists during floods is not expected to be a differentiating feature between floodplain and non-floodplain alternatives. **SDEIS Appendix K-3** provides a draft **Emergency Action Plan** outlining 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 October 2005, the USACE Fort Worth District agreed to become a cooperating agency in the preparation of the Trinity Parkway EIS. See **SDEIS Section 1.12.4 (Coordination with the USACE).** In October 2006, the USACE Fort Worth District provided comments on a draft version of the SDEIS provided to the District in July 2006. In the comments, the USACE raised several concerns about Trinity Parkway, specifically focusing on the Build Alternatives located in the Dallas Floodway as detailed in the February 2005 DEIS. The USACE expressed concern that these alternatives, as proposed, appeared to adversely impact operations and maintenance requirements within the Dallas Floodway, an existing Federal flood damage reduction project.

The NTTA and FHWA entered into consultation with the USACE and City of Dallas representatives through the fourth quarter of 2006 and first and second quarters of 2007 to attempt to address and resolve these concerns. The most substantial change made in response to the USACE consultation were the addition of two new alternatives to the SDEIS, one of which is Alternative 3C (Combined Parkway - Further Modified). This alternative was added because changes in the roadway layouts were required to address several of the USACE comments. The following summarizes the roadway layout changes made to the Combined Parkway Riverside alternative resulting in Alternative 3C:

- No ramps to Westmoreland Road to avoid possible adverse impacts to access and circulation for O&M, flood fighting and surveillance.

- The Trinity Parkway lanes are elevated at (i) the North Dallas Floodway Entry (mainlanes), (ii) the Woodall Rodgers connection (ramps), (iii) the Riverfront (Industrial) Boulevard connection (ramps), (iv) the South Dallas Floodway Exit (mainlanes), and (v) the IH-45 connection (ramps) to provide adequate vertical clearance over the levee top to allow City service vehicles to underpass the structures.

- Reinforced concrete diaphragm walls are proposed at crossing points (i) thru (v) above to reinforce the levees and offset any possible negative effects of levee penetrations. These walls would extend down to rock or unweathered shale to cut off possible under-seepage; would be 3

to 4 feet thick concrete and reinforced to free-stand as flood walls in the event a portion of the levee was washed away; and would extend upstream and downstream of the zone of levee penetrations at the crossings, giving a variable length in the range of 300 to 1,400 feet depending on the site. Based on the recent geotechnical work done for the development of the City's Levee Remediation Plan, and design development of levee crossings associated with other projects, including the Sylvan Avenue and Margaret Hunt Hill bridges, the diaphragm walls shown in the SDEIS may ultimately be substituted with other measures (see **LSS Chapter 3**).

- The levee-side ramps at diamond interchanges to existing cross-street bridges, such as Hampton and Sylvan Avenue, are redesigned to move the ramps closer to the mainlanes so they do not overlay the levee top. The ramps are now elevated using retaining walls and fill, in lieu of bridges, to avoid drill shaft penetrations of the levee.

- Gates and bridges are provided on the NB-WB ramp at IH-35E to facilitate access across/under the ramp by City maintenance personnel and vehicles.

- Longitudinal maintenance roads are replaced and reconnected in segments affected by the Trinity Parkway embankments.

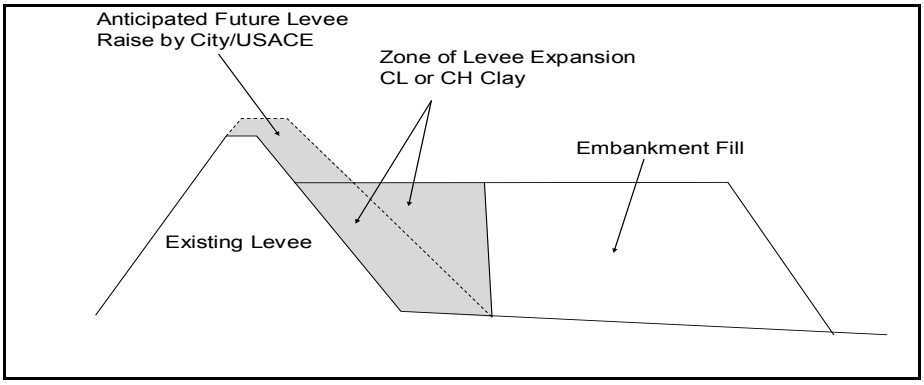
4.1.6.14 Risks Associated with Implementation of the Action

The "risks" discussed in this section focus on levee stability issues. In this context, there is an 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, the consequences of overtopping, etc. This risk analysis for the levees should answer whether these conditions would be unchanged, made worse, or made better in segments where a Build Alternative comes in contact with a levee. For Alternative 3C, the risk analysis 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 **LSS Section 3.2 Levee Remediation Plan**. 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 designs are also coordinated with the USACE conceptual designs for raising and thickening the levees so that the levee construction could occur before or after with no effect on constructability. Additionally, in areas where roadway embankments are adjacent, the roadway embankment would be designed to incorporate the levee widening up to at least the level of the top of the embankment. See **SDEIS Section 2.4.6**

(Trinity Parkway Construction in the Dallas Floodway), including **Figure 2-29**, which is repeated below as **LSS Figure 4-5**.

FIGURE 4-5. CONCEPTUAL TYPICAL SECTION – ALTERNATIVE 3C ADJACENT TO EXISTING DALLAS FLOODWAY LEVEE



Generally the geotechnical work in the Levee Remediation Plan (**LSS Section 3.2**) is intended to prove 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 believed to occur in segments with adjacent roadway embankments (generally as shown in the figure above.) The benefit would accrue for several reasons: (i) 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; (ii) due to the buttressing effect of the embankment (see figure above) the effective height of the levee slope would be reduced, reducing the potential severity of surface slides, and (iii) 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 a 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 manmade 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.

4.1.6.15 Incompatible Development

Highway projects can impact floodplains indirectly by facilitating or inducing development in floodplains. The FHWA guidance on floodplain encroachment includes a requirement to determine whether a proposed action is compatible with "a community's floodplain development plan" (FHWA, 1987,

paragraph 14). In the project corridor, the applicable community development plans for the City of Dallas are the *Trinity River Corridor MIP/BVP* and the ongoing *Trinity River Corridor Comprehensive Land Use Plan* (see **SDEIS Section 3.1.1.1 (Local Land Use Plans/Policies)**), which are subject to the CDC process (City of Dallas, 1999, 2002, and 2003).

The potential for induced development resulting from Trinity Parkway is presented in **SDEIS Section 4.24.1 (Indirect Impacts)**. This analysis identifies areas where natural, governmental, or other constraints would make future change in land use unlikely. **SDEIS Plate 4-38** is a "constraints map" depicting areas that would be unsuitable or unlikely for future development or redevelopment activities. The constraints map identifies the Dallas Floodway in its entirety and the related landside sump areas as being unsuitable or unlikely for development. The Indirect Impacts analysis is based on the presumption that any 100-year floodplain areas in the study area (including areas in the Dallas Floodway and the surrounding levee-protected lands) would be unavailable 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. Accordingly, there will be no induced incompatible development in floodplains in the Dallas Floodway or sump areas due to the implementation of Alternative 3C.

Future development in the Dallas Floodway is expected to 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. **SDEIS Section 3.1.1.4 (Coordinated Planning and Design)** provides a description of the BVP and **SDEIS Plate 3-7** provides a master plan view of the proposal. Future floodplain development in the Dallas Floodway would be conducted in accordance with EO 11988, as determined by the USACE. The proposed BVP improvements are intended to be flood resistant in response to the Dallas Floodway setting, and are of the type (parks, lakes, trails, etc.) which are generally recognized as being appropriate and compatible in floodplains. In addition, the BVP improvements are not induced by the Trinity Parkway.

4.1.6.16 Aesthetics

LSS Chapter 2 (Alternatives Considered) describes the routes and configurations of Alternative 3C, and **LSS Plates 2-4A** through **2-4C** present engineering plans, roadway profiles, and typical sections of this alternative. **SDEIS Section 4.16 (Visual Impact Analysis)** provides a visual analysis for Alternative 3C following the FHWA visual impact assessment protocol (FHWA, 1988). Additionally, visualizations of Alternative 3C were displayed (as videos) at the Public Hearing for the Trinity Parkway DEIS in Dallas on March 29, 2005, and at the public hearing for the Trinity Parkway SDEIS in Dallas on May 5, 2009.

LSS Plates 4-11 through 4-15 at the end of this chapter provide bird's eye views of Alternative 3C in the areas of (i) Hampton Road, (ii) Sylvan Avenue, (iii) Continental Street, (iv) Houston Street and (v) the DART bridge. (These plates are freeze-frames taken from the 3-D visualizations used in the May 2009 Public Hearing.)

In the northern and southern segments of the corridor, Alternative 3C would run outside of the Dallas Floodway levees, 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 walls 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 walls associated with this alternative would serve as a visual and physical barrier running through their neighborhood.

Figure 4-6 shows a view of Alternative 3C within the Dallas Floodway from atop the east levee.

FIGURE 4-6. VIEW ON TOP OF THE EAST LEVEE ALONGSIDE ALTERNATIVE 3C

Note: Looking northwest toward the Commerce Street Viaduct.

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 will 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. 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 from 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.

The MHH Bridge, which began construction in 2009, was designed by internationally-known architect Santiago Calatrava, and is generally perceived as a "signature" piece and possibly a tourist attraction.

Alternative 3C would not restrict views of the MHH 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 MHH bridge by placing them landside of the levee top. Alternative 3C includes the ramp modifications.

4.1.6.17 Historic Values

SDEIS Section 4.7 (Cultural Resources and Parklands) and **Chapter 5 (Draft Section 4(f) Evaluation)** provide an evaluation of potential impacts to cultural resources with historic significance. **LSS Chapter 5** provides additional discussion of historic values. The discussion is not repeated here. Numerous historic-age resources are located within the Trinity Parkway project area, including properties, bridges, and districts that are listed in or eligible for the NRHP. Alternative 3C, as presented in the SDEIS, would involve potential adverse impacts to such resources. As part of the Section 106 process discussed further in **LSS Chapter 5**, an analysis of measures to avoid and minimize impacts to these resources was performed, which involved the development of design refinements to either avoid the resources or minimize impacts.

4.1.6.18 Summary of Practicability Assessment for Alternative 3C

Based on the individual assessments in **LSS Sections 4.1.6.1** through **4.1.6.17** above, the performance of Alternative 3C with respect to each of the 17 factors considered does not substantially affect its practicability. The disadvantages of this alternative are that it would require floodplain modifications and unavoidable wetland impacts within the Dallas Floodway, and that it would not meet criteria specified in the 1988 USACE ROD for the Regional Environmental Impact Statement for the Trinity River and Tributaries, which includes no rise in the 100-year or SPF elevation. Alternative 3C would result in a maximum rise of 0.41 feet for the 100-year elevation and 0.03 feet rise for the SPF elevation.

The water surface rises for Alternative 3C, however, may be regarded as manageable considering the magnitude and locations where the rises occur. Additionally, minimal or no change to historic drainage patterns would be expected within or down gradient from the study area as a result of Alternative 3C. This alternative would not interfere with operation and maintenance of the Dallas Floodway, although there would be lost tollway revenue and flood damage restoration costs associated with greater than 100-year flood events. Such attendant costs, however, would be included in the funding plan for operation and maintenance for the tollway.

Impacts to floodplains are minimized by following standard stream crossing design criteria, avoiding direct impacts on stream channels, and adjusting the alignment where possible. Bridge and roadway designs

seek to minimize impacts to floodplains in compliance with the FHWA requirements - including efforts to span 100-year floodplains. Final designs would adhere to the FHWA drainage criteria for both minor and major hydraulic structures, as well as following all FEMA requirements.

