Quantitative Mobile Source Air Toxics Analysis Technical Report

IH 635 LBJ East Ultimate Project

Quantitative Mobile Source Air Toxics Analysis Technical Report

Interstate Highway (IH) 635 LBJ East Ultimate Project

From United States Highway (US) 75
To IH 30
CSJ: 2374-01-137, 2374-01-180, 2374-01-183,
2374-02-053, & 2374-02-144
Cities of Dallas, Garland, and Mesquite; Dallas County, Texas
December 2016

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 16, 2014, and executed by FHWA and TxDOT.

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I. BACKGROUND INFORMATION

I-1. Introduction

Re-Evaluation consultation is being conducted for the proposed reconstruction and improvement to an 11.2-mile section of IH 635 in Dallas County, Texas. The proposed project extends along IH 635 through portions of the cities of Dallas, Garland, and Mesquite. The original IH 635 Environmental Assessment (EA) received environmental clearance through a Federal Highway Administration (FHWA) Finding of No Significant Impact (FONSI) issued on January 30, 2003.

Project-level qualitative and quantitative mobile source air toxics (MSAT) analyses were not previously performed in the 2003 EA-FONSI. The purpose of the MSAT technical report is to satisfy the current procedural requirements of the U.S. Environmental Protection Agency (EPA) regarding the assessment of project-level impacts on ambient levels of MSAT. The MSAT analysis discussed in this document follows the October 2015 TxDOT Standard Operating Procedure for Complying with MSAT Analysis Requirements (hereinafter 'MSAT Analysis SOP'), and the Documentation Standard for a Quantitative MSAT Technical Report.

<u>Proposed Design</u>

The proposed IH 635 improvements from east of US 75 to Miller Road would include constructing one additional 12-foot-wide general-purpose lane in each direction, two 12-foot-wide tolled-managed lanes in each direction, and two to three frontage road lanes in each direction. From near Royal Lane/Miller Road to La Prada Drive, the proposed project would provide one additional general-purpose lane in each direction, two non-tolled express lanes in each direction, and two to three frontage road lanes in each direction. From La Prada Drive to south of IH 30, the project would reconstruct IH 635 to provide lane balance transitions between the general purpose lanes, proposed express lanes, and IH 30 interchange. Auxiliary lanes would be provided as needed to accommodate traffic demand volumes associated with ramp movements. The general purpose lanes would include 10-foot-wide outside and inside shoulders. The tolled managed/express lanes would include 10-foot-wide outside shoulders and 4-foot wide inside shoulders. The proposed project would also include the construction of general purpose lane ramps, tolled managed/express lane ramps, and direct-connecting ramps between IH 30 and IH 635. The proposed frontage roads along IH 635 would typically consist of 11-foot wide inside lane(s) and a 14-foot-wide outside shared use lane in each direction. Inside curb offsets would vary from 1 to 2-feet wide. Outside curb offsets adjacent to shared use lanes would be 2-feet wide. Continuous sidewalks would be provided along the proposed frontage roads.

The proposed IH 30 improvements (from west of Gus Thomasson Road to east of Galloway Avenue) would include constructing three to four 12-foot-wide general purpose lanes. Auxiliary lanes would be constructed as needed to accommodate traffic demand volumes associated with ramp movements. The general purpose lanes would include 10-foot-wide outside and inside shoulders. Two to three continuous frontage road lanes would be constructed in each direction, which would typically consist of 11-foot wide inside lane(s) and a 14-foot wide outside shared use lane in each direction. Inside curb offsets would vary from 1 to 2-feet wide and outside curb offsets adjacent to shared use lanes would be 2-feet wide. Continuous sidewalks would be provided along the proposed frontage roads.

The proposed project includes the construction of multiple noise walls located along the project corridor, where reasonable and feasible. The project would require approximately 16.3 acres of proposed ROW as well as 0.5 acres of temporary construction easements and 9.1 acres of drainage easements. Proposed ROW acquisition would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

I-2. MSAT Analysis Requirement and Coordination

Added capacity projects with FHWA involvement and an annual average daily traffic (AADT) volume over 140,000 vehicles are required to complete a quantitative MSAT analysis. As IH 635 LBJ East Ultimate Project is an added capacity project with federal involvement and an IH 635 design year (2042) AADT of 353,550 vehicles from west of TI Boulevard to Royal Lane/Miller Road, 301,850 vehicles from Royal Lane/Miller Road to the Kansas City Southern (KCS) Railroad (west of Garland Road), and 318,600 vehicles from the KCS Railroad (west of Garland Road) to south of IH 30, a quantitative MSAT analysis is required. The process for completing a quantitative MSAT analysis begins with an MSAT conference call between TxDOT and the relevant metropolitan planning organization (MPO). The call establishes the parameters for the analysis, including the base year, the horizon year and whether an interim year should be included in the modeling. The conference call also determines the schedule for the analysis including the availability of the relevant travel demand model to be used to establish the transportation network affected by the proposed project. Once the appropriate traffic and other data are available, modeling is conducted to determine the potential MSAT emissions that would be expected from the proposed project.

For the proposed IH 635 LBJ East Ultimate Project, the MSAT phone conference was held on June 27, 2016, and included staff from TxDOT, NCTCOG, and the MPO for the Dallas-Fort Worth area. During the coordination conference call, it was determined that a quantitative MSAT analysis would be completed for 2017 (base year) and 2040 (horizon year), but that MSAT data for an interim year would be unnecessary.

II. QUALITATIVE MSAT ANALYSIS

II-1. Background

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (i.e., MSAT rule),[1] and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS).[2] In addition, EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers or contributors and non-cancer hazard contributors from their 1999 National Air Toxics Assessment (NATA).[3] These are acrolein, benzene, 1,3-butadiene, acetaldehyde, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

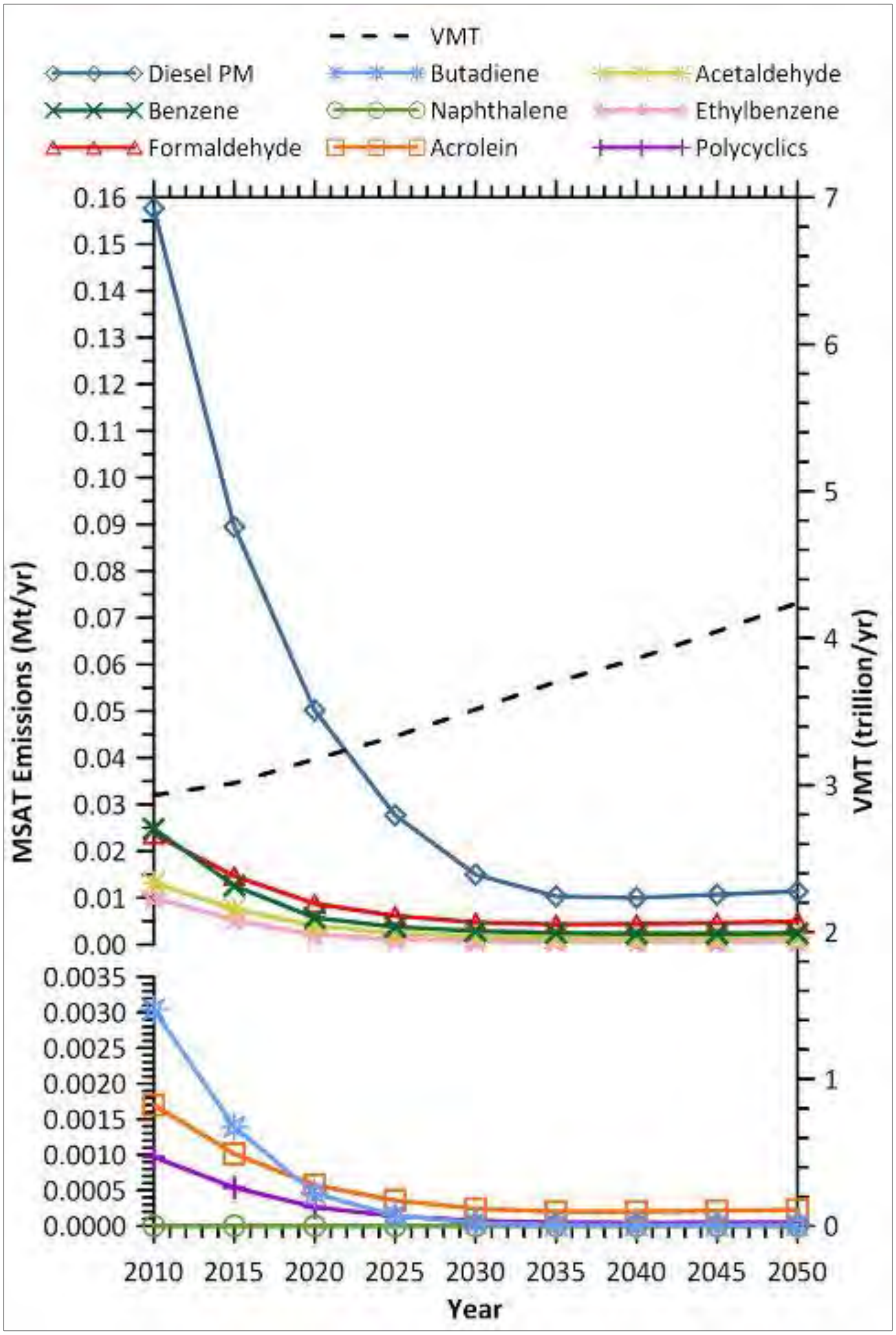
The 2007 EPA MSAT rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. Based on a FHWA analysis using EPA's MOVES2014a model, as shown in **Figure 1**, even if vehicle-miles travelled (VMT) increases by 45 percent as assumed from 2010 to 2050, a combined reduction of 91 percent in the total annual emissions for the priority MSAT is projected for the same time period.

[1] Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007.

[2] http://www.epa.gov/iris/

[3] http://www.epa.gov/ttn/atw/nata1999/

Figure 1. Projected National MSAT Emission Trends 2010 – 2050 for Vehicles Operating on Roadways Using EPA's MOVES2014a Model



Source: EPA MOVES2014a model runs conducted by FHWA, September 2016.

Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.

Diesel PM is the dominant component of MSAT emissions, making up 50 to 70 percent of all priority MSAT pollutants by mass, depending on calendar year. Users of MOVES2014a will notice some differences in emissions compared with MOVES2010b. MOVES2014a is based on updated data on some emissions and pollutant processes compared to MOVES2010b, and also reflects the latest Federal emissions standards in place at the time of its release. In addition, MOVES2014a emissions forecasts are based on lower VMT projections than MOVES2010b, consistent with recent trends suggesting reduced nationwide VMT growth compared to historical trends.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of the National Environmental Policy Act (NEPA).

Nonetheless, air toxics concerns continue to arise on highway projects during the NEPA process. Even as the science emerges, the public and other agencies expect FHWA to address MSAT impacts in its environmental documents. The FHWA, EPA, the Health Effects Institute (HEI), and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this field.

II-2. Project-Specific MSAT Information

A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives.[4]

For the No Build Alternative and Build Alternative in this document, the amount of MSAT emitted would be proportional to the VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for the Build Alternative would be higher than that for the No Build Alternative, because the proposed improvements on IH 635, IH 30 and the IH 635 and IH 30 interchange provide additional capacity and thereby increases the efficiency of the roadways. This increase in efficiency attracts rerouted trips from elsewhere in the transportation network, and in increase in VMT would lead to higher MSAT emissions for the Build Alternative along the highway corridor, along with a corresponding decrease in

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[4] http://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.pdf.

MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOVES2014a model, emissions of all of the priority MSAT decrease as speed increases.

For both the No Build and Build Alternatives, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 90 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The additional lanes on IH 635 and frontage road contemplated as part of the Build Alternative will have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, there may be localized areas where ambient concentrations of MSAT could be higher under the Build Alternative than the No Build Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the expanded IH 635 highway sections that would be built between US 75 and IH 30 including the interchange with IH 30. However, the magnitude and the duration of these potential increases compared to the No Build Alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. In sum, when a highway is widened, the localized level of MSAT emissions for the Build Alternative could be higher relative to the No Build Alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

II-3. Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

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

The EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act (CAA) and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the IRIS, which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects."[5] Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the HEI. A number of HEI studies are summarized in Appendix D of FHWA's *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*.[6] Among the adverse health effects linked to MSAT compounds at high exposures are: cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious are the adverse human health effects of MSAT compounds at current environmental concentrations[7] or in the future as vehicle emissions substantially decrease.[8]

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

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

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI.[9] As a

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[5] http://www.epa.gov/iris/

[6] http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/2016msat.pdf

[7] HEI, http://pubs.healtheffects.org/view.php?id=282

[8] HEI, http://pubs.healtheffects.org/view.php?id=306

[9] HEI, http://pubs.healtheffects.org/view.php?id=282

result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA[10] states that with respect to diesel engine exhaust, "[t]he absence of adequate data to develop a sufficiently confident dose-response relationship from the epidemiologic studies has prevented the estimation of inhalation carcinogenic risk."

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

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

II-4. Qualitative MSAT Analysis Conclusions

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

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[10] EPA, https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0642.htm#quainhal

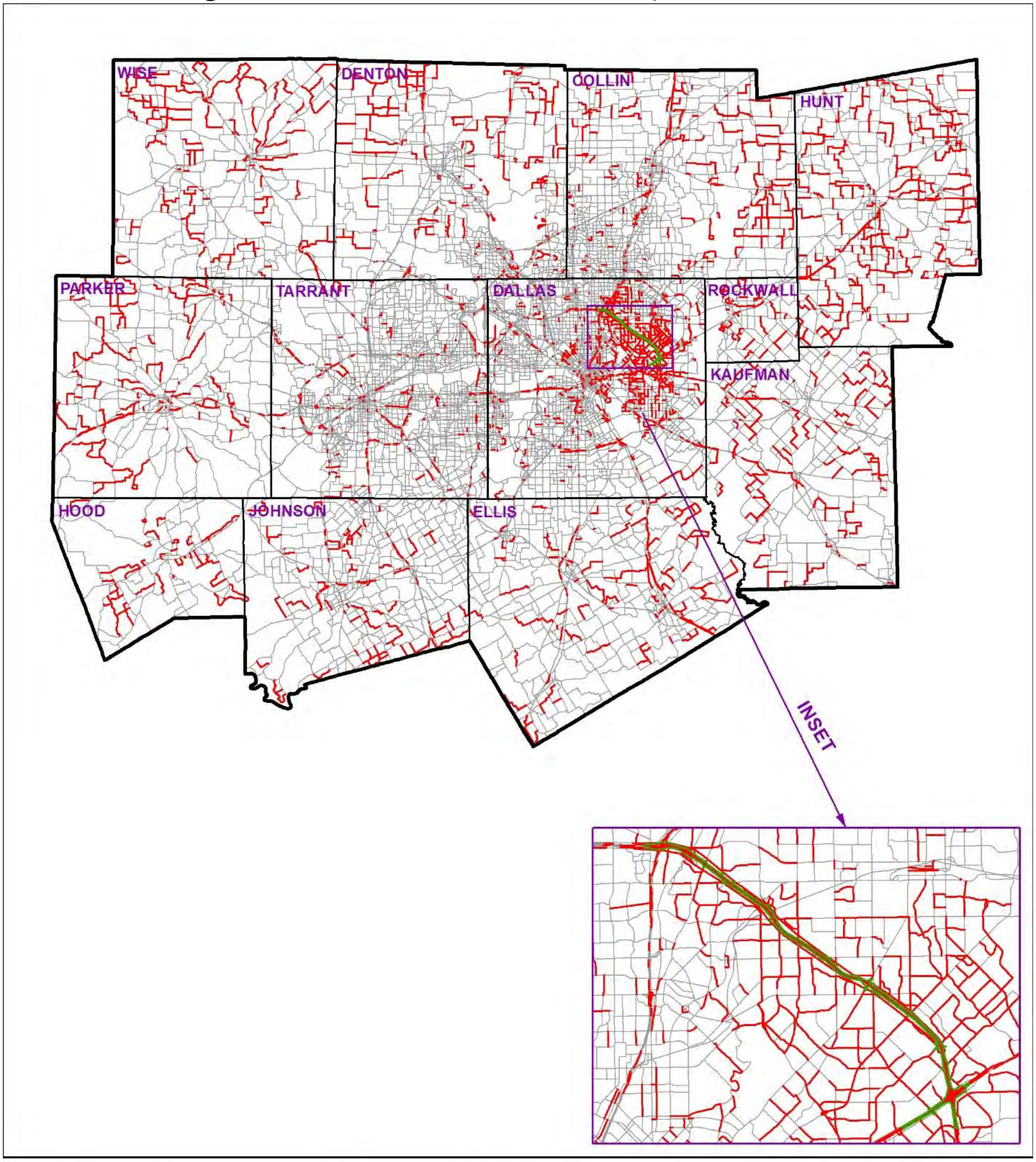
III. QUANTITATIVE MSAT ANALYSIS

III-1. Analysis Methodology

A quantitative analysis provides a basis for identifying and comparing the potential differences in MSAT emissions between the No Build and Build Alternatives. The quantitative assessment presented below is derived from a methodology developed by the FHWA, and builds upon data generated about the regional transportation network by NCTCOG. This analysis is based on existing or base year (2017) and horizon year (2040) volumes of traffic that have been projected by the NCTCOG travel model, and is reflected in *Mobility 2040*. The emission rates used in this analysis are from TxDOT's MSAT Emission Rate Look-up Table (ERLT 06/2016) which are developed based on the EPA's latest on-road model Motor Vehicle Emission Simulator MOVES2014 (Version October 2014).

The MSAT study area for the quantitative analysis is coextensive with the NCTCOG transportation model network within the twelve-county North Central Texas Metropolitan Planning Area. Within this study area, the MSAT analysis first seeks to identify the portion of the overall transportation network that would be most affected by the proposed project. The methodology employed by NCTCOG to determine the project-specific affected network for MSAT modeling identifies those roadway links in the *Mobility 2040* transportation network that would experience a change of +/- 5 percent in the traffic volume between the 2040 No Build and Build Alternatives. The 2040 affected transportation network is then extrapolated to the base year (2017) as the basis for estimating MSAT emissions under existing conditions. The affected transportation network links identified for the IH 635 LBJ East Ultimate Project for years 2017 and 2040 are shown in Figure 2 and Figure 3. These affected networks were then combined with annual emission factors provided by NCTCOG for each roadway link in the affected transportation network. These inputs are appropriate for the North Central Texas Metropolitan Planning Area, and are consistent with those used for other modeling activities in the area (e.g., air conformity analyses).

Figure 2. Year 2017 MSAT Affected Transportation Network



Legend

- Year 2017 Affected Transportation Network
- Year 2017 Transportation Network
- Project Construction Limits
- County Boundary
- MPA Boundary (12 Counties)

Figure 2.
Year 2017 MSAT
Affected Transportation Network

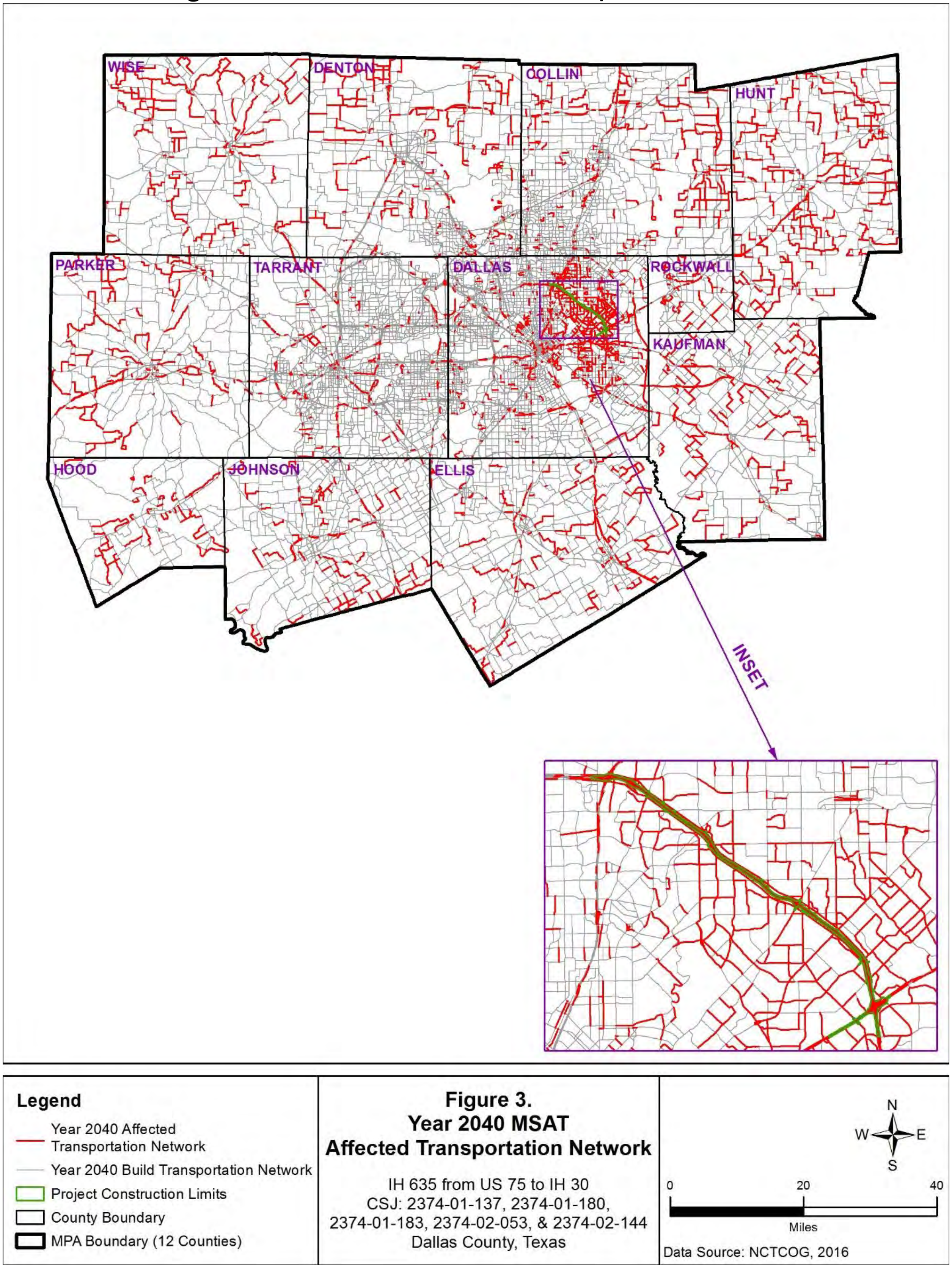
IH 635 from US 75 to IH 30
CSJ: 2374-01-137, 2374-01-180,
2374-01-183, 2374-02-053, & 2374-02-144
Dallas County, Texas

N W E S

0 20 40
Miles

Data Source: NCTCOG, 2016

Figure 3. Year 2040 MSAT Affected Transportation Network



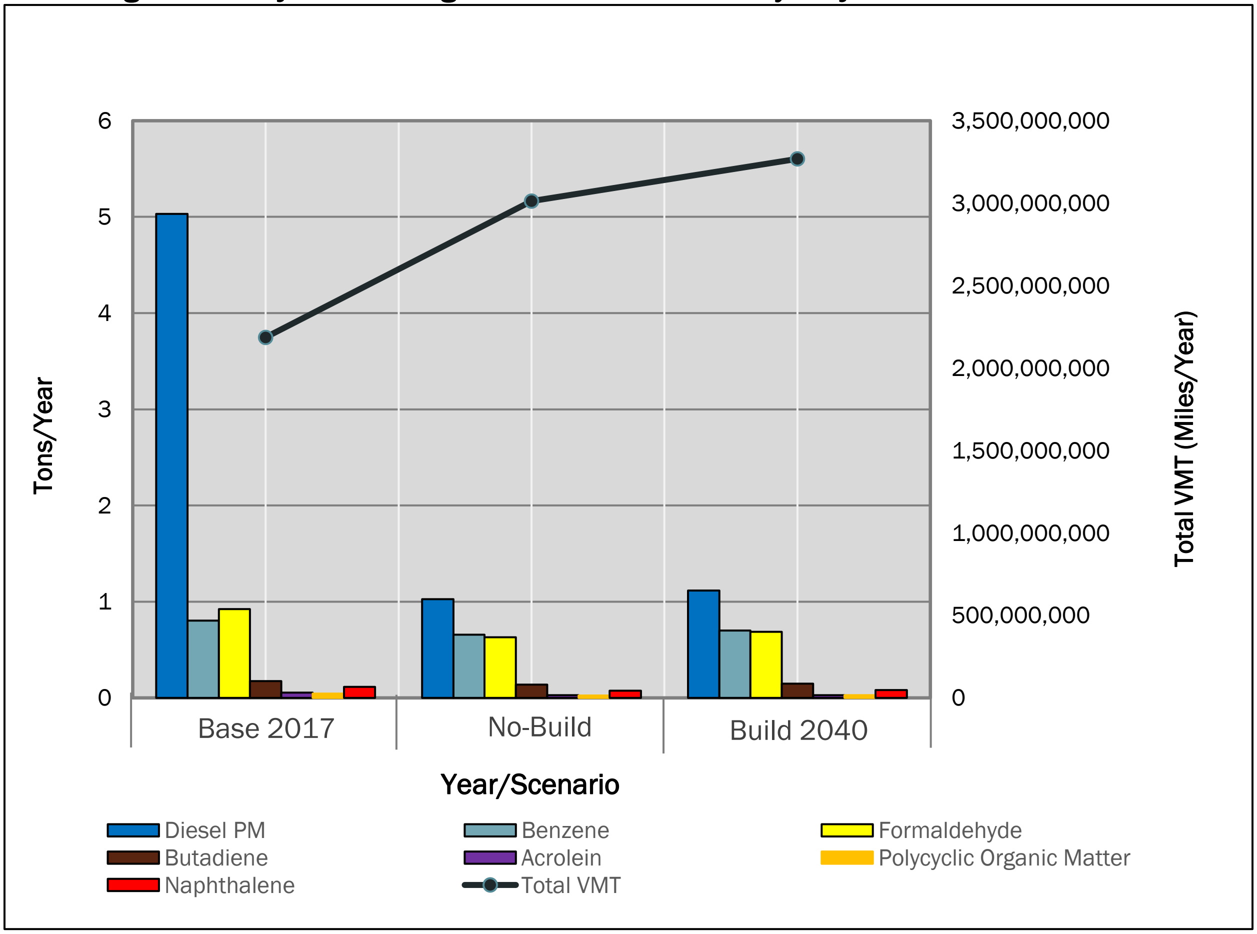
IV. QUANTITATIVE MSAT ANALYSIS RESULTS

For the IH 635 LBJ East Ultimate Project MSAT modeling, a base year of 2017 and a horizon year of 2040 were used; TxDOT determined that analysis of an interim year would not be required for this project. The numeric results of the MSAT modeling are shown below in **Table 1**. These results are represented graphically in **Figure 4**, which shows emissions for each primary MSAT for each affected network (i.e., base year and horizon year for Build and No Build scenarios), and **Figure 5**, which shows total MSAT emissions as compared to total VMT for each affected network.

Table 1. MSAT Emissions by Alternative (Tons/Year)

Compound	Year/Scenario			Percent Difference 2017-2040	
	2017 Base Year	2040 Horizon Year		No Build	Build
		No Build	Build		
Diesel Particulate Matter (PM)	5.031	1.025	1.117	-80	-78
Benzene	0.804	0.657	0.701	-18	-13
Formaldehyde	0.924	0.631	0.688	-32	-26
Butadiene	0.176	0.139	0.148	-21	-16
Acrolein	0.054	0.027	0.029	-50	-46
Polycyclic Organic Matter	0.045	0.024	0.027	-47	-40
Naphthalene	0.115	0.074	0.081	-36	-30
Total MSAT (Tons)	7.149	2.577	2.791	-64	-61
Total VMT (Miles/Year)	2,186,401,100	3,013,282,685	3,268,581,205	38	49
Source: NCTCOG data (2016)					

Figure 4. Projected Changes in MSAT Emissions by Project Scenario over Time



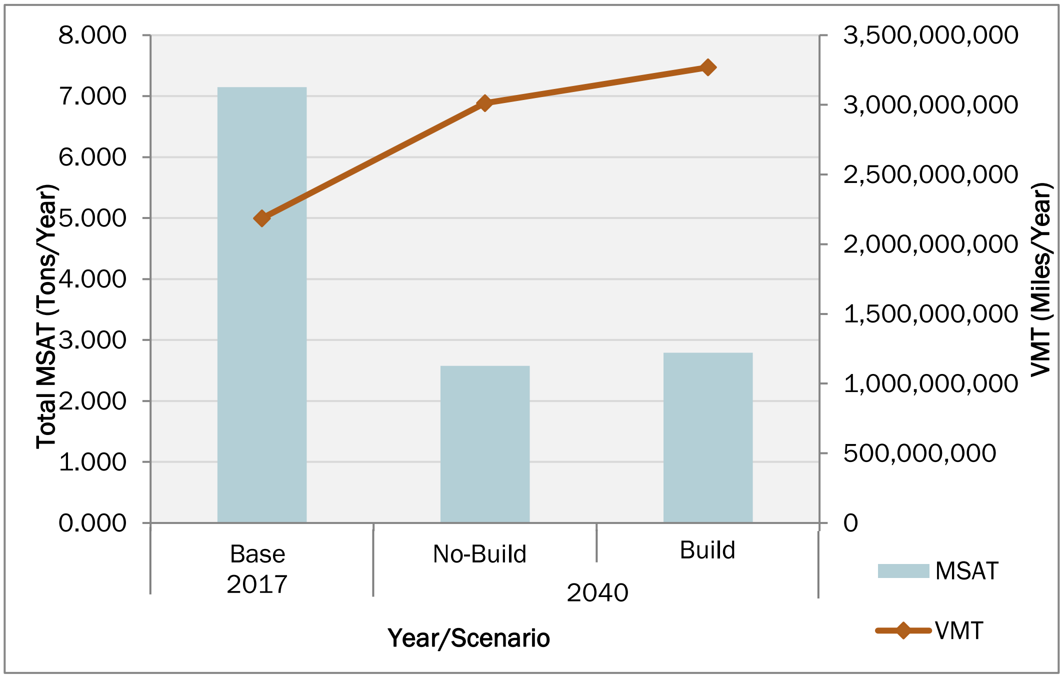
Source: NCTCOG data and Project Study Team (2016).

The analysis indicates a decrease in total MSAT emissions can be expected for both the Build and No Build Alternatives (2040) relative to the base year (2017). Emissions of total MSAT are predicted to decrease by approximately 61 percent in the 2040 Build Alternative compared with 2017 levels.

Of the seven priority MSAT compounds, diesel PM contributes the most to the emissions total in 2017 as well as in 2040 (see **Table 1** and **Figure 4**). In future years, a substantial decline in diesel PM is anticipated (78 percent reduction from 2017 to 2040 Build Alternative; 80 percent reduction from 2017 to 2040 No Build Alternative). The amount of benzene is expected to decrease by 13 percent for the 2040 Build Alternative and 18 percent for the 2040 No Build Alternative.

When total emissions are plotted over time, a substantially decreasing level of MSAT can also be seen while overall VMT continues to rise (**Figure 5**). The 2040 Build Alternative is expected to generate a 61 percent decrease in total MSAT emissions while the total VMT increases 49 percent; the 2040 No Build Alternative has a similar 64 percent decrease in total MSAT and a 38 percent increase in VMT.

Figure 5. Total MSAT Emissions and VMT by Alternative



Source: NCTCOG Data and Project Study Team (2016).

V. QUANTITATIVE MSAT ANALYSIS CONCLUSION

In this document, a quantitative MSAT assessment of MSAT emissions relative to the No Build and Build Alternatives has been provided acknowledging that both these alternatives may result in increased exposure to particular MSAT emissions in certain locations. The concentrations and duration of exposures are uncertain, however, and because of this uncertainty, the health effects from these emissions cannot be estimated. Overall, total MSAT emissions for the Build Alternative are expected to decrease 61 percent between the base year 2017 and the horizon year 2040. Accordingly, mitigation strategies for further reductions are not warranted.

Carbon Monoxide Traffic Air Quality Analysis Technical Report

Carbon Monoxide (CO) Traffic Air Quality Analysis (TAQA) Technical Report

Interstate Highway (IH) 635 LBJ East Ultimate Project

From United States Highway (US) 75
To IH 30
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I. PROJECT DESCRIPTION

Introduction

Re-Evaluation consultation is being conducted for the proposed reconstruction and improvement to an 11.2-mile section of IH 635 in Dallas County, Texas. The proposed project extends along IH 635 through portions of the cities of Dallas, Garland, and Mesquite. The original IH 635 Environmental Assessment (EA) received environmental clearance through a Federal Highway Administration (FHWA) Finding of No Significant Impact (FONSI) issued on January 30, 2003.

A project-level carbon monoxide (CO) traffic air quality analysis (TAQA) was previously performed in the 2003 EA-FONSI. Since the approval of the 2003 EA-FONSI, updates to emissions rates, new traffic projections and schematic design changes require a new CO TAQA. The purpose of this CO TAQA technical report is to satisfy the current procedural requirements of the U.S. Environmental Protection Agency (EPA) regarding the assessment of project-level impacts on ambient levels of CO. The CO TAQA discussed in this document follows the September 2015 TxDOT Standard Operating Procedure for Complying with a CO TAQA Requirements (hereinafter 'CO TAQA SOP'), and the Documentation Standard for a CO TAQA Technical Report. The estimated time of completion (ETC) year of the project is 2022 and the design year of project is 2042.

Existing Facility

Within the project limits, the existing IH 635 facility is an eight lane highway with one managed high occupancy vehicle (HOV) lane in each direction, various auxiliary lanes, and discontinuous frontage roads. The existing right-of-way (ROW) width ranges from 330 to 892 feet.

Also within the project limits, the existing IH 30 facility is a six lane highway with two reversible managed lanes and discontinuous frontage roads. The existing ROW width ranges from 300 to 1,028 feet.

Proposed Design

The proposed IH 635 improvements from east of US 75 to Miller Road would include constructing five 12-foot-wide general-purpose lanes (one additional) in each direction, two 12-foot-wide tolled-managed lanes in each direction, and two to three frontage road lanes in each direction. From near Royal Lane/Miller Road to La Prada Drive, the proposed project would provide five general-purpose lanes (one additional) in each direction, two non-tolled express lanes in each direction, and two to three frontage road lanes in each direction. From La Prada Drive to south of IH 30, the project would reconstruct IH 635 to provide lane balance transitions between the general purpose lanes, proposed express lanes, and IH 30 interchange. Auxiliary lanes would be provided as needed to accommodate traffic demand volumes associated with ramp movements. The general purpose lanes would include 10-foot-wide outside and inside shoulders. The tolled managed/express lanes would include 10-foot-wide outside shoulders and 4-foot wide inside shoulders. The proposed project would also include the construction of general purpose lane ramps, tolled managed/express lane ramps, and direct-connecting ramps between IH 30 and IH 635. The proposed frontage roads along IH 635 would typically consist of 11-foot wide inside lane(s) and a 14-foot-wide outside shared use lane in each direction. Inside curb offsets would vary from 1 to 2-feet wide. Outside curb offsets adjacent to shared use lanes would be 2-feet wide. Continuous sidewalks would be provided along the proposed frontage roads.

The proposed IH 30 improvements (from west of Gus Thomasson Road to east of Galloway Avenue) would include constructing three to four 12-foot-wide general purpose lanes. Auxiliary lanes would be constructed as needed to accommodate traffic demand volumes associated with ramp movements. The general purpose lanes would include 10-foot-wide outside and inside shoulders. Two to three continuous frontage road lanes would be constructed in each direction, which would typically consist of 11-foot wide inside lane(s) and a 14-foot wide outside shared use lane in each direction. Inside curb offsets would vary from 1 to 2-feet wide and outside curb offsets adjacent to shared use lanes would be 2-feet wide. Continuous sidewalks would be provided along the proposed frontage roads.

The proposed project includes the construction of multiple noise walls located along the project corridor, where reasonable and feasible. The project would require approximately 16.3 acres of proposed ROW as well as 0.5 acres of temporary construction easements and

9.1 acres of drainage easements. Proposed ROW acquisition would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

II. BACKGROUND INFORMATION

The primary pollutants from motor vehicles are volatile organic compounds (VOCs), CO, and nitrogen oxides (NOx). VOCs and NOx can combine under the right conditions in a series of photochemical reactions to form ozone. Because these reactions take place over a period of several hours, maximum concentrations of ozone are often found far downwind of the precursor sources. Thus, ozone is a regional problem and not a localized condition. Accordingly, concentrations of ozone for the purpose of comparing the results of the National Ambient Air Quality Standards (NAAQS) are modeled by the regional air quality planning agency for the state implementation plan (SIP). However, concentrations for CO are readily modeled for highway projects and are required by federal regulations.

Added capacity projects that have an annual average daily traffic (AADT) volume over 140,000 vehicles per day (VPD) for the ETC or design year are required to complete a project-level CO TAQA. The IH 635 LBJ East Ultimate Project is an added capacity project with a projected traffic volume that exceeds the 140,000- VPD threshold in both the ETC year (2022) and design year (2042) AADT, therefore it is subject to a project-level CO TAQA.

III. ANALYSIS METHODOLOGY

During the June 27, 2016 air quality conference call, it was decided that CO concentrations for the proposed project would be modeled for the ETC year (2022) and design year (2042) using CALINE3 to determine whether the proposed project would be likely to exceed the 1-hour or 8-hour CO NAAQS. The highest CO concentration would likely occur in the area that contains the highest AADT and the narrowest ROW. Several sections were identified along IH 635 with relatively high AADT and narrow ROW. These sections were used to model CO concentrations by placing six receptors along the edges of the IH 635 ROW lines at the seven locations shown in **Figure 1. CO Receptors on Aerial Photograph** and **Figure 2. CO Receptors on Plan View Map**. The modeling factored in adverse meteorological conditions and sensitive receptors at the ROW line in accordance with the TxDOT Air Quality Guidelines. Topography and meteorology of the area in which the proposed project is located would not seriously restrict dispersion of the air pollutants.

TxDOT's Transportation Planning and Programming (TPP) Division does not currently assign or analyze projected traffic onto proposed tolled or managed lanes and will treat managed lanes as a free-flow facility. The traffic projections were approved by TPP in October 2016. After the approval, a conversion factor provided by TxDOT Dallas District was utilized to convert the non-tolled/HOV lane traffic projections to the planned operations for the tolled-managed and express lanes. The methodology was approved by TPP in March 2016 (the detailed discussion can be found on page 7 in **Appendix A**). The traffic data used in the analysis for the ETC year (2022) and design year (2042) are shown in **Table 1**. The detailed TPP approved non-tolled facility traffic data is included in **Appendix B,** and the detailed converted tolled managed/express lanes traffic data is included in **Appendix C**.