4.1.7 Practicability of Alternative 4B – Split Parkway Riverside

As described in **LSS Chapter 2**, Alternative 4B would be approximately 8.84 miles in length, would require approximately 490 acres of ROW, and would cost approximately $1.45 billion (2011 dollars) to construct. Major interchanges associated with Alternative 4B include:

- Direct connections at IH-35E/SH-183 (northern terminus), US-175/SH-310 (southern terminus), Woodall Rodgers Freeway Extension, and IH-45;
- Full diamond interchanges at Hampton/Inwood Road, Sylvan/Wycliff Avenue, Houston/Jefferson Streets, Corinth Street, MLK, and Lamar Street/SH-310;
- Half diamond interchanges at Commonwealth Drive, Continental Avenue, and Commerce Street;
- Flood separation wall protection at major bridge underpasses, which include Hampton/Inwood Road, Wycliff/Sylvan Avenue, Woodall Rodgers Freeway Extension, UPRR Bridge, IH-30, IH-35E, Corinth Street, and the DART Bridge.

See **LSS Section 2.3.5** for a detailed description, typical sections, layout map, and a computer generated rendering graphic of Alternative 4B.

4.1.7.1 Economic Impacts

In a typical new location roadway project, the conversion of private land to transportation use could have negative effects to the local economy both in the short and long term. **SDEIS Section 4.6.2.2 (Local Economic Impacts)** provides an analysis of potential effects of Alternative 4B on the economy within the City of Dallas and Dallas County.

In the long term, direct impacts would occur when land and improvements are removed from the tax rolls. These relocations and displacements would impact the City tax base for some time until redevelopment occurs. Alternative 4B would require the acquisition of land from 184 parcels, including 167 acres of privately owned land, and would displace 35 buildings. **Table 4-25** below provides a summary of the buildings displaced by type. **SDEIS Appendix C (Relocation Assistance Information)** provides a more detailed tabulation of the affected properties and buildings. The number of displacements would be reduced in Alternative 4B through the use of public land in the Dallas Floodway to a level where the impact to the tax base is not considered a major economic constraint.

TABLE 4-25. ALTERNATIVE 4B ESTIMATED NUMBER AND DESCRIPTION OF DISPLACEMENTS

Type of Displacements	Number of Displacements
Residential Buildings	11
Commercial / Industrial Buildings	24
Community / Recreation Centers	---
Pump Stations / Levee Operations Office Buildings	---
Police and Fire Station Buildings	---
Public Health Care Facilities	---
Schools	---
DISD Facility Buildings	---
Places of Worship	---
Cemeteries	---
Total	**35**

The estimates of tax base value loss and tax revenue loss due to ROW acquisition have been updated from the estimates provided in **SDEIS Section 4.6.2.2 (Local Economic Impacts)**. The information for Alternative 4B is presented below as **Table 4-26.** The total taxable value loss due to displacements and acquisitions for Alternative 4B is estimated to be approximately $36 million (2011 dollars), affecting tax collections for Dallas County, City of Dallas, and DISD.

TABLE 4-26. ALTERNATIVE 4B ESTIMATED TAX VALUE LOST

Entity	Percent Tax Rate (%)	Annual Tax Revenue Loss (2011 $)	Total Tax Base ($)	Percent Loss from Tax Base (%)
Dallas County	0.62377	$225,652	$155,514,580,710	0.0233%
City of Dallas	0.797	$288,319	$77,295,235,801	0.0468%
DISD	1.290347	$466,791	$74,661,069,947	0.0485%
Total Tax Value Lost: $36,175,585				
Sources: Insight Research Corporation, 2011. 2011 tax rates and base property values, Dallas Central Appraisal District.				

As with other transportation projects, losses to the City tax base would accumulate for some time until redevelopment occurs. The location of Alternative 4B, in the Dallas Floodway, reduces the amount of private land and structure converted to transportation use and in effect minimizes the loss of tax revenue.

Local business owners consider construction impacts (detours, lane closures, etc.) to have very detrimental economic impacts to their businesses. This is especially true with a large-scale project, like the Trinity Parkway, which would span several years and could influence customer access for some time. Construction impacts to local businesses would be minimized since the majority of Alternative 4B would be within the Dallas Floodway rather than along existing City streets.

According to information obtained from Dun & Bradstreet by the City of Dallas, Office of Economic Development, Research & Information Division (January 2010), approximately 13 to 16 businesses would be displaced by Alternative 4B. The number of businesses differs from the number of building displacements shown in **Table 4-25** as some buildings are occupied by multiple businesses and some businesses occupy a complex comprised of multiple buildings. The number of jobs affected by the business displacements would range from approximately 62 to 187 jobs. In the short-term, there would be some local jobs created by construction and operation of the tollway.

4.1.7.2 Project Costs

Cost estimates for Alternative 4B are provided in **LSS Appendix D**, and include roadway construction, engineering, utility relocations, contingencies, ROW acquisition, environmental remediation and mitigation. The total estimated cost of Alternative 4B is approximately $1.45 billion (2011 dollars). There are cost savings associated with this Build Alternative due to reduced land acquisitions and displacements.

Construction Costs: Construction cost (roadway, structures, drainage, signage, lighting, traffic control, toll gantries, etc.) is estimated to be $1.35 billion. Structures, bridges, and walls are the largest portion of construction costs (approximately $488 million). The cost of traffic control (approximately $47 million) is minimized because the majority of construction would occur within the Dallas Floodway, not existing streets. The construction cost identified above includes the costs for environmental mitigation and anticipated structural levee remediation features proposed to address pier penetrations of the Dallas Floodway levees that are discussed separately below.

Environmental Mitigation Cost: The estimated cost for environmental mitigation is $15.8 million. The cost includes vegetation enhancements ($380,900), noise wall construction ($2.8 million), mitigation for impacts to waters of the U.S. ($1.5 million), and remediation for hazardous material sites ($3.4 million). The environmental mitigation cost also includes asbestos abatement ($7.0 million) and demolition ($638,500) associated with residential and commercial displacements.

The cost of asbestos abatement and demolition of existing structures is directly correlated to the number of displacements proposed for a project. As previously discussed, Alternative 4B minimizes impacts to structures; therefore, the cost of these elements of environmental mitigation is also minimized.

Levee Mitigation Cost: A conservative estimate of $50 million to mitigate levee impacts from Alternative 4B has been included in the construction cost as a placeholder and will be further refined once the City and the USACE finalize the 100-year and SPF levee remediation plans (see **LSS Chapter 3**).

Right-of-Way and Utility Relocation Costs: ROW costs are considered modest for Alternative 4B since the number of displacements in minimized. The estimated cost for ROW is approximately $65.7 million. See **Table 4-25** for a list of the number and type of displacements associated with Alternative 4B. The cost of utility relocations (approximately $37.5 million) is minimized due to the proposed location within the Dallas Floodway. Notably, Alternative 4B avoids the rebuilding and possible relocation of approximately 2 miles of the new Oncor 345 kV transmission line in the median of Irving Boulevard from Regal Row to Sylvan Avenue. See **LSS Section 4.1.7.4 (Alternative 4B Consideration of Logistics)**.

Operations and Maintenance Cost: O&M costs are not included in the total project cost discussed above. These are separately reported in **LSS Appendix D**. The costs are estimated over a feasibility study 52-year period (2013 – 2065) based on standard NTTA O&M practices. The estimated O&M cost for Alternative 4B is $227.2 million (2008 dollars). **LSS Appendix D** also reports the O&M costs escalated over a feasibility study 52-year period (2013 – 2065) based on standard practices for NTTA O&M. The escalated O&M costs are estimated at $579 million assuming a 2.75 percent escalation rate over the 52-year period. These estimated O&M costs will be updated in the FEIS using current NTTA parameters.

With Alternative 4B, it is proposed that the Dallas Floodway could be used as a borrow source to produce needed material to build roadway embankments (see **LSS Section 4.1.7.4**). There would be an extra maintenance responsibility for the excavated areas in the Dallas Floodway. This maintenance responsibility would be in addition to the annual O&M expenditures. Based on preliminary coordination with the City of Dallas, it is anticipated that the City Flood Control District would take responsibility for removing sediment and reestablishing grass cover in the excavated areas, as necessary, in the event intermittent flooding causes substantial sedimentation of these features following completion of the construction of the Trinity Parkway. The estimated cost of this sediment removal is $1 million per year.

As described in **LSS Chapter 2 (Alternatives Considered)**, Alternative 4B would be protected by embankments and flood separation walls to a level above the 100-year flood event in the Dallas Floodway, an event with one percent chance of being equaled or exceeded in any one year time period. This level of protection meets or exceeds NTTA and TxDOT standards for design of highway mainlane facilities. Nevertheless, costs associated with potential damages in the event of a storm exceeding the 100-year event (sufficient to cause overtopping of the roadway) have been estimated in **SDEIS Chapter 6.6**. This estimate shows landscaping and aesthetic treatment replacement ($2.56 million), debris and sediment removal ($2.36 million), and administration, environmental coordination, and miscellaneous repairs ($250,000) would be necessary to restore Alternative 4B after an inundation event. These costs total approximately $5.2 million per event. Assuming an average traffic volume of 120,000 vehicles per day on the Trinity Parkway and a future year toll of $2.00 for a full-length trip, a 5 day

shutdown of the roadway is estimated to cost $1.2 million in lost toll revenue. This makes the total cost of shutdown and recovery around $6.4 million for Alternative 4B, per extraordinary (over 100-year level) event. **LSS Appendix F** further discusses this issue and estimates an additional $4.4 million in repair costs and downtime in the event there is physical damage to the road itself due to unforeseen flow concentrations and velocities during the inundation and recession periods for a flood in excess of the 100-year level. This assumption would increase the total repair and downtime allowance to $10.8 million. Considering the 100-year recurrence interval, this equates to an annualized cost of $108,000.

4.1.7.3 Consideration of Existing Technology

Alternative 4B could utilize current engineering technology for roadway and related construction, and there appear to be no unusual or insurmountable technological issues with Alternative 4B. There is expected to be gradual adoption of new or improved technologies in the road building and toll collection fields over time. In general, any special technology for Alternative 4B is built into the cost estimates reported in **LSS Section 4.1.7.2** above.

It is noted that Alternative 4B would be located within the Dallas Floodway for about 70 percent of its length. Within the Dallas Floodway, the mainlanes are proposed to be protected from inundation by the 100-year (one percent annual chance) flood event. This level of protection is commensurate with similar roads in the Dallas area and around the state and meets or exceeds NTTA and TxDOT standards for design of highway mainlane facilities.

4.1.7.4 Consideration of Logistics

This section identifies logistics issues related to the implementation of Alternative 4B, including impacts to project schedule and construction phasing. Information used in the discussion of logistics is taken from the **SDEIS Environmental Consequences Sections 4.5 (Relocation and Displacement Impacts), 4.17 (Hazardous / Regulated Materials), 4.18 (Utilities),** and **4.20 (Temporary Impacts)**. In addition, implementation schedules have been developed for each Build Alternative in the LSS to assess time to completion. The estimated schedule for Alternative 4B is summarized below, with additional details provided in **LSS Appendix D**.

For Alternative 4B the length of time from startup of engineering/construction activities until the Trinity Parkway could be fully open to traffic is estimated to be 6.5 years. The sequence of activities is depicted in **Table 4-27**, assuming a start date of January 1, 2013.