Table 1. Projected Annual Average Daily Traffic (AADT) and Design Hour Volume (DHV) along IH 635

Location	2022 (ETC Year)		2042 (Design Year)	
	AADT	DHV*	AADT	DHV*
IH 635 From West of TI Blvd. To Royal Lane/Miller Road	263,250	23,693	353,550	31,820
IH 635 From Royal Lane/Miller Road To KCS Railroad (West of Garland Road)	224,200	20,178	301,850	27,167
IH 635 From KCS Railroad (West of Garland Road) To South of IH 30	236,950	21,326	318,600	28,674
* DHV, or design hour volume, was calculated by multiplying each segment's AADT by the project-specific K-factor (0.09).				

III-1. CO Modeling Assumptions and Input Parameters

The following assumptions and input parameters were used in the analysis:

- 1-hour CO Background Concentration: 1.9 ppm;
- 8-hour CO Background Concentration: 2.3 ppm;
- Background concentrations were obtained from the CO TAQA SOP (Appendix B Background CO Concentrations & CO NAAQS);

- CO emission factors were obtained from the CO Emission Rate Lookup Table (June 2016 publication, developed from the MOVES2014 model), downloaded from TxDOT Environmental Affairs Division's (ENV) Air Quality Toolkit website (accessed in June 2016). Only emission factors from year 2010 to 2040 are available in the CO Emission Rate Lookup Table; however, during the project air quality conference call, it was decided to model the CO concentrations for the project design year 2042. As a result of more stringent environmental regulations and exhaust emission standards for new vehicles in future years, the emission factors tend to decrease as year increases. The decrease rate tends to become smaller and smaller after 2030. For example, the emission factors for the years 2038, 2039 and 2040 for urban freeway under average speed of 60 miles per hour in Dallas - Fort Worth Area are 0.4238, 0.4160 and 0.4099 respectively. The emission factor of the year 2042 is expected slightly less than the emission factor of the year 2040 under the same conditions. Therefore, this analysis used the emission factors of 2040 to substitute the emission factors of 2042.
- Stable Atmospheric Conditions: Stability Class of F or Stability Class 6 (for worst-case analysis);
- Mixing Height: 1,000 meters;
- Wind Speed: 1 meter per second;
- Wind Directions Modeled: every 10 degrees of wind direction from 0 to 350 degrees were evaluated as recommended by the CALINE3 User's Guide; and
- The projected vehicle speeds in the future years were obtained from the design schematic of the proposed project: (1) IH 635 mainlanes: 60 miles per hour (mph); (2) IH 635 managed lanes: 60 mph; (3) IH 635 ramps: 40 mph; (4) IH 635 frontage roads/bypasses: 40 mph.

The input and output files of the CO CALINE3 model analyses for both the ETC year (2022) and design year (2042) can be found in **Appendices D - G**.

IV. RECEPTOR LOCATIONS

The TxDOT CO TAQA SOP recommends CO receptors should be placed where the maximum total project CO concentrations are likely to occur, where the general public is likely to have access, and set at an assumed breathing height of 1.8 meters above the ground. Accordingly, 42 receptors were placed on the ROW line along IH 635 which contain high traffic volume and narrow ROW width. The receptor height was set 1.8 meters above the ground for each receptor. The highest traffic volume occurs at the receptors in Sections 1 and 2, and the narrowest ROW width occurs at the receptors in Sections 3 and 6 (see the receptor locations in **Figure 1. CO Receptors on Aerial Photograph**). **Table 2** shows the detailed information for each receptor.

Table 2. Carbon Monoxide Receptors

ID	Height (m)	Distance from Road (m)	ROW Width (m)	Managed Speed (mph)	Mainlane Speed (mph)	Ramp Speed (mph)	Frontage Road Speed (mph)	ETC Year (2022)		Design Year (2042)	
								AADT	DHV	AADT	DHV
1	1.8	6	154	60	60	40	40	263,250	23,693	353,550	31,820
2	1.8	3	144	60	60	40	40	263,250	23,693	353,550	31,820
3	1.8	11	148	60	60	40	40	263,250	23,693	353,550	31,820
4	1.8	4	158	60	60	40	40	263,250	23,693	353,550	31,820
5	1.8	7	144	60	60	40	40	263,250	23,693	353,550	31,820
6	1.8	5	148	60	60	40	40	263,250	23,693	353,550	31,820
7	1.8	5	138	60	60	40	40	255,700	23,013	343,550	30,920
8	1.8	5	138	60	60	40	40	255,700	23,013	343,550	30,920
9	1.8	5	138	60	60	40	40	255,700	23,013	343,550	30,920
10	1.8	5	138	60	60	40	40	255,700	23,013	343,550	30,920
11	1.8	5	138	60	60	40	40	255,700	23,013	343,550	30,920
12	1.8	5	138	60	60	40	40	255,700	23,013	343,550	30,920
13	1.8	5	102	60	60	40	40	238,550	21,470	320,700	28,863
14	1.8	5	102	60	60	40	40	238,550	21,470	320,700	28,863
15	1.8	5	102	60	60	40	40	238,550	21,470	320,700	28,863
16	1.8	5	102	60	60	40	40	238,550	21,470	320,700	28,863
17	1.8	5	102	60	60	40	40	238,550	21,470	320,700	28,863
18	1.8	5	102	60	60	40	40	238,550	21,470	320,700	28,863
19	1.8	6	112	60	60	40	40	238,400	21,456	320,550	28,850
20	1.8	8	112	60	60	40	40	238,400	21,456	320,550	28,850
21	1.8	5	112	60	60	40	40	238,400	21,456	320,550	28,850
22	1.8	9	112	60	60	40	40	238,400	21,456	320,550	28,850
23	1.8	8	112	60	60	40	40	238,400	21,456	320,550	28,850
24	1.8	6	112	60	60	40	40	238,400	21,456	320,550	28,850
25	1.8	5	102	--	60	40	40	152,200	13,698	201,150	18,104
26	1.8	5	99	--	60	40	40	152,200	13,698	201,150	18,104
27	1.8	9	107	--	60	40	40	152,200	13,698	201,150	18,104
28	1.8	5	102	--	60	40	40	152,200	13,698	201,150	18,104

ID	Height (m)	Distance from Road (m)	ROW Width (m)	Managed Speed (mph)	Mainlane Speed (mph)	Ramp Speed (mph)	Frontage Road Speed (mph)	ETC Year (2022)		Design Year (2042)	
								AADT	DHV	AADT	DHV
29	1.8	5	99	--	60	40	40	152,200	13,698	201,150	18,104
30	1.8	5	105	--	60	40	40	152,200	13,698	201,150	18,104
31	1.8	3	98	--	60	40	40	202,400	18,216	267,550	24,080
32	1.8	3	98	--	60	40	40	202,400	18,216	267,550	24,080
33	1.8	4	102	--	60	40	40	202,400	18,216	267,550	24,080
34	1.8	5	98	--	60	40	40	202,400	18,216	267,550	24,080
35	1.8	5	98	--	60	40	40	202,400	18,216	267,550	24,080
36	1.8	5	103	--	60	40	40	202,400	18,216	267,550	24,080
37	1.8	5	109	--	60	40	--	227,350	20,462	305,900	27,531
38	1.8	5	102	--	60	40	--	227,350	20,462	305,900	27,531
39	1.8	5	109	--	60	40	--	227,350	20,462	305,900	27,531
40	1.8	5	109	--	60	40	40	227,350	20,462	305,900	27,531
41	1.8	3	102	--	60	40	40	227,350	20,462	305,900	27,531
42	1.8	9	109	--	60	40	--	227,350	20,462	305,900	27,531

V. ANALYSIS RESULTS

Using the foregoing model and data inputs, CO concentrations for the proposed action were estimated for the 1-hour CO concentrations for both the ETC year (2022) and design year (2042) of each air quality receptor. The results are included on the following page in **Table 3**. Also shown in the table are the 8-hour CO concentrations that were calculated from the 1-hour results according to the conversion formula prescribed in Appendix C of the TxDOT CO TAQA SOP. For the ETC year, Receptors 2, 6, 7, 8, 10, 13, 16, 18 and 32 have the highest 1-hour CO concentration of 2.6 ppm and highest 8-hour CO concentration of 2.7 ppm. The CO modeling also predicted that for the design year, Receptors 7, 11, 12, 34 and 35 would have the highest 1-hour CO concentration of 2.3 ppm and 8-hour CO concentration of 2.5 ppm. Notably, the estimated levels of CO indicate negligible increases over the background ambient CO levels for the 1-hour (1.9 ppm) and 8-hour (2.3 ppm) standards. Moreover, the estimated levels for CO concentrations for the design year are generally slightly less than the ETC year, despite an expected substantial increase in AADT. These results are strongly influenced by the expected decrease in CO emissions as a result of more stringent environmental regulations and exhaust emission standards for new vehicles in future years, and as older vehicles with comparatively greater CO emissions are taken out of service.

The model results meet expectations and the local concentrations of CO are not expected to exceed national standards at any time. The results of the analysis are summarized in **Table 4**.

Table 3. Carbon Monoxide Concentrations of Each Receptor

ID	ETC Year (2022)		Design Year (2042)	
	1-Hr CO (ppm)	8-Hr CO (ppm)	1-Hr CO (ppm)	8-Hr CO (ppm)
1	2.5	2.6	2.1	2.4
2	**2.6**	**2.7**	2.2	2.4
3	2.4	2.6	2.2	2.4
4	2.5	2.6	2.0	2.3
5	2.5	2.6	2.2	2.4
6	**2.6**	**2.7**	2.2	2.4
7	**2.6**	**2.7**	**2.3**	**2.5**
8	**2.6**	**2.7**	2.1	2.4
9	2.4	2.6	2.2	2.4
10	**2.6**	**2.7**	2.2	2.4
11	2.5	2.6	**2.3**	**2.5**
12	2.5	2.6	**2.3**	**2.5**
13	**2.6**	**2.7**	2.2	2.4
14	2.4	2.6	2.1	2.4
15	2.5	2.6	2.2	2.4
16	**2.6**	**2.7**	2.2	2.4
17	2.4	2.6	2.2	2.4
18	**2.6**	**2.7**	2.2	2.4
19	2.4	2.6	2.2	2.4
20	2.2	2.4	2.1	2.4
21	2.5	2.6	2.2	2.4
22	2.4	2.6	2.1	2.4
23	2.3	2.5	2.1	2.4
24	2.4	2.6	2.1	2.4
25	2.3	2.5	2.0	2.3
26	2.3	2.5	2.1	2.4
27	2.2	2.4	2.0	2.3
28	2.3	2.5	2.0	2.3
29	2.3	2.5	2.0	2.3
30	2.3	2.5	2.0	2.3
31	2.5	2.6	2.1	2.4
32	**2.6**	**2.7**	2.1	2.4

ID	ETC Year (2022)		Design Year (2042)	
	1-Hr CO (ppm)	8-Hr CO (ppm)	1-Hr CO (ppm)	8-Hr CO (ppm)
33	2.4	2.6	2.1	2.4
34	2.5	2.6	**2.3**	**2.5**
35	2.4	2.6	**2.3**	**2.5**
36	2.3	2.5	2.2	2.4
37	2.5	2.6	2.2	2.4
38	2.4	2.6	2.2	2.4
39	2.5	2.6	2.2	2.4
40	2.5	2.6	2.1	2.4
41	2.5	2.6	2.2	2.4
42	2.5	2.6	2.2	2.4

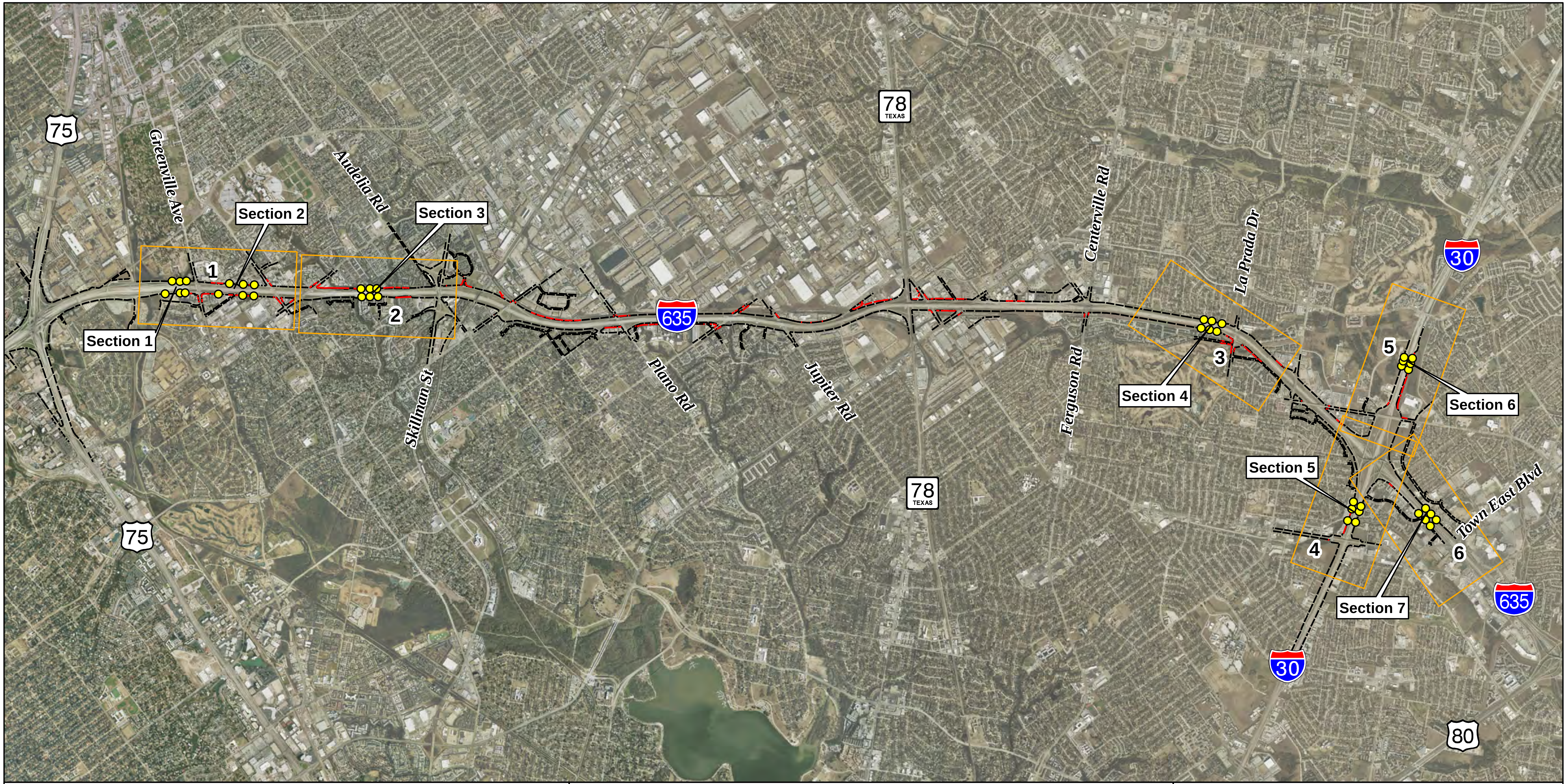
Table 4. Predicted Maximum CO Concentrations

Year	1-hour CO (Standard 35 ppm)	1-hour % NAAQS	8-hour CO (Standard 9 ppm)	8-hour % NAAQS
2022 (ETC)	2.6	7.4%	2.7	30.0%
2042 (Design Year)	2.3	6.6%	2.5	27.8%
Note: The NAAQS for CO is 35 ppm for the 1-hour standard and 9 ppm for the 8-hour standard. Analysis includes a 1-hour background concentration of 1.9 ppm and an 8-hour background concentration of 2.3 ppm per the TxDOT CO TAQA SOP (September 2015).				

2003 EA-FONSI CO TAQA Results Comparison

The previous CO TAQA performed in the 2003 EA-FONSI analyzed the base year (1997) and the design year (2020). The previous CO TAQA did not include an ETC year. According to the 2003-EA FONSI, the CO TAQA predicted that the 1-hour CO concentration would be 10.4 ppm (29.7 percent) and the 8-hour CO concentration would be 5.0 ppm (55.6 percent) in the design year 2020.

Despite higher project traffic projections and schematic design changes since the approval of the 2003 EA-FONSI, the predicted 1-hour and 8-hour CO concentrations for the design year 2020 in the previous analysis were projected to be higher than the results for the design year 2042 in the current analysis. The CO emission rates strongly influenced the results between the two analyses. The CO emission rates used in the current analysis are based on the EPA's MOVES2014 model, which are considerably lower than the emission rates from the EPA's MOBILE series model that were used in the previous analysis. The MOBILE series of models is no longer appropriate for use in current regulatory analyses and was replaced by MOVES in 2010 as EPA's official model for estimating emissions from cars, trucks and motorcycles.



Legend

- CO Receptor
- Map Grid
- Existing ROW
- Proposed ROW

Carbon Monoxide (CO) Receptors on Aerial Photograph Map Index

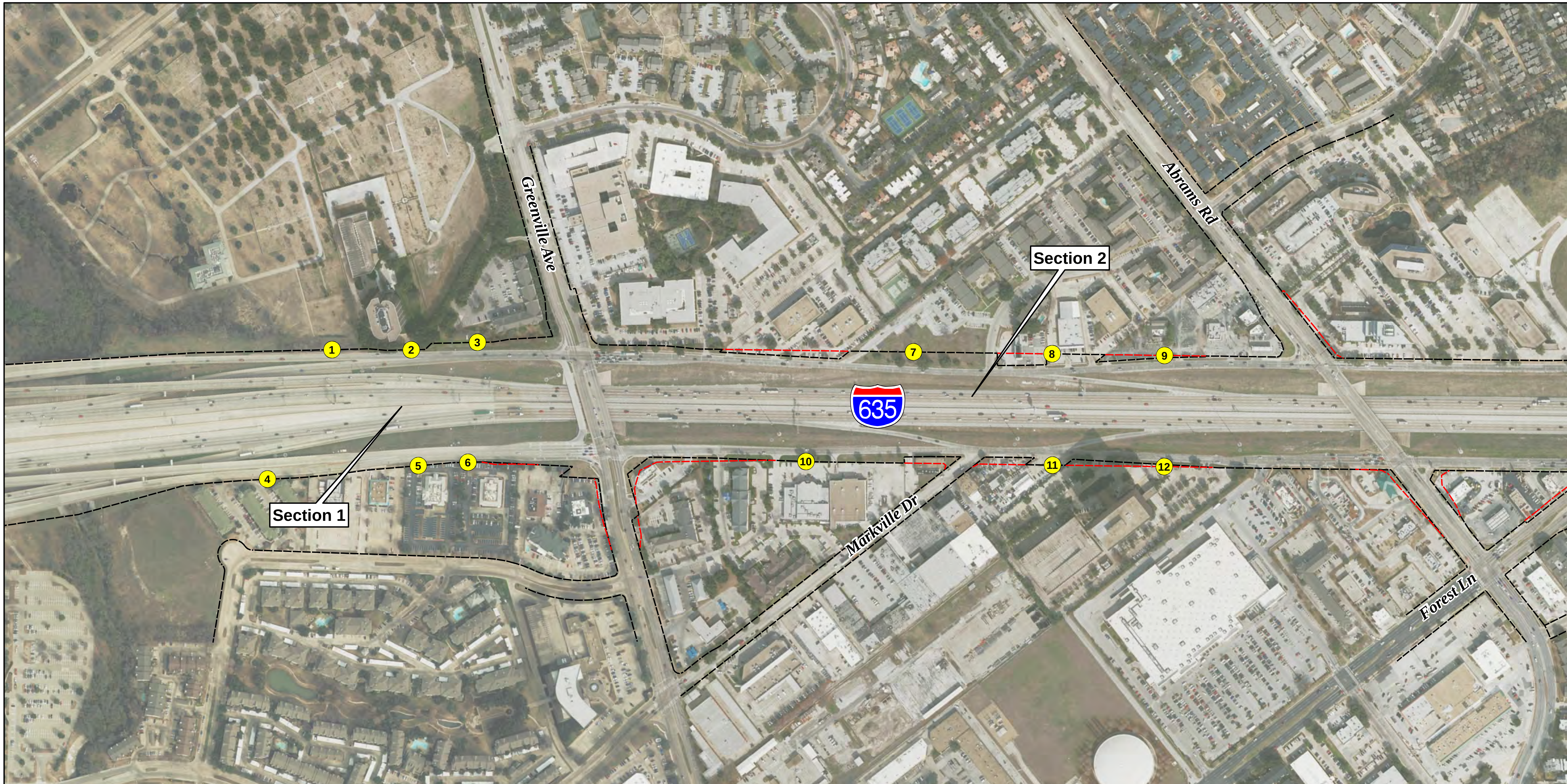
IH 635 from US 75 to IH 30
Cities of Dallas, Garland and Mesquite, Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180, 2374-01-183,
2374-02-053, & 2374-02-144

0 4,000 8,000
SCALE IN FEET

N E W S

Source / Year of Aerial Photograph: NCTCOG / 2015

Figure 1



Legend

- 2 CO Receptor
- Existing ROW
- Proposed ROW
- Proposed Drainage Easement
- Proposed Temporary Construction Easement

Carbon Monoxide (CO) Receptors on Aerial Photograph

Page 1 of 6

IH 635 from US 75 to IH 30
Cities of Dallas, Garland and Mesquite, Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180, 2374-01-183,
2374-02-053, & 2374-02-144

0 400 800
SCALE IN FEET

N E W S

Source / Year of Aerial Photograph: NCTCOG / 2015

Figure 1

Legend	
2	CO Receptor
	Existing ROW
	Proposed ROW
	Proposed Drainage Easement
	Proposed Temporary Construction Easement

Carbon Monoxide (CO) Receptors on Aerial Photograph Page 2 of 6

IH 635 from US 75 to IH 30
Cities of Dallas, Garland and Mesquite, Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144

0 400 800
SCALE IN FEET

N E W S

Source / Year of Aerial Photograph: NCTCOG / 2015

Legend

- CO Receptor
- Existing ROW
- Proposed ROW
- Proposed Drainage Easement
- Proposed Temporary Construction Easement

Carbon Monoxide (CO) Receptors on Aerial Photograph
Page 3 of 6

IH 635 from US 75 to IH 30
Cities of Dallas, Garland and Mesquite, Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180, 2374-01-183,
2374-02-053, & 2374-02-144

0 400 800
SCALE IN FEET

Source / Year of Aerial Photograph: NCTCOG / 2015

Legend

- CO Receptor
- Existing ROW
- Proposed ROW
- Proposed Drainage Easement
- Proposed Temporary Construction Easement

Carbon Monoxide (CO) Receptors on Aerial Photograph

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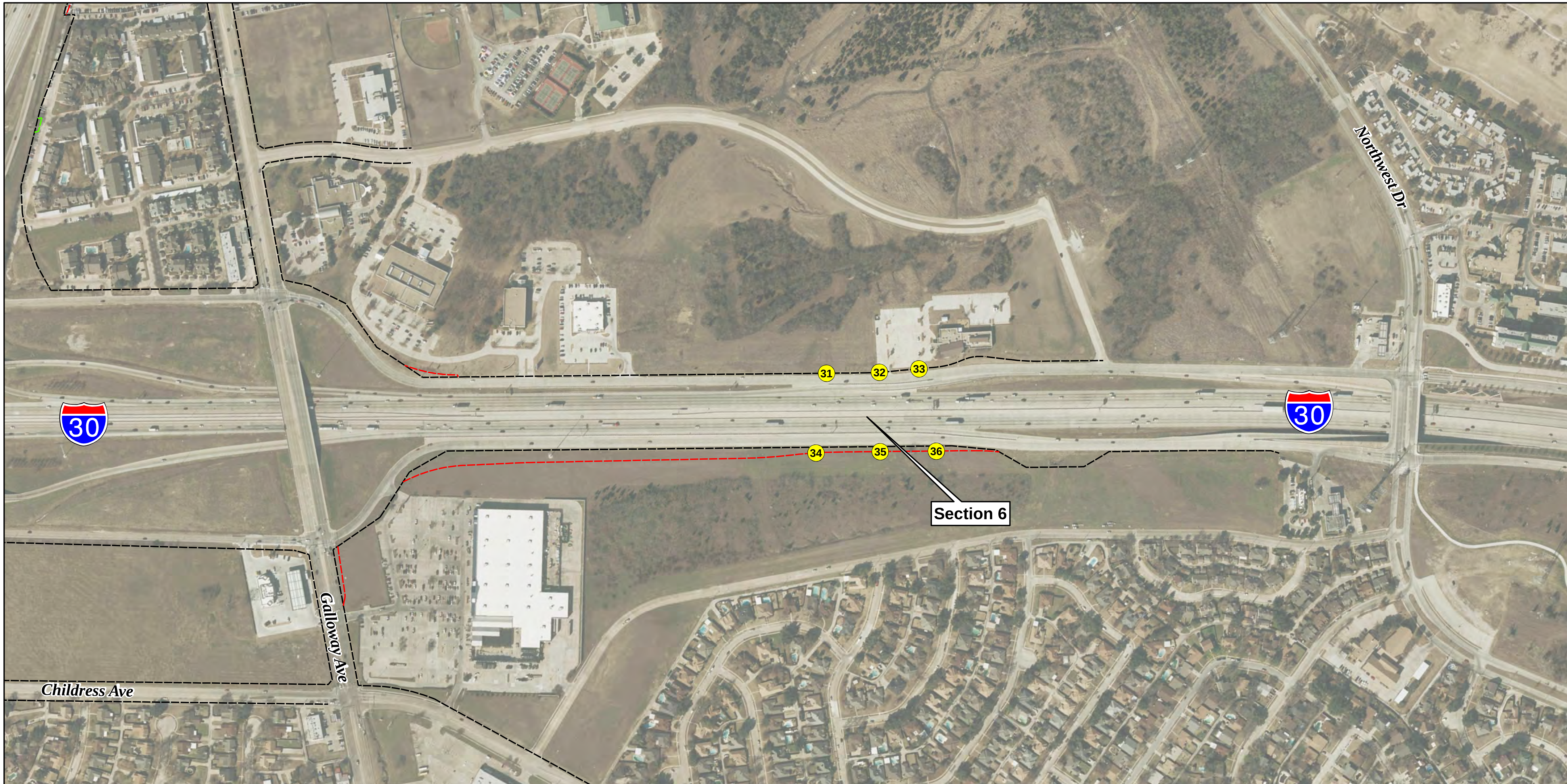
IH 635 from US 75 to IH 30
Cities of Dallas, Garland and Mesquite, Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180, 2374-01-183,
2374-02-053, & 2374-02-144

0 400 800
SCALE IN FEET

Source / Year of Aerial Photograph: NCTCOG / 2015



Legend

- CO Receptor
- Existing ROW
- Proposed ROW
- Proposed Drainage Easement
- Proposed Temporary Construction Easement

Carbon Monoxide (CO) Receptors on Aerial Photograph
Page 5 of 6

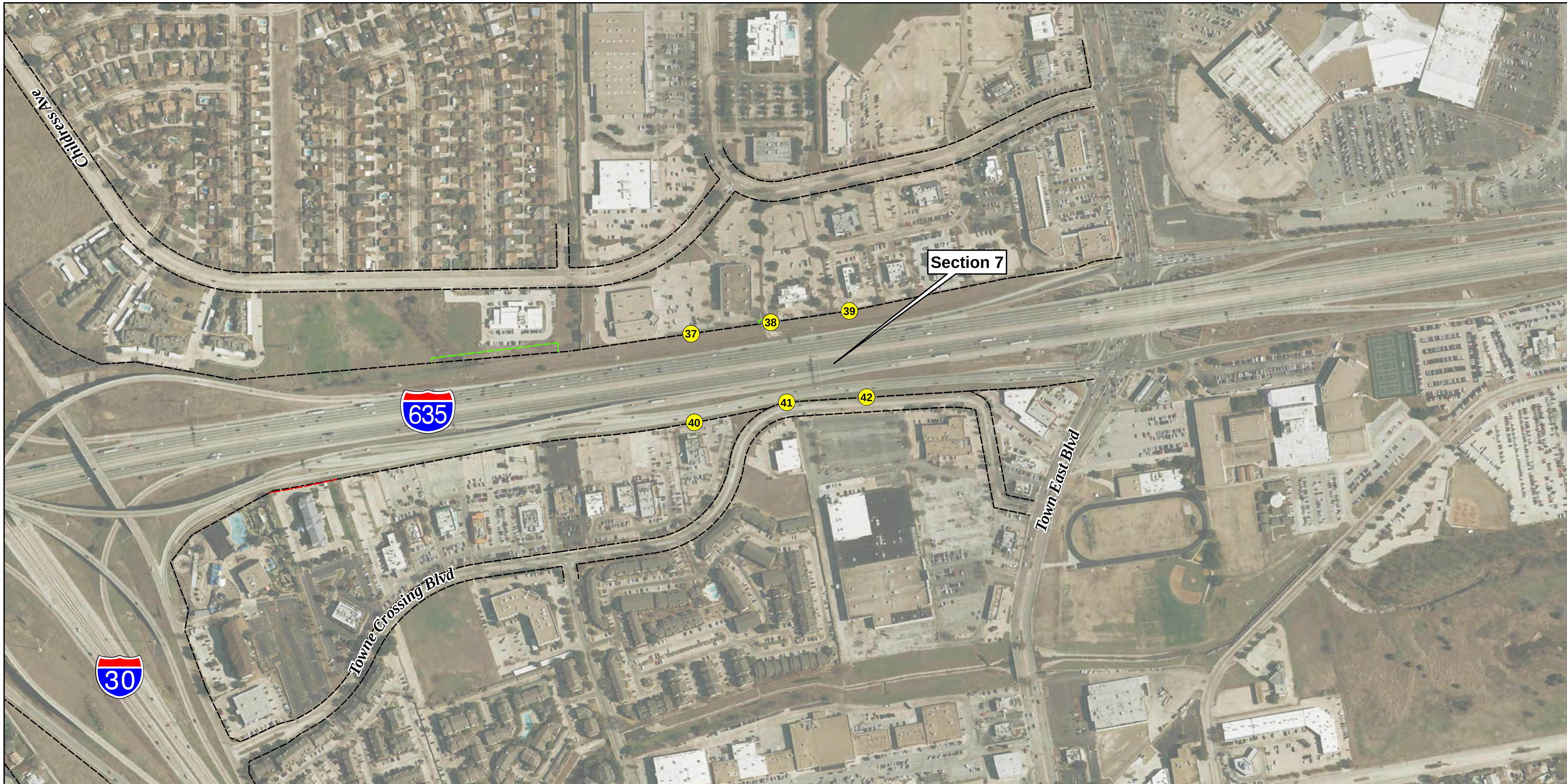
IH 635 from US 75 to IH 30
Cities of Dallas, Garland and Mesquite, Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144

0 400 800
SCALE IN FEET

W N S E

Source / Year of Aerial Photograph: NCTCOG / 2015

Figure 1



Legend

- 2 CO Receptor
- Existing ROW
- Proposed ROW
- Proposed Drainage Easement
- Proposed Temporary Construction Easement

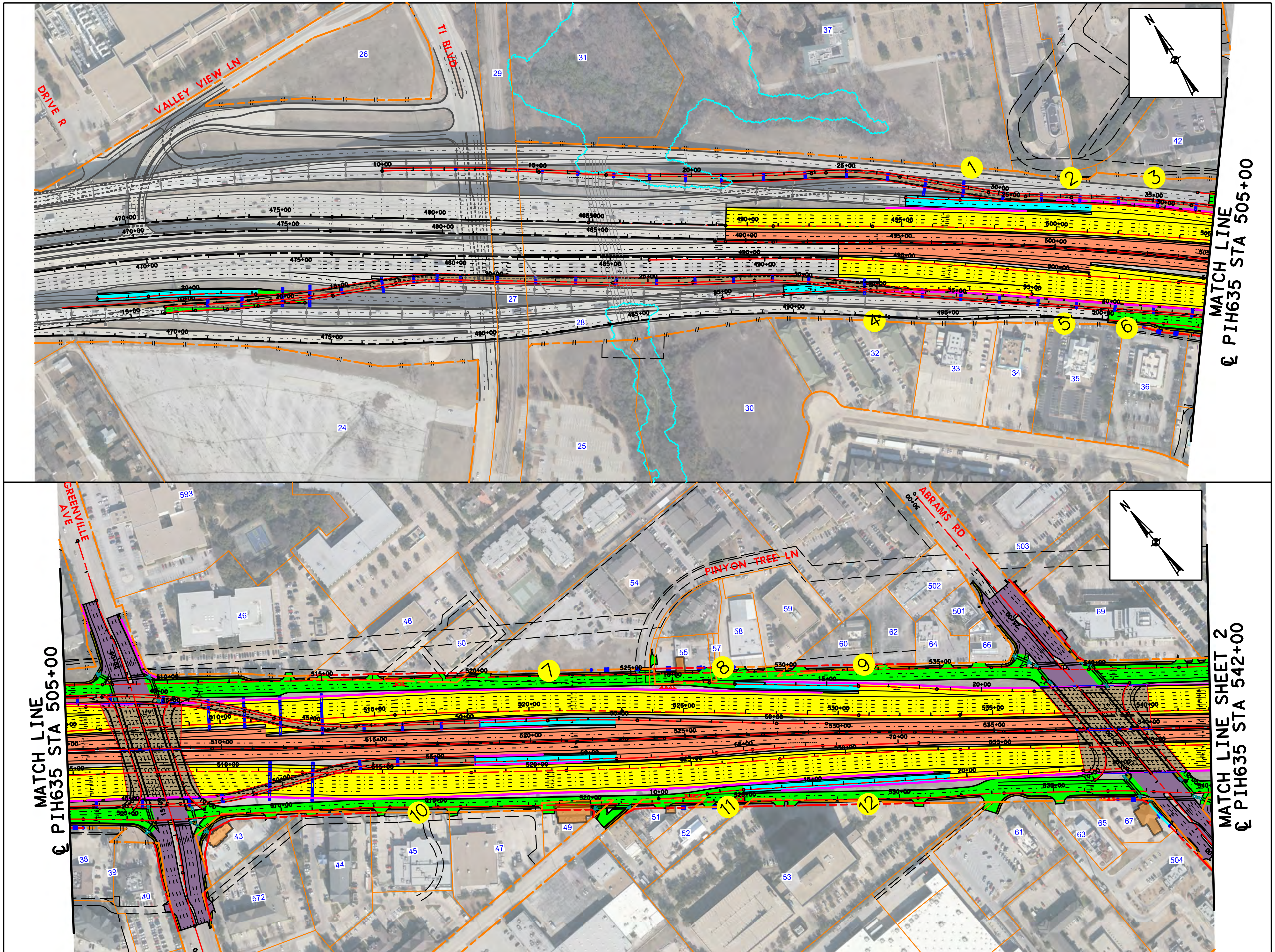
Carbon Monoxide (CO) Receptors on Aerial Photograph
Page 6 of 6

IH 635 from US 75 to IH 30
Cities of Dallas, Garland and Mesquite, Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144

0 400 800
SCALE IN FEET

E N S W

Source / Year of Aerial Photograph: NCTCOG / 2015



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SCALE: 1"=300'

DATE: 11/18/2016

LEGEND:

- EXISTING ROW
- EXISTING ACCESS DENIAL (TO REMAIN)
- EXISTING EASEMENT
- EXISTING PROPERTY LIMITS
- EXISTING 100 YR FLOODPLAIN LIMITS
- PROPOSED CENTERLINE/ BASELINE
- PROPOSED ROW
- PROPOSED EASEMENT
- TEMPORARY CONSTRUCTION EASEMENT
- PROPOSED ACCESS DENIAL
- PROPOSED EDGE OF PAVEMENT
- PROPOSED BRIDGE ABUTMENT
- PROPOSED BRIDGE BENT
- PROPOSED RETAINING WALL
- PROPOSED PRELIMINARY NOISE WALL
- PROPOSED CULVERT
- DIRECTION OF TRAVEL
- PROPOSED BRIDGE
- PROPOSED MAIN LANES
- PROPOSED MANAGED LANES
- PROPOSED RAMP
- PROPOSED FRONTAGE ROAD
- PROPOSED CROSS STREET
- PROPOSED SIDEWALK
- POTENTIAL DISPLACEMENTS
- PAVEMENT / BRIDGE TO BE REMOVED
- 3 CO RECEPTOR

SOURCE/DATE OF AERIAL BASEMAP: TXDOT/2013 (SEE 90% SCHEMATICS)