TABLE 4-27. ALTERNATIVE 4B LOGICAL SEQUENCE OF ACTIVITIES AFTER ANTICIPATED ROD

Activity	Begin Date	Completion Date
Preliminary Engineering[1]	First Quarter 2013	Third Quarter 2013
Select Consultant Team and Award[2]	First Quarter 2013	Second Quarter 2013
Traffic and Revenue Studies[3]	First Quarter 2013	Third Quarter 2013
Local, State and Federal Permitting[4]	First Quarter 2013	First Quarter 2014
Surveys and Preliminary Environmental Work[5]	Second Quarter 2013	Third Quarter 2015
ROW Acquisition and Relocations	Fourth Quarter 2013	Fourth Quarter 2015
Municipal Setting Designation – Application/Approval	Fourth Quarter 2014	Fourth Quarter 2015
Property Cleanup, Asbestos Abatement and Demolition	First Quarter 2014	Fourth Quarter 2018
Utility Relocations[6]	First Quarter 2014	Fourth Quarter 2014
Final Tollway Design[7]	Second Quarter 2013	Fourth Quarter 2014
Construction Bid and Award	Third Quarter 2015	Fourth Quarter 2015
Construction	Second Quarter 2016	Third Quarter 2019

Notes:
1. 95 percent Schematic Update and Review by TxDOT and the FHWA, Prepare O&M Costs, Develop Market Valuation, Final Schematic Design Preparation and Approval, Interstate Access Study, Major Project Study, Design Criteria Manual
2. Includes ROW Surveyors and Acquisition Support, Environmental Phases I and II, Section Design and Review Engineers, Corridor Managers, Contract Administration, and Geotech
3. Includes Value Engineering Study
4. Includes Section 404 and Section 408 Permits
5. Includes Set/Recover Controls, Deed Research, Parcel Map Preparation
6. Includes design of utility relocations, bid, award and construct
7. Includes select and award consultant contracts

As shown in **Table 4-27**, Alternative 4B is estimated to have a completion date of Third Quarter 2019 Activities that most influence the schedule for construction within the Dallas Floodway include ROW acquisition, building and utility relocation, and construction within the Dallas Floodway. These are discussed briefly below:

Right-of-way Acquisition, Building and Utility Relocations: As described in **LSS Section 4.1.7.1 (Economic Impacts)** there would be a relatively small number of displacements (35 buildings) required for Alternative 4B. A reasonable number of parcels located outside the Dallas Floodway levees (124 parcels) would be affected by ROW taking from this alternative. It would take approximately 2 years to acquire ROW and relocate the displaced commercial and residential buildings. This 2-year time frame would also encompass preliminary environmental work that would include the investigation of 16 high risk hazardous material sites. This is considered a reasonable schedule for these activities compared to other projects of this magnitude. Property acquisition and relocations are not considered a constraint to the practicability of this Build Alternative. In fact, the minimal displacements associated with Alternative 4B are considered a benefit to the implementation of this Build Alternative.

There are water lines, high voltage electrical (138 kV) overhead transmission lines, and storm water outfalls, which would need to be coordinated and cleared from the Alternative 4B ROW. No sanitary

sewer lines, natural gas lines, storm drainage pump stations, or storage sumps would be impacted by Alternative 4B. These utility relocations are considered typical for a project of this magnitude and are not considered logistical constraints, nor would they negatively impact the project schedule. Alternative 4B would also avoid impacts to the Oncor 345 kV transmission line (completed in 2010) in the median of Irving Boulevard from Regal Row to Sylvan Avenue, which is a benefit to implementing Alternative 4B.

Construction within the Dallas Floodway: Alternative 4B will have scheduling risks, which are inherent with construction in areas subject to flooding. However, based on experiences of recent years, periodic flooding has not been a serious impediment to work in the Dallas Floodway. There are many examples of successfully completed projects in the Trinity River floodplains including channel widening in the Dallas Floodway by the City of Dallas in the early 2000s, the reconstruction of the Westmoreland and Hampton Road Bridge Crossings, and the current MHH Bridge construction. Additionally, various components of the USACE DFE project have been completed downstream of the Dallas Floodway. The Dallas Floodway is typically subject to intermittent rains and possible flooding in the spring and fall, but there are long periods of low flows and dry conditions, particularly in summer. It is expected the grading contractor could beneficially use low flow periods in the Dallas Floodway to complete the required excavation and embankment included in Alternative 4B. Considering an 18-month grading period, accumulated delays due to wet conditions would not be expected to exceed 6 months in the worst case. Further, once the Trinity Parkway embankments have been established, the work area would be expected to be adequately protected from flooding events.

Alternative 4B is proposed to be constructed on embankments built using material borrowed from inside the Dallas Floodway. Coordination with the USACE and the City on construction phasing and usage of borrow material from the floodway would continue in the event Alternative 4B is recommended as the preferred alternative. Results of this coordination would be presented in the FEIS. It is anticipated that usage of borrow material would depend on the timing of projects in the floodway and that agreements regarding borrow material would be made at a later date. The proposed excavation areas have been subject to preliminary study to confirm they provide sufficient impervious material for expanding and raising the east and west Dallas Floodway levees from the DART Bridge (end of floodway) to the West Fork / Elm Fork Confluence. **Table 4-28** summarizes the earthworks analysis to date.

TABLE 4-28. ALTERNATIVE 4B COMPARISON OF VOLUME NEEDS AND SUITABLE SOIL BORROW VOLUMES

Soil Suitability Type	Volume Needs[1] (CY)	Usable Excavation Volumes (CY)	Remainder (CY)
Levee	2.6 Million	4.5 Million	+ 1.9 Million
Roadway Embankment	4.1 Million	1.3 Million	- 2.8 Million
Total	**6.7 Million**	**5.8 Million**	**-0.9 Million (shortfall)**

Note:
1. Includes 10% shrinkage for roadway and 25% shrinkage for levee raise.

The excavation shapes as currently proposed would be somewhat short of achieving an earthworks balance with the east and west roadway embankments of Alternative 4B. The needed material appears available by reshaping or deepening the proposed borrow sites.

4.1.7.5 Locational Advantages

Alternative 4B would result in a significant encroachment within the Dallas Floodway; however, the facility would be designed in accordance with 23 CFR 650 Subpart A which would reduce the impacts of such encroachment to be consistent with standards established by the USACE, FEMA, and state and local governmental agencies. The locational advantages, including the functional need for locating in the floodplain, of Alternative 4B are discussed below.

As shown in **Table 4-29,** Alternative 4B would provide northbound-to-westbound and eastbound-to-southbound connections to South RL Thornton Freeway (IH-35E) from the Trinity Parkway. Other notable connections include half diamond interchanges at Commonwealth Drive, Continental Avenue, and Commerce Street, as well as a full diamond interchange at Houston/Jefferson Street. The configuration of these connections optimize traffic conditions in the event of traffic incidents in the Mixmaster.

TABLE 4-29. ALTERNATIVE 4B INTERCHANGE ACCESS

Interchange Location	Type of Interchange
Stemmons Freeway (IH-35E)/SH-183	Direct Connection via Ramps
Commonwealth Drive	Half Diamond Interchange
Hampton/Inwood Road	Full Diamond Interchange
Wycliff/Sylvan Avenue	Full Diamond Interchange
Continental Avenue	None
Woodall Rodgers Freeway	Direct Connections (SB-EB and WB-EB)
Commerce Street	None
Houston/Jefferson Street	Full Diamond Interchange
South RL Thornton Freeway (IH-35E)	NB-WB, EB-SB Connection via Ramps
Corinth Street	Full Diamond Interchange
MLK	Full Diamond Interchange
IH-45	Direct Connection via ramps
Lamar Street	Half Diamond Interchange
SH-310	Half Diamond Interchange
US-175	Direct Mainlane Connection

SDEIS Section 2.3.12 (Access to IH-35E, US 175, and Corinth Street) lists various Dallas Council and community actions dating back to 1997 calling for provision of access from South RL Thornton Freeway (IH-35E) to Trinity Parkway. If a connection could not be provided to South RL Thornton Freeway, it would be a substantial shortcoming, meaning that commuters on South RL Thornton Freeway could not connect to Trinity Parkway and bypass the downtown Mixmaster interchange. The interchange

connection in the design for Alternative 4B would be particularly critical to maintaining traffic flow in the event of traffic incidents in the Mixmaster.

The location of Alternative 4B (inside the floodplain) may minimize restriction to development in some areas of the corridor. One of the purposes of the proposed project is to provide compatibility with local development plans. Alternative 4B would generally avoid disruption of the business district situated between the Dallas CBD and the east levee, which would be consistent with the City's vision for this area. However, the location of Alternative 4B along both the east and west levees within the Dallas Floodway is inconsistent with the City's BVP (see **LSS Section 4.1.7.10**).

4.1.7.6 Natural and Beneficial Values Served by Floodplains

Natural and beneficial floodplain values include fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, forestry, natural moderation of floods, water quality maintenance, and groundwater recharge (23 CFR 650, Subpart A). **SDEIS Section 3.4.6 (Waters of the U.S., including Wetlands)** provides an analysis of functions and values of aquatic features in the project area floodplains. **SDEIS Sections 4.8 (Impacts to Waters of the U.S., Including Wetlands)**, **4.9 (Water Body Modification; Vegetation and Wildlife Impacts)**, **4.12 (Water Quality Impacts)**, and **4.13 (Floodplain Impacts)** describe the impacts of Alternative 4B to floodplain values.

Fish and wildlife diversity and density within floodplains strongly correlate with aquatic habitat and vegetation diversity considered along with the type, degree, and frequency of disturbances. Therefore, aquatic habitat and vegetation impacts are used as an indicator of potential impacts to fish and wildlife. **SDEIS Section 3.4.3 (Vegetation within the Study Area)** provides a breakdown of land cover types in the Trinity Parkway Study Area. The total study area is 7,036 acres, of which urban areas comprise 56 percent (3,907 acres), maintained grass areas comprise 31 percent (2,198 acres), bottomland and riparian forests comprise 4 percent (290 acres), and water features or aquatic habitats comprise 9 percent of the area (641 acres). The "maintained grass" acreage primarily comprises the Dallas Floodway, a facility which has been almost entirely re-graded and realigned from its former natural floodplain condition, and which is subject to periodic mowing by the City of Dallas. **Table 4-30** below shows a summary of vegetation impacts for Alternative 4B.

TABLE 4-30. ALTERNATIVE 4B ACRES OF VEGETATION COVER TYPES DIRECTLY AFFECTED

Assessment Area	Woodland (non-wetland)		Aquatic Habitats		Maintained Grass Areas	Total Undeveloped Area Impacts
	Bottomland Hardwoods	Riparian Forest	Waters of the U.S., Incl. Wetlands	Other		
4B Alignment**	9.6	5.9	47.1*	0.1	314.8	377.5
Potential Borrow Areas	---	13.8	63.5	---	258.3	335.6

Notes:
1. All quantities are shown in acres. Calculated areas are estimates only.
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. **---** = No impact anticipated for this alternative.

***** = Includes impacts associated with drainage sumps, open water, and river channel, most would be spanned by bridges.
****** = Alternative 4B would also require excavation from the potential borrow areas shown in this table.

There would be impacts from Alternative 4B on floodplain values related to wildlife movement, open space loss, and outdoor recreation potential. However, many of the natural values of the floodplain have already been altered by the creation of the Dallas Floodway levee system and the regular operation and maintenance of the system. The Dallas Floodway is not utilized for forestry or agriculture, and Alternative 4B would have no impact on these types of values that are sometimes associated with floodplains.

4.1.7.7 Waters of the U.S., Including Wetlands and Water Quality

An overview of the wetlands and other jurisdictional waters (e.g., rivers, creeks, and sumps) within the Study Area is presented in the **SDEIS Section 3.4.6 (Waters of the U.S., including Wetlands)**. The effect of Alternative 4B on wetlands is presented in **SDEIS Section 4.8 (Impacts to Waters of the U.S., including Wetlands)**. The SDEIS included a jurisdictional determination of waters of the U.S., including wetlands within the Dallas Floodway, which was approved by the USACE on June 19, 2006. In March 2011, a supplemental jurisdictional determination was submitted to the USACE requesting a reverification and time extension of the approval (Note: the delineated area for the Historic River Channel, which is currently utilized as sumps for storm water collection, increased slightly because the 2011 jurisdictional determination included drainage culverts connecting the sumps that were not included in the 2006 jurisdictional determination; however, this did not result in a change in the impacted acreage from the SDEIS for Alternative 4B). The USACE determined that there has not been a significant change in the location of waters of the U.S. from the date of the original approval and that an extension of the approved jurisdictional determination is in the public interest (see **LSS Appendix A**). As such, the approved jurisdictional determination is valid until March 24, 2016. The jurisdictional determination for the Dallas Floodway (USACE approved 2006 and 2011) was intended to provide a baseline for potential impacts to waters of the U.S. for the numerous Trinity River Corridor projects and was not limited to the scope of the proposed Trinity Parkway project. It should be noted that areas outside the geographic scope of the approved jurisdictional determination near the northern and southern termini of the Trinity Parkway

project and along Irving and Riverfront (Industrial) Boulevards are occupied by urban development with low opportunity for the presence of aquatic features. However, aquatic features beyond the geographic scope of the approved jurisdictional determination were mapped in a manner consistent with USACE procedures for conducting jurisdictional determinations during the initial field investigations for the Trinity Parkway project. **Table 4-31** below shows impact data for Alternative 4B.

TABLE 4-31. ALTERNATIVE 4B POTENTIAL IMPACTS TO WATERS OF THE U.S., INCLUDING WETLANDS

Emergent Wetlands		Forested Wetlands		Open Water - Intermittent*		Historic Trinity River Channel*		Intermittent Stream		Trinity River*		Total	
Fill	Ex.	Fill	Ex.	Fill	Ex.	Fill	Ex.	Fill	Ex.	Fill	Ex.	Fill	Ex.
35.77	20.63	1.28	--	5.79	2.53	1.21	--	0.10	--	2.98	40.35	47.13	63.51

Notes:
1. All quantities shown in acres. Calculated areas are estimates only. "**Fill**" impacts are expected from roadway construction; excavation ("**Ex**.") impacts are expected from potential borrow areas
2. Expected impacts are based on the jurisdictional determination approved by the USACE on March 24, 2011 (File # SWF-2011-00049).
3. **--** = No impact anticipated for this alternative.
4. The Historic Trinity River Channel refers to old meanders of the Elm Fork and West Fork Trinity River located outside the Dallas Floodway that are currently utilized as sumps to collect local storm water runoff that eventually drains into the Dallas Floodway.

* Potential impacts to waters of the U.S., including wetlands, may occur from bridge column construction and can be addressed, minimized or possibly eliminated during final design.

As shown in **Table 4-31**, Alternative 4B would result in filling 47.13 acres and excavating 63.51 acres of jurisdictional waters of the U.S., including wetlands. Losses are predominately associated with a number of intermittent wetland depressions that are dry during portions of the year. Alternative 4B could also impact man-made linear drainage sumps in the study area; however, these are not classified as waters of the U.S. and are not quantified in **Table 4-31**. **SDEIS Section 7.4 (Measures to Minimize Impacts to Waters of the U.S., Including Wetlands)** provides further discussion of measures to avoid, minimize, or mitigate such impacts. A preliminary Section 404 mitigation plan is presented in **SDEIS Appendix J**. A more detailed review of impacts to waters of the U.S., including wetlands, and a refined mitigation plan for unavoidable impacts will be provided in the FEIS once a preferred alternative has been recommended. The NCTCOG entered into an agreement with the USACE in October 2008 to fund a position to expedite Section 404 permitting for regional projects, with a priority focus on regionally significant transportation projects (NCTCOG, 2009b). This agreement allowed the USACE to assign a dedicated staff person to expedite Section 404 permits, and the USACE legislative authority to enter into these agreements was recently extended through 2016.

As noted in **SDEIS Section 3.4.6 (Waters of the U.S., including Wetlands)**, the waters of the U.S., including wetlands in the study area provide a wide range of functions, with each level of function dependent on a range of variables. The most recognizable function that would be affected is that of long-term surface water storage. Simply put, this function 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, of which all waters of the U.S., including wetlands in the study area are highly capable.

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 prohibits the development of riverine emergent wetlands into forested riverine wetlands, limiting the ability of the wetlands to function in general. Whereas the loss of the long-term surface water storage function resulting from Alternative 4B may be more recognized, losses of aquatic function associated with vegetation characteristics (e.g.; vegetative communities, interspersion, and connectivity) would be comparatively low.

The typical water quality concerns associated with construction activities are erosion and sedimentation. The potential for erosion and sedimentation is accelerated when vegetation is cleared in preparation for the construction of the roadway, as exposed ground is susceptible to erosion. Alternative 4B would require the crossing of several water bodies within the study area, including the Trinity River and its network of drainage sumps and tributaries (see **LSS Plate 4-24**). In the area of the Dallas Floodway, the Alternative 4B construction areas would be subject to possible inundation by periodic river flooding, in addition to direct effects of rainfall and runoff. This would need to be accounted for in the Emergency Action Plan for the construction phase of the project (see **SDEIS Section 2.4.9**) to identify measures to protect exposed areas in the event of a threatened river flood. The potential erosion and sedimentation are dependent upon local conditions (i.e., soil type, slope, and vegetation) and construction practices (see **SDEIS Sections 3.4.3 Vegetation within the Study Area**; **3.5.3.3 Soils**; **4.11 Topography, Geology, and Soils**; **4.12 Water Quality Impacts**; and **4.20 Temporary Impacts During Construction**). 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 water quality degradation. 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. Water quality impacts of construction would be reduced to acceptable levels by compliance with the regulatory standards of applicable construction stormwater management permits, and water quality related impacts of the paved roadway would also be managed in accordance with appropriate permit terms specified by regulatory agencies. Detailed discussions of federal and state permits related to the abatement of water quality impacts are found in **SDEIS Section 4.12 (Water Quality Impacts)** and **Section 7.2 (Measures to Minimize Impacts to Water Quality)**. Additional discussions in the SDEIS regarding regulatory controls of water quality impacts are included in **SDEIS Section 4.13.1 (CDC Process – Trinity River Main Stem)**, **Section 7.4 (Measures to Minimize Impacts to Waters of the U.S., Including Wetlands)**, **Section 7.5 (Measures to Minimize Impacts to Floodplains)**, **Appendix H (Preliminary Section 404(b)(1)**

Guidelines Evaluation), and **Appendix I (TCEQ Section 401 Water Quality Certification Questionnaire)**.

4.1.7.8 Fish and Wildlife Habitat Values

SDEIS Section 4.9 (Water Body Modification; Vegetation and Wildlife Impacts) presents a quantitative assessment of impacts to woodlands, aquatics, and grasslands, as well as threatened and endangered species. Much of the discussion centers on impacts to vegetation with riparian woodlands and aquatic habitat identified as "highest quality wildlife habitat." As shown in Table 4-30 above, 377.5 acres and 335.6 acres of undeveloped areas would be impacted for the Alternative 4B alignment and the associated borrow sites, respectively. The impacted areas consist of mostly maintained grass areas. Impacts to contiguous stands of mature woodlands would be associated with riparian (5.9 acres) and bottomland (9.6 acres) forests between the DART Bridge and MLK.

The earth works for Alternative 4B would potentially affect approximately 111 acres of aquatic habitat as follows: approximately 43 acres would ultimately remain open water and continue to provide aquatic habitat following completion of construction activities; approximately 21 acres of emergent wetlands would be converted to maintained grass areas that could serve as habitat for terrestrial wildlife; and approximately 36 acres of emergent wetlands, one acre of forested wetlands, and 10 acres of open water would be lost due to fill activities. Mitigation for impacts to these habitats during and after construction will include efforts to avoid and minimize impacts as well compensatory mitigation such as wetland restoration or creation. A detailed discussion of mitigation relating to these resources is included in **SDEIS Section 7.4 (Measures to Minimize Impacts to Waters of the U.S., Including Wetlands)**. A preliminary mitigation plan is included in **SDEIS Appendix J (Preliminary Section 404 Mitigation Plan)** which discusses protective measures to be followed during construction to avoid/minimize impacts and a mitigation planting plan which addresses the planting of riparian trees and native grass areas for long-term compensation for habitat impacts.

As reported in **SDEIS Section 4.9.2.4 (Threatened and Endangered Species)**, no recent occurrences of federally or state listed threatened or endangered species have been identified in the project study area during field surveys. This was also confirmed through informal coordination with the USFWS, a search of the TPWD's NDD (TPWD, 2007), and correspondence with other organizations considered to have special expertise related to wildlife and their habitat. In March 2009, the USFWS concurred that the proposed action is not likely to adversely affect any federally listed species.

4.1.7.9 Conservation

SDEIS Section 4.19 (Energy Requirements) and **Section 4.22 (Irreversible and Irretrievable Commitments of Resources)** include general discussions regarding transportation-related energy use and the commitment of resources. For the implementation of Alternative 4B, energy, fuel, materials consumption would occur during construction and operation. The highway construction materials that would be used are not in short supply and therein construction would not adversely affect continued availability of similar resources. This alternative would operate as an all-electronic toll collection facility, which provides operational efficiencies to reduce stop and go traffic conditions. This would result in lower fuel/energy consumption. When correlating the measures of effectiveness to energy use, managing congestion delay and vehicle hours traveled means lower fuel and energy use.

4.1.7.10 Needs and Welfare of the People

The Trinity Parkway is a high profile project that, for about the past 15 years, has involved numerous stakeholders and individuals along the corridor in the project development process. **Chapter 1** of this LSS summarizes this long process of project planning and evaluation. Effects of the proposed project on the local community could be a major factor in determining practicability of Alternative 4B. Information used in the analysis of the impact of Alternative 4B on the needs and welfare of the people is presented in **SDEIS Section 4.1 (Land Use Impacts), Section 4.2 (Coordinated Planning and Design), Section 4.3 (Social Impacts), Section 4.4 (Transportation Impacts), Section 4.5 (Relocations and Displacements Impacts), Section 4.17 (Hazardous/Regulated Materials),** and **Section 4.20 (Temporary Impacts During Construction)**. Public comments on the SDEIS are also relevant to this discussion.

Social Impacts: **Table 4-25** in **LSS Section 4.1.7.1** provides a summary of the residences, commercial buildings, and public facilities that would be relocated under Alternative 4B (a total of 35), and **SDEIS Appendix C (Relocation Assistance Information)** provides a detailed listing of the same. In accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, relocation assistance would be provided to any person, business, farm, or non-profit organization displaced as a result of the acquisition of real property for public use (see **SDEIS Appendix C**).

The number of relocations would equate to six in La Bajada (West Dallas), three in the Trinity Industrial District, 11 in the Brookhollow Industrial Park, and 15 in the South Dallas Neighborhood District. According to information obtained from Dun & Bradstreet by the City of Dallas, Office of Economic Development, Research & Information Division (January 2010), Alternative 4B would only displace 13 to

16 businesses, which would be expected to affect approximately 62 to 187 jobs. Alternative 4B generally avoids impacts to the neighborhoods and neighborhood districts in the project corridor, since a majority of the alignment would be within the Dallas Floodway.