THIS EXHIBIT IS A SIMPLIFIED REPRESENTATION OF THE DESIGN SCHEMATIC

--PRELIMINARY--

FOR ENVIRONMENTAL DOCUMENT REVIEW ONLY

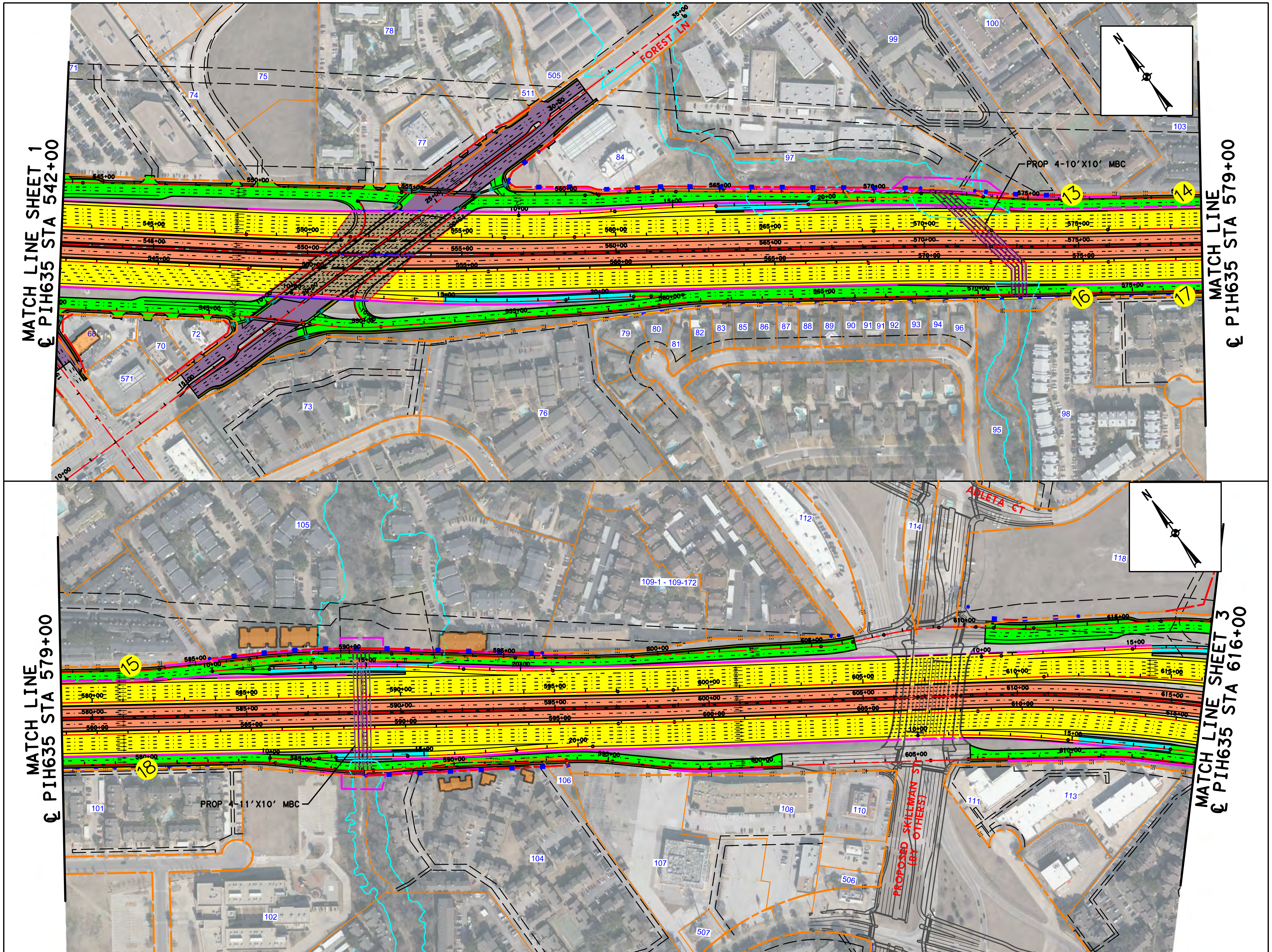
CARBON MONOXIDE (CO) RECEPTORS ON PLAN VIEW MAP

Page 1 OF 6

IH 635 FROM US 75 TO IH 30
CITIES OF DALLAS, GARLAND AND MESQUITE,
DALLAS COUNTY, TEXAS
CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144

Figure 2

PDF 2D CLR FW CR 300.plt Default 11/18/2016 2:14:47 PM



0 150 300 450 600

SCALE: 1"=300'

DATE: 11/18/2016

LEGEND:

- EXISTING ROW
- EXISTING ACCESS DENIAL (TO REMAIN)
- EXISTING EASEMENT
- EXISTING PROPERTY LIMITS
- EXISTING 100 YR FLOODPLAIN LIMITS
- PROPOSED CENTERLINE/ BASELINE
- PROPOSED ROW
- PROPOSED EASEMENT
- TEMPORARY CONSTRUCTION EASEMENT
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- PROPOSED EDGE OF PAVEMENT
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- PROPOSED SIDEWALK
- POTENTIAL DISPLACEMENTS
- PAVEMENT / BRIDGE TO BE REMOVED
- 3 CO RECEPTOR

SOURCE/DATE OF AERIAL BASEMAP: TXDOT/2013 (SEE 90% SCHEMATICS)

THIS EXHIBIT IS A SIMPLIFIED REPRESENTATION OF THE DESIGN SCHEMATIC

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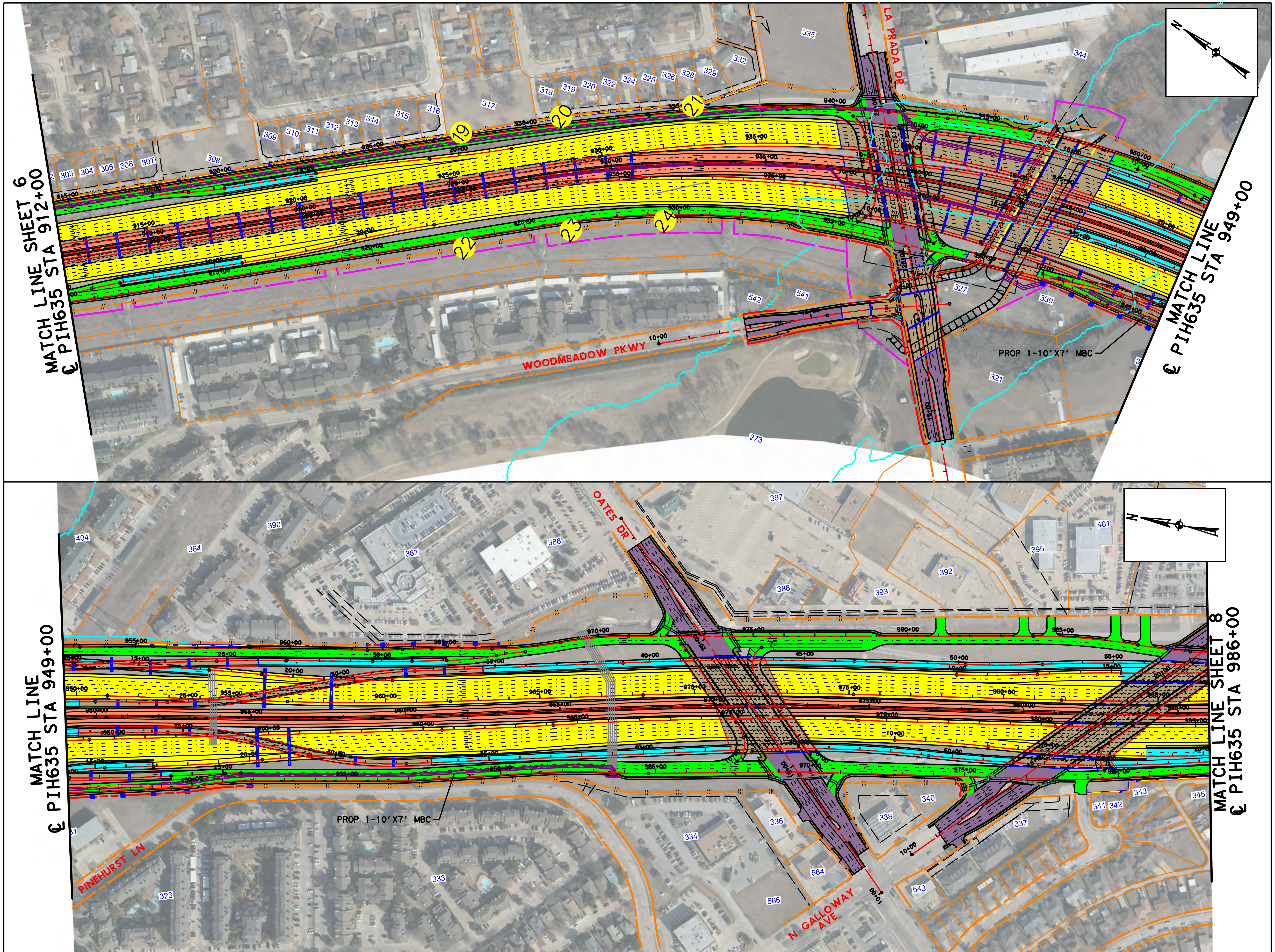
FOR ENVIRONMENTAL DOCUMENT REVIEW ONLY

CARBON MONOXIDE (CO) RECEPTORS ON PLAN VIEW MAP

Page 2 OF 6

IH 635 FROM US 75 TO IH 30
CITIES OF DALLAS, GARLAND AND MESQUITE,
DALLAS COUNTY, TEXAS
CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144

Figure 2



0 150 300 450 600

SCALE: 1"=300'

DATE: 11/18/2016

LEGEND:

- EXISTING ROW
- EXISTING ACCESS DENIAL (TO REMAIN)
- EXISTING EASEMENT
- EXISTING PROPERTY LIMITS
- EXISTING 100 YR FLOODPLAIN LIMITS
- PROPOSED CENTERLINE/ BASELINE
- PROPOSED ROW
- PROPOSED EASEMENT
- TEMPORARY CONSTRUCTION EASEMENT
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- POTENTIAL DISPLACEMENTS
- PAVEMENT / BRIDGE TO BE REMOVED
- 3 CO RECEPTOR

SOURCE/DATE OF AERIAL BASEMAP: TXDOT/2013 (SEE 90% SCHEMATICS)

THIS EXHIBIT IS A SIMPLIFIED REPRESENTATION OF THE DESIGN SCHEMATIC

--PRELIMINARY--

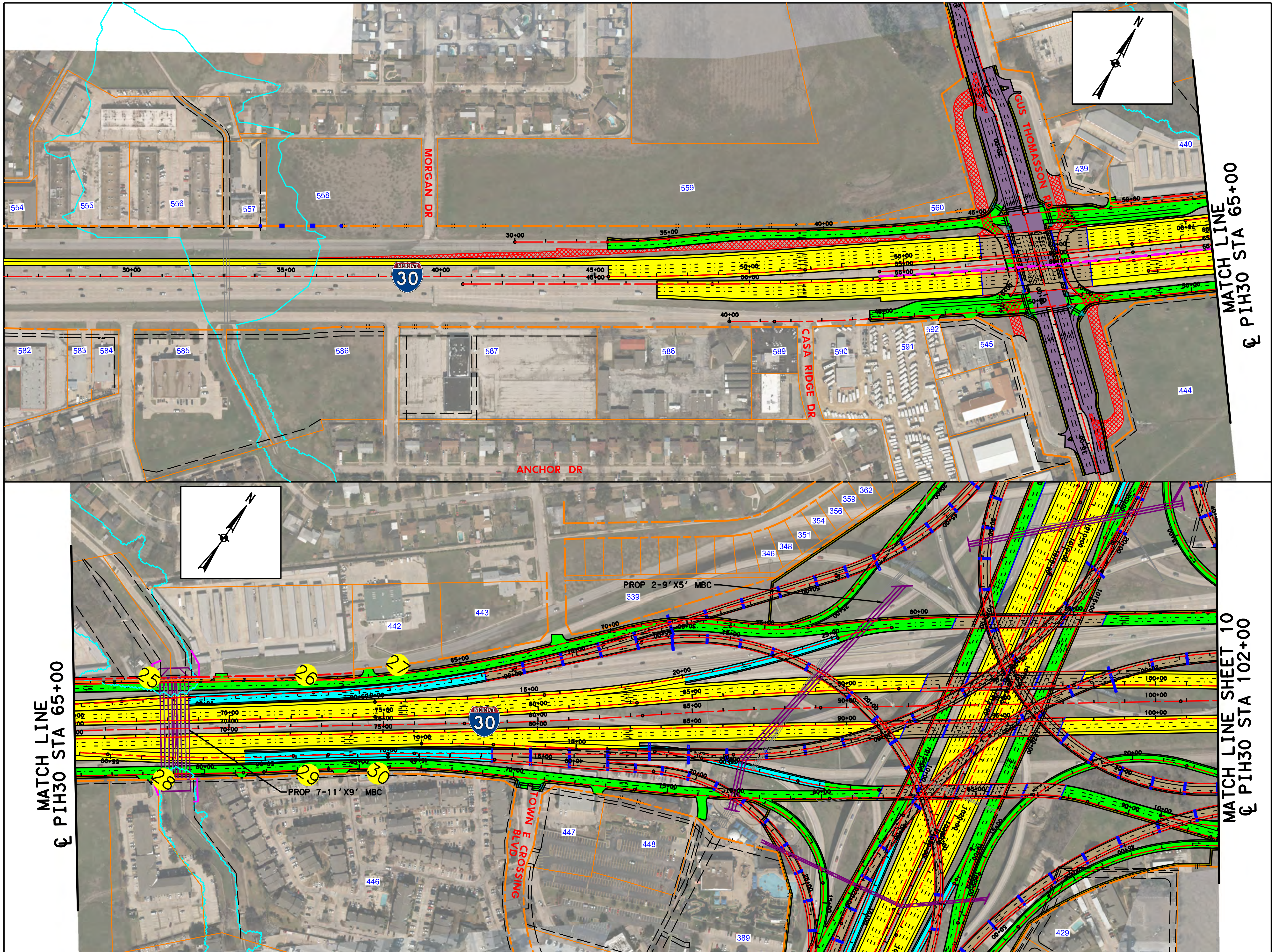
FOR ENVIRONMENTAL DOCUMENT REVIEW ONLY

CARBON MONOXIDE (CO) RECEPTORS ON PLAN VIEW MAP

Page 3 OF 6

IH 635 FROM US 75 TO IH 30
CITIES OF DALLAS, GARLAND AND MESQUITE,
DALLAS COUNTY, TEXAS
CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144

Figure 2



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SCALE: 1"=300'

DATE: 11/18/2016

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- EXISTING ACCESS DENIAL (TO REMAIN)
- EXISTING EASEMENT
- EXISTING PROPERTY LIMITS
- EXISTING 100 YR FLOODPLAIN LIMITS
- PROPOSED CENTERLINE/ BASELINE
- PROPOSED ROW
- PROPOSED EASEMENT
- TEMPORARY CONSTRUCTION EASEMENT
- PROPOSED ACCESS DENIAL
- PROPOSED EDGE OF PAVEMENT
- PROPOSED BRIDGE ABUTMENT
- PROPOSED BRIDGE BENT
- PROPOSED RETAINING WALL
- PROPOSED PRELIMINARY NOISE WALL
- PROPOSED CULVERT
- DIRECTION OF TRAVEL
- PROPOSED BRIDGE
- PROPOSED MAIN LANES
- PROPOSED MANAGED LANES
- PROPOSED RAMP
- PROPOSED FRONTAGE ROAD
- PROPOSED CROSS STREET
- PROPOSED SIDEWALK
- POTENTIAL DISPLACEMENTS
- PAVEMENT / BRIDGE TO BE REMOVED
- 3 CO RECEPTOR

SOURCE/DATE OF AERIAL BASEMAP: TXDOT/2013 (SEE 90% SCHEMATICS)

THIS EXHIBIT IS A SIMPLIFIED REPRESENTATION OF THE DESIGN SCHEMATIC

--PRELIMINARY--

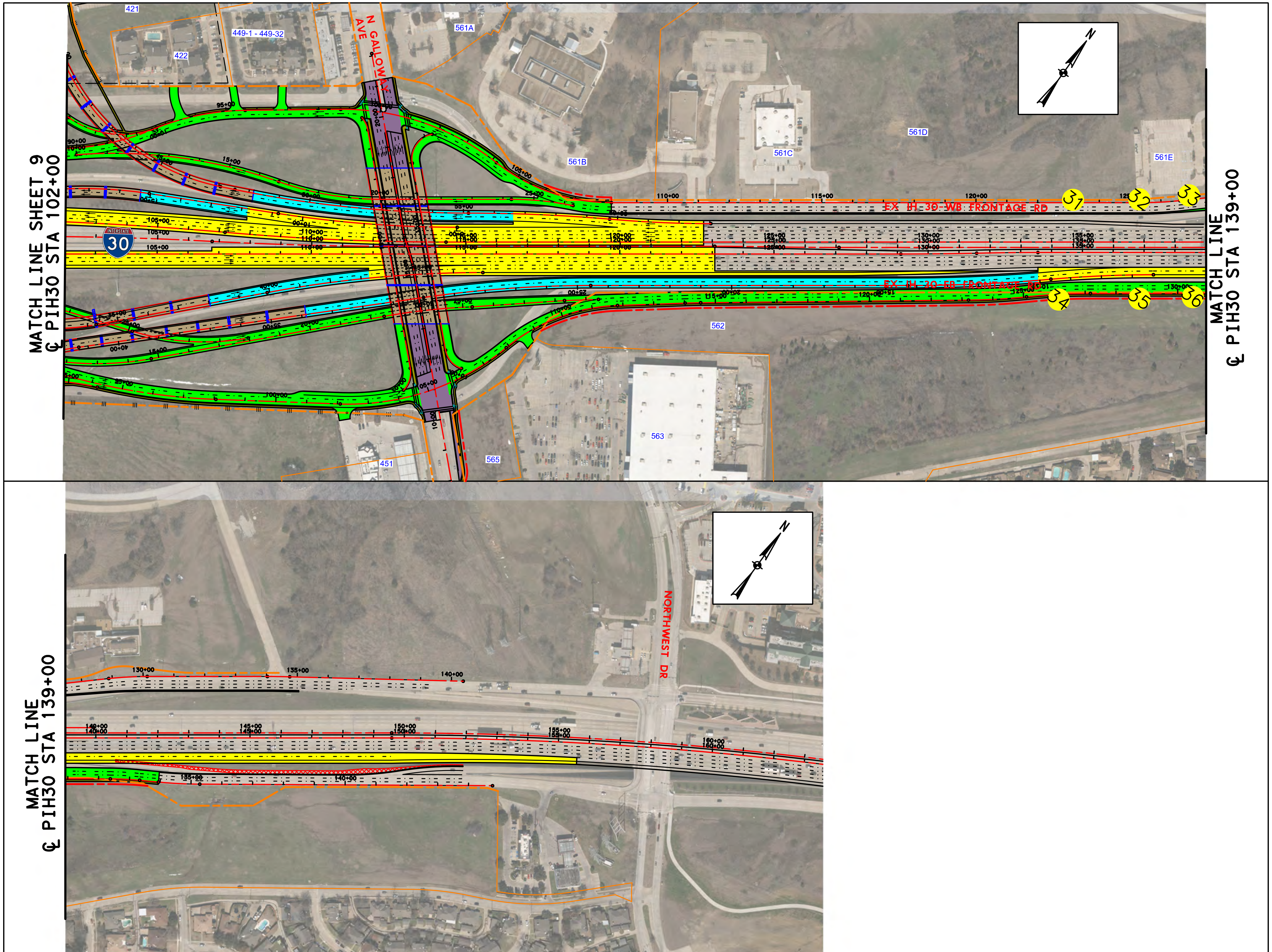
FOR ENVIRONMENTAL DOCUMENT REVIEW ONLY

CARBON MONOXIDE (CO) RECEPTORS ON PLAN VIEW MAP

Page 4 OF 6

IH 635 FROM US 75 TO IH 30
CITIES OF DALLAS, GARLAND AND MESQUITE,
DALLAS COUNTY, TEXAS
CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144

Figure 2



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SCALE: 1"=300'

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Figure 2

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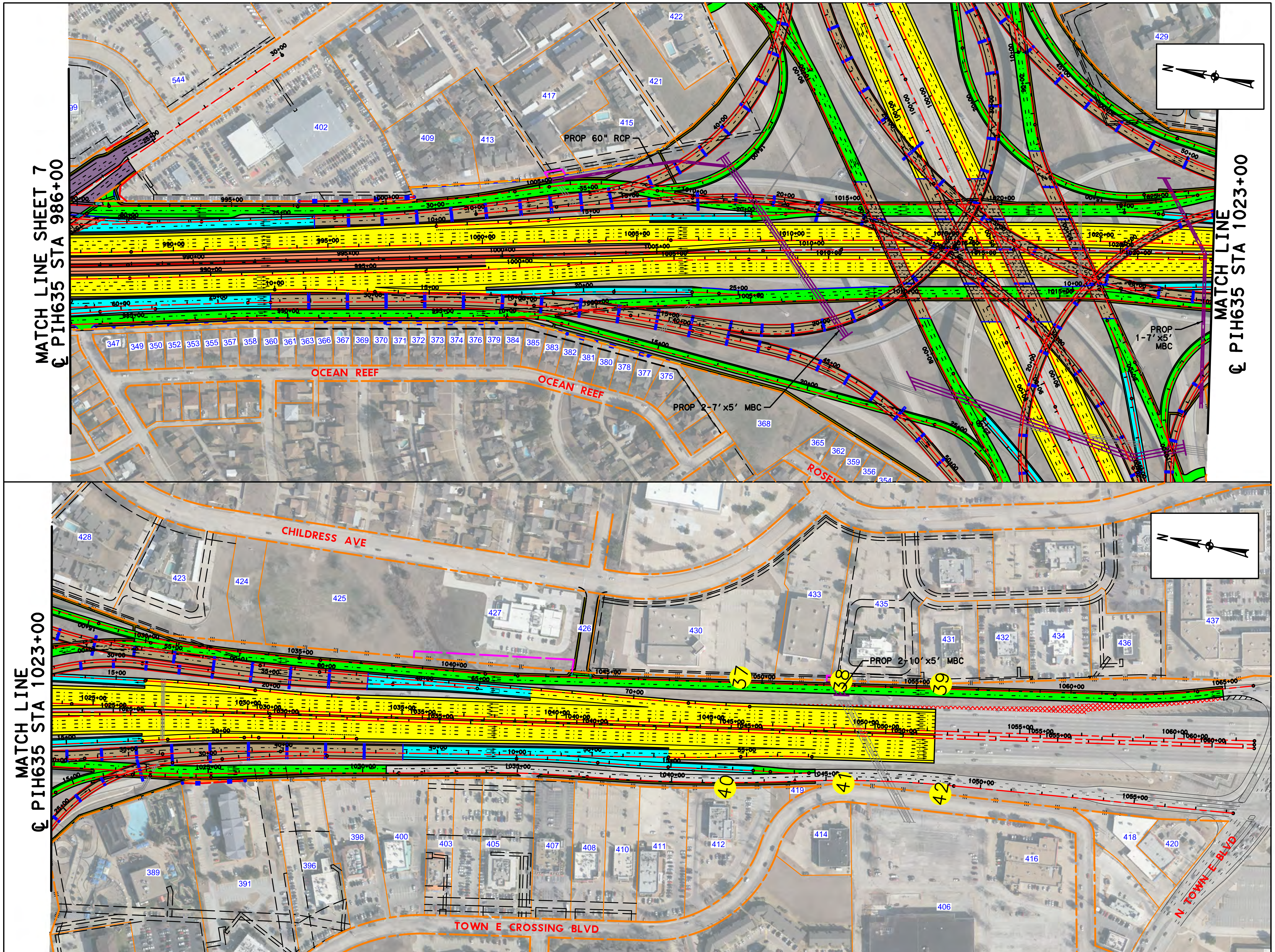

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Figure 2

APPENDIX A: TPP APPROVAL OF TRAFFIC METHODOLOGY

Texas Department of Transportation

MEMO

March 28, 2016

To: Stan Hall, P.E., Advance Project Development Director
Attention: Mohammed (MO) K. Bur, P.E., Director of TPD

Through: William E. Knowles, P.E.
Traffic Analysis Section Director, TPP

From: Robert C. Williams
Transportation Analyst, TPP

Subject: Traffic Data
CSJ: 2374-01-137 & 2374-02-053
I-635:
From US 75
To I-30
Dallas County

TPP has reviewed the Draft I-635 Traffic Projections Methodology dated February 23, 2016, for the described limits of the route and finds the methodology acceptable. Please note that we approve the methodology only. The final Traffic Data will be reviewed for consistency with the methodology and those numbers will also need to be approved.

Please refer to your original email dated February 23, 2016.

If you have any questions or need additional information, please contact Robert C. Williams at (512) 486-5145.

Attachment

CC: Godfrey Sendawula, Dallas District
Transportation Specialist
Design Division

JACOBS

Jacobs Engineering Group Inc.
1999 Bryan Street, Suite 1200
Dallas, Texas 75201-3136
214-583-8500

Memorandum

Date	February 22, 2016	**From**	Mark Van Andel, P.E.
Attention	Stephen Endres, P.E.	**Project No.**	WFXM8000
Firm / Agency	TxDOT-Dallas District	**Copies to**	Spenta Irani Jeremy Wyndham Arun Olarnrat WFXM8000
Subject	Lyndon B. Johnson Freeway (I-635) Traffic Projections Draft Methodology		

INTRODUCTION

TxDOT-Dallas District has asked Jacobs to update the daily traffic projections along the Lyndon B. Johnson Freeway (I-635) corridor. The limits of the study corridor are along I-635 between US 75 and I-30 within the cities of Dallas, Garland and Mesquite. The location of the study corridor is shown in **Figure 1**. This traffic study is an element of a larger study that would convert the HOV lanes along the I-635 corridor to managed lanes. The updated traffic projections will be used to determine the capacity, accessibility and operational requirements along the study corridor. The daily traffic projections will be developed for Year 2022 (Opening Year), Year 2042 (Design Year) and Year 2052 (Pavement Design Year).

This memorandum describes the proposed methodology for developing the traffic projections for the noted years within the study limits.

SOURCES

Jacobs will use the following data sources to develop the traffic projections:

- Corridor analysis information for the I-635 corridor and vicinity prepared by TxDOT's Transportation Planning and Programming division (TPP).
- 2012 Accumulative Count Recorder Traffic Data (ACR) and Ramp Book provided by TPP.
- The 20-Year Regressions using historical District Traffic Count data in the Study corridor.
- Travel Demand Model (TDM) runs for the years 2013, 2018, 2028 and 2040, as obtained from the North Central Texas Council of Governments (NCTCOG).
- Previously approved traffic projections
- The historic Daily Traffic counts in the study corridor, as obtained from NCTCOG's website.
- The historic HOV traffic volumes as obtained from Dallas Area Rapid Transit (DART).

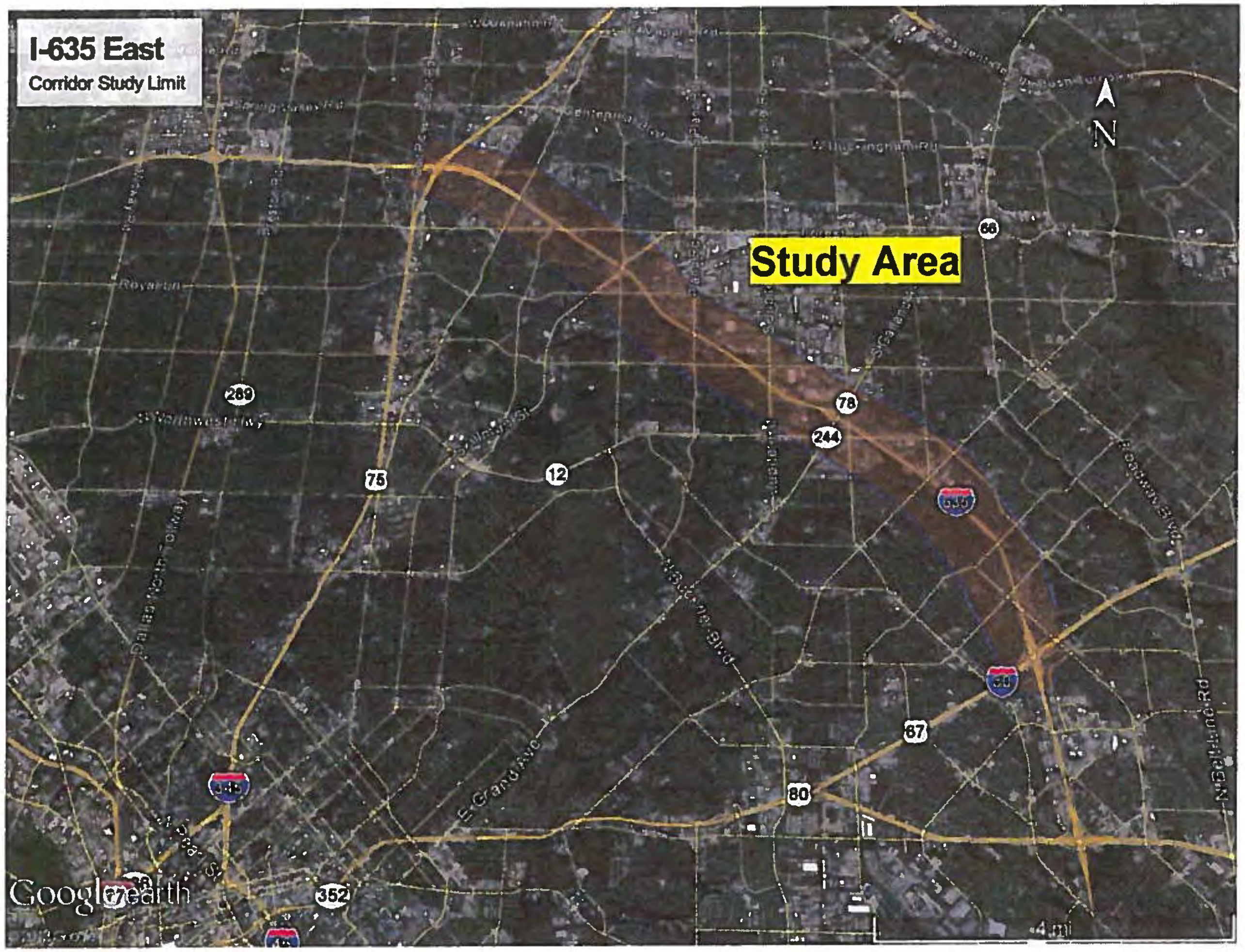


Figure 1- Study Area

METHODOLOGY

The steps below will be followed in developing the years 2022, 2042, and 2052 traffic projections.

Step 1: Historical Growth Calculation:

The traffic volume 20-Yr regression worksheet was obtained from TPP and has been summarized below in ***Table 1***. The detail of 20-Yr regression worksheet is shown in the **Appendix.**

TABLE 1
Historic Growth Rates

Year	Between US-75 and TI Blvd (Sta.H-18)	Between Abrams Rd and Forest Ln (Sta.H-19)	Between Jupiter Rd and Garland Ave (Sta.H-20)	Between Shiloh Rd and NW Hwy	Between Galloway Ave and I-30	Average Annual Growth Rate
1993-2013	0.5%	0.7%	0.8%	0.9%	0.8%	0.7%
2012-2013	4.1%	3.5%	3.6%	4.3%	3.3%	3.8%

Based on the historic counts the average annual growth rate from 1993 to 2013 is 0.7%. However, the average growth between year 2012 and year 2013 is estimated as 3.8%

Step 2: I-635 Model Growth Calculation:

The NCTCOG travel model data was used as a reference for estimating growth factors in the study area. The traffic volumes extracted from the model at various locations along I-635 corridor are shown in ***Table 2***. The corresponding growth rates are shown in ***Table 3***. The average annual growth rate from 2013 to 2040 is 1.6%.

TABLE 2
Study Corridor NCTCOG Traffic Volumes (2040 Mobility Model)

Year	Between US-75 and TI Blvd	Between Abrams Rd and Forest Ln	Between Jupiter Rd and Garland Ave	Between Shiloh Rd and NW Hwy	Between Galloway Ave and I-30
2013	279,575	226,693	208,996	196,487	213,772
2018	301,352	243,281	221,731	214,064	225,019
2028	313,747	251,987	233,674	226,703	237,168
2040*	381,338	304,213	293,976	302,501	312,128
2040**	393,427	340,911	334,840	342,537	312,128

*Estimated by applying 1.5% to 2035 no-build model volumes

**2040 build model volumes

TABLE 3
Study Corridor NCTCOG Annual Growth Rates
(2040 Mobility Model)

Year	Between US-75 and TI Blvd	Between Abrams Rd and Forest Ln	Between Jupiter Rd and Garland Ave	Between Shiloh Rd and NW Hwy	Between Galloway Ave and I-30
2013-2018	1.6%	1.5%	1.2%	1.8%	1.1%
2018-2028	0.4%	0.4%	0.5%	0.6%	0.5%
2028-2040	1.8%	1.7%	2.2%	2.8%	2.6%
2013-2040	1.4%	1.3%	1.5%	2.0%	1.7%
2013-2040*	1.5%	1.9%	2.2%	2.8%	2.1%
Average 2013-2040	1.6%				

*Growth rate based on 2013 no-build and 2040 build model volumes

Step 3: <u>TPP Traffic Analysis for Highway Design Data:</u>

Table 4 shows daily traffic volumes extracted from the Traffic Analysis for Highway Design table based on TPP approved traffic projections data dated April 8, 2015. Given the data in ***Table 4***, the growth rate was determined based on the Pivot method using the 2012 count year.

TABLE 4
TPP Growth Rates (Pivot method)

I-635 Section	2016	2036	2046	Annual Growth Rate	
				2012-2032 ≤20	2032-2046 >20
From US 75 to I-30	250,100	340,700	382,600	2.0%	1.8%

Step 4: <u>Recommended Growth Rates:</u>

The historical growth (from step 1) and future growth (from steps 2 and 3) were compared to determine the trends. The growth factors were adjusted based on the trends, volume to capacity ratios (V/C) and engineering judgment. Considering both the historic growth rates (0.7% from 1993-2013 and 3.8% from 2012-2013) and the travel demand model average growth rate of 1.6%, ***Table 5*** shows the recommended growth rates for the study area corridor.

TABLE 5
Recommended Corridor Growth Rates

I-635 Section	2012-2013	2013-2033 ≤20	2033-2052 >20
From US 75 to I-30	3.8%	2.0%	1.8%

Step 5: Corridor Volume Adjustments:

It is proposed to forecast 2013 corridor traffic volumes by applying a 3.8% growth rate to the 2012 main lane traffic volumes (Ramp and ACR book) provided by TPP. The recommended growth rates (from step 4) will then be applied using the Pivot Method, which is based on TPP's traffic projections guidelines, to the 2013 forecasted corridor traffic volumes to project traffic volumes for the years 2022, 2042, and 2052.

Based on TPP's guidance in the memo dated June 11, 2014, the developed traffic projections will show the total demand within the corridor based on non-tolled facilities (general purpose and HOV lanes) only. Detailed projections will be provided for both the general purpose lanes and the HOV lanes. Combined total demand of the non-tolled facilities will be provided in the Traffic Analysis for Highway Design (TAHD) tables. Conversion factors, to convert the free-flow (general purpose and HOV lanes) projections to HOV/Managed lane projections, will be developed and provided to the District Project Engineer.

Step 6: Design Hour Volume and Truck Percentages:

From TPP's package, the k and D factors and the percent trucks have been extracted as shown below.

- k-factor = 9.3%
- Directional Distribution = 53% / 47%
- Truck Percentages: 5.7% (ADT) and 2.6% (DHV)

If recent traffic data (e.g. traffic counts, k, D, and T factors) are made available to Jacobs during the development of the detailed corridor traffic projections, these data will be incorporated into the development of the traffic projections.

APPENDIX B: TPP APPROVED NON-TOLLED FACILITY TRAFFIC DATA

Texas Department of Transportation

MEMO

October 12, 2016

To: James K. Selman District Engineer
Attention: Mohammed (MO) K. Bur, P.E., Director of TPD

Through: William E. Knowles, P.E.
Traffic Analysis Section Director, TPP

From: Robert C. Williams
Transportation Analyst, TPP

Subject: Traffic Data
CSJ: 2374-01-137, 183 & 2374-02-053
I-635:
From West of TI Blvd.
To South of I-30
Dallas County

Attached are copies of schematics TPP reviewed and approved depicting 2022, 2042 and 2052 anticipated average daily traffic volumes and turning movements along I-635 for both No-Build and Build Conditions specified in your request. Also attached are tabulations showing traffic analysis for highway design for the 2022 to 2042 twenty year period and 2022 to 2052 thirty year period for the described limits of the route. Included are tabulations showing data for use in air and noise analysis.

Due to differences in the traffic volumes this project was separated into three sections.

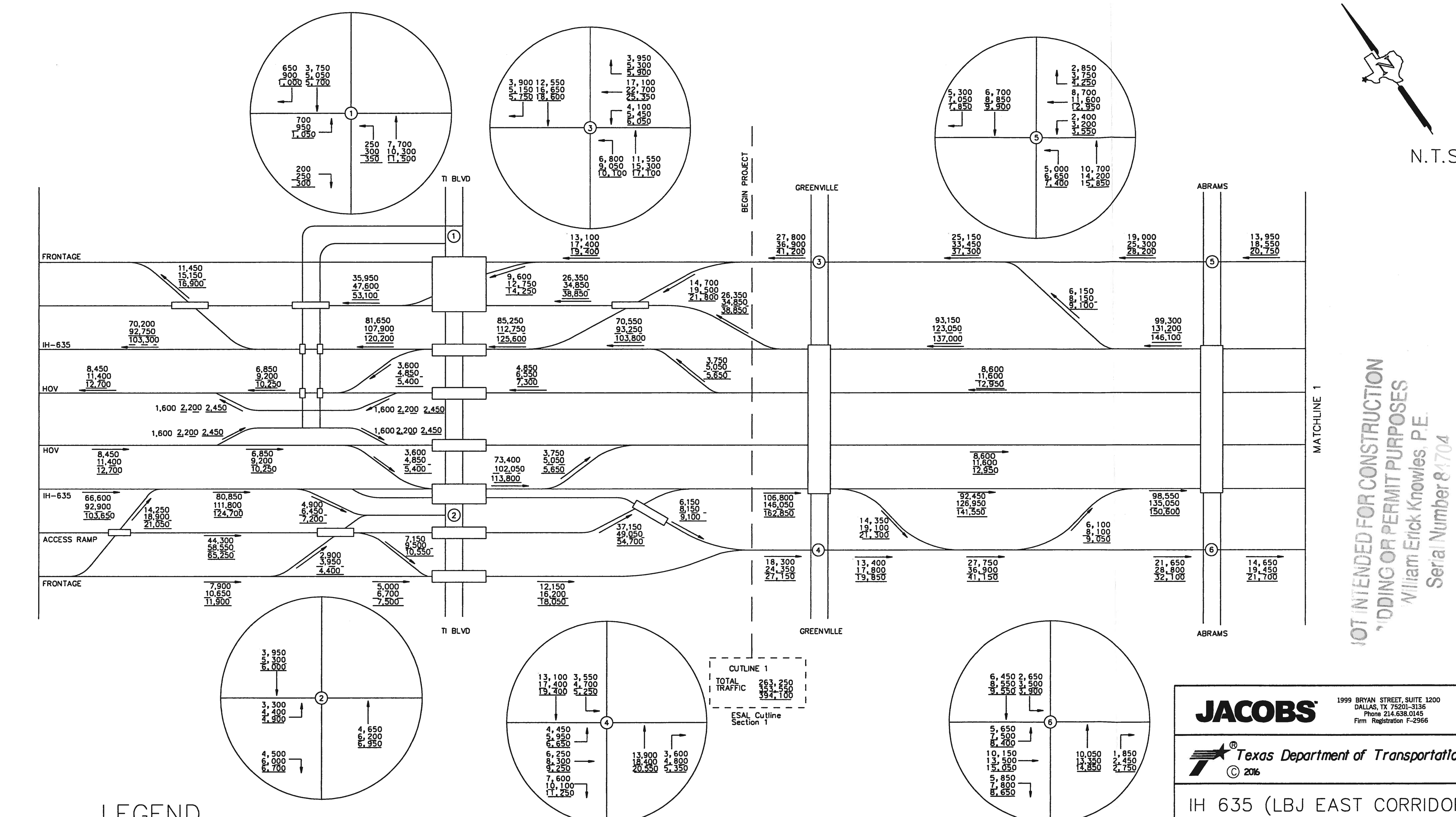
Section 1: From West of TI Blvd. to Royal Lane / Miller Road
Section 2: From Royal Lane / Miller Road to KCS Railroad (West of Garland Road)
Section 3: From KCS Railroad (West of Garland Road) to South of I-30

Please refer to your original memorandum dated June 15, 2016.