Minority and low-income populations exist in the project area, and Alternative 4B has been evaluated for compliance with the EO 12898, FHWA Order 6640.23, and Title VI of the Civil Rights Act of 1964, as amended (see **SDEIS Section 4.3.3 Environmental Justice Considerations**). Beneficial and adverse impacts to minority and low-income populations have been identified, along with potential mitigation strategies, and there appear to be no disproportionately high or adverse impacts; therefore, Alternative 4B is considered to be consistent with the EO 12898 and FHWA Order 6640.23. Alternative 4B is similarly consistent with Title VI in that there is no evidence of discriminatory intent or effect.

General Public Opinion: **SDEIS Section 1.3 (Project History)** describes two well-publicized citywide elections in which Dallas citizens expressed support for a Trinity Parkway location within the Dallas Floodway:

(i) May 2, 1998 - Dallas voters approved the issuance of General Obligation Bonds including $84 million for the Trinity Parkway, a reliever route within the Dallas Floodway levee system (City of Dallas, 1998), and

(ii) November 6, 2007 - Dallas voters rejected a petition calling for prohibition of construction, maintenance, or improvement of certain roadways (i.e. Trinity Parkway) within the Trinity River levees from Westmoreland Road to IH-45.

Alternative 4B is consistent with the views of the electorate expressed in the November 6, 2007 election since it would be built within the Floodway.

Stakeholder Opinions: Only two comments were received regarding Alternative 4B during the official comment period for the SDEIS from March 20, 2009 to June 30, 2009. One statement in support was received, and it was noted that Alternative 4B was their "second choice" after Alternative 3C. There was one statement opposed to Alternative 4B. Twenty-two comments were received that expressed general opposition to a Dallas Floodway alternative. Comments received from agencies and the public during the public comment period for the SDEIS will be included in the FEIS, along with responses to the comments received.

Future Land Use Plans: The Dallas City Council approved the renaming of Industrial Boulevard to "Riverfront Boulevard" in November 2008 and local business owners consider this a positive influence on their community that supports re-development. There is also on-going development in the corridor,

although the pace may have slowed due to national economic conditions. This includes infill development of the Design District, and the infill of residential lofts and similar development along the corridor. Alternative 4B would not directly conflict with these development plans. However, it is not the preferred alignment supported by the City and local business owners.

The City of Dallas has widely publicized its "Trinity River Corridor Project," which is actually the name for a series of proposed projects that are along the main stem and Elm Forks of the Trinity River in Dallas. Since 2003, the City has planned for Trinity Parkway to have a combined parkway riverside layout, balancing the Trinity Parkway embankments with proposed excavation of lakes in the Dallas Floodway as part of the City's BVP. Since 2007, the design work of the City's Trinity Lakes Consultant Team has been based on this plan, impacting multiple design decisions such as physical layout of the lakes, trails, public spaces and access points, the hydraulic modeling, the earthworks plan, etc. While it is acknowledged the City's BVP must still be evaluated by the USACE and found to be environmentally acceptable and technically sound before the plan can be implemented, Alternative 4B would not be compatible with the current plan.

Stemmons Deed Precedent: There has been a longstanding intent in Dallas to include a major roadway in the Dallas Floodway, mostly notably derived from the Stemmons Deed Precedent. The 1972 donation of 930 acres of the Dallas Floodway land to the City by Industrial Properties included the following language in the escrow agreement: "*It is the desire of Industrial [Properties] and of the City that all such lands situated within the floodway as above described be made available for parks, open space, recreational, and transportation facilities as set out below," … "All of said lands so acquired… shall be used for parks, open space, recreational, transportation facilities, including roadways on and adjacent to the levees, and such uses as are necessarily incident to the navigation channel, and all of which uses shall be generally consistent with the concept of the Coordinated Plan For Open Space Development Of The Trinity River System of the Dallas Park Board dated December 9, 1969 and adopted by the Park Board and approved by the City Council on March 9, 1970."* (City of Dallas Park Board Resolution 72-0126, dated January 10, 1972) Further, the 1974 purchase of remaining lands in the Dallas Floodway by the City included this same provision regarding transportation facilities. Alternative 4B is consistent with the intended use as outlined in the deed.

4.1.7.11 Air Quality Impacts

A traffic air quality analysis was performed for the proposed project to measure projected CO levels as an indicator to determine whether local air quality would be adversely affected. As discussed in the **SDEIS Section 4.14 (Air Quality Impacts),** for Alternative 4B the percentages of projected 2025 and 2030 concentrations for 1-hour and 8-hour CO would be below the NAAQS threshold. Local concentrations of

CO are not expected to exceed national standards at any time. A quantitative MSATs analysis was also performed for the proposed project (see **SDEIS Section 4.14.5 Mobile Source Air Toxics**). MSATs are expected to decrease over time due to EPA's vehicle and fuel regulations. Based upon this assessment, air quality impacts do not appear to be a major practicability constraint for Alternative 4B.

This project is located within Dallas County, which is part of the EPA's designated nine-county serious nonattainment area for the 2007 eight-hour ozone standard; therefore, the transportation conformity rule applies. The proposed project is included in the area's financially constrained long-range MTP (*Mobility 2035*) and the 2011-2014 TIP, as amended. The USDOT (FHWA/FTA) found the MTP and the TIP to conform to the SIP on July 14, 2011. Analyses for the subsequent FEIS will be conducted based on the current MTP at that time. During the FEIS preparation process and prior to issuance of a ROD by the FHWA, appropriate measures would be taken to ensure that the proposed project is consistent with the conforming MTP and the TIP/STIP.

4.1.7.12 Traffic Noise Impacts

As discussed in the **SDEIS Section 4.15 (Noise Impacts)**, existing and predicted traffic noise levels were modeled at receiver locations that represent the land use activity areas adjacent to Alternative 4B that may be impacted by traffic noise and may potentially benefit from feasible and reasonable noise abatement. The following paragraphs describe the impacts:

The southern terminus is an existing heavy traffic area with south US-75 connecting with US-175. Land use is single-family residential with a few retail/commercial facilities. Alternative 4B merges with US-175 at the southern end of the project. In this area, 106 residences would have noise levels that exceed NAC criteria in the design year.

The northern terminus is an existing heavy traffic area at the IH-35E and SH-183 split. Land use is retail/commercial with a residential neighborhood known as Arlington Park located approximately 300 feet east of the existing freeways. In this area, Alternative 4B provides connecting ramps to the existing freeway system. Nineteen residences and one small playground/park (Sleepy Hollow Park) near the northern terminus would have noise levels that exceed NAC criteria in the design year.

From the southern terminus, Alternative 4B passes through an industrial area, then enters the Trinity River floodplain and levee system near the AT&SF/DART railroad bridges. The alternative splits at this point, with travel lanes tracking along the riverside of the east and west levees for about 5.5 miles. Alternative 4B exits the levee system near Hampton Road. The alternative then passes through a commercial area to the northern terminus. In addition to the north and southern termini impacts, 39

residences and one park (Oak Cliff Founders Park) would have noise levels that exceed NAC criteria in the design year. These noise impacts occur at ramp connections to existing roads along the landside of the west levee.

A noise wall analysis was performed for the impacted areas. Based on the analysis, noise walls were determined to be both feasible and reasonable only at the residential neighborhoods at the southern terminus of Alternative 4B. Noise walls in this area would reduce noise levels by at least 5 dBA at impacted receivers. Noise walls to mitigate the impacted areas at the northern terminus and at ramp connections to Hampton Road, Sylvan Avenue, Continental Avenue, Houston Street, and South RL Thornton Freeway (IH-35E) along the landside of the west levee would not be reasonable and feasible. **SDEIS Plate 4-35** shows the noise impacted areas. The noise analysis and discussion regarding noise impacts and feasible and reasonable abatement measures will be updated in the FEIS in accordance with TxDOT's (FHWA approved) April 2011 Guidelines for Analysis and Abatement of Roadway Traffic Noise.

4.1.7.13 Impact of Floods on Human Safety

The subject of flooding is addressed in **SDEIS Section 4.13 (Floodplain Impacts)** and **SDEIS Appendix F**. As Alternative 4B is proposed to be located primarily within the Dallas Floodway, approximately 418 acres of the proposed alignment would be located in the 100-year (base) floodplain. In regard to Alternative 4B, the approach is to provide a hydraulically neutral design with respect to the Dallas Floodway function by balancing the Trinity Parkway embankments with corresponding excavations in the Dallas Floodway. As shown in **SDEIS Section 4.13 Floodplain Impacts**, Alternative 4B would meet the USACE criteria pertaining to valley storage and changes in floodwater velocities. However, Alternative 4B would result in a maximum rise of 1.2 feet for the 100-year event and 0.71 feet for the SPF event, which would not meet the USACE criteria that there should be no rise in the flood elevation. In the event Alternative 4B is selected for further development, measures to reduce or eliminate the increases in flood elevation would need to be evaluated. Specific measures or refinements to the preliminary design that may reduce or eliminate the rises in flood elevations are not known at this point, but would be researched later. The associated civil engineering work would be subject to review and approval by the USACE throughout design and construction to assure compliance with the requirement for hydraulic neutrality (as well as other design and operational requirements). Alternative 4B has been designed not to interfere with the USACE's or the City's ability to operate and maintain the Dallas Floodway, conduct flood fighting activities, or restore or improve the flood damage reduction capability of the Federal project. A Section 404/10 permit decision on the project cannot be made until the 1988 ROD criteria evaluation is complete.

Future on-going maintenance within the Dallas Floodway is addressed in **SDEIS Section 2.4.8 (Facility Operations and Maintenance in the Dallas Floodway).** As described in this section, mowing and other maintenance operations in the Trinity Parkway operations areas would be at least as frequent as the mowing and maintenance cycles of the City of Dallas Flood Control District. Further, the City would be given unencumbered rights to operate within the Trinity Parkway area, including the ability to shut the road down to traffic operations if judged necessary by the City for purposes of the flood control function. Because of the hydraulic design approach and the requirements for no interference with floodway operations and maintenance, Alternative 4B is not expected to adversely impact human safety with respect to the Dallas Floodway's ability to carry floods.

Another issue related to human safety in floods is the possible danger to motorists of flooding over the proposed roadway. As described in **LSS Chapter 2 (Alternatives Considered)**, Alternative 4B would be protected from inundation from the 100-year storm, a level of protection commensurate with other roadways in the NTTA system. Alternative 4B would be primarily protected by the physical elevation of the roadway above the computed 100-year event in the Dallas Floodway. Additionally, as described in **SDEIS Section 2.4.7 (Pump Stations in the Dallas Floodway)**, 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 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 (see **SDEIS Appendix K-3** for additional details regarding the Emergency Action Plan). Because of the design features, safety to motorists during floods is not expected to be a differentiating feature between floodplain and non-floodplain alternatives. **SDEIS Appendix K-3** provides a draft **Emergency Action Plan** outlining alarm, notification, and roadway closure procedures in the unlikely event of a flood in excess of the 100-year event in the Dallas Floodway. Regarding the discussion of practicability, the impacts of flooding on human safety are not considered critical, due to the proposed design and operational considerations with respect to flood protection. All proposed flood protection features are reflected in the estimated costs for Alternative 4B.

In October 2005, the USACE Fort Worth District agreed to become a cooperating agency in the preparation of the Trinity Parkway EIS. See **SDEIS Section 1.12.4 (Coordination with USACE).** In October 2006, the USACE Fort Worth District provided comments on a draft version of the SDEIS provided to the District in July 2006. In the comments, the USACE raised several concerns about Trinity Parkway, specifically focusing on the Build Alternatives located in the Dallas Floodway as detailed in the February 2005 DEIS. The USACE expressed concern that these alternatives, as proposed, appeared to adversely impact operations and maintenance requirements within the Dallas Floodway, an existing Federal flood damage reduction project.