If you have any questions or need additional information, please contact Robert C. Williams at (512) 486-5145.

Attachments

CC: Godfrey Sendawula, Transportation Specialist, Dallas District
Design Division



LEGEND

⟶ = TRAVEL DIRECTION

XX,XXX = YEAR 2022 DAILY TRAFFIC

XX,XXX = YEAR 2042 DAILY TRAFFIC

XX,XXX = YEAR 2052 DAILY TRAFFIC

HOV = HIGH OCCUPANCY VEHICLE (A VEHICLE OCCUPIED BY TWO OR MORE PEOPLE MAY USE HOV LANES)

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Phone 214.638.0145
Firm Registration F-2966

Texas Department of Transportation

IH 635 (LBJ EAST CORRIDOR) TRAFFIC PROJECTIONS NO BUILD CONDITION

SHEET 1 OF 7

DESIGN	FED. RD. DIV. NO.			HIGHWAY NO.
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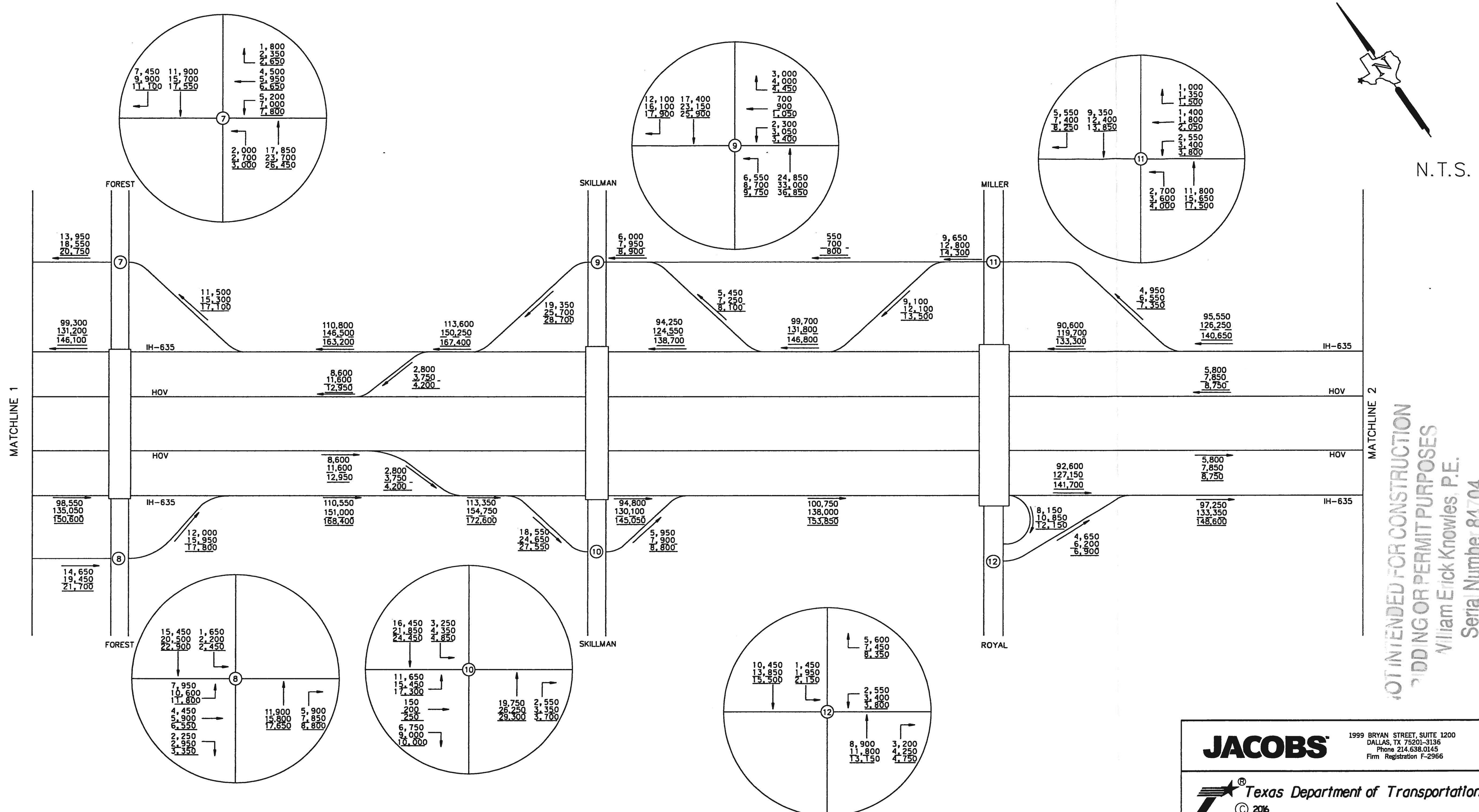

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IH 635 (LBJ EAST CORRIDOR) TRAFFIC PROJECTIONS

NO BUILD CONDITION

SHEET 2 OF 7

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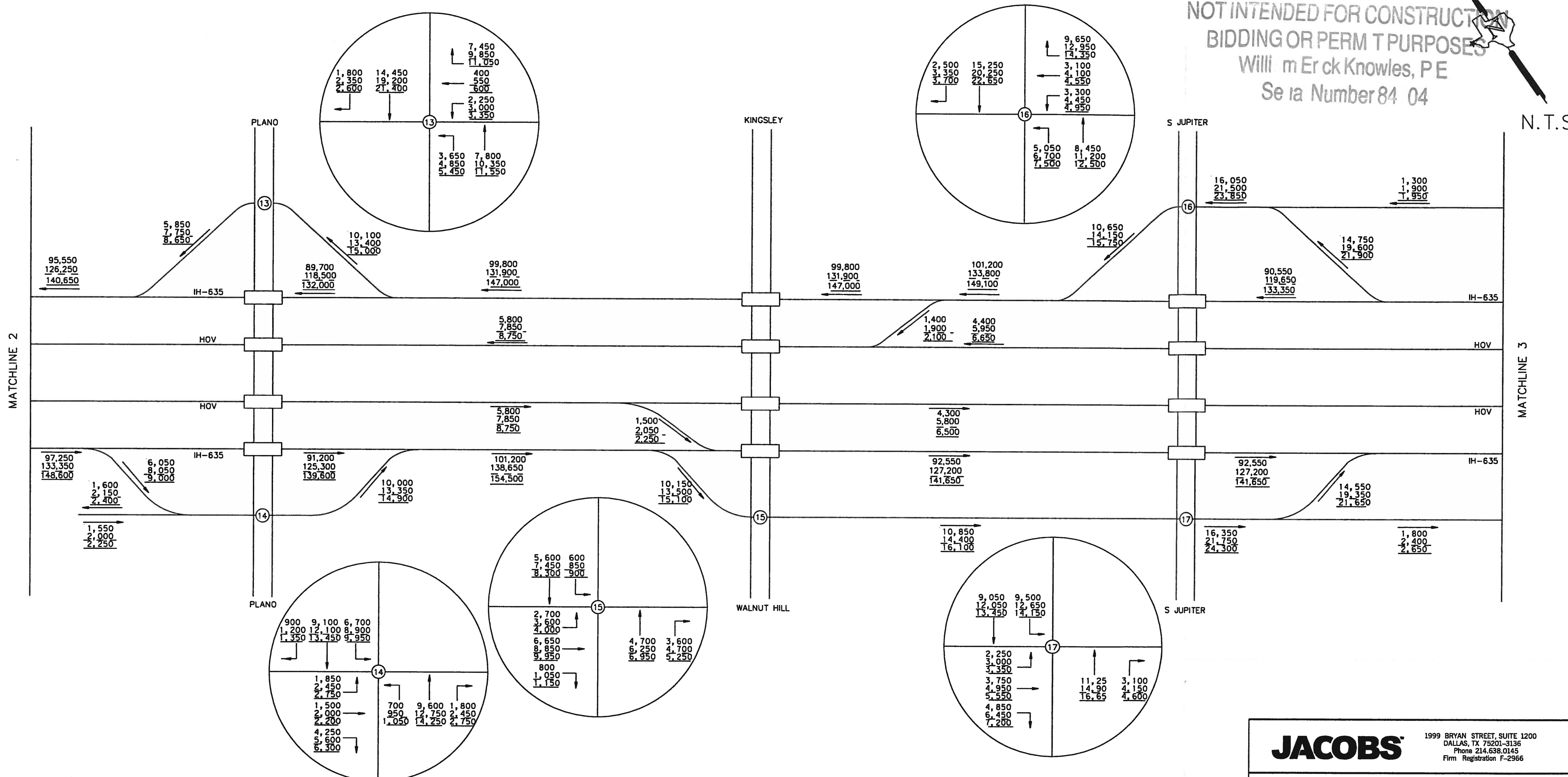

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SHEET 3 OF 7

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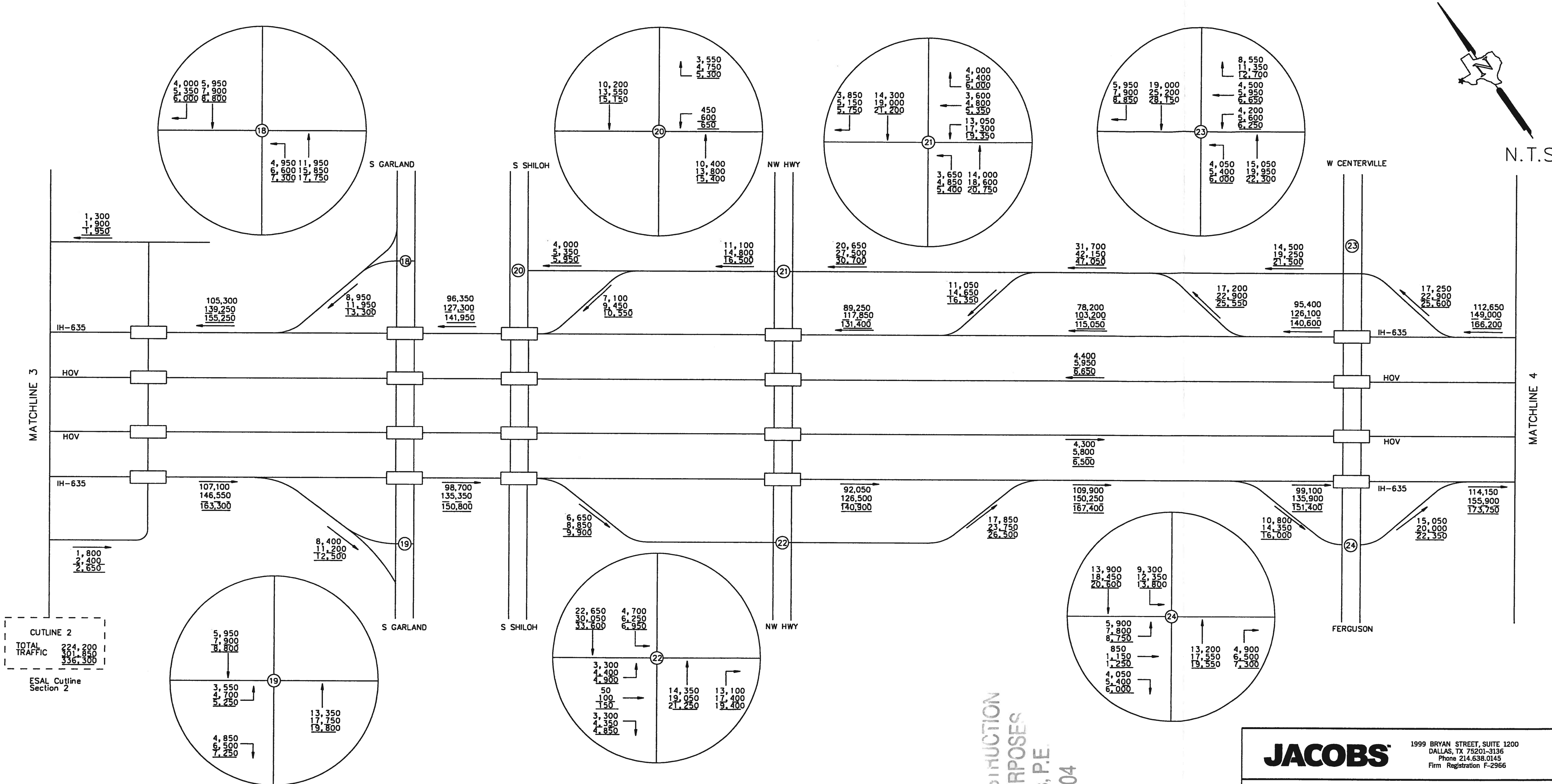

NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES
William Erick Knowles, P.E.
Serial Number 84704

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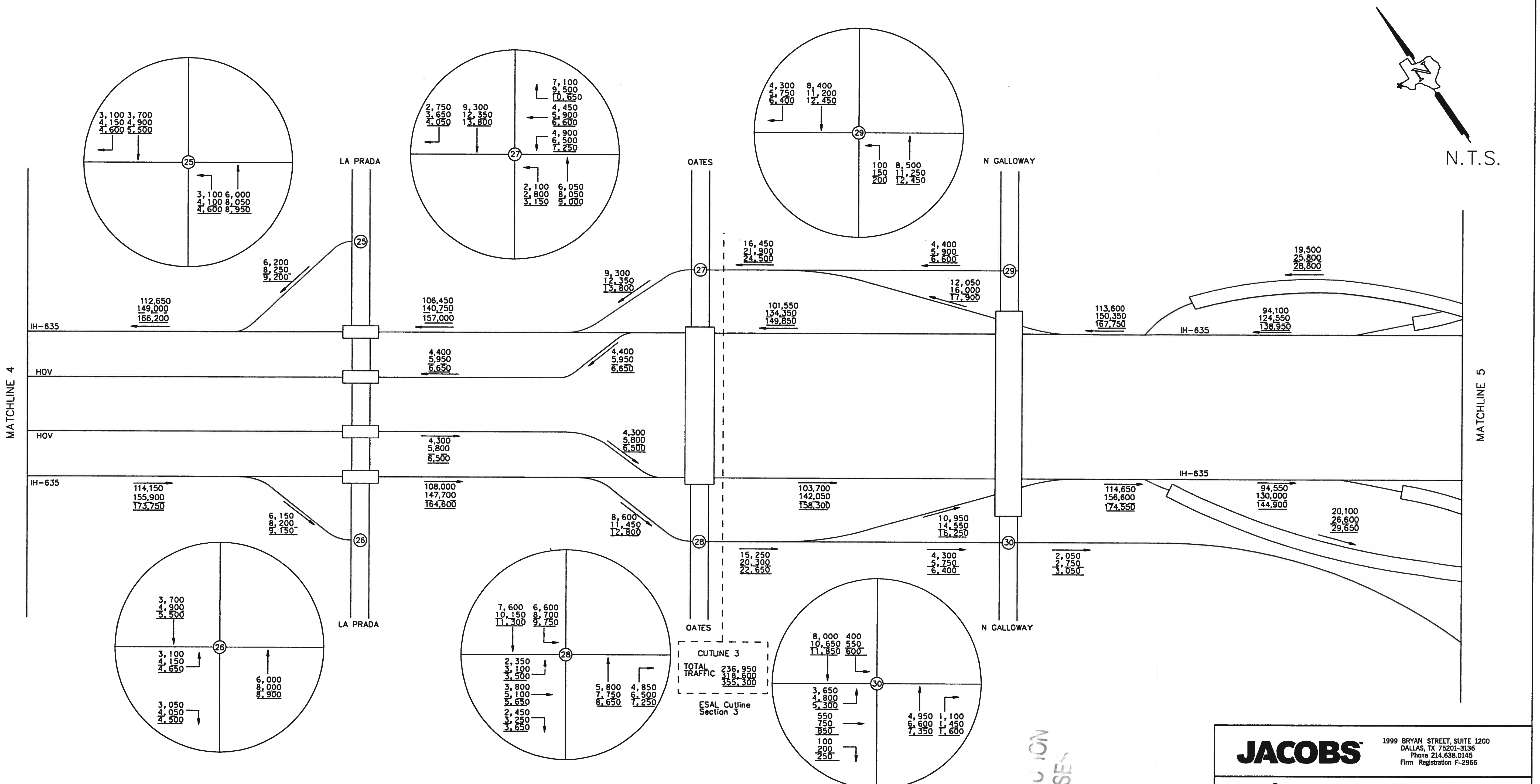

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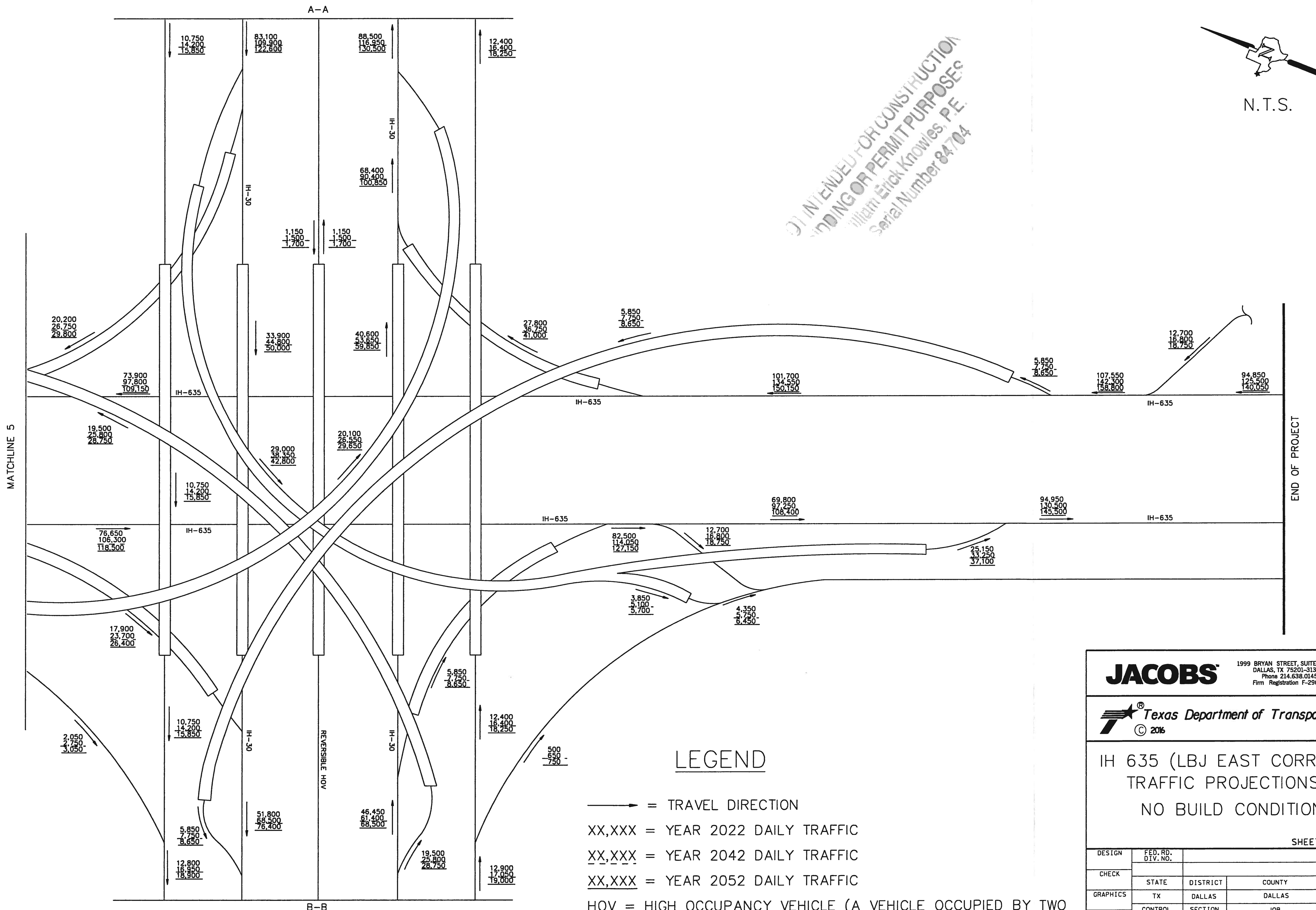

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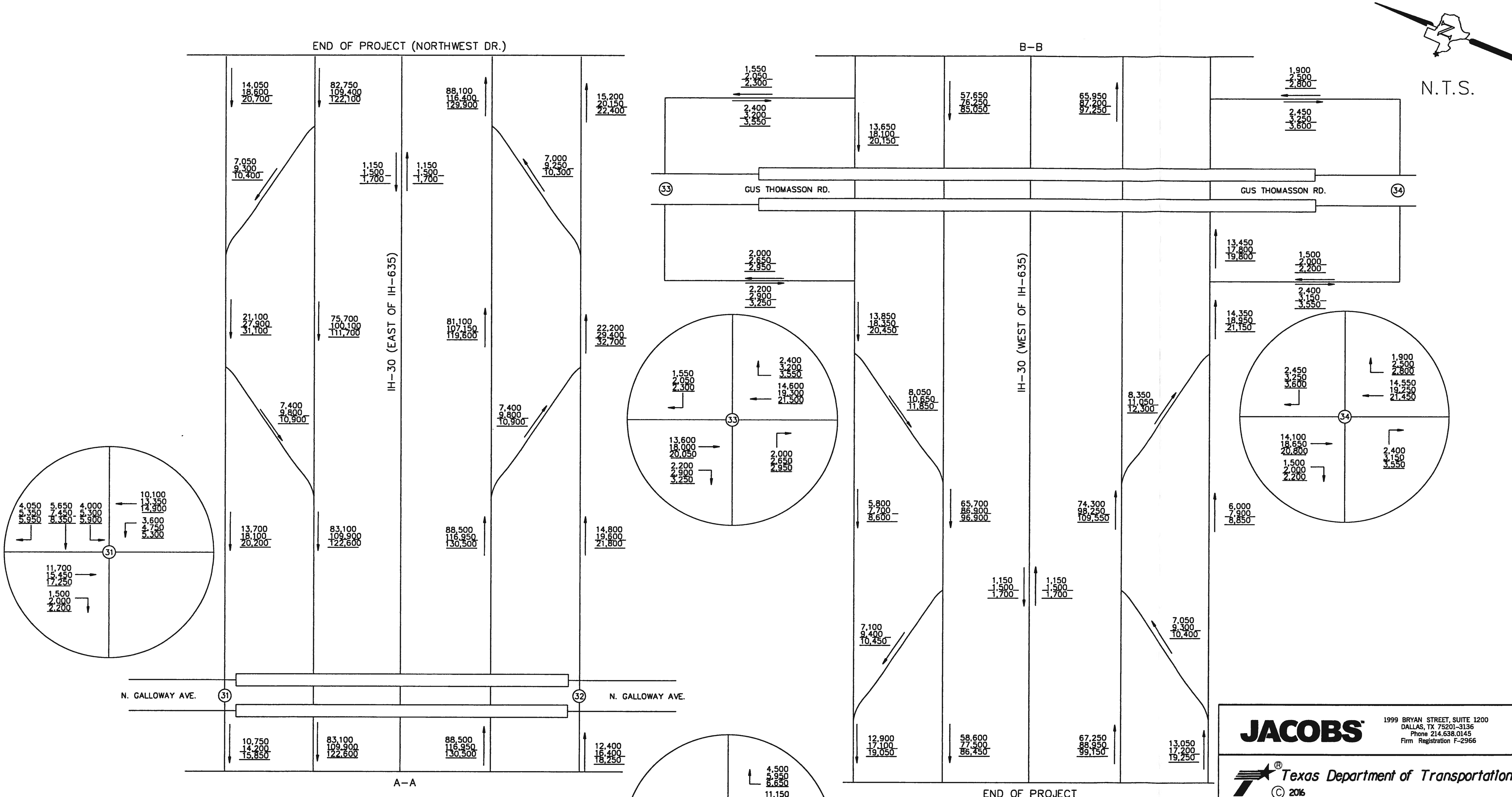

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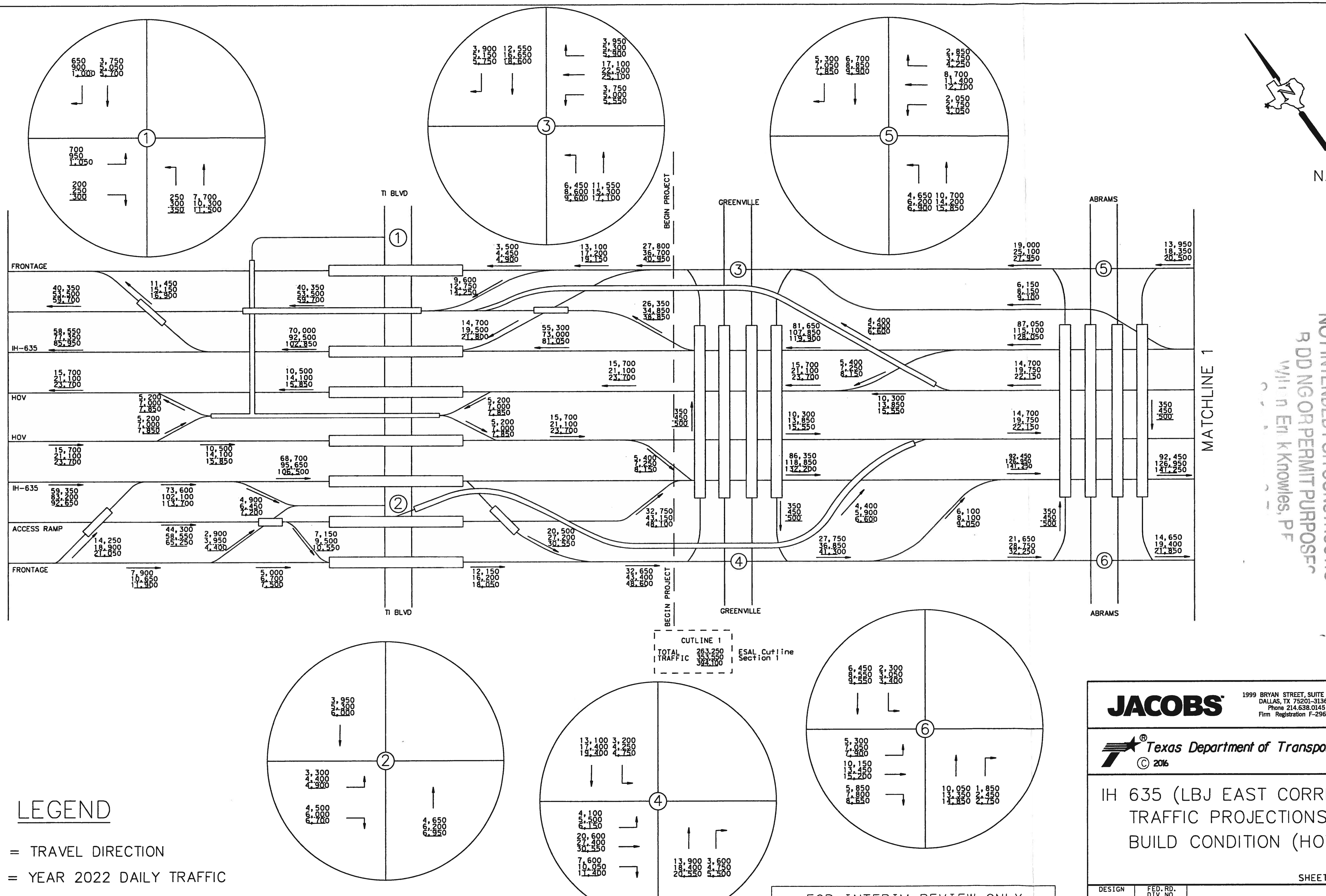

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IH 635 (LBJ EAST CORRIDOR) TRAFFIC PROJECTIONS BUILD CONDITION (HOV)

SHEET 1 OF 7

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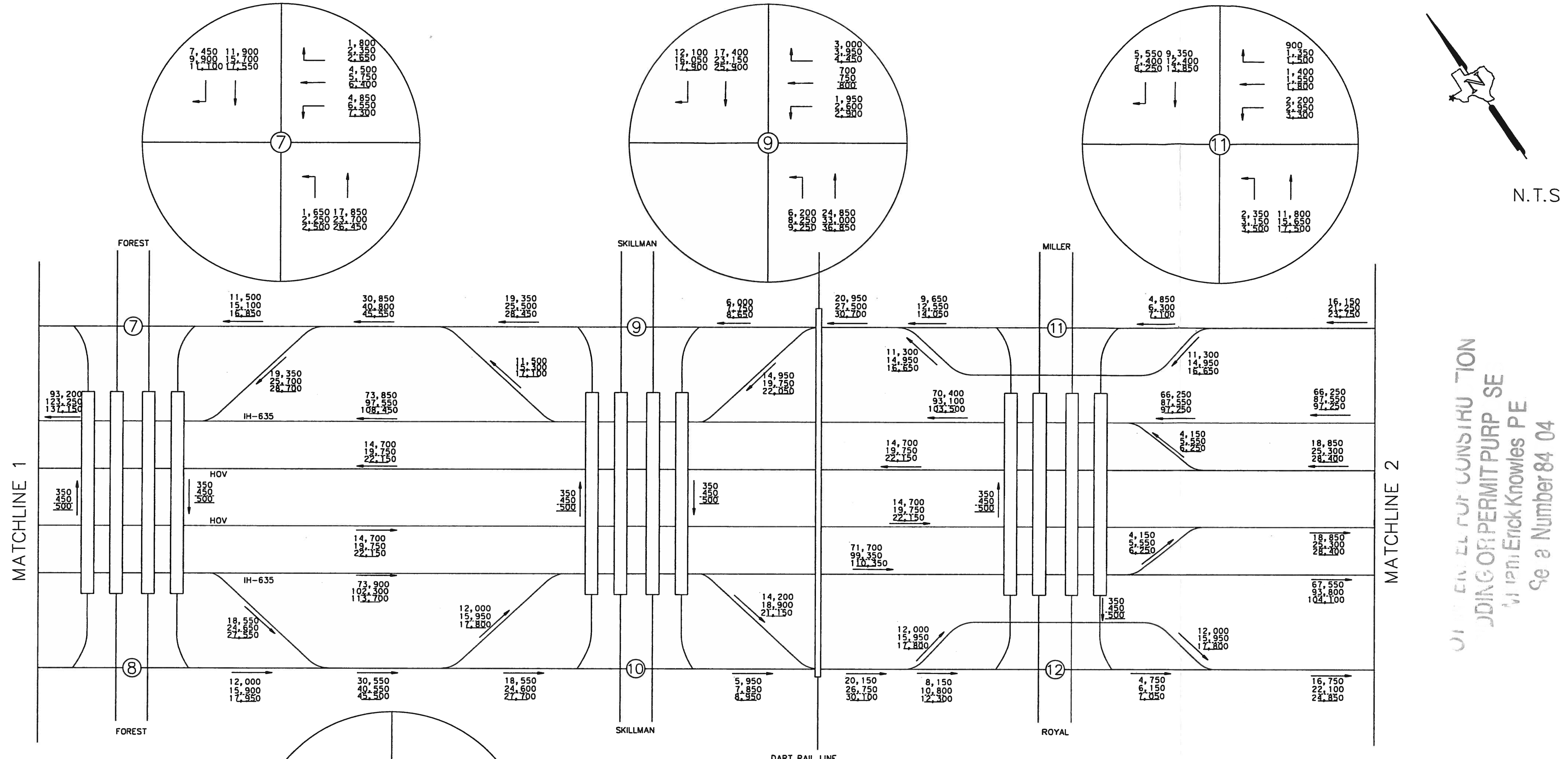

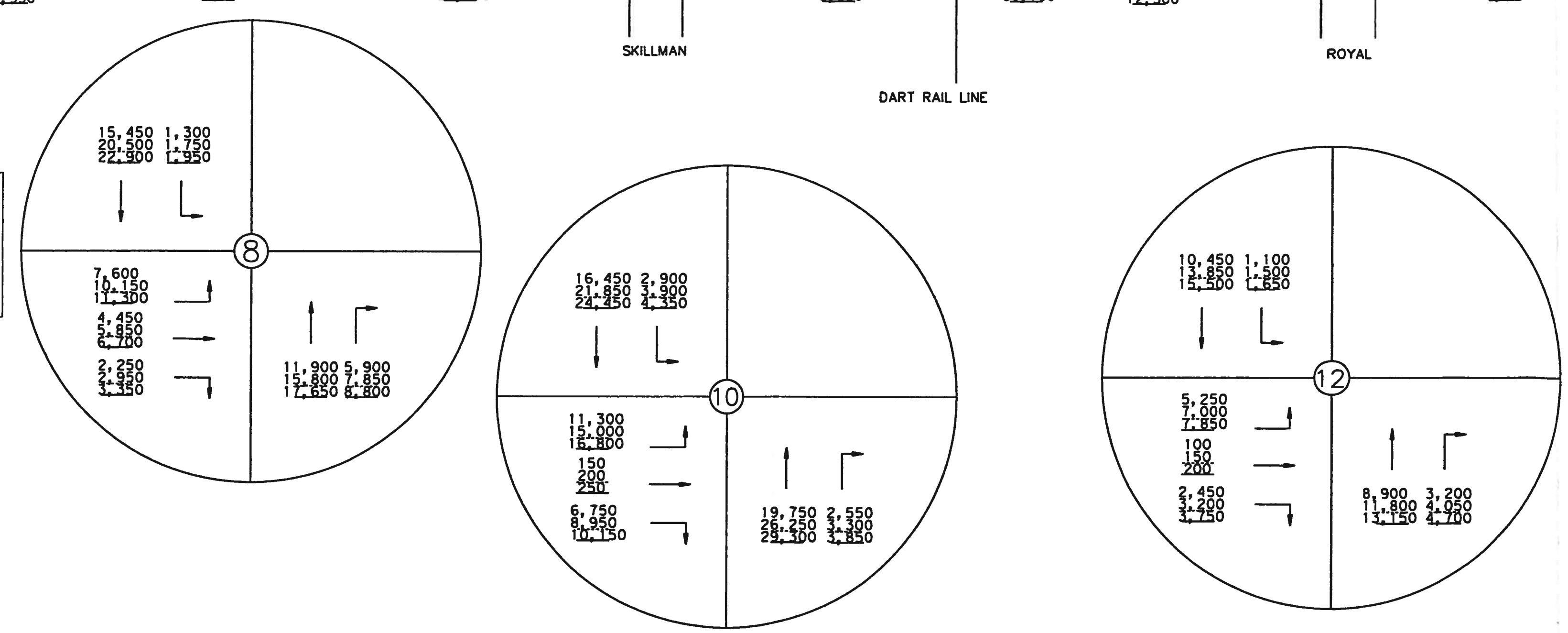

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BIDDING OR PERMIT PURPOSES

LEGEND

⟶ = TRAVEL DIRECTION

XX,XXX = YEAR 2022 DAILY TRAFFIC

XX,XXX = YEAR 2042 DAILY TRAFFIC (dashed underline)

XX,XXX = YEAR 2052 DAILY TRAFFIC (solid underline)

HOV = HIGH OCCUPANCY VEHICLE (A VEHICLE OCCUPIED BY TWO OR MORE PEOPLE MAY USE HOV LANES)

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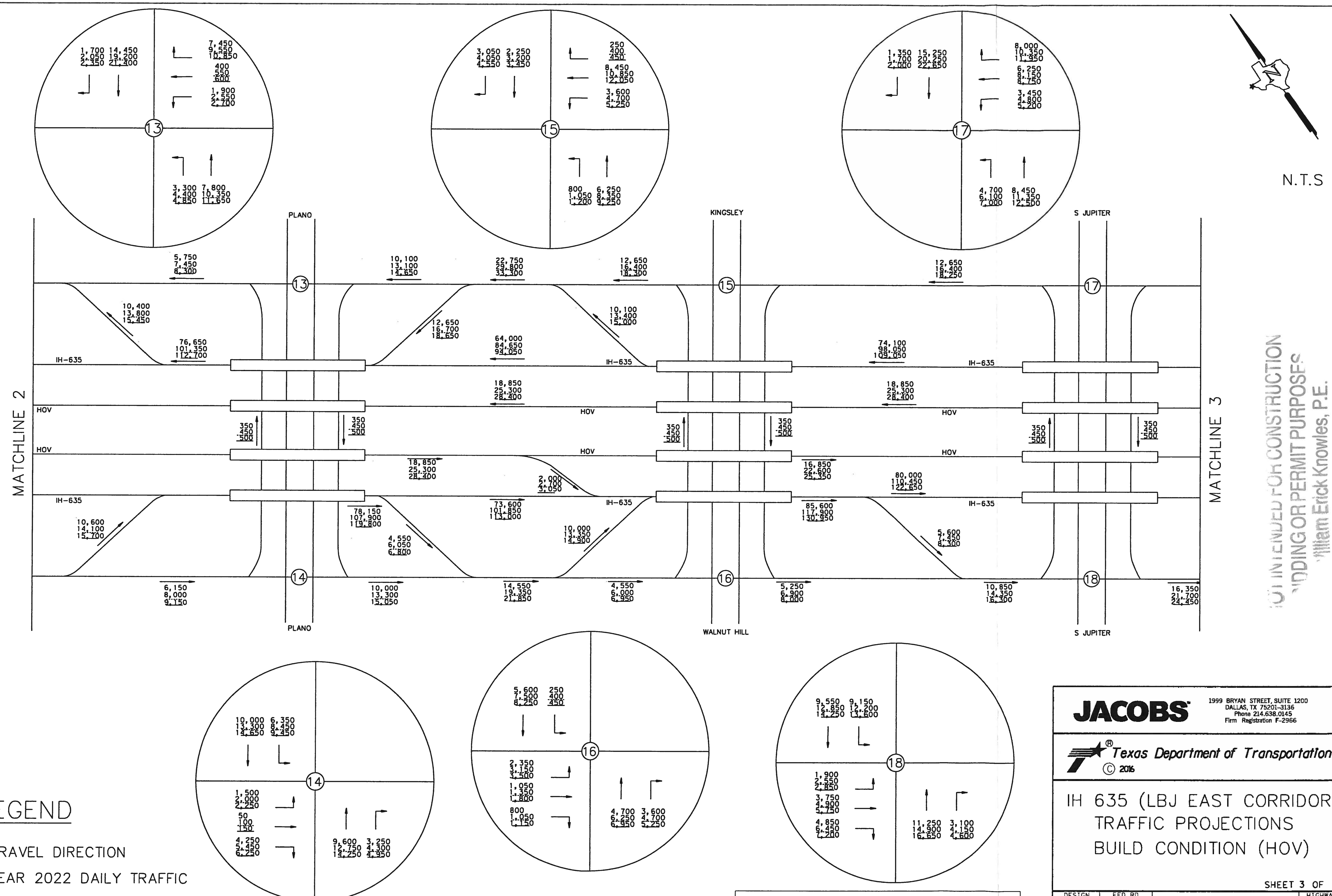
Texas Department of Transportation

IH 635 (LBJ EAST CORRIDOR)
TRAFFIC PROJECTIONS
BUILD CONDITION (HOV)

SHEET 2 OF 7

DESIGN	FED. RD. DIV. NO.			HIGHWAY NO.
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS	TX	DALLAS	DALLAS	
CHECK	CONTROL	SECTION	JOB	
	2374 2374	01 02	183, 137 053	



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William Erick Knowles, P.E.
Serial Number 84704

LEGEND

——→ = TRAVEL DIRECTION

XX,XXX = YEAR 2022 DAILY TRAFFIC

XX,XXX = YEAR 2042 DAILY TRAFFIC

XX,XXX = YEAR 2052 DAILY TRAFFIC

HOV = HIGH OCCUPANCY VEHICLE (A VEHICLE OCCUPIED BY TWO OR MORE PEOPLE MAY USE HOV LANES)

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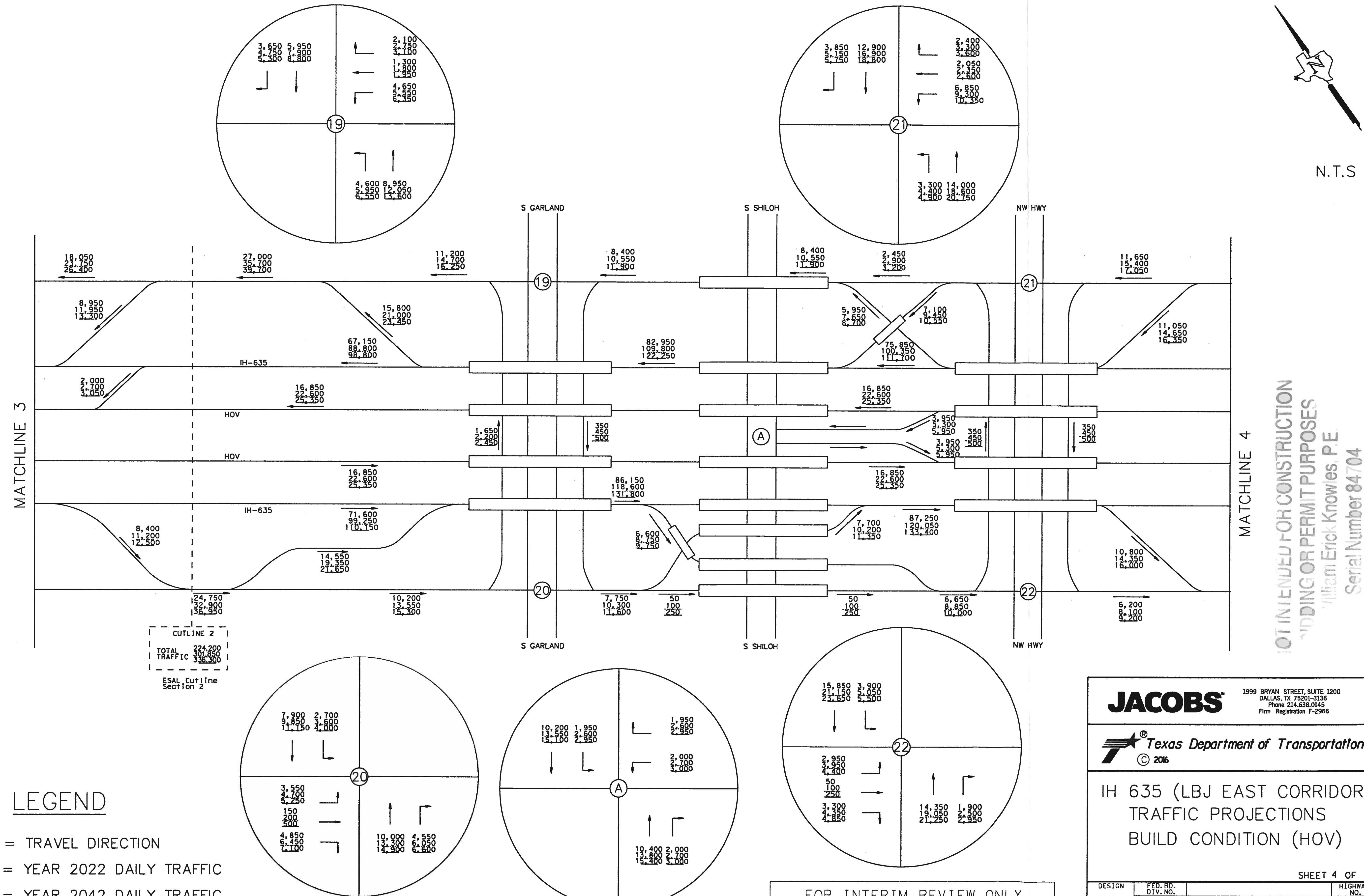
IH 635 (LBJ EAST CORRIDOR)
TRAFFIC PROJECTIONS
BUILD CONDITION (HOV)

SHEET 3 OF 7

DESIGN	FED. RD. DIV. NO.				HIGHWAY NO.
CHECK	STATE	DISTRICT	COUNTY		SHEET NO.
GRAPHICS	TX	DALLAS	DALLAS		
CHECK	CONTROL	SECTION	JOB		
	2374 2374	01 02	183,137 053		



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William Erick Knowles, P.E.
Serial Number 84704

LEGEND

→ = TRAVEL DIRECTION

XX,XXX = YEAR 2022 DAILY TRAFFIC

XX,XXX = YEAR 2042 DAILY TRAFFIC

XX,XXX = YEAR 2052 DAILY TRAFFIC

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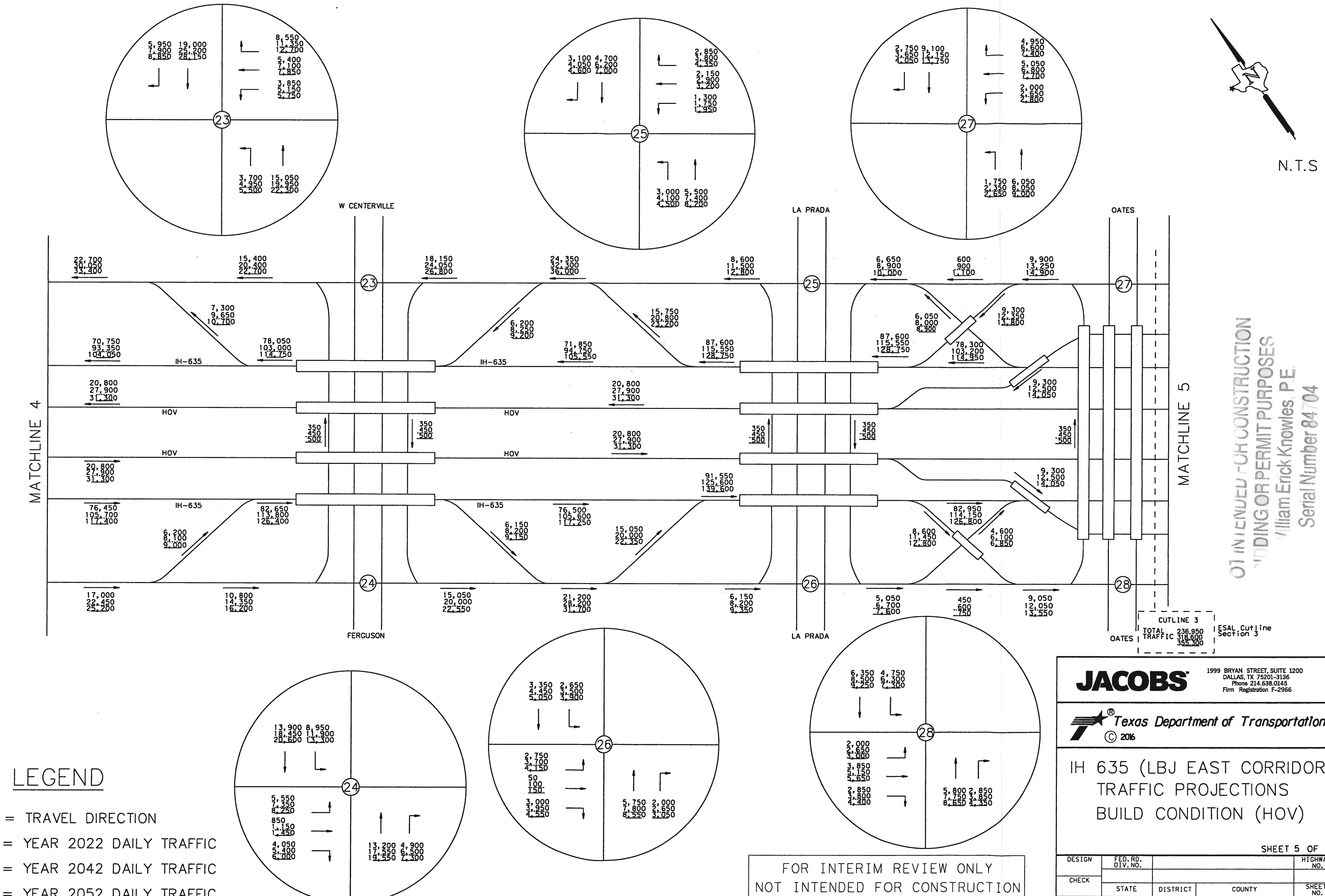
IH 635 (LBJ EAST CORRIDOR) TRAFFIC PROJECTIONS BUILD CONDITION (HOV)

SHEET 4 OF 7

DESIGN	FED. RD. DIV. NO.				HIGHWAY NO.
CHECK	STATE	DISTRICT	COUNTY		SHEET NO.
GRAPHICS	TX	DALLAS	DALLAS		
CHECK	CONTROL	SECTION	JOB		
	2374 2374	01 02	183, 137 053		



LEGEND

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XX,XXX = YEAR 2022 DAILY TRAFFIC

XX,XXX = YEAR 2042 DAILY TRAFFIC

XX,XXX = YEAR 2052 DAILY TRAFFIC

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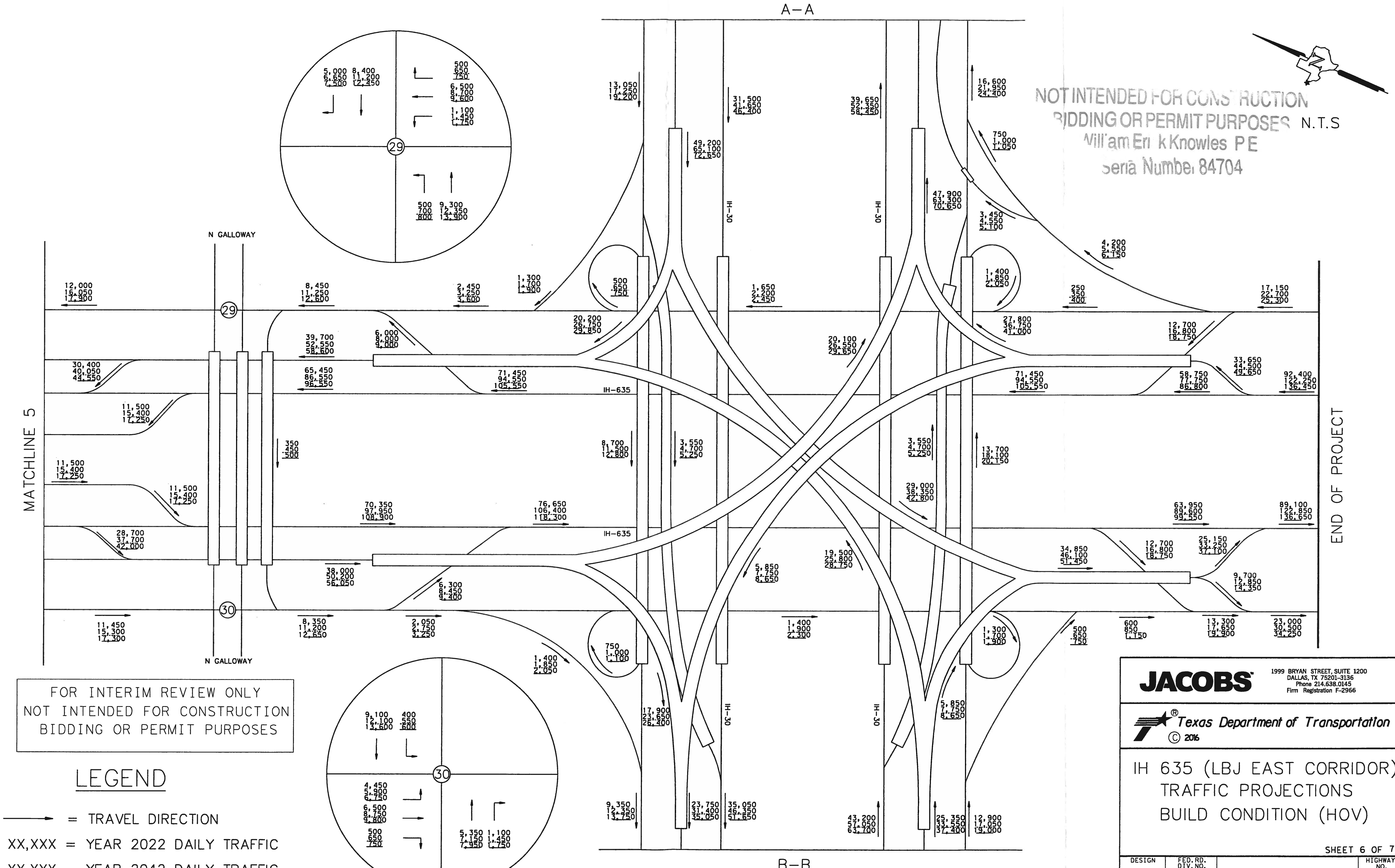
IH 635 (LBJ EAST CORRIDOR)
TRAFFIC PROJECTIONS
BUILD CONDITION (HOV)

SHEET 5 OF 7

DESIGN	FED. RD. DIV. NO.			HIGHWAY NO.
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS	TX	DALLAS	DALLAS	
CHECK	CONTROL	SECTION	JOB	
	2374 2374	01 02	183,137 053	



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LEGEND

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XX,XXX = YEAR 2022 DAILY TRAFFIC

XX,XXX = YEAR 2042 DAILY TRAFFIC

XX,XXX = YEAR 2052 DAILY TRAFFIC

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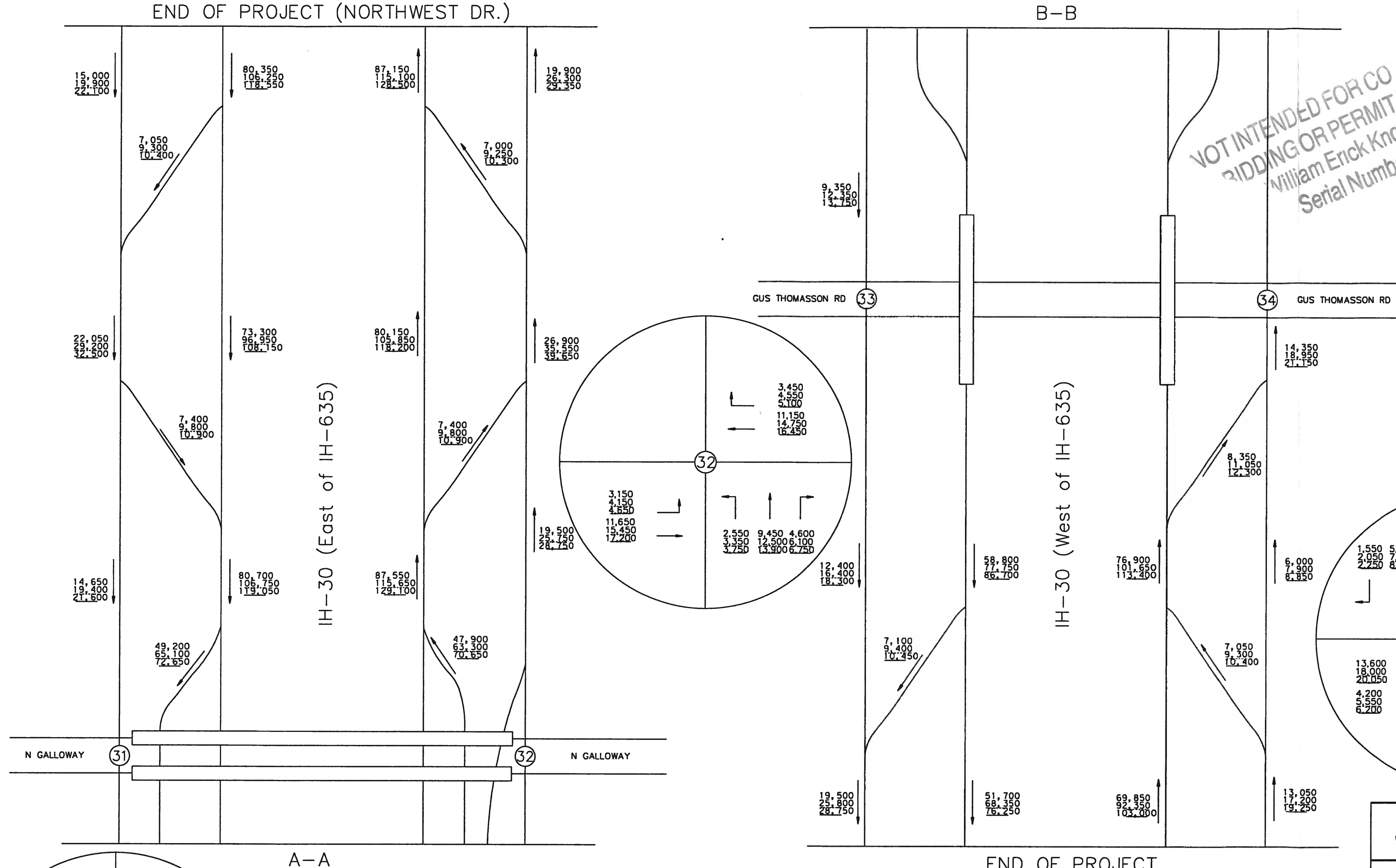
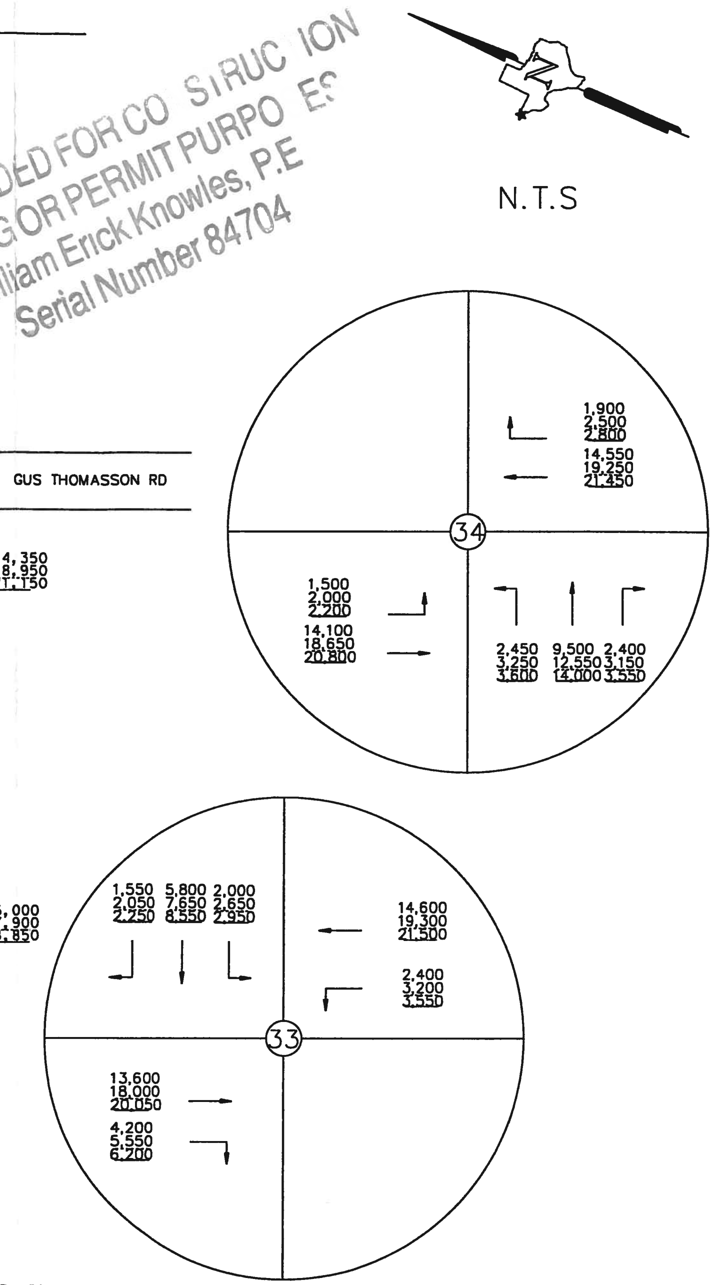
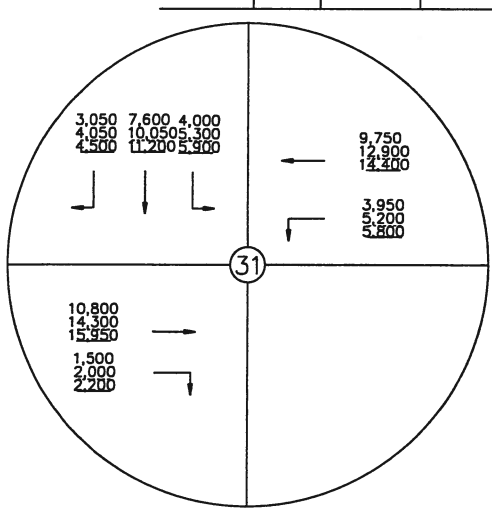
IH 635 (LBJ EAST CORRIDOR)
TRAFFIC PROJECTIONS
BUILD CONDITION (HOV)

SHEET 6 OF 7

DESIGN	FED. RD. DIV. NO.			HIGHWAY NO.
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS	TX	DALLAS	DALLAS	
CHECK	CONTROL	SECTION	JOB	
	2374 2374	01 02	183,137 053	







LEGEND

⟶ = TRAVEL DIRECTION

XX,XXX = YEAR 2022 DAILY TRAFFIC

XX,XXX = YEAR 2042 DAILY TRAFFIC

XX,XXX = YEAR 2052 DAILY TRAFFIC

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IH 635 (LBJ EAST CORRIDOR)
TRAFFIC PROJECTIONS
BUILD CONDITION (HOV)

DESIGN	FED. RD. DIV. NO.			HIGHWAY NO.
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS	TX	DALLAS	DALLAS	
CHECK	CONTROL	SECTION	JOB	
	2374 2374	01 02	183,137 053	

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Dallas District **October 7, 2016**

Description of Location	Average Daily Traffic 2022	Average Daily Traffic 2042	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2022 to 2042) Flexible Pavement	S N	Rigid Pavement	SLAB
I-635 Both No Build and Build Conditions Section 1 From West of TI Blvd. To Royal Lane/Miller Road Dallas County	263,250	353,550	52 - 48	9.0	6.0	2.7	13,400	20	56,208,000	3	75,046,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	94.0	97.3
Medium Duty	2.5	1.1
Heavy Duty	3.5	1.6

Description of Location	Average Daily Traffic 2022	Average Daily Traffic 2052	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2022 to 2052) Flexible Pavement	S N	Rigid Pavement	SLAB
I-635 Both No Build and Build Conditions Section 1 From West of TI Blvd. To Royal Lane/Miller Road Dallas County	263,250	394,100	52 - 48	9.0	6.0	2.7	13,500	20	89,856,000	3	119,972,000	8"

NOT INTENDED FOR CONSTRUCTION
BIDDING OR PERMIT PURPOSES
William Erick Knowles P E
S ia Number 4 04

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Dallas District | **October 7, 2016**

Description of Location	Average Daily Traffic 2022	Average Daily Traffic 2042	Base Year: Dir Dist %	Base Year: K Factor	Base Year: Percent Trucks ADT	Base Year: Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2022 to 2042): Flexible Pavement	S N	Rigid Pavement	SLAB
I-635 Both No Build and Build Conditions Section 2 From Royal Lane/Miller Road To KCS Railroad (West of Garland Road) Dallas County	224,200	301,850	52 - 48	9.0	6.4	2.9	13,400	20	51,095,000	3	68,247,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	93.6	97.1
Medium Duty	2.7	1.2
Heavy Duty	3.7	1.7

Description of Location	Average Daily Traffic 2022	Average Daily Traffic 2052	Base Year: Dir Dist %	Base Year: K Factor	Base Year: Percent Trucks ADT	Base Year: Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2022 to 2052): Flexible Pavement	S N	Rigid Pavement	SLAB
I-635 Both No Build and Build Conditions Section 2 From Royal Lane/Miller Road To KCS Railroad (West of Garland Road) Dallas County	224,200	336,300	52 - 48	9.0	6.4	2.9	13,400	20	81,663,000	3	109,076,000	8"

NOT INTENDED FOR CONSTRUCTION
BIDDING OR PERMIT PURPOSES
William Erick Knowles, P.E.
Serial Number 84704

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Dallas District — **October 7, 2016**

Description of Location	Average Daily Traffic 2022	Average Daily Traffic 2042	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2022 to 2042) Flexible Pavement	S N	Rigid Pavement	SLAB
I-635 Both No Build and Build Conditions Section 3 From KCS Railroad (West of Garland Road) To South of I-30 Dallas County	236,950	318,600	52 - 48	9.0	6.3	2.8	13,400	20	53,126,000	3	70,953,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	93.7	97.2
Medium Duty	2.6	1.2
Heavy Duty	3.7	1.6

Description of Location	Average Daily Traffic 2022	Average Daily Traffic 2052	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2022 to 2052) Flexible Pavement	S N	Rigid Pavement	SLAB
I-635 Both No Build and Build Conditions Section 3 From KCS Railroad (West of Garland Road) To South of I-30 Dallas County	236,950	355,300	52 - 48	9.0	6.3	2.8	13,400	20	84,954,000	3	113,461,000	8"

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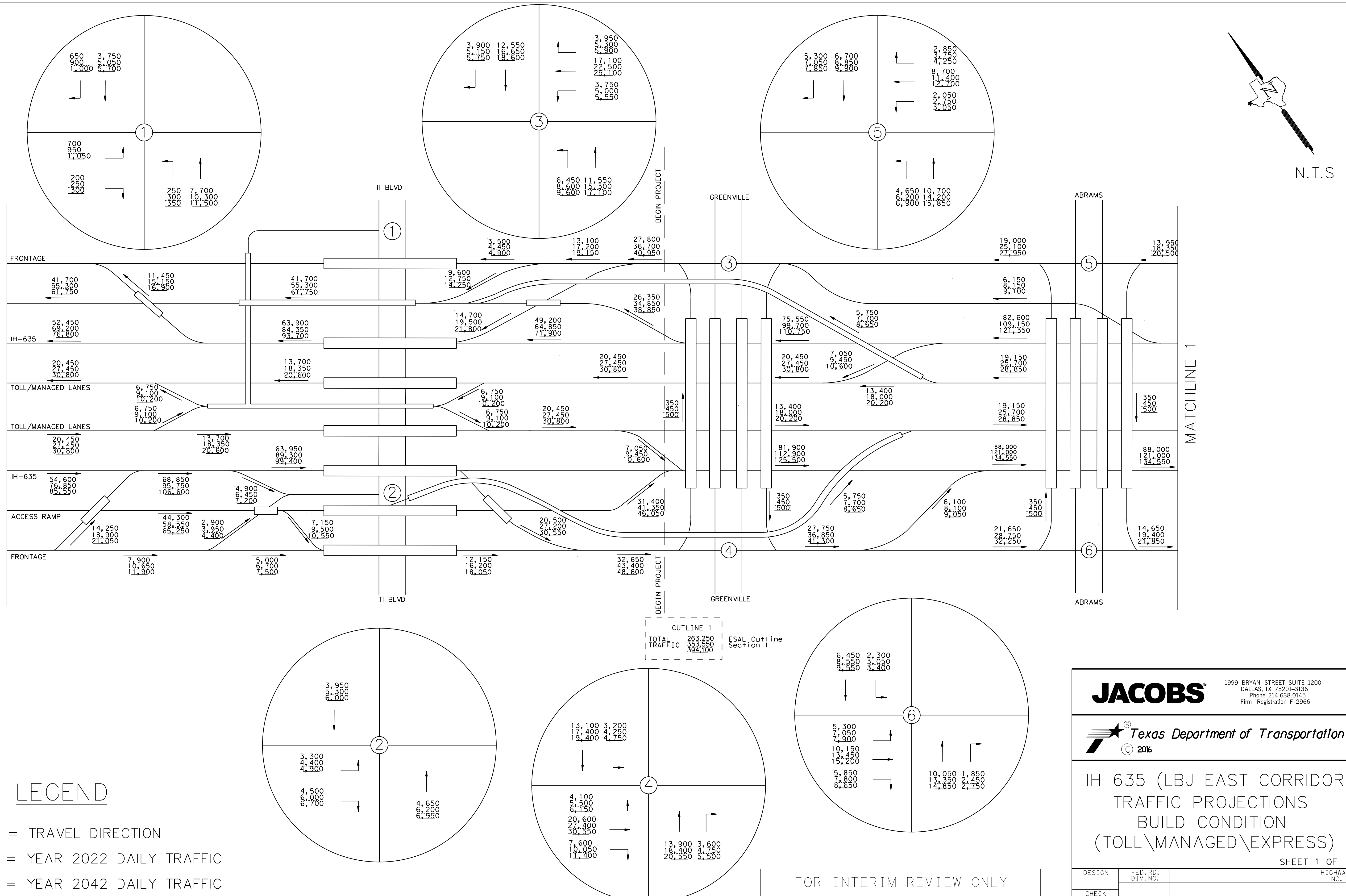
BIDDING OR PERMIT PURPOSES
William Erick Knowles, P.E.
Serial Number 84704

APPENDIX C: CONVERTED TOLLED-MANAGED AND EXPRESS LANES TRAFFIC DATA



LEGEND

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XX,XXX = YEAR 2022 DAILY TRAFFIC

XX,XXX = YEAR 2042 DAILY TRAFFIC

XX,XXX = YEAR 2052 DAILY TRAFFIC

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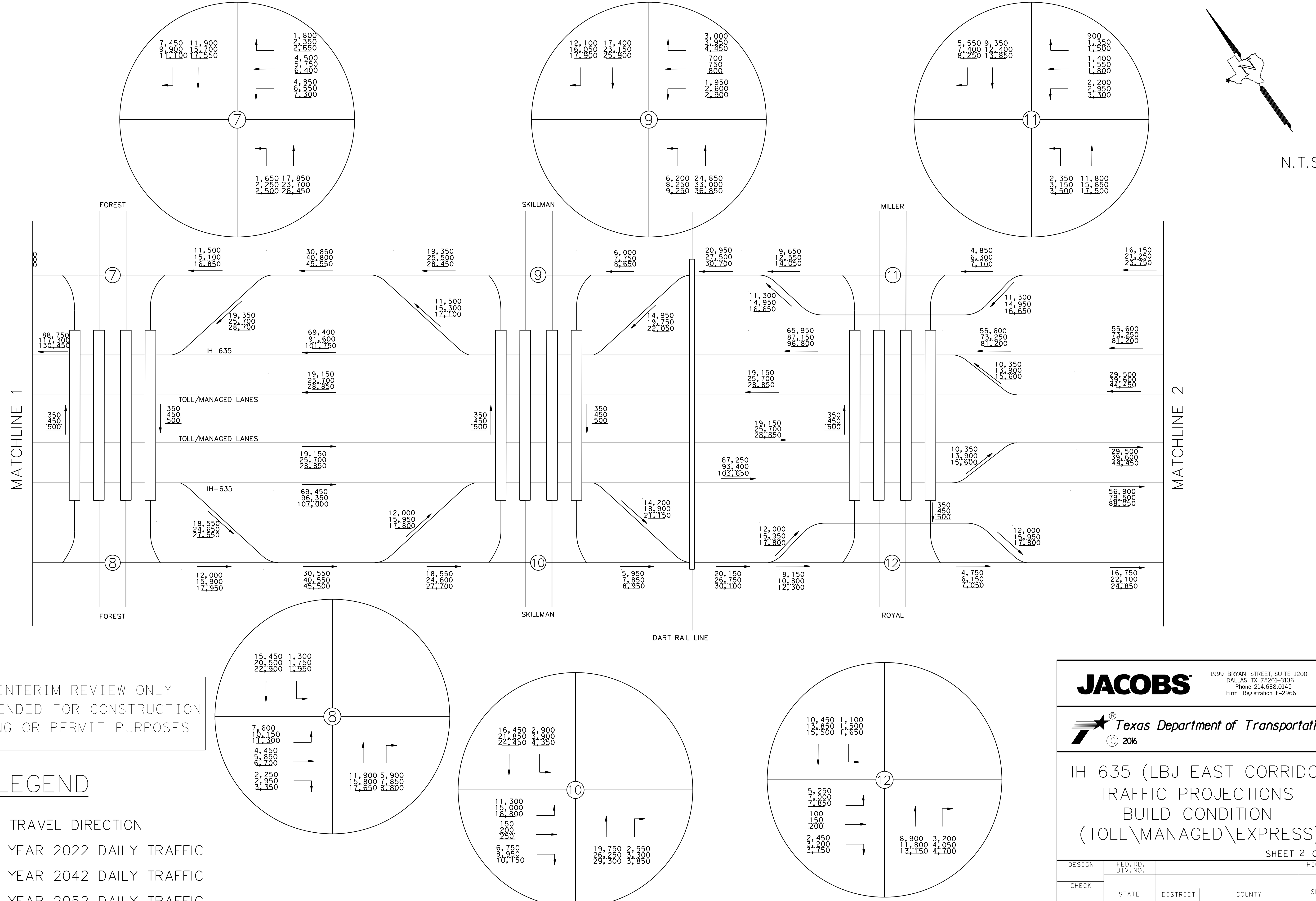
IH 635 (LBJ EAST CORRIDOR)
TRAFFIC PROJECTIONS
BUILD CONDITION
(TOLL\MANAGED\EXPRESS)

SHEET 1 OF 7

DESIGN	FED.RD. DIV.NO.			HIGHWAY NO.
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS	TX	DALLAS	DALLAS	
CHECK	CONTROL	SECTION	JOB	
	2374 2374	01 02	183,137 053	