The NTTA and the FHWA entered into consultation with the USACE and City of Dallas representatives through the fourth quarter of 2006 and first and second quarters of 2007 to attempt to resolve these concerns. The most substantial change made in response to the USACE consultation was the addition of two new alternatives to the SDEIS, one of which is Alternative 4B. This alternative was added because changes in the roadway layout were required to address several of the USACE comments. The following summarizes the roadway layout changes made to the Split Parkway Riverside alternative resulting in Alternative 4B:

- No ramps to Westmoreland Road to avoid possible adverse impacts to access and circulation for O&M, flood fighting and surveillance.

- The Trinity Parkway lanes are elevated at (i) the North Dallas Floodway Entry (mainlanes), (ii) the Woodall Rodgers connection (ramps), (iii) the Riverfront (Industrial) Boulevard connection (ramps), (iv) the South Dallas Floodway Exit (mainlanes), and (v) the IH-45 connection (ramps) to provide adequate vertical clearance over the levee top to allow City service vehicles to underpass the structures.

- Reinforced concrete diaphragm walls are proposed at crossing points (i) thru (v) above to reinforce the levees and offset any possible negative effects of levee penetrations. These walls would extend down to rock or unweathered shale to cut off possible under-seepage; would be 3 to 4 feet thick concrete and reinforced to free-stand as flood walls in the event a portion of the levee was washed away; and would extend upstream and downstream of the zone of levee penetrations at the crossings, giving a variable length in the range of 300 to 1,400 feet depending on the site. Based on the recent geotechnical work done for the development of the City's Levee Remediation Plan, and design development of levee crossings associated with other projects, including the Sylvan Avenue and Margaret Hunt Hill bridges, the diaphragm walls shown in the SDEIS may ultimately be substituted with other measures (see **LSS Chapter 3**).

- The levee-side ramps at diamond interchanges to existing cross-street bridges, such as Hampton and Sylvan Avenue, are redesigned to move the ramps closer to the mainlanes so they do not overlay the levee top. The ramps are now elevated using retaining walls and fill, in lieu of bridges, to avoid drill shaft penetrations of the levee.

- Gates and bridges are provided on the NB-WB ramp at IH-35E to facilitate access across/under the ramp by City maintenance personnel and vehicles.

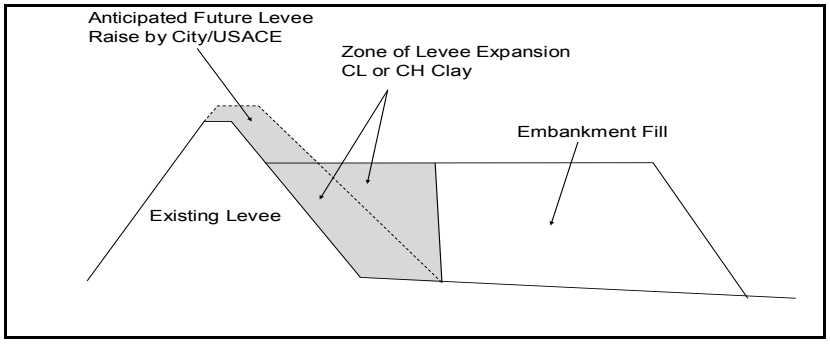
- Longitudinal maintenance roads are replaced and reconnected in segments affected by the Trinity Parkway embankments.

4.1.7.14 Risks Associated with Implementation of the Action

The "risks" discussed in this section focus on levee stability issues. For Alternative 4B, the risk analysis focuses on the segment from approximately Hampton Road to MLK where the roadway embankments and the levees would be conjoined. This represents about 70 percent of the total length of Alternative 4B.

The geotechnical design conditions related Alternative 4B are discussed in **LSS Section 3.2 Levee Remediation Plan.** 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 designs are also coordinated with the USACE conceptual designs for raising and thickening the levees so that the levee construction could occur before or after with no affect on constructability. Additionally, in areas where roadway embankments are adjacent, the roadway embankment would be designed to incorporate the levee widening up to at least the level of the top of the embankment. See **SDEIS Section 2.4.6 (Trinity Parkway Construction in the Dallas Floodway)**, including **Figure 2-29** which is repeated below as **LSS Figure 4-7**.

FIGURE 4-7. CONCEPTUAL TYPICAL SECTION – ALTERNATIVE 4B ADJACENT TO EXISTING DALLAS FLOODWAY LEVEE



Generally, the geotechnical work in the Levee Remediation Plan (**LSS Section 3.2)** is intended to prove 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 believed to occur in segments with adjacent roadway embankments (generally as shown in the figure above.) The benefit would accrue for several reasons: (i) for events up to the 100-year level, the flow path distance for seepage under the levee would increase substantially due to the addition of the roadway embankment, resulting in lower seepage flows and more gradual transitions of pore pressure; (ii) due to the buttressing effect of the embankment (see figure

above) the effective height of the levee slope would be reduced, reducing the potential severity of surface slides, and (iii) 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 a 100-year level embankment to hold back at least some of the floodwater from entering the City. The final point incorporates the concept of "resilience" as a tool for mitigating the effects of natural and manmade disasters.

In regard to the discussion of practicability, 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 4B.

4.1.7.15 Incompatible Development

Highway projects can impact floodplains indirectly by facilitating or inducing development in floodplains. The FHWA guidance on floodplain encroachment includes a requirement to determine whether a proposed action is compatible with "a community's floodplain development plan" (FHWA, 1987, paragraph 14). In the project corridor, the applicable community development plans for the City of Dallas are the *Trinity River Corridor MIP/BVP* and the ongoing *Trinity River Corridor Comprehensive Land Use Plan* (see **SDEIS Section 3.1.1.1 (Local Land Use Plans/Policies)**), which are both subject to the CDC process (City of Dallas, 1999, 2002, and 2003).

The potential for induced development resulting from Trinity Parkway is presented in **SDEIS Section 4.24.1 (Indirect Impacts)**. This analysis identifies areas where natural, governmental, or other constraints would make future change in land use unlikely. **SDEIS Plate 4-38** is a "constraints map" depicting areas that would be unsuitable or unlikely for future development or redevelopment activities. The constraints map identifies the Dallas Floodway in its entirety and the related landside sump areas as being unsuitable or unlikely for development. The Indirect Impacts analysis is based on the presumption that any 100-year floodplain areas in the study area (including areas in the Dallas Floodway and the surrounding levee-protected lands) would be unavailable 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. Accordingly, there would be no induced incompatible development in floodplains in the Dallas Floodway or sump areas due to the implementation of Alternative 4B.

Future development in the Dallas Floodway is expected to be controlled closely by 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. **SDEIS Section 3.1.1.4 (Coordinated Planning and Design)** provides a description of the BVP and **SDEIS Plate 3-7** provides a master plan view of the proposal. The proposed BVP improvements are intended to be flood resistant in response to the Dallas Floodway setting, and are of the type (parks, lakes, trails, etc.) which are generally recognized as being appropriate and compatible in floodplains. The BVP improvements are not induced by the Trinity Parkway.

4.1.7.16 Aesthetics

LSS Chapter 2 (Alternatives Considered) describes the routes and configurations of Alternative 4B, and **LSS Plates 2-5A** through **2-5C** present engineering plans, roadway profiles and typical sections of Alternative 4B. **SDEIS Section 4.16 (Visual Impact Analysis)** provides a visual analysis for Alternative 4B following the FHWA visual impact assessment protocol (FHWA, 1988). Additionally, visualizations of Alternative 4B were displayed (as videos) at the Public Hearing for the Trinity Parkway DEIS in Dallas on March 29, 2005, and at the public hearing for the Trinity Parkway SDEIS in Dallas on May 5, 2009.

LSS Plates 4-16 through 4-20 at the end of this chapter provide bird's eye views of Alternative 4B in the areas of (i) Hampton Road, (ii) Sylvan Avenue, (iii) Continental Street, (iv) Houston Street, and (v) the DART bridge. These plates are freeze-frames taken from the 3-D visualizations used in the May 2009 Public Hearing.

At the northern and southern segments of the corridor, Alternative 4B would run outside of the Dallas Floodway levees, 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. Proposed noise walls 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 4B and/or noise walls associated with this alternative would serve as a visual and physical barrier running through their neighborhood.

Figure 4-8 shows a view of Alternative 4B within the Dallas Floodway from atop the east levee.

FIGURE 4-8. VIEW ON TOP OF THE EAST LEVEE ALONGSIDE ALTERNATIVE 4B

Note: Looking northwest toward the Commerce Street Viaduct.

Within the Dallas Floodway, Alternative 4B 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. 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 4B would not substantially limit the views of most commercial businesses and residential neighborhoods beyond the immediate corridor.

The most common view for future motorists from Alternative 4B 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 4B toward many of the commercial businesses and residential neighborhoods on the other side of the levee and toward the Dallas CBD.

The MHH Bridge, which began construction in 2009, was designed by internationally-known architect Santiago Calatrava, and is generally perceived as a "signature" piece and possibly a tourist attraction. Alternative 4B would not restrict views of the MHH Bridge.

4.1.7.17 Historic Values

SDEIS Section 4.7 (Cultural Resources and Parklands) and **Chapter 5 (Draft Section 4(f) Evaluation)** provide an evaluation of potential impacts to cultural resources with historic significance. **LSS Chapter 5** provides additional discussion of historic values. The discussion is not repeated here. Numerous historic-age resources are located within the Trinity Parkway project area, including properties, bridges, and districts that are listed in or eligible for the NRHP. Alternative 4B, as presented in the SDEIS, would involve impacts to such resources. As part of the Section 106 process discussed further in **LSS Chapter 5**, an analysis of measures to avoid and minimize impacts to these resources was performed, which involved the development of design refinements to either completely avoid the resources or minimize impacts such that they are not considered to be adverse.

4.1.7.18 Summary of Practicability Assessment for Alternative 4B

Based on the individual assessments in **LSS Sections 4.1.7.1** through **4.1.7.17** above, the performance of Alternative 4B with respect to each of the 17 factors considered does not substantially affect its practicability. The disadvantages of this alternative are that it would require floodplain modifications and unavoidable wetland impacts within the Dallas Floodway, and that it would not meet criteria specified in the 1988 USACE ROD for the Regional Environmental Impact Statement for the Trinity River and Tributaries, which includes no rise in the 100-year or SPF elevation. Alternative 4B would result in a maximum rise of 1.2 feet for the 100-year elevation and 0.71 feet for the SPF elevation. Minimal or no change to historic drainage patterns would be expected within or down gradient from the study area as a result of Alternative 4B. This alternative would not interfere with operation and maintenance of the Dallas Floodway, although there would be lost tollway revenue and flood damage restoration costs associated with greater than 100-year flood events. Such attendant costs, however, would be included in the funding plan for operation and maintenance for the tollway.

Impacts to floodplains are minimized by following standard stream crossing design criteria, avoiding direct impacts on stream channels, and adjusting the alignment where possible. Bridge and roadway designs seek to minimize impacts to floodplains in compliance with the FHWA requirements, including efforts to span 100-year floodplains. Final designs would adhere to the FHWA drainage criteria for both minor and major hydraulic structures, as well as following all FEMA requirements.

One of the purposes of the proposed project is to provide compatibility with local development plans, and the location of Alternative 4B is inconsistent with these plans. Alternative 4B is not preferred by the City or the local business community.

4.1.8 Summary Comparison of Practicability

This chapter of the LSS has separately examined the Build Alternatives in light of a variety of factors used by federal agencies to evaluate the practicability of each alternative pursuant to EO 11990 regarding protection of wetlands and EO 11988 regarding floodplain management. **Table 4-32** provides a summary of data relevant to evaluating practicability and facilitates making comparative distinctions among the Build Alternatives as to the listed factors. The recommendation of a preferred alternative will be based on the information discussed above and summarized in **Table 4-32** in combination with an evaluation of comments on the LSS and from a Public Hearing. The recommendation will be made after all pertinent factors have been weighed to determine the practicability of each alternative within the meaning of EO 11988 and EO 11990, as well as implementing regulations and guidance of the FHWA and the USACE as discussed in **Section 4.1.2**.