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LEGEND

→ = TRAVEL DIRECTION

XX,XXX = YEAR 2022 DAILY TRAFFIC

XX,XXX = YEAR 2042 DAILY TRAFFIC

XX,XXX = YEAR 2052 DAILY TRAFFIC

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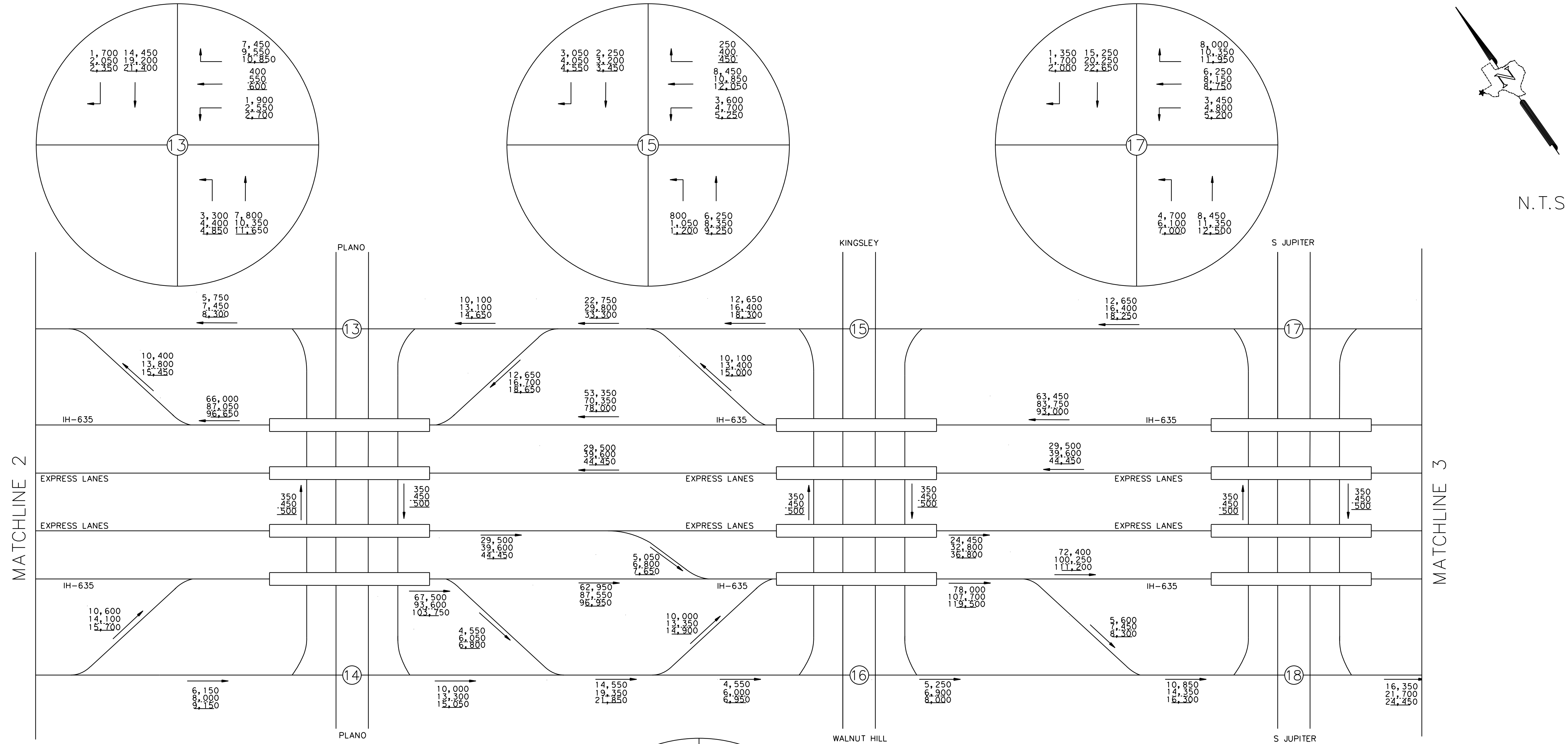
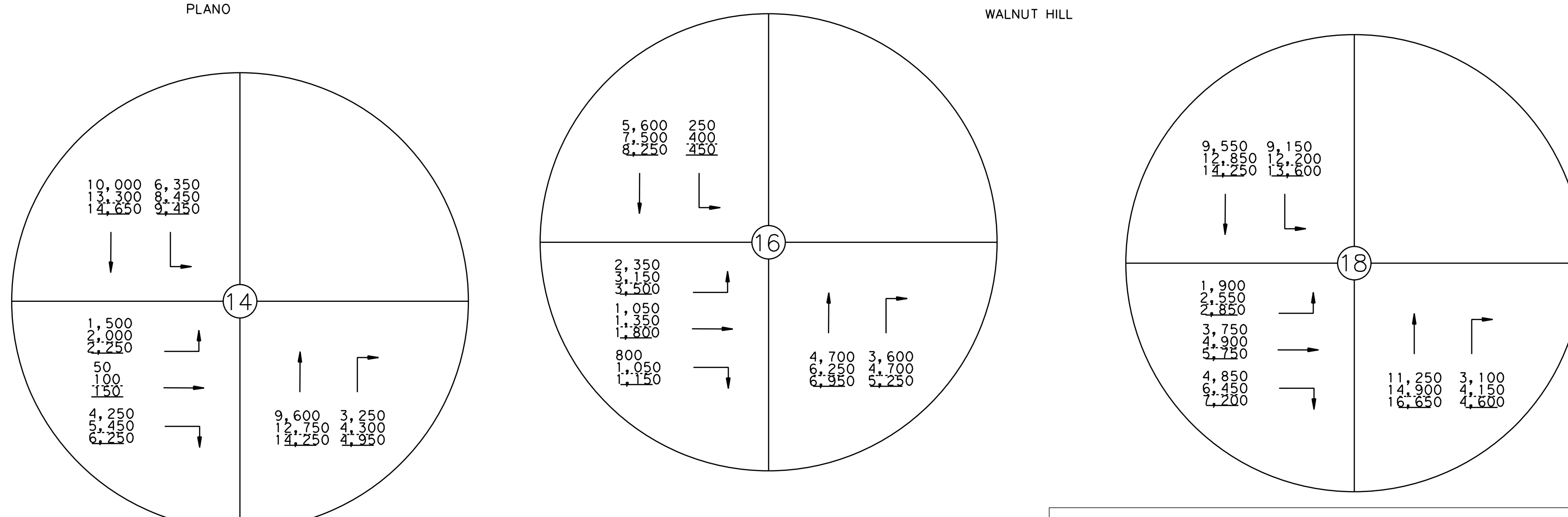
IH 635 (LBJ EAST CORRIDOR) TRAFFIC PROJECTIONS BUILD CONDITION (TOLL\MANAGED\EXPRESS)

SHEET 2 OF 7

DESIGN	FED.RD. DIV.NO.			HIGHWAY NO.
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS	TX	DALLAS	DALLAS	
CHECK	CONTROL	SECTION	JOB	
	2374 2374	01 02	183,137 053	





LEGEND

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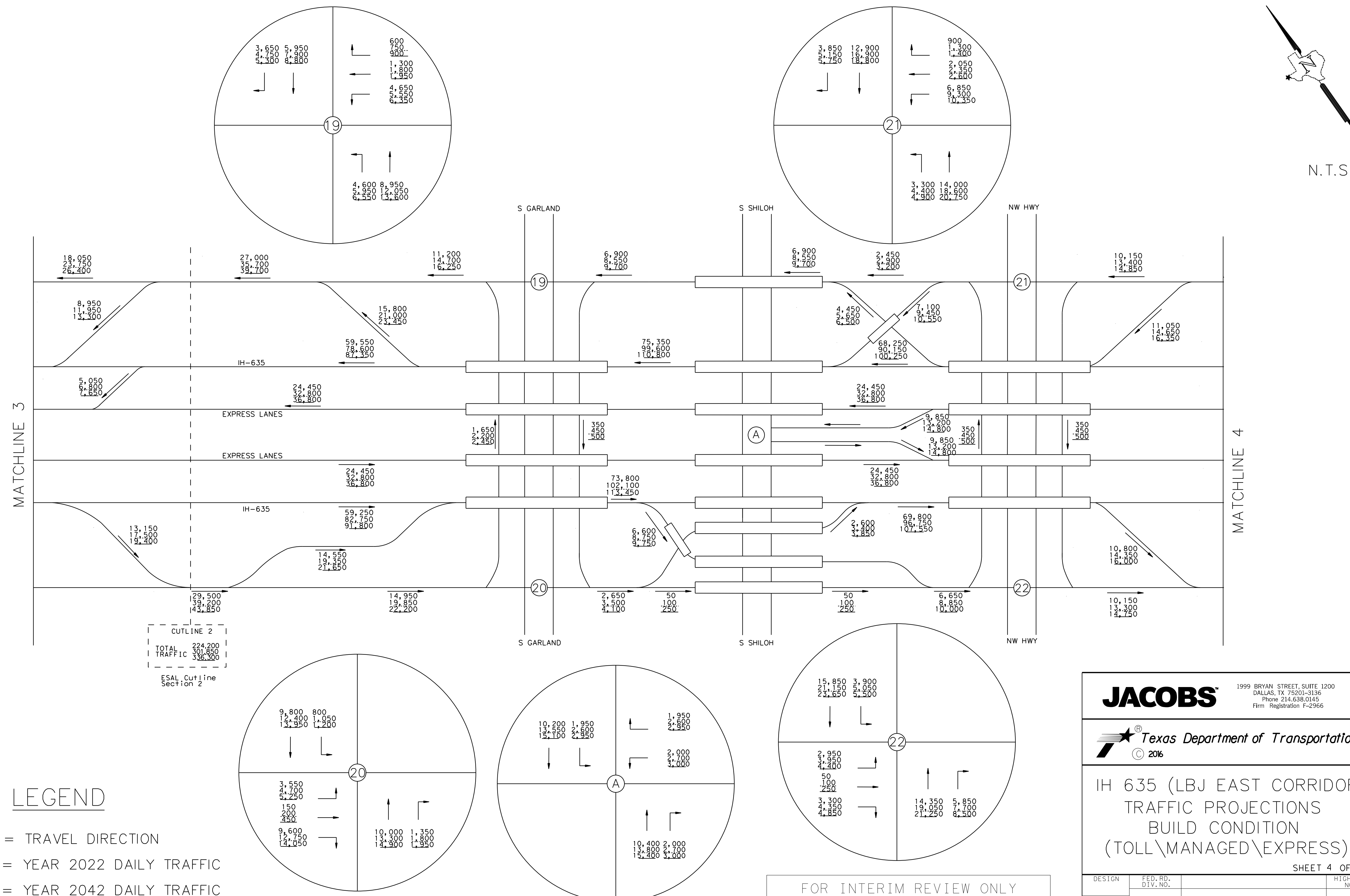
IH 635 (LBJ EAST CORRIDOR)
TRAFFIC PROJECTIONS

SHEET 3 OF 7

DESIGN	FED.RD. DIV.NO.			HIGHWAY NO.
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS	TX	DALLAS	DALLAS	
CHECK	CONTROL	SECTION	JOB	
	2374 2374	01 02	183,137 053	



LEGEND

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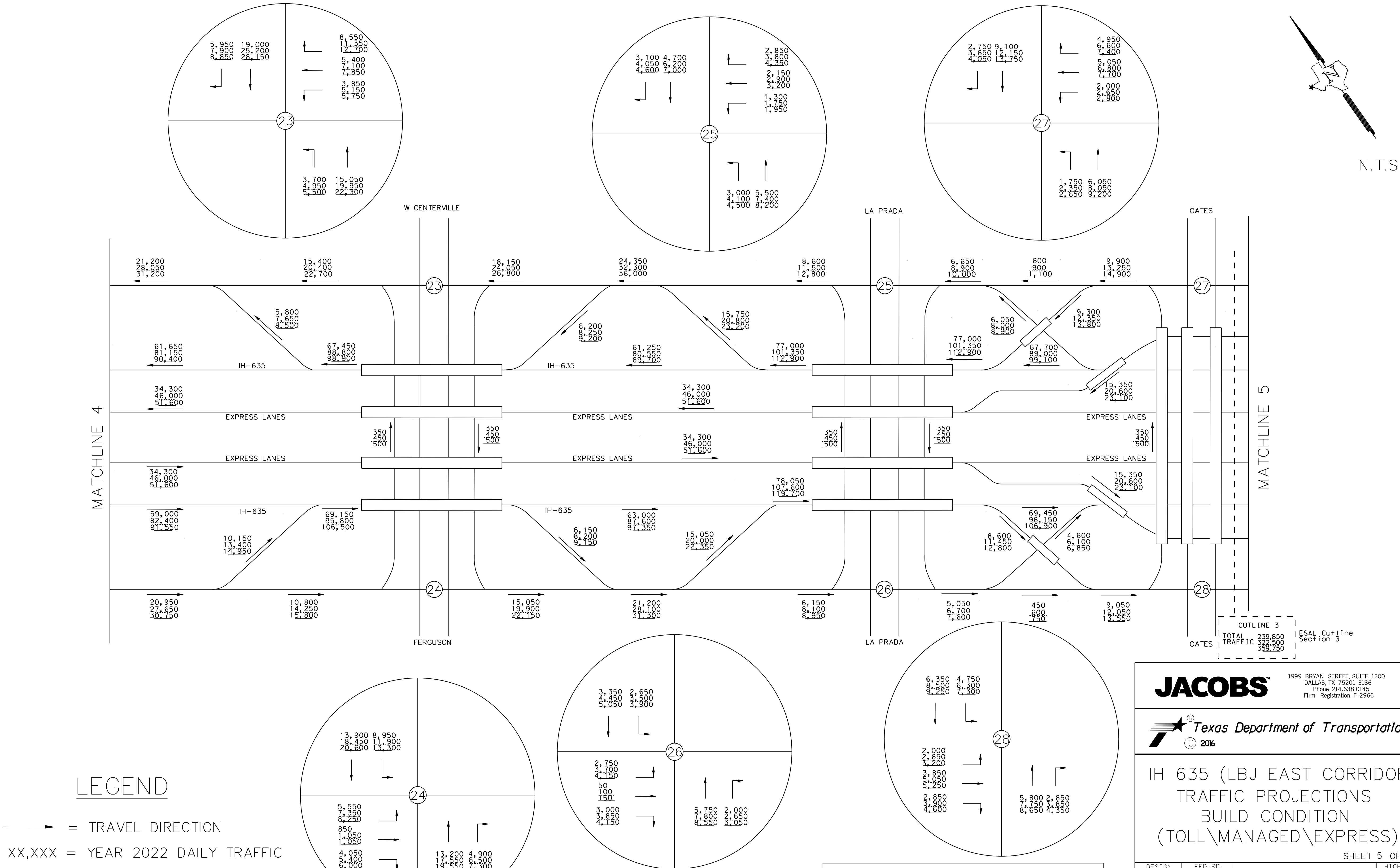
IH 635 (LBJ EAST CORRIDOR)
TRAFFIC PROJECTIONS
BUILD CONDITION
(TOLL\MANAGED\EXPRESS)

DESIGN	FED. RD. DIV. NO.			HIGHWAY NO.
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS	TX	DALLAS	DALLAS	
CHECK	CONTROL	SECTION	JOB	
	2374 2374	01 02	183,137 053	



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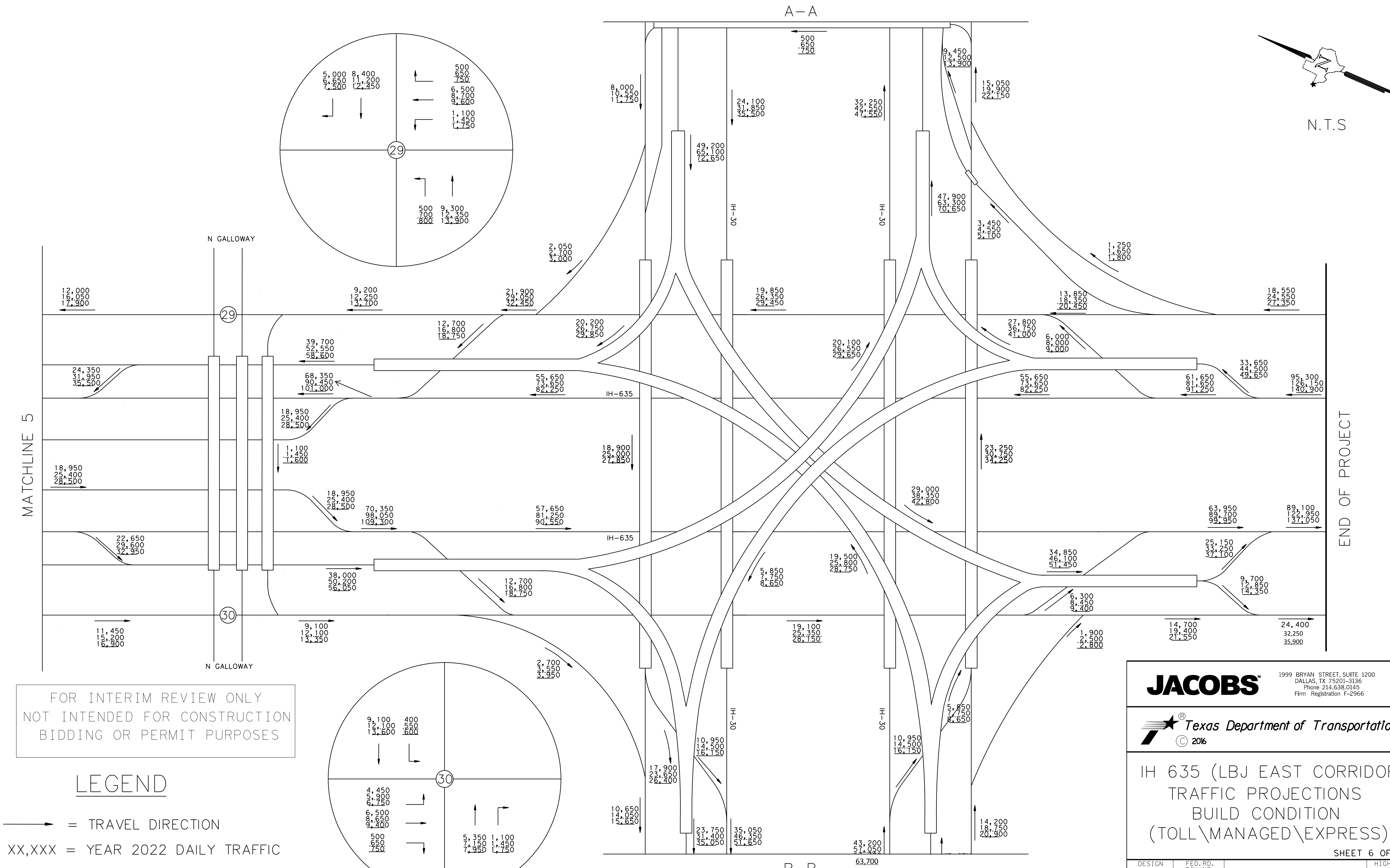
IH 635 (LBJ EAST CORRIDOR)
TRAFFIC PROJECTIONS
BUILD CONDITION
(TOLL\MANAGED\EXPRESS)

SHEET 5 OF 7

DESIGN	FED. RD. DIV. NO.			HIGHWAY NO.
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS	TX	DALLAS	DALLAS	
CHECK	CONTROL	SECTION	JOB	
	2374 2374	01 02	183,137 053	



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XX,XXX = YEAR 2042 DAILY TRAFFIC

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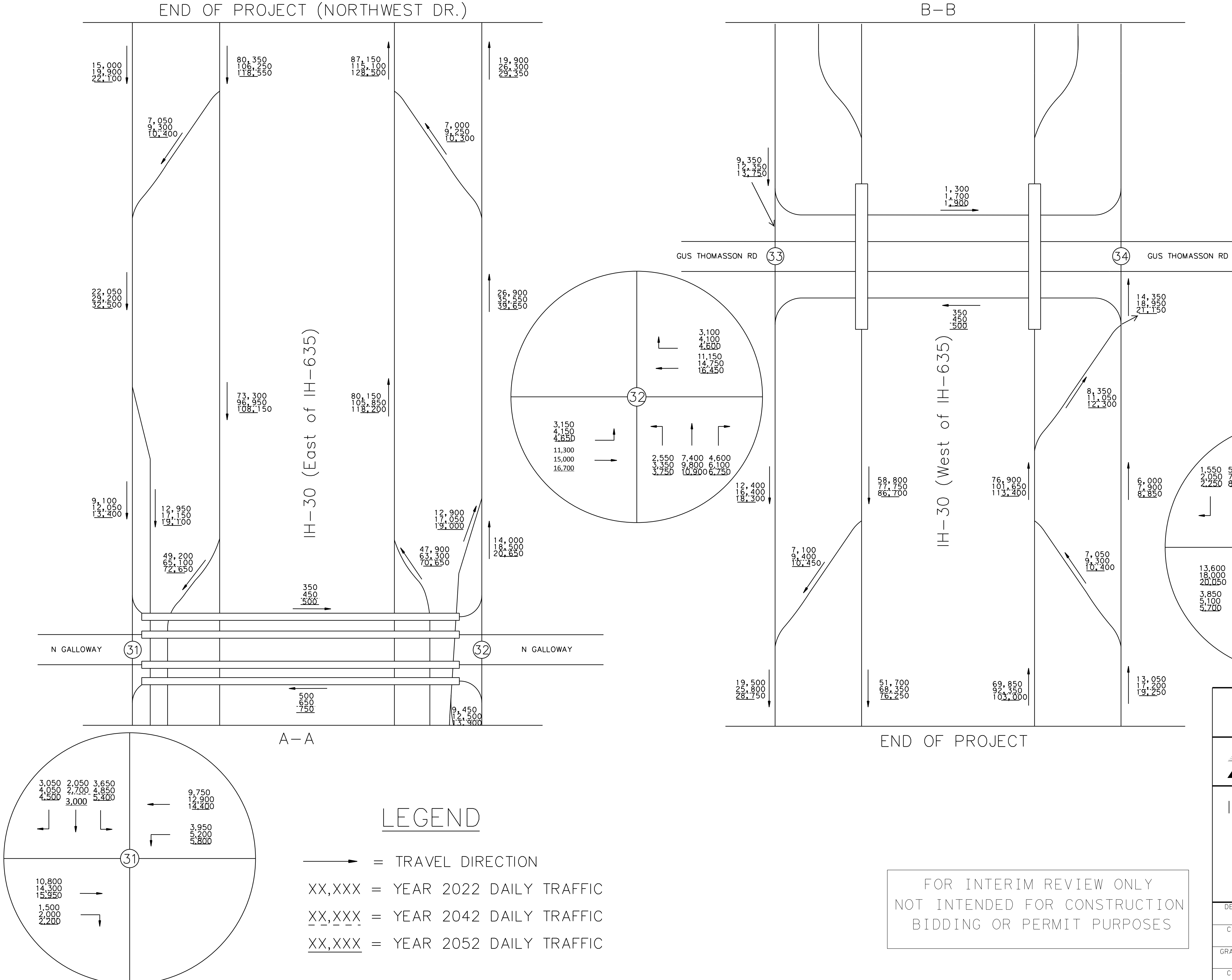
IH 635 (LBJ EAST CORRIDOR) TRAFFIC PROJECTIONS BUILD CONDITION (TOLL\MANAGED\EXPRESS)

DESIGN	FED.RD. DIV.NO.			HIGHWAY NO.
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS	TX	DALLAS	DALLAS	
CHECK	CONTROL	SECTION	JOB	
	2374 2374	01 02	183,137 053	



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IH 635 (LBJ EAST CORRIDOR) TRAFFIC PROJECTIONS BUILD CONDITION (TOLL\MANAGED\EXPRESS)

SHEET 7 OF 7

DESIGN	FED. RD. DIV. NO.			HIGHWAY NO.
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
GRAPHICS	TX	DALLAS	DALLAS	
CHECK	CONTROL	SECTION	JOB	
	2374 2374	01 02	183,137 053	

APPENDIX D: PROJECT CO CALINE3 MODEL INPUT DATA FOR THE ETC YEAR (2022)

PROJECT CO CALINE3 MODEL INPUT DATA FOR THE ETC YEAR (2022)

MODEL: IH 635 LBJ EAST ULTIMATE PROJECT

'' 60.0 100.0 0.0 0.0 42 1 0 0 'PPM'

'RCPT1' 710806.6 3644566.4 1.8

'RCPT2' 710885.0 3644508.0 1.8

'RCPT3' 710956.1 3644465.6 1.8

'RCPT4' 710646.1 3644486.6 1.8

'RCPT5' 710805.7 3644387.7 1.8

'RCPT6' 710857.2 3644354.0 1.8

'RCPT7' 711379.7 3644131.9 1.8

'RCPT8' 711514.8 3644027.8 1.8

'RCPT9' 711626.0 3643942.2 1.8

'RCPT10' 711190.9 3644103.7 1.8

'RCPT11' 711432.7 3643917.5 1.8

'RCPT12' 711542.1 3643832.7 1.8

'RCPT13' 712696.2 3643142.4 1.8

'RCPT14' 712788.7 3643079.8 1.8

'RCPT15' 712859.9 3643031.9 1.8

'RCPT16' 712645.2 3643053.5 1.8

'17' 712729.1 3642997.0 1.8

'RCPT18' 712812.9 3642939.7 1.8

'RCPT19' 721147.1 3636812.5 1.8

'RCPT20' 721218.6 3636741.9 1.8

'RCPT21' 721303.3 3636643.1 1.8

'RCPT22' 721057.1 3636743.7 1.8

'RCPT23' 721133.8 3636667.8 1.8

'RCPT24' 721194.8 3636599.0 1.8

'RCPT25' 721191.3 3633719.4 1.8

'RCPT26' 721317.5 3633810.3 1.8

'RCPT27' 721385.4 3633871.2 1.8

'RCPT28' 721262.8 3633645.3 1.8

'RCPT29' 721376.6 3633730.0 1.8

'RCPT30' 721431.3 3633771.5 1.8

'RCPT31' 722849.3 3634926.1 1.8

'RCPT32' 722902.0 3634965.2 1.8

'RCPT33' 722939.0 3634997.5 1.8

'RCPT34' 722896.2 3634838.4 1.8

'RCPT35' 722959.8 3634885.2 1.8

'RCPT36' 723016.3 3634926.6 1.8

'RCPT37' 722084.4 3633292.3 1.8

'RCPT38' 722096.7 3633192.5 1.8

'RCPT39' 722111.7 3633096.4 1.8

'RCPT40' 721973.2 3633287.0 1.8

'RCPT41' 721996.9 3633173.0 1.8

'RCPT42' 722003.2 3633075.2 1.8

'' 74 1 1 'C'

1 1

'W-FR-1-1' 'AG' 710735.6 3644606.6 710891.1 3644493.8 1179 1.1742 0.0 13.7

1 1

'W-MIR-1-1' 'AG' 710727.8 3644590.8 710890.2 3644493.9 1323 1.1742 0.0 10.4

1 1

'W-FR-1-2' 'AG' 710891.1 3644493.9 711025.6 3644395.2 2502 1.1742 0.0 17.1

1 1

'W-FR-2-1' 'AG' 711025.6 3644394.3 711127.8 3644314.8 2264 1.1742 0.0 20.7

1 1

'W-FR-2-2' 'AG' 711127.8 3644313.1 711469.3 3644046.7 2264 1.1742 0.0 17.1

1 1

'W-FR-2-3' 'AG' 711469.3 3644045.8 711640.5 3643918.3 1710 1.1742 0.0 13.4

1 1

'W-FR-2-4' 'AG' 711641.3 3643916.6 711744.4 3643836.2 1710 1.1742 0.0 17.1

1 1

'W-MOR-2-1' 'AG' 711727.8 3643810.9 711469.3 3644046.7 554 1.1742 0.0 10.4

1 6

'W-MNGR-2-1' 'BR' 710731.3 3644603.1 710818.6 3644526.2 518 1.1742 5.2 10.4

1

'W-MNGR-2-1' 'BR' 710818.6 3644526.2 711011.6 3644392.6 518 1.1742 5.2 10.4

1

'W-MNGR-2-1' 'BR' 711011.6 3644392.6 711096.3 3644316.6 518 1.1742 5.2 10.4

1

'W-MNGR-2-1' 'BR' 711096.3 3644316.6 711172.3 3644228.4 518 1.1742 5.2 10.4

1

'W-MNGR-2-1' 'BR' 711172.3 3644228.4 711398.5 3644052.8 518 1.1742 5.2 10.4

1

'W-MNGR-2-1' 'BR' 711398.5 3644052.8 711483.3 3643974.2 518 1.1742 5.2 10.4

1 2

'W-MOR-1-1' 'AG' 710699.8 3644596.1 710888.5 3644466.8 2372 1.1742 0.0 13.4

1

'W-MOR-1-1' 'AG' 710888.5 3644466.8 710989.8 3644383.8 2372 1.1742 0.0 13.4

1 1

'W-ML-1-1' 'AG' 710649.2 3644603.1 710989.8 3644382.1 4428 1.0746 0.0 20.7

1 1

'W-ML-2-1' 'AG' 710989.8 3644382.1 711379.3 3644093.9 6800 1.0746 0.0 24.4

1 1

'W-MNGL-1-1' 'AG' 710640.4 3644586.5 710975.8 3644365.5 1841 1.0746 0.0 13.4

1 1

'W-MNGL-2-1' 'AG' 710976.7 3644364.6 711484.1 3643973.3 1206 1.0746 0.0 13.3

1 1

'W-MOR-2-2' 'AG' 710975.8 3644365.5 711378.4 3644093.0 635 1.0746 0.0 10.4

1 1

'W-ML-2-2' 'AG' 711380.2 3644093.0 711727.8 3643810.0 7434 1.0746 0.0 24.4

1 1

'W-MNGL-2-2' 'AG' 711484.1 3643972.5 711718.2 3643791.7 1724 1.0746 0.0 13.4

1 1

'E-MNGL-1-1' 'AG' 710634.3 3644575.1 710753.1 3644500.0 1841 1.0746 0.0 13.4

1 2

'E-MNGL-2-1' 'AG' 710754.0 3644499.1 711006.4 3644321.8 1206 1.0746 0.0 13.4

1

'E-MNGL-2-1' 'AG' 711006.4 3644321.8 711523.4 3643927.9 1206 1.0746 0.0 13.4

1 1

'E-MNGL-2-2' 'AG' 711523.4 3643927.1 711757.5 3643743.6 1724 1.0746 0.0 13.4

1 1

'E-MNGR-1-1' 'AG' 710753.1 3644499.1 711004.6 3644295.6 635 1.0746 0.0 10.4

1 1

'E-ML-1-1' 'AG' 710630.0 3644561.1 710822.1 3644426.6 3911 1.0746 0.0 20.7

1 1

'E-ML-1-2' 'AG' 710822.1 3644425.8 711004.6 3644294.8 6737 1.0746 0.0 28.0

1 1

'E-ML-2-1' 'AG' 711004.6 3644294.8 711459.7 3643936.7 7371 1.0746 0.0 28.0

1 1

'E-ML-2-2' 'AG' 711460.5 3643935.8 711736.5 3643737.5 7371 1.0746 0.0 24.4

1 1

'E-MIR-1-1' 'AG' 710578.4 3644559.4 710821.2 3644425.8 2826 1.1742 0.0 13.4

1 3

'E-MNGR-1-2' 'BR' 710613.4 3644554.1 711048.3 3644235.4 518 1.1742 5.2 10.4

1

'E-MNGR-1-2' 'BR' 711048.3 3644235.4 711176.7 3644178.6 518 1.1742 5.2 10.4

1

'E-MNGR-1-2' 'BR' 711176.7 3644178.6 711522.6 3643927.1 518 1.1742 5.2 10.4

1 1

'E-FR-1-1' 'AG' 710620.3 3644513.1 710778.4 3644418.8 1094 1.1742 0.0 13.7

1 1

'E-FR-1-2' 'AG' 710779.3 3644417.9 710891.1 3644341.0 2939 1.1742 0.0 13.7

1 1

'E-FR-1-3' 'AG' 710892.0 3644340.2 711029.1 3644235.4 2939 1.1742 0.0 20.7

1 1

'E-FR-2-1' 'AG' 711029.1 3644235.4 711420.4 3643941.9 2498 1.1742 0.0 13.7

1 1

'E-FR-2-2' 'AG' 711421.2 3643941.0 711645.7 3643763.7 1949 1.1742 0.0 13.7

1 1

'E-MOR-1-1' 'AG' 710641.3 3644514.0 710779.3 3644417.9 1845 1.1742 0.0 13.4

1 1

'E-MIR-2-1' 'AG' 711420.4 3643940.2 711731.3 3643728.8 549 1.1742 0.0 10.4

1 1

'W-FR-3-1' 'BR' 712621.7 3643181.0 712918.6 3642980.1 2777 1.1742 5.5 17.1

1 1

'W-ML-3-1' 'AG' 712596.8 3643179.4 712946.2 3642935.8 6246 1.0746 0.0 24.4

1 1

'W-MNGL-3-1' 'AG' 712583.7 3643168.9 712936.6 3642922.7 1724 1.0746 0.0 13.4

1 1

'E-MNGL-3-1' 'AG' 712575.0 3643156.7 712931.3 3642911.3 1724 1.0746 0.0 13.4

1 1

'E-ML-3-1' 'AG' 712561.9 3643145.4 712922.6 3642896.5 6251 1.0746 0.0 24.4

1 1

'E-FR-3-1' 'BR' 712551.4 3643128.8 712912.1 3642883.4 2750 1.1742 5.5 13.7

1 1

'W-FR-10-1' 'AG' 721102.8 3636843.9 721300.2 3636632.5 2192 1.1742 0.0 13.7

1 1

'W-ML-10-1' 'AG' 721098.4 3636817.7 721301.9 3636605.4 5513 1.0746 0.0 24.4

1 1

'W-MNGL-10-1' 'DP' 721081.8 3636811.5 721269.6 3636608.9 3087 1.0746 -7.9 13.4

1 1

'E-MNGL-10-1' 'DP' 721071.3 3636801.1 721256.5 3636600.2 3087 1.0746 -7.9 13.4

1 1

'E-ML-10-1' 'AG' 721056.5 3636794.1 721245.1 3636588.0 5670 1.0746 0.0 28.0

1 1

'E-FR-10-1' 'AG' 721042.5 3636776.6 721225.9 3636580.5 1908 1.1742 0.0 13.7

1 2

'W-FR-14-1' 'AG' 721173.5 3633693.5 721379.6 3633844.6 959 1.1742 0.0 13.7

1

'W-FR-14-1' 'AG' 721379.6 3633844.6 721452.1 3633912.8 959 1.1742 0.0 13.7

1 1

'W-MIR-14-1' 'BR' 721157.8 3633652.5 721460.0 3633909.3 2138 1.1742 5.8 13.4

1 1

'W-ML-14-1' 'BR' 721157.8 3633652.5 721535.1 3633932.0 3155 1.0746 5.8 20.7

1 1

'E-ML-14-1' 'BR' 721185.8 3633630.6 721533.4 3633888.3 3888 1.0746 5.8 17.1

1 1

'E-FR-14-1' 'AG' 721203.2 3633614.1 721477.5 3633817.6 1278 1.1742 0.0 13.7

1 1

'E-MOR-14-1' 'BR' 721185.8 3633631.5 721518.5 3633856.9 2282 1.1742 5.8 13.4

1 1

'W-FR-15-1' 'AG' 722798.0 3634875.2 723009.6 3635038.8 819 1.1742 0.0 13.7

1 1

'W-ML-15-1' 'AG' 722831.2 3634875.2 723150.9 3635104.9 6597 1.0746 0.0 20.7

1 1

'W-MIR-15-1' 'AG' 722830.3 3634875.2 723009.6 3635040.8 1166 1.1742 0.0 10.4

1 1

'E-ML-15-1' 'AG' 722824.2 3634839.4 723164.0 3635082.2 4712 1.0746 0.0 20.7

1 1

'E-MIR-15-1' 'AG' 722865.3 3634845.5 723253.1 3635134.6 2502 1.1742 0.0 13.4

1 1

'E-FR-15-1' 'AG' 722857.4 3634822.8 723082.8 3634991.4 2421 1.1742 0.0 13.7

1 1

'E-FR-16-2' 'AG' 721968.3 3633404.4 722001.5 3633202.7 1323 1.1742 0.0 13.7

1 1

'E-MOR-16-1' 'AG' 721975.3 3633444.6 722002.4 3633201.8 873 1.1742 0.0 9.8

1 1

'E-FR-16-1' 'AG' 722003.2 3633200.9 722023.3 3633030.6 2196 1.1742 0.0 17.1

1 1

'E-ML-16-1' 'AG' 722004.1 3633347.7 722063.5 3632964.3 8019 1.0746 0.0 28.0

1 1

'W-ML-16-1' 'AG' 722035.6 3633361.6 722091.5 3632968.6 8577 1.0746 0.0 24.4

1 1

'W-FR-16-1' 'AG' 722059.1 3633376.5 722119.4 3632973.0 1670 1.1742 0.0 13.7

1.0 0 4 1000.0 1.9 'Y' 10 0 35

APPENDIX E: PROJECT CO CALINE3 MODEL OUTPUT DATA FOR THE ETC YEAR (2022)

PROJECT CO CALINE3 MODEL OUTPUT DATA FOR THE ETC YEAR (2022)

MODEL RESULTS: IH 635 LBJ EAST ULTIMATE PROJECT

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-350.

WIND * CONCENTRATION

ANGLE * (PPM)

(DEGR)*	REC1	REC2	REC3	REC4	REC5	REC6	REC7	REC8	REC9	REC10	REC11	REC12	REC13	REC14	REC15	REC16	REC17	REC18	REC19	REC20
0. *	1.9	1.9	1.9	2.1	2.3	2.2	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.2	2.2	2.2	1.9	1.9
10. *	1.9	1.9	1.9	2.2	2.2	2.2	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9
20. *	1.9	1.9	1.9	2.2	2.1	2.2	1.9	1.9	1.9	2.3	2.3	2.2	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9
30. *	1.9	1.9	1.9	2.2	2.2	2.2	1.9	1.9	1.9	2.2	2.3	2.2	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9
40. *	1.9	1.9	1.9	2.2	2.2	2.2	1.9	1.9	1.9	2.2	2.3	2.2	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9
50. *	1.9	1.9	1.9	2.1	2.2	2.2	1.9	1.9	1.9	2.2	2.2	2.2	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9
60. *	1.9	1.9	1.9	2.3	2.2	2.2	1.9	1.9	1.9	2.3	2.2	2.3	1.9	1.9	1.9	2.1	2.2	2.2	1.9	1.9
70. *	1.9	1.9	1.9	2.3	2.2	2.2	1.9	1.9	1.9	2.3	2.2	2.3	1.9	1.9	1.9	2.3	2.2	2.3	1.9	1.9
80. *	1.9	1.9	1.9	2.4	2.2	2.3	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9
90. *	1.9	1.9	1.9	2.4	2.2	2.3	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9
100. *	1.9	1.9	1.9	2.4	2.4	2.4	1.9	1.9	1.9	2.4	2.3	2.2	1.9	1.9	1.9	2.3	2.3	2.2	1.9	1.9
110. *	1.9	1.9	1.9	2.4	2.4	2.6	1.9	1.9	1.9	2.5	2.4	2.2	1.9	1.9	1.9	2.6	2.4	2.3	1.9	1.9
120. *	1.9	2.0	1.9	2.5	2.5	2.6	1.9	1.9	1.9	2.6	2.3	2.1	2.0	2.0	1.9	2.3	2.2	2.0	1.9	1.9
130. *	2.4	2.5	2.4	1.9	2.0	2.2	2.3	2.1	2.0	2.0	2.0	1.9	2.3	2.2	2.0	2.0	1.9	1.9	1.9	1.9
140. *	2.5	2.6	2.3	1.9	1.9	1.9	2.6	2.3	2.1	1.9	1.9	1.9	2.6	2.4	2.2	1.9	1.9	1.9	2.2	2.0
150. *	2.3	2.4	2.3	1.9	1.9	1.9	2.4	2.4	2.3	1.9	1.9	1.9	2.3	2.3	2.2	1.9	1.9	1.9	2.3	2.1
160. *	2.3	2.3	2.3	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.4	2.2
170. *	2.3	2.1	2.3	1.9	1.9	1.9	2.2	2.3	2.3	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.3	2.2
180. *	2.1	2.1	2.3	1.9	1.9	1.9	2.3	2.3	2.2	1.9	1.9	1.9	2.2	2.2	2.2	1.9	1.9	1.9	2.2	2.2
190. *	2.0	2.2	2.2	1.9	1.9	1.9	2.2	2.3	2.3	1.9	1.9	1.9	2.2	2.1	2.1	1.9	1.9	1.9	2.2	2.2
200. *	2.0	2.2	2.2	1.9	1.9	1.9	2.2	2.3	2.3	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	2.2	2.2
210. *	2.0	2.1	2.2	1.9	1.9	1.9	2.2	2.1	2.2	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	2.2	2.2
220. *	2.0	2.0	2.2	1.9	1.9	1.9	2.2	2.2	2.2	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	2.2	2.2
230. *	2.0	2.1	2.2	1.9	1.9	1.9	2.2	2.2	2.2	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	2.2	2.2
240. *	2.0	2.1	2.2	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.2	2.1	2.1	1.9	1.9	1.9	2.2	2.2
250. *	2.1	2.2	2.2	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.2	2.2	2.3	1.9	1.9	1.9	2.2	2.2
260. *	2.2	2.4	2.1	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.1	2.2
270. *	2.2	2.4	2.2	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.1	2.2

280. *	2.2	2.3	2.3	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.2	2.3	2.3	1.9	1.9	1.9	2.1	2.2
290. *	2.0	2.3	2.2	1.9	1.9	1.9	2.5	2.5	2.3	1.9	1.9	1.9	2.2	2.4	2.5	1.9	1.9	1.9	2.0	2.2
300. *	2.0	2.1	2.1	1.9	1.9	2.0	2.5	2.6	2.4	1.9	1.9	1.9	2.0	2.2	2.3	1.9	2.0	2.0	2.0	2.1
310. *	1.9	1.9	1.9	1.9	2.3	2.4	2.0	2.1	2.1	2.4	2.3	2.3	1.9	1.9	1.9	2.0	2.3	2.3	2.0	2.0
320. *	1.9	1.9	1.9	2.1	2.3	2.3	1.9	1.9	1.9	2.5	2.5	2.5	1.9	1.9	1.9	2.2	2.4	2.6	1.9	1.9
330. *	1.9	1.9	1.9	2.1	2.4	2.4	1.9	1.9	1.9	2.4	2.4	2.3	1.9	1.9	1.9	2.2	2.3	2.3	1.9	1.9
340. *	1.9	1.9	1.9	2.1	2.3	2.2	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9
350. *	1.9	1.9	1.9	2.0	2.3	2.2	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9
MAX *	2.5	2.6	2.4	2.5	2.5	2.6	2.6	2.6	2.4	2.6	2.5	2.5	2.6	2.4	2.5	2.6	2.4	2.6	2.4	2.2
DEGR. *	140	140	130	120	120	120	140	300	300	120	320	320	140	140	290	110	110	320	160	160

WIND * CONCENTRATION

ANGLE * (PPM)

(DEGR)*	REC21	REC22	REC23	REC24	REC25	REC26	REC27	REC28	REC29	REC30	REC31	REC32	REC33	REC34	REC35	REC36	REC37	REC38	REC39	REC40
0. *	1.9	2.1	2.3	2.2	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.0
10. *	1.9	2.1	2.2	2.2	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.0
20. *	1.9	2.1	2.2	2.2	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.1
30. *	1.9	2.1	2.2	2.2	1.9	1.9	1.9	2.3	2.3	2.2	1.9	1.9	1.9	2.3	2.3	2.3	1.9	1.9	1.9	2.1
40. *	1.9	2.2	2.2	2.2	1.9	1.9	1.9	2.3	2.2	2.2	1.9	1.9	1.9	2.5	2.4	2.3	1.9	1.9	1.9	2.2
50. *	1.9	2.2	2.2	2.2	1.9	1.9	1.9	2.2	2.0	1.9	1.9	1.9	1.9	2.3	2.1	2.1	1.9	1.9	1.9	2.2
60. *	1.9	2.2	2.2	2.2	2.2	2.2	1.9	1.9	1.9	1.9	2.2	2.3	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.2
70. *	1.9	2.2	2.2	2.2	2.3	2.2	2.1	1.9	1.9	1.9	2.5	2.6	2.4	1.9	1.9	1.9	1.9	1.9	1.9	2.1
80. *	1.9	2.2	2.2	2.2	2.3	2.3	2.1	1.9	1.9	1.9	2.3	2.4	2.3	1.9	1.9	1.9	1.9	1.9	1.9	2.2
90. *	1.9	2.2	2.3	2.1	2.1	2.1	2.1	1.9	1.9	1.9	2.2	2.2	2.2	1.9	1.9	1.9	1.9	1.9	1.9	2.1
100. *	1.9	2.2	2.3	2.1	2.1	2.1	2.1	1.9	1.9	1.9	2.2	2.2	2.2	1.9	1.9	1.9	1.9	1.9	1.9	2.2
110. *	1.9	2.3	2.3	2.1	2.0	2.0	1.9	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.2
120. *	1.9	2.4	2.3	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.2	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.2
130. *	1.9	2.2	2.2	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.3
140. *	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.4
150. *	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.5
160. *	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.5
170. *	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2	2.1	2.1	1.9	1.9	1.9	2.0	2.0	1.9	2.1
180. *	2.0	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.2	2.1	2.1	1.9	1.9	1.9	2.3	2.3	2.0	1.9
190. *	2.0	1.9	1.9	1.9	2.0	2.1	2.1	1.9	1.9	1.9	2.1	2.2	2.2	1.9	1.9	1.9	2.5	2.4	2.2	1.9
200. *	2.1	1.9	1.9	1.9	2.0	2.2	2.2	1.9	1.9	1.9	2.0	2.2	2.2	1.9	1.9	1.9	2.4	2.4	2.3	1.9

210. *	2.1	1.9	1.9	1.9	1.9	2.3	2.2	1.9	1.9	1.9	2.0	2.4	2.4	1.9	1.9	1.9	2.3	2.3	2.3	1.9
220. *	2.1	1.9	1.9	1.9	1.9	2.2	2.2	1.9	1.9	1.9	2.0	2.1	2.2	1.9	1.9	1.9	2.3	2.3	2.3	1.9
230. *	2.2	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.3	2.3	2.3	1.9
240. *	2.2	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.2	1.9	1.9	1.9	1.9	2.0	2.2	2.3	2.3	2.3	1.9
250. *	2.2	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	2.3	1.9	1.9	1.9	2.0	2.3	2.3	2.3	2.3	2.3	1.9
260. *	2.2	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.3	2.3	1.9	1.9	1.9	2.0	2.2	2.3	2.3	2.3	2.3	1.9
270. *	2.2	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.3	2.3	1.9	1.9	1.9	2.1	2.3	2.3	2.3	2.3	2.3	1.9
280. *	2.3	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	2.1	2.3	2.3	2.3	2.3	2.3	1.9
290. *	2.4	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	1.9	1.9	1.9	2.2	2.3	2.3	2.3	2.3	2.3	1.9
300. *	2.5	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.3	2.3	2.3	2.3	2.3	2.3	1.9
310. *	2.3	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.3	2.3	2.3	2.2	2.3	2.3	1.9
320. *	2.0	1.9	2.1	2.1	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.3	2.3	2.3	2.2	2.4	2.4	1.9
330. *	1.9	1.9	2.3	2.3	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.3	2.3	2.3	2.1	2.4	2.5	1.9
340. *	1.9	2.0	2.2	2.4	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.3	2.3	2.3	2.0	2.2	2.4	1.9
350. *	1.9	2.0	2.3	2.3	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.3	2.3	2.3	1.9	2.0	2.1	1.9
MAX *	2.5	2.4	2.3	2.4	2.3	2.3	2.2	2.3	2.3	2.3	2.5	2.6	2.4	2.5	2.4	2.3	2.5	2.4	2.5	2.5
DEGR. *	300	120	350	340	80	210	200	40	270	270	70	70	70	40	40	350	190	190	330	150

WIND * ANGLE * (DEGR)*	CONCENTRATION (PPM) REC41	REC42
0. *	2.3	2.2
10. *	2.4	2.5
20. *	2.4	2.4
30. *	2.4	2.4
40. *	2.3	2.3
50. *	2.3	2.3
60. *	2.3	2.3
70. *	2.3	2.2
80. *	2.3	2.2
90. *	2.3	2.2
100. *	2.3	2.3
110. *	2.3	2.3
120. *	2.3	2.3
130. *	2.3	2.3

140.	*	2.4	2.3
150.	*	2.5	2.1
160.	*	2.3	2.0
170.	*	2.1	1.9
180.	*	1.9	1.9
190.	*	1.9	1.9
200.	*	1.9	1.9
210.	*	1.9	1.9
220.	*	1.9	1.9
230.	*	1.9	1.9
240.	*	1.9	1.9
250.	*	1.9	1.9
260.	*	1.9	1.9
270.	*	1.9	1.9
280.	*	1.9	1.9
290.	*	1.9	1.9
300.	*	1.9	1.9
310.	*	1.9	1.9
320.	*	1.9	1.9
330.	*	1.9	1.9
340.	*	1.9	1.9
350.	*	2.0	1.9
-----------	*	------------------	
MAX	*	2.5	2.5
DEGR.	*	150	10

THE HIGHEST CONCENTRATION OF 2.60 PPM OCCURRED AT RECEPTORS REC2, REC6, REC7, REC8, REC10, REC13, REC16, REC18 AND REC32.

APPENDIX F: PROJECT CO CALINE3 MODEL INPUT DATA FOR THE DESIGN YEAR (2042)

PROJECT CO CALINE3 MODEL INPUT DATA FOR THE ETC YEAR (2042)

MODEL: IH 635 LBJ EAST ULTIMATE PROJECT

'' 60.0 100.0 0.0 0.0 42 1 0 0 'PPM'

'RCPT1' 710806.6 3644566.4 1.8

'RCPT2' 710885.0 3644508.0 1.8

'RCPT3' 710956.1 3644465.6 1.8

'RCPT4' 710646.1 3644486.6 1.8

'RCPT5' 710805.7 3644387.7 1.8

'RCPT6' 710857.2 3644354.0 1.8

'RCPT7' 711379.7 3644131.9 1.8

'RCPT8' 711514.8 3644027.8 1.8

'RCPT9' 711626.0 3643942.2 1.8

'RCPT10' 711190.9 3644103.7 1.8

'RCPT11' 711432.7 3643917.5 1.8

'RCPT12' 711542.1 3643832.7 1.8

'RCPT13' 712696.2 3643142.4 1.8

'RCPT14' 712788.7 3643079.8 1.8

'RCPT15' 712859.9 3643031.9 1.8

'RCPT16' 712645.2 3643053.5 1.8

'17' 712729.1 3642997.0 1.8

'RCPT18' 712812.9 3642939.7 1.8

'RCPT19' 721147.1 3636812.5 1.8

'RCPT20' 721218.6 3636741.9 1.8

'RCPT21' 721303.3 3636643.1 1.8

'RCPT22' 721057.1 3636743.7 1.8

'RCPT23' 721133.8 3636667.8 1.8

'RCPT24' 721194.8 3636599.0 1.8

'RCPT25' 721191.3 3633719.4 1.8

'RCPT26' 721317.5 3633810.3 1.8

'RCPT27' 721385.4 3633871.2 1.8

'RCPT28' 721262.8 3633645.3 1.8

'RCPT29' 721376.6 3633730.0 1.8

'RCPT30' 721431.3 3633771.5 1.8

'RCPT31' 722849.3 3634926.1 1.8

'RCPT32' 722902.0 3634965.2 1.8

'RCPT33' 722939.0 3634997.5 1.8

'RCPT34' 722896.2 3634838.4 1.8

'RCPT35' 722959.8 3634885.2 1.8

'RCPT36' 723016.3 3634926.6 1.8

'RCPT37' 722084.4 3633292.3 1.8

'RCPT38' 722096.7 3633192.5 1.8

'RCPT39' 722111.7 3633096.4 1.8

'RCPT40' 721973.2 3633287.0 1.8

'RCPT41' 721996.9 3633173.0 1.8

'RCPT42' 722003.2 3633075.2 1.8

'' 74 1 1 'C'

1 1

'W-FR-1-1' 'AG' 710735.6 3644606.6 710891.1 3644493.8 1548 0.4232 0.0 13.7

1 1

'W-MIR-1-1' 'AG' 710727.8 3644590.8 710890.2 3644493.9 1755 0.4232 0.0 10.4

1 1

'W-FR-1-2' 'AG' 710891.1 3644493.9 711025.6 3644395.2 3303 0.4232 0.0 17.1

1 1

'W-FR-2-1' 'AG' 711025.6 3644394.3 711127.8 3644314.8 2993 0.4232 0.0 20.7

1 1

'W-FR-2-2' 'AG' 711127.8 3644313.1 711469.3 3644046.7 2993 0.4232 0.0 17.1

1 1

'W-FR-2-3' 'AG' 711469.3 3644045.8 711640.5 3643918.3 2259 0.4232 0.0 13.4

1 1

'W-FR-2-4' 'AG' 711641.3 3643916.6 711744.4 3643836.2 2259 0.4232 0.0 17.1

1 1

'W-MOR-2-1' 'AG' 711727.8 3643810.9 711469.3 3644046.7 734 0.4232 0.0 10.4

1 6

'W-MNGR-2-1' 'BR' 710731.3 3644603.1 710818.6 3644526.2 693 0.4232 5.2 10.4

1

'W-MNGR-2-1' 'BR' 710818.6 3644526.2 711011.6 3644392.6 693 0.4232 5.2 10.4

1

'W-MNGR-2-1' 'BR' 711011.6 3644392.6 711096.3 3644316.6 693 0.4232 5.2 10.4

1

'W-MNGR-2-1' 'BR' 711096.3 3644316.6 711172.3 3644228.4 693 0.4232 5.2 10.4

1

'W-MNGR-2-1' 'BR' 711172.3 3644228.4 711398.5 3644052.8 693 0.4232 5.2 10.4

1

'W-MNGR-2-1' 'BR' 711398.5 3644052.8 711483.3 3643974.2 693 0.4232 5.2 10.4

1 2

'W-MOR-1-1' 'AG' 710699.8 3644596.1 710888.5 3644466.8 3137 0.4232 0.0 13.4

1

'W-MOR-1-1' 'AG' 710888.5 3644466.8 710989.8 3644383.8 3137 0.4232 0.0 13.4

1 1

'W-ML-1-1' 'AG' 710649.2 3644603.1 710989.8 3644382.1 5837 0.4099 0.0 20.7

1 1

'W-ML-2-1' 'AG' 710989.8 3644382.1 711379.3 3644093.9 8973 0.4099 0.0 24.4

1 1

'W-MNGL-1-1' 'AG' 710640.4 3644586.5 710975.8 3644365.5 2471 0.4099 0.0 13.4

1 1

'W-MNGL-2-1' 'AG' 710976.7 3644364.6 711484.1 3643973.3 1620 0.4099 0.0 13.3

1 1

'W-MOR-2-2' 'AG' 710975.8 3644365.5 711378.4 3644093.0 851 0.4099 0.0 10.4

1 1

'W-ML-2-2' 'AG' 711380.2 3644093.0 711727.8 3643810.0 9824 0.4099 0.0 24.4

1 1

'W-MNGL-2-2' 'AG' 711484.1 3643972.5 711718.2 3643791.7 2313 0.4099 0.0 13.4

1 1

'E-MNGL-1-1' 'AG' 710634.3 3644575.1 710753.1 3644500.0 2471 0.4099 0.0 13.4

1 2

'E-MNGL-2-1' 'AG' 710754.0 3644499.1 711006.4 3644321.8 1620 0.4099 0.0 13.4

1

'E-MNGL-2-1' 'AG' 711006.4 3644321.8 711523.4 3643927.9 1620 0.4099 0.0 13.4

1 1

'E-MNGL-2-2' 'AG' 711523.4 3643927.1 711757.5 3643743.6 2313 0.4099 0.0 13.4

1 1

'E-MNGR-1-1' 'AG' 710753.1 3644499.1 711004.6 3644295.6 851 0.4099 0.0 10.4

1 1

'E-ML-1-1' 'AG' 710630.0 3644561.1 710822.1 3644426.6 5589 0.4099 0.0 20.7

1 1

'E-ML-1-2' 'AG' 710822.1 3644425.8 711004.6 3644294.8 9311 0.4099 0.0 28.0

1 1

'E-ML-2-1' 'AG' 711004.6 3644294.8 711459.7 3643936.7 10161 0.4099 0.0 28.0

1 1

'E-ML-2-2' 'AG' 711460.5 3643935.8 711736.5 3643737.5 10161 0.4099 0.0 24.4

1 1

'E-MIR-1-1' 'AG' 710578.4 3644559.4 710821.2 3644425.8 3722 0.4232 0.0 13.4

1 3

'E-MNGR-1-2' 'BR' 710613.4 3644554.1 711048.3 3644235.4 693 0.4232 5.2 10.4

1

'E-MNGR-1-2' 'BR' 711048.3 3644235.4 711176.7 3644178.6 693 0.4232 5.2 10.4

1

'E-MNGR-1-2' 'BR' 711176.7 3644178.6 711522.6 3643927.1 693 0.4232 5.2 10.4

1 1

'E-FR-1-1' 'AG' 710620.3 3644513.1 710778.4 3644418.8 1458 0.4232 0.0 13.7

1 1

'E-FR-1-2' 'AG' 710779.3 3644417.9 710891.1 3644341.0 3906 0.4232 0.0 13.7

1 1

'E-FR-1-3' 'AG' 710892.0 3644340.2 711029.1 3644235.4 3906 0.4232 0.0 20.7

1 1

'E-FR-2-1' 'AG' 711029.1 3644235.4 711420.4 3643941.9 3317 0.4232 0.0 13.7

1 1

'E-FR-2-2' 'AG' 711421.2 3643941.0 711645.7 3643763.7 2588 0.4232 0.0 13.7

1 1

'E-MOR-1-1' 'AG' 710641.3 3644514.0 710779.3 3644417.9 2448 0.4232 0.0 13.4

1 1

'E-MIR-2-1' 'AG' 711420.4 3643940.2 711731.3 3643728.8 729 0.4232 0.0 10.4

1 1

'W-FR-3-1' 'BR' 712621.7 3643181.0 712918.6 3642980.1 3672 0.4232 5.5 17.1

1 1

'W-ML-3-1' 'AG' 712596.8 3643179.4 712946.2 3642935.8 8244 0.4099 0.0 24.4

1 1

'W-MNGL-3-1' 'AG' 712583.7 3643168.9 712936.6 3642922.7 2313 0.4099 0.0 13.4

1 1

'E-MNGL-3-1' 'AG' 712575.0 3643156.7 712931.3 3642911.3 2313 0.4099 0.0 13.4

1 1

'E-ML-3-1' 'AG' 712561.9 3643145.4 712922.6 3642896.5 8672 0.4099 0.0 24.4

1 1

'E-FR-3-1' 'BR' 712551.4 3643128.8 712912.1 3642883.4 3650 0.4232 5.5 13.7

1 1

'W-FR-10-1' 'AG' 721102.8 3636843.9 721300.2 3636632.5 2907 0.4232 0.0 13.7

1 1

'W-ML-10-1' 'AG' 721098.4 3636817.7 721301.9 3636605.4 7250 0.4099 0.0 24.4

1 1

'W-MNGL-10-1' 'DP' 721081.8 3636811.5 721269.6 3636608.9 4140 0.4099 -7.9 13.4

1 1

'E-MNGL-10-1' 'DP' 721071.3 3636801.1 721256.5 3636600.2 4140 0.4099 -7.9 13.4

1 1

'E-ML-10-1' 'AG' 721056.5 3636794.1 721245.1 3636588.0 7884 0.4099 0.0 28.0

1 1

'E-FR-10-1' 'AG' 721042.5 3636776.6 721225.9 3636580.5 2529 0.4232 0.0 13.7

1 2

'W-FR-14-1' 'AG' 721173.5 3633693.5 721379.6 3633844.6 1265 0.4232 0.0 13.7

1

'W-FR-14-1' 'AG' 721379.6 3633844.6 721452.1 3633912.8 1265 0.4232 0.0 13.7

1 1

'W-MIR-14-1' 'BR' 721157.8 3633652.5 721460.0 3633909.3 2826 0.4232 5.8 13.4

1 1

'W-ML-14-1' 'BR' 721157.8 3633652.5 721535.1 3633932.0 4172 0.4099 5.8 20.7

1 1

'E-ML-14-1' 'BR' 721185.8 3633630.6 721533.4 3633888.3 5135 0.4099 5.8 17.1

1 1

'E-FR-14-1' 'AG' 721203.2 3633614.1 721477.5 3633817.6 1688 0.4232 0.0 13.7

1 1

'E-MOR-14-1' 'BR' 721185.8 3633631.5 721518.5 3633856.9 3020 0.4232 5.8 13.4

1 1

'W-FR-15-1' 'AG' 722798.0 3634875.2 723009.6 3635038.8 1085 0.4232 0.0 13.7

1 1

'W-ML-15-1' 'AG' 722831.2 3634875.2 723150.9 3635104.9 8726 0.4099 0.0 20.7

1 1

'W-MIR-15-1' 'AG' 722830.3 3634875.2 723009.6 3635040.8 1544 0.4232 0.0 10.4

1 1

'E-ML-15-1' 'AG' 722824.2 3634839.4 723164.0 3635082.2 6219 0.4099 0.0 20.7

1 1

'E-MIR-15-1' 'AG' 722865.3 3634845.5 723253.1 3635134.6 3308 0.4232 0.0 13.4

1 1

'E-FR-15-1' 'AG' 722857.4 3634822.8 723082.8 3634991.4 3200 0.4232 0.0 13.7

1 1

'E-FR-16-2' 'AG' 721968.3 3633404.4 722001.5 3633202.7 1746 0.4232 0.0 13.7

1 1

'E-MOR-16-1' 'AG' 721975.3 3633444.6 722002.4 3633201.8 1157 0.4232 0.0 9.8

1 1

'E-FR-16-1' 'AG' 722003.2 3633200.9 722023.3 3633030.6 2903 0.4232 0.0 17.1

1 1

'E-ML-16-1' 'AG' 722004.1 3633347.7 722063.5 3632964.3 11066 0.4099 0.0 28.0

1 1

'W-ML-16-1' 'AG' 722035.6 3633361.6 722091.5 3632968.6 11354 0.4099 0.0 24.4

1 1

'W-FR-16-1' 'AG' 722059.1 3633376.5 722119.4 3632973.0 2210 0.4232 0.0 13.7

1.0 0 4 1000.0 1.9 'Y' 10 0 35

APPENDIX G: PROJECT CO CALINE3 MODEL OUTPUT DATA FOR THE DESIGN YEAR (2042)

PROJECT CO CALINE3 MODEL OUTPUT DATA FOR THE ETC YEAR (2042)

MODEL RESULTS: IH 635 LBJ EAST ULTIMATE PROJECT

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-350.

WIND * CONCENTRATION
ANGLE * (PPM)

(DEGR)*	REC1	REC2	REC3	REC4	REC5	REC6	REC7	REC8	REC9	REC10	REC11	REC12	REC13	REC14	REC15	REC16	REC17	REC18	REC19	REC20
0. *	1.9	1.9	1.9	1.9	2.0	2.1	1.9	1.9	1.9	2.1	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9
10. *	1.9	1.9	1.9	1.9	1.9	2.1	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9
20. *	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9
30. *	1.9	1.9	1.9	1.9	2.0	2.1	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9
40. *	1.9	1.9	1.9	1.9	2.0	2.1	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9
50. *	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9
60. *	1.9	1.9	1.9	1.9	2.0	2.1	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9
70. *	1.9	1.9	1.9	1.9	2.1	2.1	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9
80. *	1.9	1.9	1.9	1.9	2.1	2.1	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9
90. *	1.9	1.9	1.9	1.9	2.1	2.1	1.9	1.9	1.9	2.1	2.1	2.0	1.9	1.9	1.9	2.1	2.1	2.0	1.9	1.9
100. *	1.9	1.9	1.9	1.9	2.2	2.2	1.9	1.9	1.9	2.2	2.1	2.1	1.9	1.9	1.9	2.2	2.2	2.1	1.9	1.9
110. *	1.9	1.9	1.9	2.0	2.2	2.2	1.9	1.9	1.9	2.2	2.2	2.1	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9
120. *	1.9	1.9	1.9	2.0	2.1	2.1	1.9	1.9	1.9	2.2	2.1	2.0	1.9	1.9	1.9	2.1	2.1	2.0	1.9	1.9
130. *	2.0	2.1	2.0	1.9	1.9	1.9	2.0	1.9	1.9	2.0	1.9	1.9	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9
140. *	2.1	2.2	2.2	1.9	1.9	1.9	2.3	2.1	2.0	1.9	1.9	1.9	2.2	2.1	2.1	1.9	1.9	1.9	2.0	1.9
150. *	2.1	2.0	2.2	1.9	1.9	1.9	2.2	2.1	2.0	1.9	1.9	1.9	2.1	2.1	2.0	1.9	1.9	1.9	2.1	2.1
160. *	2.0	2.0	2.0	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	2.1	2.1	2.0	1.9	1.9	1.9	2.1	2.1
170. *	1.9	2.0	1.9	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	2.2	2.0
180. *	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	2.0	2.0
190. *	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0
200. *	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0
210. *	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0
220. *	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0
230. *	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0
240. *	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0
250. *	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	2.0	2.0
260. *	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.0	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	2.0	2.0

270.	*	1.9	2.0	1.9	1.9	1.9	1.9	2.1	2.1	2.0	1.9	1.9	1.9	2.0	2.1	2.1	1.9	1.9	1.9	2.0	2.0
280.	*	1.9	2.0	2.1	1.9	1.9	1.9	2.2	2.1	2.1	1.9	1.9	1.9	2.0	2.1	2.2	1.9	1.9	1.9	1.9	2.0
290.	*	1.9	2.1	2.1	1.9	1.9	1.9	2.2	2.1	2.2	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	2.0	2.0
300.	*	1.9	2.0	1.9	1.9	1.9	1.9	2.1	2.1	2.2	1.9	1.9	1.9	1.9	2.1	2.1	1.9	1.9	1.9	2.0	2.1
310.	*	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	2.0	2.1	2.1	1.9	1.9	1.9	2.0	2.1	2.1	1.9	2.0
320.	*	1.9	1.9	1.9	1.9	2.1	2.1	1.9	1.9	1.9	2.1	2.3	2.3	1.9	1.9	1.9	2.1	2.1	2.2	1.9	1.9
330.	*	1.9	1.9	1.9	1.9	2.1	2.0	1.9	1.9	1.9	2.2	2.1	2.1	1.9	1.9	1.9	2.0	2.1	2.1	1.9	1.9
340.	*	1.9	1.9	1.9	1.9	2.1	2.1	1.9	1.9	1.9	2.2	2.0	2.1	1.9	1.9	1.9	2.0	2.1	2.1	1.9	1.9
350.	*	1.9	1.9	1.9	1.9	2.0	2.1	1.9	1.9	1.9	2.1	2.0	2.1	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9
MAX	*	2.1	2.2	2.2	2.0	2.2	2.2	2.3	2.1	2.2	2.2	2.3	2.3	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.1
DEGR.	*	150	140	140	110	100	100	140	300	290	100	320	320	140	300	280	100	100	320	170	300

WIND ANGLE (DEGR)	*	CONCENTRATION (PPM) REC21	REC22	REC23	REC24	REC25	REC26	REC27	REC28	REC29	REC30	REC31	REC32	REC33	REC34	REC35	REC36	REC37	REC38	REC39	REC40
0.	*	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9
10.	*	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2	2.1	2.1	1.9	1.9	1.9	1.9
20.	*	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2	2.2	2.2	1.9	1.9	1.9	1.9
30.	*	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.2	2.2	2.2	1.9	1.9	1.9	2.0
40.	*	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.3	2.3	2.2	1.9	1.9	1.9	2.0
50.	*	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.0	1.9	1.9	1.9	1.9	2.1
60.	*	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
70.	*	1.9	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.1
80.	*	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	2.1
90.	*	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.1
100.	*	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.1
110.	*	1.9	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.1
120.	*	1.9	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.1
130.	*	1.9	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.1
140.	*	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.1
150.	*	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.1
160.	*	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.1
170.	*	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9
180.	*	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.1	2.1	2.0	1.9
190.	*	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.2	2.2	2.1	1.9

200.	*	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	2.1	2.1	2.0	1.9
210.	*	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	2.1	2.1	2.1	1.9
220.	*	2.0	1.9	1.9	1.9	1.9	2.1	2.0	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	2.1	2.1	2.1	1.9
230.	*	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.1	1.9
240.	*	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.1	1.9
250.	*	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.1	2.1	1.9
260.	*	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.2	2.1	2.1	2.1	1.9
270.	*	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.2	2.1	2.1	2.1	1.9
280.	*	2.2	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.1	2.1	2.1	1.9
290.	*	2.2	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.1	2.1	1.9
300.	*	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	2.1	1.9
310.	*	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	1.9
320.	*	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.1	1.9
330.	*	1.9	1.9	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.2	1.9
340.	*	1.9	1.9	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	1.9
350.	*	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9
MAX	*	2.2	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.3	2.3	2.2	2.2	2.2	2.2	2.1
DEGR.	*	280	130	340	340	60	220	220	30	30	30	80	80	80	40	40	20	190	190	330	160

WIND ANGLE (DEGR)	*	CONCENTRATION (PPM) REC41	REC42
0.	*	2.0	2.0
10.	*	2.0	2.2
20.	*	2.1	2.2
30.	*	2.1	2.1
40.	*	2.1	2.1
50.	*	2.1	2.1
60.	*	2.1	2.1
70.	*	2.1	2.1
80.	*	2.1	2.1
90.	*	2.1	2.1
100.	*	2.1	2.1
110.	*	2.1	2.1
120.	*	2.1	2.1

130.	*	2.1	2.1
140.	*	2.2	2.0
150.	*	2.2	2.0
160.	*	2.1	1.9
170.	*	2.0	1.9
180.	*	1.9	1.9
190.	*	1.9	1.9
200.	*	1.9	1.9
210.	*	1.9	1.9
220.	*	1.9	1.9
230.	*	1.9	1.9
240.	*	1.9	1.9
250.	*	1.9	1.9
260.	*	1.9	1.9
270.	*	1.9	1.9
280.	*	1.9	1.9
290.	*	1.9	1.9
300.	*	1.9	1.9
310.	*	1.9	1.9
320.	*	1.9	1.9
330.	*	1.9	1.9
340.	*	1.9	1.9
350.	*	1.9	1.9
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MAX	*	2.2	2.2
DEGR.	*	140	10

THE HIGHEST CONCENTRATION OF 2.30 PPM OCCURRED AT RECEPTORS REC7, REC11, REC12, REC34 AND REC35.

Water Resources Technical Report

Water Resources Technical Report

Interstate Highway (IH) 635 LBJ East Ultimate Project

From United States Highway (US) 75
To IH 30
CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144
Cities of Dallas, Garland, and Mesquite; Dallas County, Texas
December 2016

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 16, 2014, and executed by FHWA and TxDOT.

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I. BACKGROUND INFORMATION

I-1. Introduction

Re-Evaluation consultation is being conducted for the proposed reconstruction and improvement to an 11.2-mile section of IH 635 in Dallas County, Texas. The proposed project extends along IH 635 through portions of the cities of Dallas, Garland, and Mesquite (see **Project Location Map**). The original IH 635 Environmental Assessment (EA) received environmental clearance through a Federal Highway Administration (FHWA) Finding of No Significant Impact (FONSI) issued on January 30, 2003.

A project-level analysis of water resources was included in the 2003 EA-FONSI which addressed the following topics: floodplains, water quality, water features subject to regulatory jurisdiction under Section 404 of the Clean Water Act (CWA), and erosion control during project construction. The purpose of this technical report is to update information on the water resource topics addressed in the 2003 EA-FONSI to reflect changes in the proposed project's construction footprint, as well as changes in regulatory requirements (e.g., modifications of the Nationwide Permit program under Section 404 of the CWA). The topics addressed in this report are consistent with the current TxDOT EA-level policies and practices for documenting the potential impacts of a transportation project on water resources.

I-2. Proposed Design

The proposed IH 635 improvements from east of US 75 to Miller Road would include constructing one additional 12-foot-wide general-purpose lane in each direction, two 12-foot-wide tolled-managed lanes in each direction, and two to three frontage road lanes in each direction. From near Royal Lane/Miller Road to La Prada Drive, the proposed project would provide one additional general-purpose lane in each direction, two non-tolled express lanes in each direction, and two to three frontage road lanes in each direction. From La Prada Drive to south of IH 30, the project would reconstruct IH 635 to provide lane balance transitions between the general purpose lanes, proposed express lanes, and IH 30 interchange. Auxiliary lanes would be provided as needed to accommodate traffic demand volumes associated with ramp movements. The general purpose lanes would include 10-foot-wide outside and inside shoulders. The tolled managed/express lanes would include 10-foot-wide outside shoulders and 4-foot wide inside shoulders. The proposed project would also include the construction of general purpose lane ramps, tolled managed/express lane ramps, and direct-connecting ramps between IH 30 and IH 635. The proposed frontage roads along IH 635 would typically consist of 11-foot wide inside lane(s) and a 14-foot-wide outside shared use lane in each direction. Inside curb offsets would vary from 1 to 2-feet wide. Outside curb offsets adjacent to shared use lanes would be 2-feet wide. Continuous sidewalks would be provided along the proposed frontage roads.

The proposed IH 30 improvements (from west of Gus Thomasson Road to east of Galloway Avenue) would include constructing three to four 12-foot-wide general purpose lanes. Auxiliary lanes would be constructed as needed to accommodate traffic demand volumes associated with ramp movements. The general purpose lanes would include 10-foot-wide outside and inside shoulders. Two to three continuous frontage road lanes would be constructed in each direction, which would typically consist of 11-foot wide inside lane(s) and a 14-foot wide outside shared use lane in each direction. Inside curb offsets would vary from 1 to 2-feet wide and outside curb offsets adjacent to shared use lanes would be 2-feet wide. Continuous sidewalks would be provided along the proposed frontage roads.

The proposed project includes the construction of multiple noise walls located along the project corridor, where reasonable and feasible. The project would require approximately 16.3 acres of proposed ROW as well as 0.5 acres of temporary construction easements and 9.1 acres of drainage easements. Proposed ROW acquisition would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

II. ANALYSIS OF WATER RESOURCES

The proposed project area is located within the eastern portion of the Headwaters to the Trinity River and western portion of the Duck Creek to East Fork Trinity River watersheds. Both of these watersheds flow in a north to south direction towards Trinity River (see **Project on USGS Topographic Map**). Multiple prominent streams features are located within the project area. Stream features listed from west to east include: Cottonwood Creek, Floyd Branch, Jackson Branch, Dixon Branch, Long Branch, South Mesquite Creek and multiple associated Unnamed Tributaries to these major streams. These stream crossings are indicated by call-out boxes in the attached **Water Resources Map**, and representative water features are shown in the **Water-related Project Area Photographs**.

II-1. Methodology

The description of water resources in this report is based on a combination of field reconnaissance, interpretation of current and historical color aerial photography, and the analysis of many layers of spatial data using geographical information system (GIS) software. Such data layers included U.S. Geological Survey (USGS) topographic maps, hydrologic feature shapefiles, Federal Emergency Management Agency (FEMA) floodplain maps, river and stream spatial data from the USGS, and topographic contour shapefiles. Field reconnaissance and delineation of water resources that could be affected by the proposed project was accomplished with several field visits between April 27 and May 3, 2016.

II-2. CWA Section 404: Waters of the United States and Permits

During the water resources field reconnaissance survey, all water features were examined and those water features meeting the regulatory definition of waters of the United States (WOUS) under Section 404 of the Clean Water Act (CWA)[1] were delineated using Global Positioning System (GPS) equipment. The proposed project crosses several streams, each with a defined stream bed and bank, and these streams were delineated by taking GPS readings of ordinary high water marks (OHWM) based on established criteria issued by the U.S. Army Corps of Engineers (USACE). A summary of the water features evaluated and the expected impacts to each is presented in **Table 1**.

Table 1. Impacts to Waters of the U.S., including Wetlands*

Map ID and Name of Water Feature (Approx. Distance from the Nearest Cross Street)	Existing Structure	Proposed Work or Structure	Permanent Fill		Temporary Fill		NWP #	PCN ? (Y/N)
			Waters (acres & linear ft)	Wetlands (acres)	Waters (acres & linear ft)	Wetlands (acres)		
Cottonwood Creek (600 feet SE of US 75)	bridge	none	none	none	none	none	n/a	N
Floyd Branch (450 feet SE of TI Boulevard)	bridge	none	none	none	none	none	n/a	N
UTJB-2 – Unnamed Tributary #2 to Jackson Branch (1,400 feet SE of Forest Lane)	none	box culverts	0.05 acre 196 LF	none	none	none	14	N
UTJB-1 – Unnamed Tributary #1 to Jackson Branch (2,000 feet SE of Forest Lane)	box culverts	replace box culverts & riprap extension	0.06 acre 218 LF	none	none	none	14	N
UTJB-3 – Unnamed Tributary #3 to Jackson Branch (2,000 feet SE of Forest Lane)	none	box culverts	0.02 acre 118 LF	none	none	none	14	N
Jackson Branch (750 feet NW of Skillman Street)	box culverts	replace box culverts & riprap extension	0.07 ac. 120 LF	none	none	none	14	N
Dixon Branch (800 feet SE of Plano Road)	box culverts	replace box culverts & riprap extension	0.05 acre 98 LF	none	none	none	14	N
UTDB-1 – Unnamed Tributary #1 to Dixon Branch (at Kingsley Road)	box culverts	replace box culverts & extension	0.09 acre 289 LF	none	none	none	14	N
UTDB1-EW – Abutting Emergent Wetland (at Kingsley Road)	none	filled	none	0.01 acre	none	none	14	Y
UTDB-2 – Unnamed Tributary #2 to Dixon Branch (1,000 feet NW of Jupiter Road)	box culverts	replace box culverts & extension	0.04 acre 134 LF	none	none	none	14	N

[1] 33 U.S. Code Section 1344.

Table 1. Impacts to Waters of the U.S., including Wetlands*

Map ID and Name of Water Feature (Approx. Distance from the Nearest Cross Street)	Existing Structure	Proposed Work or Structure	Permanent Fill		Temporary Fill		NWP #	PCN ? (Y/N)
			Waters (acres & linear ft)	Wetlands (acres)	Waters (acres & linear ft)	Wetlands (acres)		
UTLB-1 – Unnamed Tributary #1 to Long Branch (at Shiloh Road)	box culverts and modified channel	replace box culverts w. riprap; channel grading in existing easement	0.25 acre 732 LF	none	none	none	14	Y
Long Branch crossing #1 (1,150 feet SE of Northwest Highway)	box culverts, concrete lined channels	replace box culverts & riprap extension	0.10 acre 216 LF	none	none	none	14	N
UTLB-2 – Unnamed Tributary #2 to Long Branch (2,050 feet NW of Centerville Road)	box culverts	replace box culverts & extension	0.03 acre 116 LF	none	none	none	14	N
Long Branch crossing #2 (at La Prada Drive)	bridges, box culverts, concrete lined channels	replace box culverts w. concrete lined channel & extension	0.22 acre 289 LF	none	none	none	14	Y
UTLB-3 – Unnamed Tributary #3 to Long Branch (1,700 feet north of Oates Drive)	box culverts	divert flow to new box culverts	0.01 acre 84 LF	none	none	none	14	N
UTLB3-EW – Abutting Emergent Wetland (1,700 feet north of Oates Drive)	none	filled	none	0.01 acre	none	none	14	Y
IH 30: South Mesquite Creek (900 feet NE of Gus Thomasson Road)	box culverts, concrete outfall	replace box culverts & riprap extension	none	none	none	none	14	N
IH 30: UTSMC-1 – Unnamed Tributary #1 to South Mesquite Creek (2,600 feet SW of Gus Thomasson Road)	box culverts	none	none	none	none	none	n/a	N

***Notes:** The stream crossings are listed in the order that each is crossed by IH 635 from west to east, or by IH 30 (last two crossings) from north to south. The locations of all stream crossings of these highways are shown in the **Water Resources Map**.
Abbreviations in Table 1: UT = Unnamed Tributary; NWP = Nationwide Permit; PCN = Pre-construction Notification (to the USACE).