TABLE 4-32. SUMMARY OF PRACTICABILITY OF THE TRINITY PARKWAY BUILD ALTERNATIVES

Practicability Factors	Unit of Measure	Trinity Parkway Build Alternatives			
		2A	2B	3C	4B
Economic Impacts					
Estimated Total Tax Value Lost from Land Conversion[1]	$ Millions	379.0	306.4	54.0	36.2
Estimated Annual Tax Revenue Lost from Land Conversion[2]	$ Millions	10.3	8.3	1.5	1.0
Estimated Businesses Displaced[3]	Number	285 to 304	220 to 289	15 to 20	13 to 16
Estimated Jobs Impacted Due to Business Displacements[3]	Number	6,437 to 6,640	6,182 to 6,655	72 to 203	62 to 187
Project Costs					
Estimated Construction Costs (Including Design and Agency Costs)[4]	$ Billions	1.76	1.35	1.27	1.35
Estimated ROW and Utility Relocation Costs	$ Millions	601.0	520.3	142.1	103.2
Estimated Environmental Mitigation Costs[5]	$ Millions	48.2	45.2	16.3	15.8
Estimated Costs to Mitigate Levee Impacts	$ Millions	---	---	30.0	50.0
Estimated Routine O&M Costs – Total[6] / Annualized	$ Millions	78.1 / 1.5	233.0 / 4.5	232.6 / 4.5	227.2 / 4.4
Estimated Flood Damage Restoration Costs for >100-yr. Flood – Total / Annualized	$	Negligible	Negligible	4.8 Million / 48,000 (cleanup and damage repair)	7.2 Million /72,000 (cleanup and damage repair)
Estimated Revenue Loss from Downtime due to >100-yr. Flood – Total / Annualized	$	Negligible	Negligible	3.6 Million / 36,000	3.6 Million / 36,000
Technology					
Major Technological Constraints[15]	Yes/No	No	No	No	No
Logistics					
Estimated Time to Complete Construction After Anticipated ROD	Years	10	9	6.25	6.5
High Risk Hazardous Material Sites[7]	Number	34	35	17	16
Major Utility Constraints	Yes/No	Yes (relocate 52,000 linear feet of water/sewer lines and 2 miles of Oncor 345 kV line)	Yes (relocate 52,000 linear feet of water/sewer lines, 2 miles of Oncor 345 kV line, and the West Network Substation)	No	No
Estimated Net Borrow Material (cut/fill) Including Shrinkage	Cubic Yards	0.3 Million	0.9 Million	4.3 Million	6.7 Million

TABLE 4-32. SUMMARY OF PRACTICABILITY OF THE TRINITY PARKWAY BUILD ALTERNATIVES

Practicability Factors	Unit of Measure	Trinity Parkway Build Alternatives			
		2A	2B	3C	4B
Locational Advantages					
Consistent with Local Plans	Yes/No	No	No	Yes	No
Impacts on Natural and Beneficial Values Served by Floodplains					
Woodlands Impacted	Acres	4.6	6.4	33.3	29.3
Maintained Grass Areas Impacted[8]	Acres	11.8	31.1	468.1	573.1
Waters of the U.S., Including Wetlands, and Water Quality					
Waters of the U.S. Including Wetlands Impacted	Acres	4.3	9.1	90.9	110.6
Water Quality Impacts	Yes/No	Yes	Yes	Yes	Yes
Storm Water Runoff Abatement Needed	Yes/No	Yes	Yes	Yes	Yes
Fish and Wildlife Habitat Values					
Threatened and Endangered Species	Yes/No	No	No	No	No
Conservation					
Expected reduction in energy and fuel consumption	Yes/No	Yes	Yes	Yes	Yes
Needs and Welfare of the People					
Residential Relocations	Number	8	6	6	11
Commercial Displacements (Buildings)	Number	272	228	29	24
Community and Public Building Displacements	Number	5	11	0	0
Consistent with EJ Order and Title VI	Yes/No	Yes	Yes	Yes	Yes
Consistent with Location Favored by Majority of Stakeholders and General Public	Yes/No	No	No	Yes	No
Air Quality					
Projected CO Concentrations Below the NAAQS	Yes/No	Yes	Yes	Yes	Yes
MSATs – Expected Change[9]	Decrease/ Increase	Decrease	Decrease	Decrease	Decrease
Traffic Noise					
Noise Receivers Impacted	Number	209	202	128	166
Impacts of Floods on Human Safety					
Tollway Area within 100-yr. (Base) Floodplain	Acres	55	76	297	418
Tollway Protected from 100-yr. Flood	Yes/No	Yes	Yes	Yes	Yes
Interferes with Floodway O&M[10]	Yes/No	TBD	TBD	TBD	TBD

TABLE 4-32. SUMMARY OF PRACTICABILITY OF THE TRINITY PARKWAY BUILD ALTERNATIVES

Practicability Factors	Unit of Measure	Trinity Parkway Build Alternatives			
		2A	2B	3C	4B
Proposed Condition Meets USACE Criteria for Valley Storage (100-yr. and SPF)	Yes/No	Yes	Yes	Yes	Yes
Proposed Condition Meets USACE Criteria Concerning Increase in Flood Elevation (100-yr. and SPF)[11]	Yes/No	Yes	Yes	No - 100-year (max. rise of 0.41 ft.) Yes – SPF (max. rise of 0.03 ft.)[11]	No (max. rise of 1.2 ft. for the 100-yr. and 0.71 ft. for the SPF)
Proposed Condition Meets USACE Criteria Concerning Erosive Water Velocity	Yes/No	Yes	Yes	Yes	Yes
Risks Associated with Implementation of the Action					
Adverse Impacts to Levee Integrity[16]	Yes/No	TBD	TBD	TBD	TBD
Incompatible Development					
Induced Development in Floodplains or Wetlands	Yes/No	No	No	No	No
Aesthetics					
Visual Impacts[12]	Low/Medium/High	High	Medium	Medium	Medium
Historic Values					
Archeological Historic Properties Impacted[13]	Number	0	0	0	0
Non-Archeological Historic Properties with Adverse Effects[14]	Number	0	0	1	0
Section 4(f) Involvement[17]	**Yes/No**	**N/A**	**N/A**	**N/A**	**N/A**

Notes:
CO = Carbon Monoxide; **EJ** = Environmental Justice; **EO** = Executive Order; **MSAT** = Mobile Source Air Toxics; **N/A** = Not applicable; **NAAQS** = National Ambient Air Quality Standards; **O&M** = Operations and Maintenance; **ROD** = Record of Decision; **ROW** = right-of-way; **SPF** = Standard Project Flood; **TBD** = To be determined.

1. Based on 2011 Dallas Central Appraisal District base property values for property needed for ROW.
2. Based on 2011 tax rates for Dallas County, the City of Dallas, and Dallas Independent School District.
3. Based on data from business records obtained from Dun & Bradstreet by the City of Dallas, Office of Economic Development, Research & Information Division (January 2010). It should be noted that some jobs and businesses could be permanently lost if displaced businesses are unable to relocate successfully and employees are unable to find similar work. These numbers do not factor in jobs that would be created by construction and operation of the tollway.
4. The construction costs do not include the ROW and utility relocation costs, but do include the environmental mitigation costs shown separately. The construction costs for Alternatives 3C and 4B include costs for anticipated structural levee remediation features proposed to address pier penetrations of the Dallas Floodway levees that are also shown separately in the above table (see **LSS Appendix D**).
5. The environmental mitigation costs include estimated asbestos abatement for displaced buildings, investigation/remediation for hazardous material sites, noise walls, and restoration costs for impacts to woodlands and waters of the U.S., including wetlands (see **LSS Appendix D**).
6. These costs are estimated over a feasibility study 52-year period (2013 – 2065) based on standard practices for NTTA O&M. The estimates were developed based on best available information using conceptual schematics for each alternative and may vary from final O&M costs.
7. Hazardous waste/material sites considered to have a high probability for contamination located within or adjacent to proposed ROW (see **SDEIS Section 4.17**).
8. The figures for impacts to maintained grass areas for Alternatives 3C and 4B include an estimated 258 acres from proposed excavation sites for borrow material to be used for tollway embankment.

TABLE 4-32. SUMMARY OF PRACTICABILITY OF THE TRINITY PARKWAY BUILD ALTERNATIVES

Practicability Factors	Unit of Measure	Trinity Parkway Build Alternatives			
		2A	2B	3C	4B

9. The EPA 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 standards and low sulfur diesel fuel, and the EPA's proposed Off-Road Diesel Engine and Fuel Standard). These projected air emission reductions will be realized even with the predicted continued growth in vehicle miles traveled (EPA, 2001; EPA, 1999).
10. Although the Build Alternatives have been designed to avoid interference with the USACE's and City's ability to operate and maintain the Dallas Floodway, the preferred alternative would be subject to further review in accordance with 33 USC 408 (Section 408). The final determination regarding whether the preferred alternative would interfere with floodway O&M would be made during the Section 408 process.
11. The 1988 USACE ROD Hydrologic and Hydraulic criteria states that the following maximum allowable hydraulic impacts will be satisfied: No rise in the 100-year and the SPF water surface elevations. The criteria further states that this evaluation will be developed using reasonable judgment based on the degree of accuracy of the evaluation. The H&H analysis performed for Alternative 3C has revealed a maximum localized rise in the SPF water surface of 0.03 feet upstream of the Houston Street Bridge (see **LSS Plate 4-25**). With consideration for the small magnitude of the SPF rise, the location, and the very limited extent of the rise, it has been determined that for the SPF flood event, the 1988 ROD criteria has effectively been met. In the event that Alternative 3C or 4B is selected for further development, additional measures or project modifications to the preliminary design may be used to reduce or eliminate these water surface rises. However, the water surface rises determined in the preliminary design evaluations are not sufficient to eliminate these alternatives from further consideration. A Section 404/10 permit decision on the project cannot be made until the 1988 ROD criteria evaluation is complete.
12. For the purpose of summarizing the visual impacts discussed in **LSS Sections 4.1.4.16**, **4.1.5.16**, **4.1.6.16**, and **4.1.7.16**, the Build Alternatives were assigned an overall impact rating of low, medium or high. A low rating would represent a minimal visual change where the Build Alternative is somewhat visible, but consistent with the existing landscape. A medium rating represents a moderate visual change where the Build Alternative is considerably visible, but does not obscure the view of the landscape. A high rating represents a strong visual change where the Build Alternative would be highly visible, obscure views, and greatly alter the character of the landscape.
13. TxDOT determined with concurrence from the SHPO that the proposed undertaking would not affect archeological historic properties as defined in 36 CFR 800.16(l) (see **LSS Appendix B**).
14. See **LSS Chapter 5, Section 5.5.25**.
15. For the purpose of this analysis, a major technological constraint was considered to be any insurmountable technological issue that would influence the constructability, operations, or maintenance of a particular Build Alternative.
16. If a Build Alternative is recommended as the preferred alternative, the USACE is expected to exercise its design review authority under the Section 408 permit process to assure no adverse impacts to Dallas Floodway levees. See also **LSS Sections 4.1.6.14** and **4.1.7.14** for potential benefits to levee stability from Alternatives 3C and 4B in segments with the roadway embankment alongside.
17. Section 4(f) is shaded to denote for the reader that Section 4(f) is not applicable for this project pursuant to Section 405 of Public Law No. 111-212 (see **LSS Section 5.1**).

The comparative arrangement of information in **Table 4-32** facilitates the identification of factors that may be helpful in evaluating the practicability of the four Build Alternatives. For example, Alternatives 2A and 2B have severe constraints relating to project costs, logistics, locational disadvantages, needs and welfare of the people, and aesthetics. Specifically, each of these two alternatives would cause hundreds of business displacements and, as a result, over 6,000 jobs would be expected to be impacted. In contrast, Alternatives 3C and 4B would have far fewer impacts regarding such factors but would require floodplain modifications and unavoidable wetland impacts within the Dallas Floodway which are factors relevant in the evaluation of alternatives under both EO 11988 and EO 11990, as well as the federal regulations and guidance discussed in **Section 4.1.2**. As mentioned in the introduction to this subsection, findings as to the practicability of the Build Alternatives will be included in the FEIS after considering public comments on the LSS and after applying all regulatory requirements for evaluating practicability.

[END OF CHAPTER 4 EXCEPT FOR PLATES]

PLATE 4-1
ALTERNATIVE 2A -
IRVING/RIVERFRONT (INDUSTRIAL) BLVD. ELEVATED
VIEW 1 - NEAR HAMPTON RD


STEMMONS FRWY
MARKET CENTER BLVD
OAK LAWN
TRINITY PARKWAY - ALT 2A
SYLVAN AVE
EAST LEVEE
NOTE : RIVER MEANDER AND LAKES SHOWN WITHIN THE DALLAS FLOODWAY ARE PROPOSED FEATURES, AS SHOWN IN THE DALLAS "BALANCED VISION PLAN"
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PLATE 4-2
ALTERNATIVE 2A -
IRVING/RIVERFRONT (INDUSTRIAL) BLVD. ELEVATED
VIEW 2 - NEAR SYLVAN AVE

PLATE 4-3
ALTERNATIVE 2A -
IRVING/RIVERFRONT (INDUSTRIAL) BLVD. ELEVATED
VIEW 3 - NEAR CONTINENTAL ST

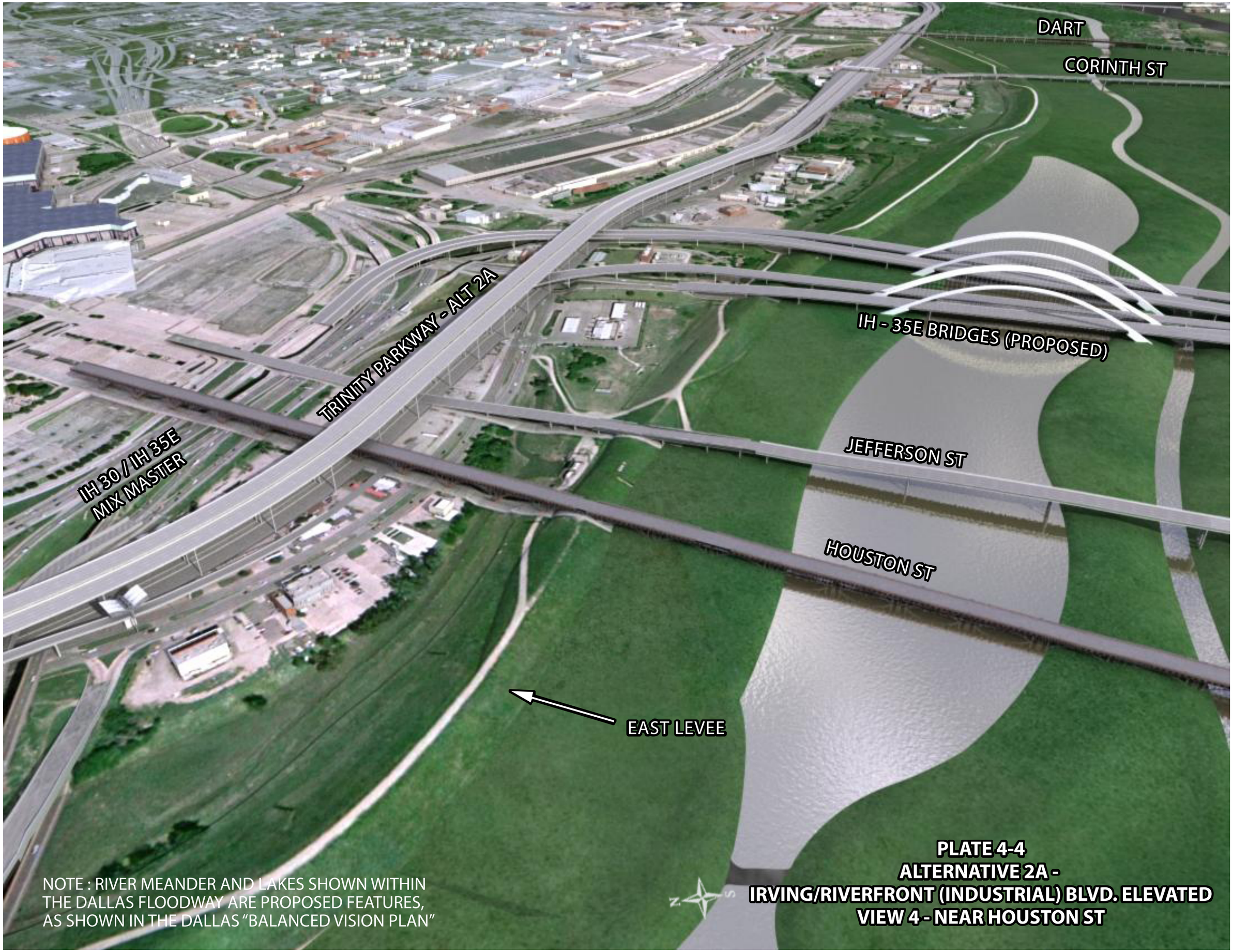

PLATE 4-4
ALTERNATIVE 2A -
IRVING/RIVERFRONT (INDUSTRIAL) BLVD. ELEVATED
VIEW 4 - NEAR HOUSTON ST


IH - 45
MARTIN LUTHER KING JR BLVD
TRINITY PARKWAY - ALT 2A
DART
EAST LEVEE
NOTE : RIVER MEANDER AND LAKES SHOWN WITHIN
THE DALLAS FLOODWAY ARE PROPOSED FEATURES,
AS SHOWN IN THE DALLAS "BALANCED VISION PLAN"
PLATE 4-5
ALTERNATIVE 2A -
IRVING/RIVERFRONT (INDUSTRIAL) BLVD. ELEVATED
VIEW 5 - NEAR DART BRIDGE

PLATE 4-6
ALTERNATIVE 2B -
IRVING/RIVERFRONT (INDUSTRIAL) BLVD. AT-GRADE
VIEW 1 - NEAR HAMPTON RD


STEMMONS FRWY
OAK LAWN
MARKET CENTER BLVD
TRINITY PARKWAY - ALT 2B
SYLVAN AVE
EAST LEVEE
NOTE : RIVER MEANDER AND LAKES SHOWN WITHIN THE DALLAS FLOODWAY ARE PROPOSED FEATURES, AS SHOWN IN THE DALLAS "BALANCED VISION PLAN"
PLATE 4-7
ALTERNATIVE 2B -
IRVING/RIVERFRONT (INDUSTRIAL) BLVD. AT - GRADE
VIEW 2 - NEAR SYLVAN AVE

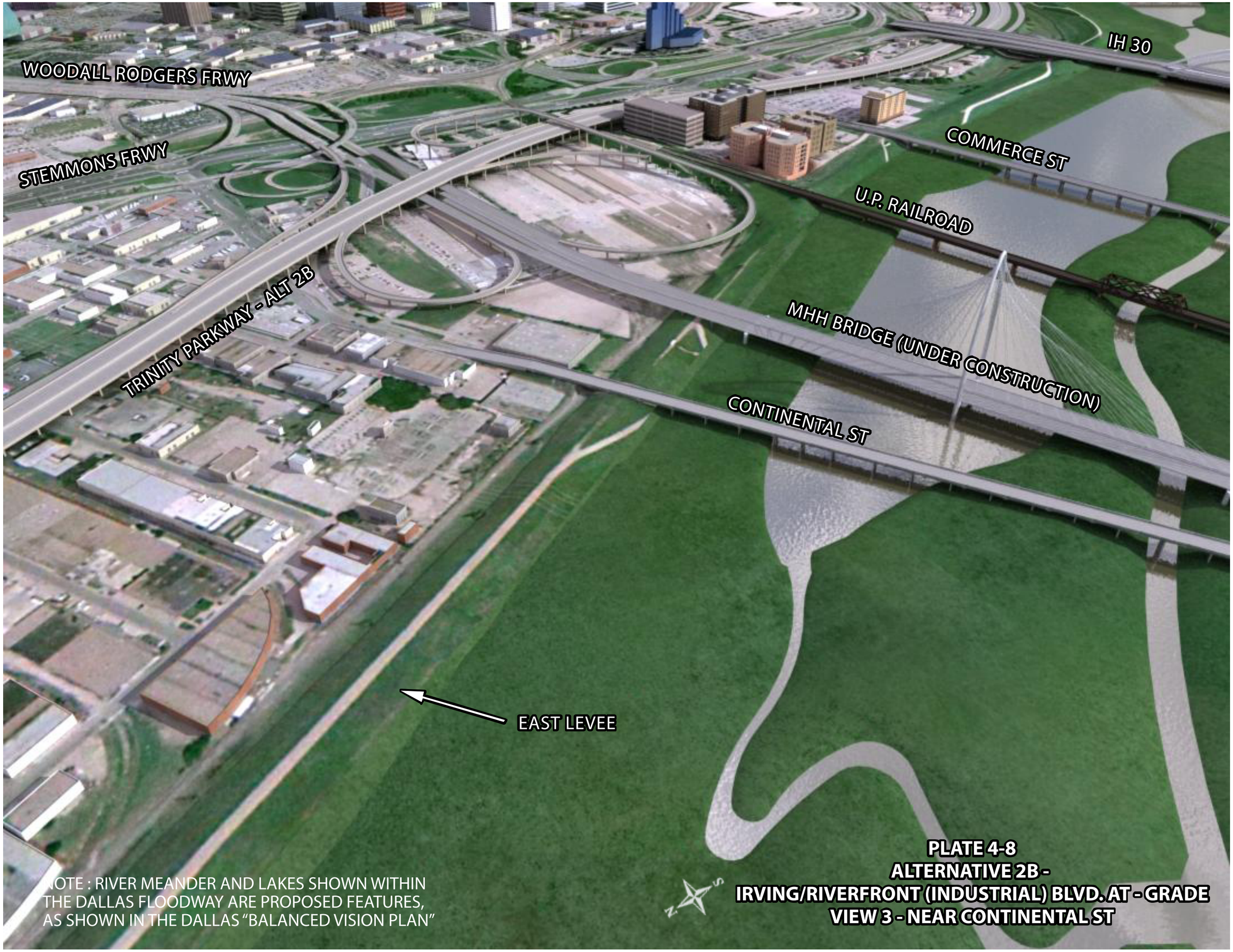
WOODALL RODGERS FRWY
IH 30
STEMMONS FRWY
COMMERCE ST
U.P. RAILROAD
TRINITY PARKWAY - ALT 2B
MHH BRIDGE (UNDER CONSTRUCTION)
CONTINENTAL ST
EAST LEVEE
NOTE : RIVER MEANDER AND LAKES SHOWN WITHIN
THE DALLAS FLOODWAY ARE PROPOSED FEATURES,
AS SHOWN IN THE DALLAS "BALANCED VISION PLAN"
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PLATE 4-8
ALTERNATIVE 2B -
IRVING/RIVERFRONT (INDUSTRIAL) BLVD. AT - GRADE
VIEW 3 - NEAR CONTINENTAL ST