Federal regulations (note that WOUS may include intrastate rivers and streams, including impoundments and other waters.[2] In response to a Supreme Court decision addressing the limits of federal jurisdiction under Section 404,[3] the USACE and Environmental Protection Agency (EPA) have issued further guidance, and require additional documentation to support jurisdiction. Currently, the USACE continues to assert jurisdiction over traditionally navigable waters and non-navigable tributaries of traditionally navigable waters where the tributaries are relatively permanent waters (i.e., tributaries that typically flow year round or have

[2] 33 Code of Federal Regulations (CFR) Section 328.3(a).
[3] *Rapanos v. U.S.*, 547 S. Ct. 715 (2006).

continuous flow at least seasonally). The streams Cottonwood Creek, Floyd Branch, Jackson Branch, UTJB-1, Dixon Branch, UTDB-1, and Long Branch are relatively permanent (perennial or intermittent) non-navigable tributaries to a traditional navigable water (Trinity River) and should be considered WOUS. Additionally, the wetland feature UTDB1-EW is a special aquatic site directly abutting UTDB-1, consistent with the rule and guidance, this feature should also be considered a WOUS.

Further evaluation of water features is provided below to support conclusions of jurisdictional status for the remainder of the aquatic features in the study area. The current USACE guidelines require a jurisdictional evaluation to determine if the following types of water features have a significant nexus to traditionally navigable waters: (1) water bodies and tributaries that are not relatively permanent waters, including adjacent wetlands if present; and, (2) wetlands adjacent to, but not directly abutting, a relatively permanent stream. A significant nexus exists if the aquatic feature has more than a speculative or insubstantial effect on the chemical, physical, and/or biological integrity of a traditionally navigable water. Establishing a significant nexus is necessary Section 404 jurisdiction as a water of the United States to attach.

As non-permanent water features, ephemeral streams UTJB-2, UTJB-3, UTDB-2, UTLB-1, UTLB-2, and UTLB-3 require a significant nexus determination. As demonstrated, these streams are characterized by relatively short stream distance to their respective relatively permanent tributary (Jackson Branch, Dixon Branch, and Long Branch) and exhibit a discernible OHWM connection to the aforementioned tributaries. Through this connection, these streams function to capture and convey local surface runoff from higher elevations within the watersheds that contribute flow eventually to the Trinity River. These functions demonstrate more than a speculative effect on the chemical, physical, and/or biological integrity of a traditionally navigable water. Therefore, the streams UTJB-2, UTJB-3, UTDB-2, UTLB-1, UTLB-2, and UTLB-3 should be considered WOUS. Furthermore, the wetland feature UTLB3-EW is a special aquatic site directly abutting UTLB-3, and consistent with USACE rules and guidance, this feature should also be considered a WOUS.

The remainder of the aquatic features within the study area are manmade linear drainage swales, some of which include areas that meet the definition of a wetland, based on vegetation, soil, and hydrology criteria. Historic aerial imagery and USGS topographic maps reveal that these features were constructed in upland areas and are not rerouted historic stream channels or drainages. During the field investigation, these features were observed with ponded water and, based on topography and conditions observed in the field, likely only convey flowing water ephemerally during significant rain events. According to joint EPA and

USACE guidance for delineating WOUS,[4] certain geographic features generally are not jurisdictional waters, and include the following:

1. Swales, erosional features (e.g. gullies) and small washes characterized by low volume, infrequent, and short duration flow;
2. Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water;
3. Uplands transporting over land flow generated from precipitation (i.e., rain events and snowmelt).

Furthermore, the joint USACE and EPA 2015 Final Rule at 33 CFR Section 328.3(b) provides the following regulatory definition regarding drainage ditches:[5]

> "(b) The following are not "waters of the United States" even where they otherwise meet the terms of paragraphs (a)(4) through (8) of this section…
>
> (3) The following ditches:
>
> (i) Ditches with ephemeral flow that are not a relocated tributary or excavated in a tributary.
>
> (ii) Ditches with intermittent flow that are not a relocated tributary, excavated in a tributary, or drain wetlands.
>
> (iii) Ditches that do not flow, either directly or through another water, into a water identified in paragraphs (a)(1) through (3) of this section."

Based on the regulation and guidance discussed above, it is clear that the EPA and the USACE do not assert regulatory jurisdiction over manmade linear drainage features constructed wholly in uplands, regardless of whether a water feature might meet the technical criteria of a wetland. Therefore, the roadside drainage swales mapped within the study area, including wetland areas within or adjacent to these drainage swales, would not be considered WOUS, and would not be subject to USACE regulation under Section 404 of the CWA.

The placement of permanent fill material into each of the jurisdictional WOUS noted in Table 1 would be authorized under Nationwide Permit 14 – Linear Transportation Projects (hereinafter 'NWP-14') under Section 404; this would also apply to temporary fill material, but such impacts are not anticipated. That is, each of the crossings would be a single and complete crossing of a separate water body, and each would affect less than 0.50 acre of jurisdictional waters. At each stream crossing the project proposes the removal and replacement of existing culverts. Along with culvert replacements, culverts would be extended and in some cases additional rock riprap would be added to the stream channel. Impacts to

[4] U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook (5/30/2007). See: *http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/cwa_guide/jd_guidebook_051207final.pdf.* Accessed 11/16/2016.

[5] The implementation of this regulation has been stayed by a decision of the U.S. Sixth Circuit Court of Appeals, and the EPA and USACE have extended the stay nationwide pending resolution. The regulatory definition is nevertheless instructive as to the interpretation of Section 404 jurisdiction by these agencies.

WOUS were calculated only for the portions of waters that were not previously filled by culverts and rock riprap. The majority of the streams that are crossed by IH 635 are presently within culverts or concrete lined channels. It is understood that the OHWM of WOUS extends through these culverts but these portions were not considered in final impact calculations. It was concluded that the replacement of culverts with new culverts or the modification of previously concrete-lined channels would result in no new adverse effects to WOUS. Two of the proposed stream crossings (Long Branch crossing #2 and UTLB-1) described in Table 1, would exceed 0.10 acres of impacts and would require the submittal of a Pre-construction Notification (PCN) to the USACE in accordance with NWP-14. Furthermore, two jurisdictional wetland features (UTDB1-EW and UTLB3-EW) were identified within the project area and would also require PCN in accordance with NWP-14. All other crossings associated within the project would result in impacts less than 0.10 acre and would be permitted under NWP-14 with no PCN required.

During construction, appropriate measures would be taken to maintain normal downstream flows and minimize flooding. Temporary fills consisting of materials would be placed in a manner that would not be eroded by expected high flows. If temporary fills of water features occur, these would be entirely removed and affected areas restored to pre-construction elevations and revegetated as appropriate. Stream channel modifications, including bank stabilization, would be limited to the minimum necessary to construct or protect roads or drainage structures, and would be restricted to the immediate vicinity of the project. The proposed project would comply with all general and regional conditions applicable to NWP-14.

II-3. CWA Section 401: Water Quality Certification

Under Section 401 of the CWA, certification of compliance with water quality standards issued by the state water quality agency is required for any discharge of pollutants into waters subject to regulation under Section 404. In Texas, state water quality certification under Section 401 is carried out by the Texas Commission on Environmental Quality (TCEQ). With regard to projects with impacts to WOUS that meet the criteria for a NWP, TCEQ has provided conditional Section 401 certification.[6] For transportation projects with impacts to water features covered by NWP-14, such as the proposed project, TCEQ's Section 401 conditional certification requires the Soil Erosion and Sedimentation Controls under NWP General Condition (GC) 12 and the Post-construction Total Suspended Solids (TSS) Controls under NWP GC 25. In essence, these GCs require the use of best management practices (BMPs) to manage water quality on construction sites.

The Section 401 certification requirements for NWP-14 would be met by implementing at least one TCEQ-approved BMP for each of the following categories of controls:

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[6] TCEQ letter to USACE dated April 5, 2012 re USACE Nationwide Permits. This TCEQ letter addresses Section 401 water quality certification for USACE NWPs issued under Section 404. *http://media.swf.usace.army.mil/pubdata/environ/regulatory/permitting/nwp/2012_TCEQ401.pdf*, accessed 11/16/2016.

- Category I – Erosion Control;
- Category II – Sedimentation Control; and
- Category III – Post-construction Total Suspended Solids (TSS) Control.

Category I could be addressed with temporary vegetation, which would involve re-seeding disturbed areas according to TxDOT-approved seeding specifications. Category II could be addressed by installing silt fences around construction areas prior to commencing work. Category III could be addressed by installing mulch filter socks at drainage inlets. During final design of the proposed project, other TCEQ-approved BMPs may be substituted if necessary using one of the BMPs from the identical control category. In this regard, TxDOT recognizes that the increase in pavement surface related to the proposed IH 635 improvements can alter the stormwater runoff quality due to accumulated sediments on the roadway pavement. As TSS represent the primary type of pollutant in highway stormwater runoff, TxDOT is exploring the use of additional BMPs designed to improve the quality of stormwater runoff discharged into receiving jurisdictional water bodies. To develop a comprehensive, permanent BMP plan for reducing stormwater TSS within the IH 635 LBJ East Project right-of-way, TxDOT has utilized guidance from the North Central Texas Council of Governments Transportation Integrated Stormwater Management (TriSWM) manual and TxDOT's Stormwater Management Guidelines for Construction Activities. In applying these guidelines within a highly-urbanized transportation corridor with constrained right-of-way, the primary TSS BMPs under consideration throughout the project area include the use of enhanced vegetation swales, below-ground hydrodynamic devices, and detention ponds within the existing right-of-way. These proposed BMPs that may be added to the project design are currently being reviewed by TxDOT.

II-4. Executive Order 11990: Protection of Wetlands

In addition to the regulation of wetlands that meet the criteria of Section 404 as WOUS, Executive policy issued as Executive Order (EO) 11990[7] seeks to protect a broader range of wetland environments. Under EO 11990, wetlands are defined as "those areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction." Unlike Section 404, the definition of wetlands in EO 11990 does not consider the relationship of wetlands to any WOUS or tributaries to them, but applies to areas with vegetation adapted to wetland conditions wherever such areas may be found. However, as the intent of EO 11990 is clearly to preserve the contributions of "natural systems" for uses by wildlife, public recreation, scientific study, public health and safety, water supply, and other uses, the existence of minor wetland areas within highway bar ditches do not meet the letter or spirit of EO 11990.

[7] EO 11990 – Protection of Wetlands (42 Federal Register 26961, May 24, 1977).

During field investigations for the proposed project, the project construction footprint was examined for areas that would meet the definition of wetlands under EO 11990. Multiple drainage ditches within the study area were observed that support hydric vegetation due to their function of conveying storm water runoff. The ditches within the study area, through review of historic aerials, were concluded to not be frequently inundated and are entirely constructed within upland areas not influenced by groundwater. Although these features exhibited wetland characteristics at the time of the field investigation, the features should not be considered as wetlands defined under EO 11990 for the reasons noted above. Accordingly, the requirements of EO 11990 have been met.

II-5. Sections 9 and 10 of the Rivers and Harbors Act of 1899

The proposed project does not involve work in or over a navigable water of the U.S., therefore Section 10 of the Rivers and Harbors Act does not apply. Likewise, a navigational clearance under the General Bridge Act of 1946, and Section 9 of the Rivers and Harbors Act (administered by the U.S. Coast Guard [USCG]) is not applicable. Coordination with the USCG (for Section 9 and the General Bridge Act) and the USACE (for Section 10) would not be required.

II-6. CWA Section 303(d): Impaired Waters

Runoff from this proposed project would not discharge directly into a stream segment listed pursuant to Section 303(d) of the CWA as a threatened or impaired water, or into a stream within 5 miles upstream of a Section 303(d) listed threatened or impaired water.[8]

II-7. CWA Section 402: Erosion Control

Pursuant to Section 402 of the CWA, TxDOT would comply with the TCEQ Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit (CGP) for control of soil erosion and sedimentation. As the proposed project would include more than 5 acres of earth disturbance, a Storm Water Pollution Prevention Plan (SW3P) would be prepared and implemented, a construction site notice would be posted on the construction site, and a Notice of Intent (NOI) would be required.

II-8. CWA Section 402: Municipal Separate Storm Sewer System

This project is located within the boundaries of the Cities of Dallas, Garland, and Mesquite Phase II Municipal Separate Storm Sewer Systems (MS4), as shown in the attached MS4 Area Map. The proposed project would comply with the applicable MS4 requirements issued by

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[8] See TCEQ's 2014 Texas Integrated Report – Texas 303(d) List for Water Segments – 805 (Upper Trinity River) and 819 (East Fork Trinity River): *https://www.tceq.texas.gov/assets/public/waterquality/swqm/assess/14txir/2014_303d.pdf,* accessed October 27, 2016.

the TCEQ, and notify the MS4 operators for the Cities of Dallas, Garland, and Mesquite of potential storm water discharges from construction activities.

II-9. Executive Order 11988: Floodplains

The protection of floodplains and floodways is required by EO 11988,[9] which establishes a national policy to avoid the occupancy and modification of floodplains, where practicable. When construction within a floodplain is necessary, the EO requires the agency to design the project to minimize potential harm to the functions of the floodplain. Portions of the proposed project are located within a FEMA designated 100-year floodplain and construction work would occur in the floodplain (see the **Water Resources Map** and the **FEMA Flood Insurance Rate Maps**). The hydraulic design for this project would be in accordance with current FHWA and TxDOT design policies. The facility would permit the conveyance of the 100-year flood and would not increase the base flood elevation to a level that would violate applicable floodplain regulations and ordinances. Coordination with the City of Dallas, Garland, and Mesquite Floodplain Administrators would be required.

II-10. Groundwater Resources

The Trinity Aquifer is the only major aquifer in the project area[10]. This aquifer is part of the Edwards-Trinity aquifer system forming a wider arc from central Texas to southeastern Oklahoma. The Trinity Aquifer portion of this aquifer system extends from the Red River southward to San Antonio area. The aquifer is underlain by much older, low-permeability rocks that range in age from Precambrian to Jurassic, and typically occurs where is confided above the Walnut Clay Formation and other younger sedimentary formations such as the Woodbine Formation[11]. Water saturation within the sand and gravel comprising this aquifer may be as thick as 900 feet[10]. The recharge zone for this aquifer occurs in Montague and Wise Counties where the Antlers Sand Formation (conglomerate rock) outcrops, leaving the IH 635 project area well outside of the aquifer recharge zone. In general, water from this aquifer within the outcrop area is fresh but very hard (i.e., high in total dissolved solids), and salinity of the water varies from slightly to moderately saline[10]. Although the water quality of this aquifer is acceptable for most municipal and industrial purposes, past overuse within the Dallas area has resulted in substantial lowering of the depth of water within the aquifer. Currently, water supplied to the area comes from surface water reservoirs located east and north of the project area.

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9 EO 11988 – Floodplain Management (42 Federal Register 26951, May 24, 1977).

10 See Texas Water Development Board. 1995. Major Aquifers of Texas. TWDB Report 345: Trinity Major Aquifer Map and Description. ***http://www.twdb.texas.gov/publications/reports/numbered_reports/doc/R345/R345Complete.pdf.*** Accessed December 14, 2016.

11 See U.S. Geologic Survey, Department of the Interior. 1996. Ground Water Atlas of the United States. Report HA 730, Chapter E (Oklahoma and Texas) – Edwards-Trinity Aquifer System. ***http://pubs.usgs.gov/ha/ha730/ch_e/E-text8.html.*** Accessed December 14, 2016.

The Woodbine Aquifer is a minor groundwater feature with a recharge zone that is co-extensive with the Woodbine Formation[10], a geologic feature found approximately 13 miles to the west of the project area. This formation consists of permeable fine-grained sand and sandstone interbedded with clay. This aquifer overlies the Trinity Aquifer, and forms a wide (typically 40 to 60 miles) north-south band that extends from the northern McLennan county to the Red River. The subsurface portion of this aquifer extends eastward, and is overlain by younger Cretaceous rocks. This aquifer consists of sandstone interbedded with shale and clay which form several distinct water-bearing zones. The maximum thickness for this aquifer is approximately 700 feet, and the quality of the water deteriorates below 1,500 feet where water is pumped from upper areas of the Woodbine Formation. This aquifer has been used extensively for municipal, industrial, domestic, livestock, and small irrigation supplies, which have contributed to declines in water level in excess of 100 feet[10].

Groundwater near the ground surface in floodplain terraces and deposits is in hydraulic connection with the Trinity River, its major tributaries, and larger local lakes. The primary source of this near-surface groundwater is rainwater infiltration on the surface of the alluvial terrace and floodplain deposits. Most water accumulating in floodplain deposits is discharged into surface water bodies, evaporated, or transpired from plants. Relatively shallow or "perched" groundwater conditions occur locally within the project area, especially in creek channels present above the limestone bedrock. Several creek beds are known to exist near and within the project area.

In conclusion, the groundwater recharge zones for the Trinity Aquifer and the Woodbine Aquifer are located over ten miles to the west of the project area. This geologic situation makes it highly improbable that the IH 635 project could affect these groundwater resources.

II-11. Other Requirements for Water Resources

The proposed project is located outside of the jurisdiction of the water-related statutory and/or regulatory requirements listed below. No further action is required regarding these programs.

- Texas Coastal Management Program;
- Coastal Barrier Resources Act;
- Edwards Aquifer Recharge and Contributing Zones;
- International Boundary and Water Commission;
- Wild and Scenic Rivers; and
- Trinity River Corridor Development Certificate Program.

[10] See the same numbered footnote reference citation on previous page.

Legend

Project Limits

N
W E
S

0 3 6

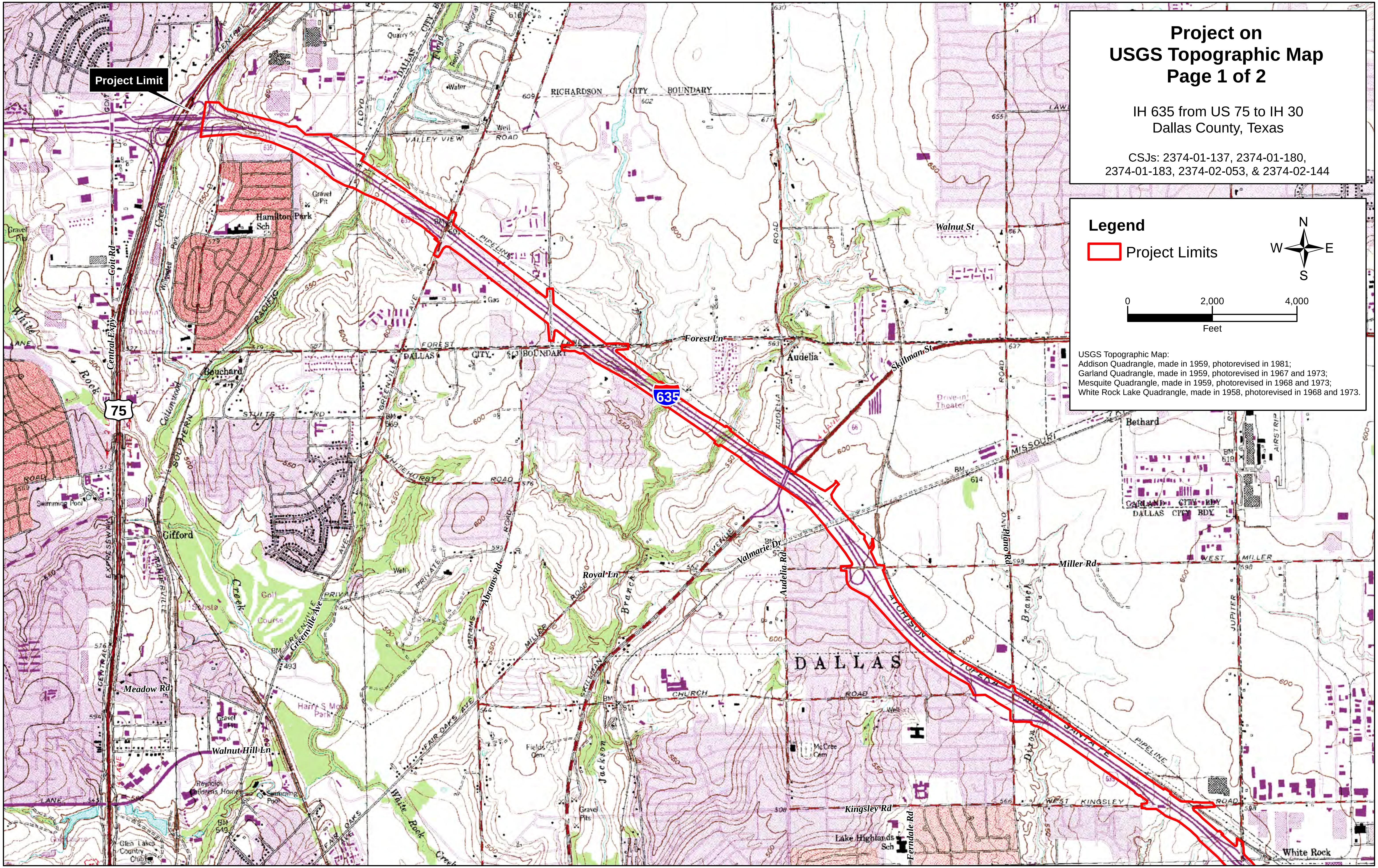
SCALE IN MILES

Base Map Source: NCTCOG

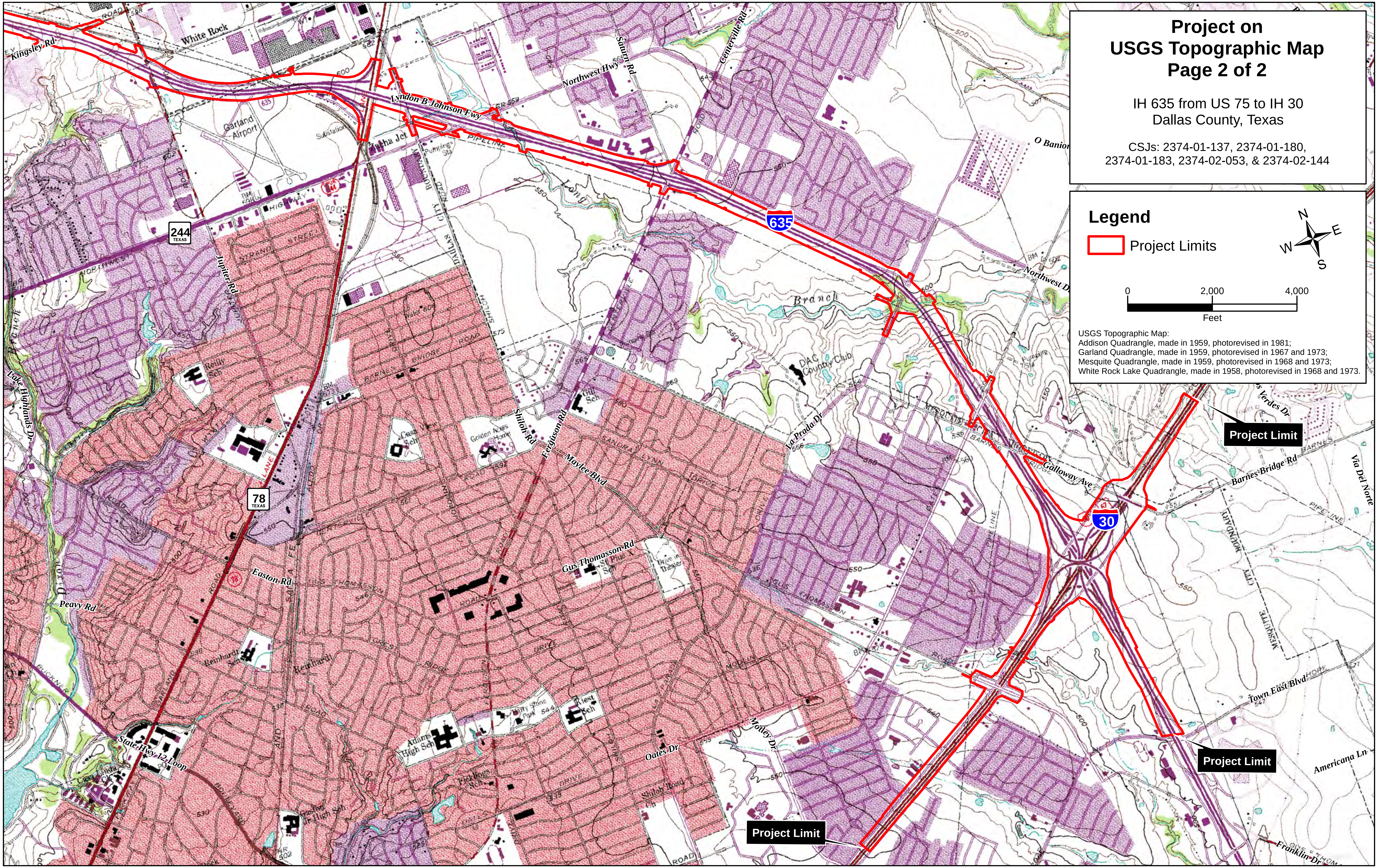
Project Location Map

IH 635 from US 75 to IH 30
Dallas County, Texas

CSJs: 2374-01-137, 2374-01-180,
2374-01-183, 2374-02-053, & 2374-02-144



Project on
USGS Topographic Map
Page 1 of 2
IH 635 from US 75 to IH 30
Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144
Legend
Project Limits
N
W
E
S
0
2,000
4,000
Feet
USGS Topographic Map:
Addison Quadrangle, made in 1959, photorevised in 1981;
Garland Quadrangle, made in 1959, photorevised in 1967 and 1973;
Mesquite Quadrangle, made in 1959, photorevised in 1968 and 1973;
White Rock Lake Quadrangle, made in 1958, photorevised in 1968 and 1973.
Project Limit
635
75
RICHARDSON CITY BOUNDARY
DALLAS CITY BOUNDARY
Hamilton Park Sch
Forest Ln
Audelia
Skillman St
Walnut St
Bethard
Central Expy
Coit Rd
Bouchard
Gifford
Meadow Rd
Walnut Hill Ln
Royal Ln
Valmarie Dr
Miller Rd
Kingsley Rd
Lake Highlands Sch
Ferndale Rd
Audelia Rd
Abrams Rd
Greenville Ave
DALLAS
White Rock
Golf Course
Drive-in Theater


Project on
USGS Topographic Map
Page 2 of 2
IH 635 from US 75 to IH 30
Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180,
2374-01-183, 2374-02-053, & 2374-02-144
Legend
Project Limits
N
E
S
W
0
2,000
4,000
Feet
USGS Topographic Map:
Addison Quadrangle, made in 1959, photorevised in 1981;
Garland Quadrangle, made in 1959, photorevised in 1967 and 1973;
Mesquite Quadrangle, made in 1959, photorevised in 1968 and 1973;
White Rock Lake Quadrangle, made in 1958, photorevised in 1968 and 1973.
Project Limit
Project Limit
Project Limit
635
30
244
78
Kingsley Rd
White Rock
Lyndon B Johnson Fwy
Northwest Hwy
Saturn Rd
Centerville Rd
Garland Airport
Jupiter Rd
O Banion
Branch
DAC Country Club
La Prada Dr
Galloway Ave
Barnes Bridge Rd
Via Del Norte
Shiloh Rd
Ferguson Rd
Maylee Blvd
Gus Thomasson Rd
Easton Rd
Peavy Rd
Lake Highlands Dr
Reinhardt
Adams High Sch
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Motley Dr
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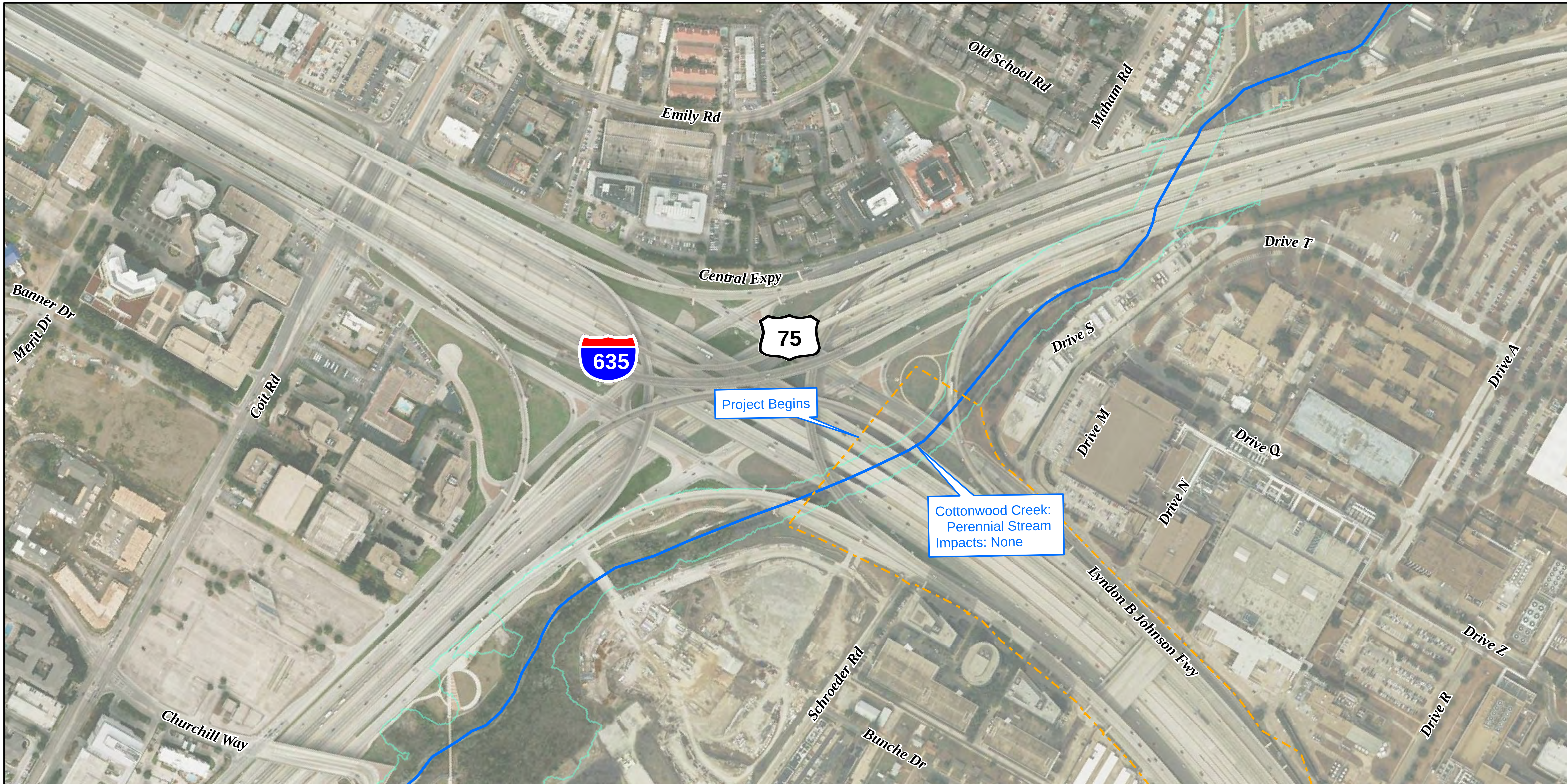
Americana Ln
Franklin Dr
Golden Acres Home
Drive In Theater



Legend

Layer
- Existing Right of Way
- Proposed Right of Way
- Drainage Easement
- Construction Easement

Proposed Drainage Structure
- Proposed Culvert/Pipe
- Drainage Outfall (Riprap, Concrete)
- Proposed Grading

Water Resources
- Stream
- 100 - Year Floodplain
- Permanent WOUS * Impact
- Drainage Ditch **

Notes

* *WOUS=Waters of the United States, including wetlands*

** *Non-jurisdictional feature*

N E S W

0 400 800

SCALE IN FEET

Date: 11/15/2016

Source / Year of Aerial Photograph: NCTCOG / 2015

WATER RESOURCES MAP

Page 1 of 13

IH 635 from US 75 to IH 30
Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180,
2374-01-183, 2374-02-053,
& 2374-02-144

Legend

Layer
- Existing Right of Way
- Proposed Right of Way
- Drainage Easement
- Construction Easement

Proposed Drainage Structure
- Proposed Culvert/Pipe
- Drainage Outfall (Riprap, Concrete)
- Proposed Grading

Water Resources
- Stream
- 100 - Year Floodplain
- Permanent WOUS * Impact
- Drainage Ditch **

Notes

**WOUS=Waters of the United States, including wetlands*

***Non-jurisdictional feature*

N E S W

0 400 800

SCALE IN FEET

Date: 11/15/2016

Source / Year of Aerial Photograph: NCTCOG / 2015

WATER RESOURCES MAP
Page 2 of 13

IH 635 from US 75 to IH 30
Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180,
2374-01-183, 2374-02-053,
& 2374-02-144

Legend

Layer
- Existing Right of Way
- Proposed Right of Way
- Drainage Easement
- Construction Easement

Proposed Drainage Structure
- Proposed Culvert/Pipe
- Drainage Outfall (Riprap, Concrete)
- Proposed Grading

Water Resources
- Stream
- 100 - Year Floodplain
- Permanent WOUS * Impact
- Drainage Ditch **

Notes

**WOUS=Waters of the United States, including wetlands*

***Non-jurisdictional feature*

N E S W

0 400 800

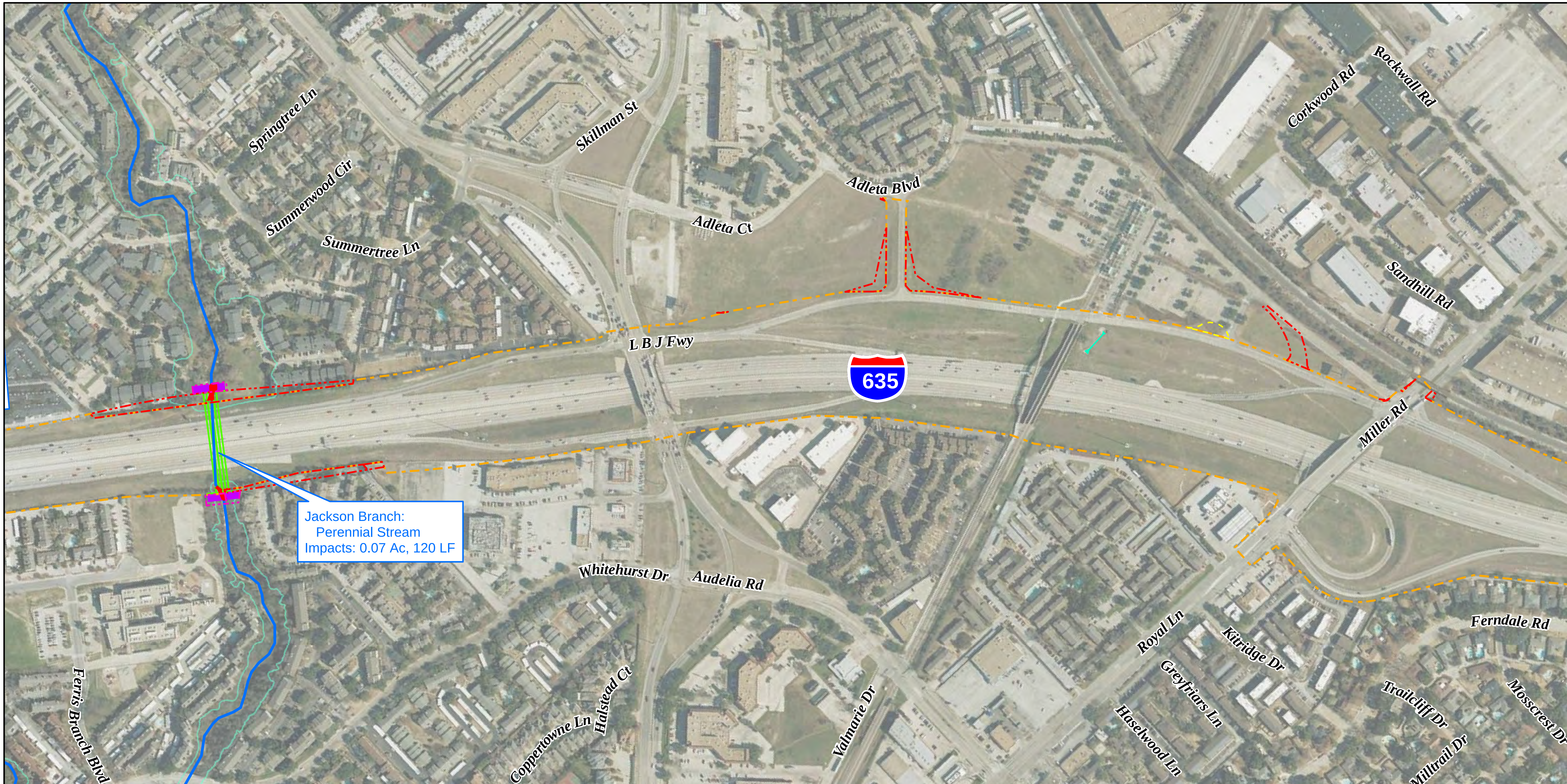
SCALE IN FEET

Date: 11/15/2016

Source / Year of Aerial Photograph: NCTCOG / 2015

WATER RESOURCES MAP
Page 3 of 13

IH 635 from US 75 to IH 30
Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180,
2374-01-183, 2374-02-053,
& 2374-02-144



Legend

Layer
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Source / Year of Aerial Photograph: NCTCOG / 2015

WATER RESOURCES MAP
Page 4 of 13

IH 635 from US 75 to IH 30
Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180,
2374-01-183, 2374-02-053,
& 2374-02-144

Legend

Layer
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** *Non-jurisdictional feature*

N E S W

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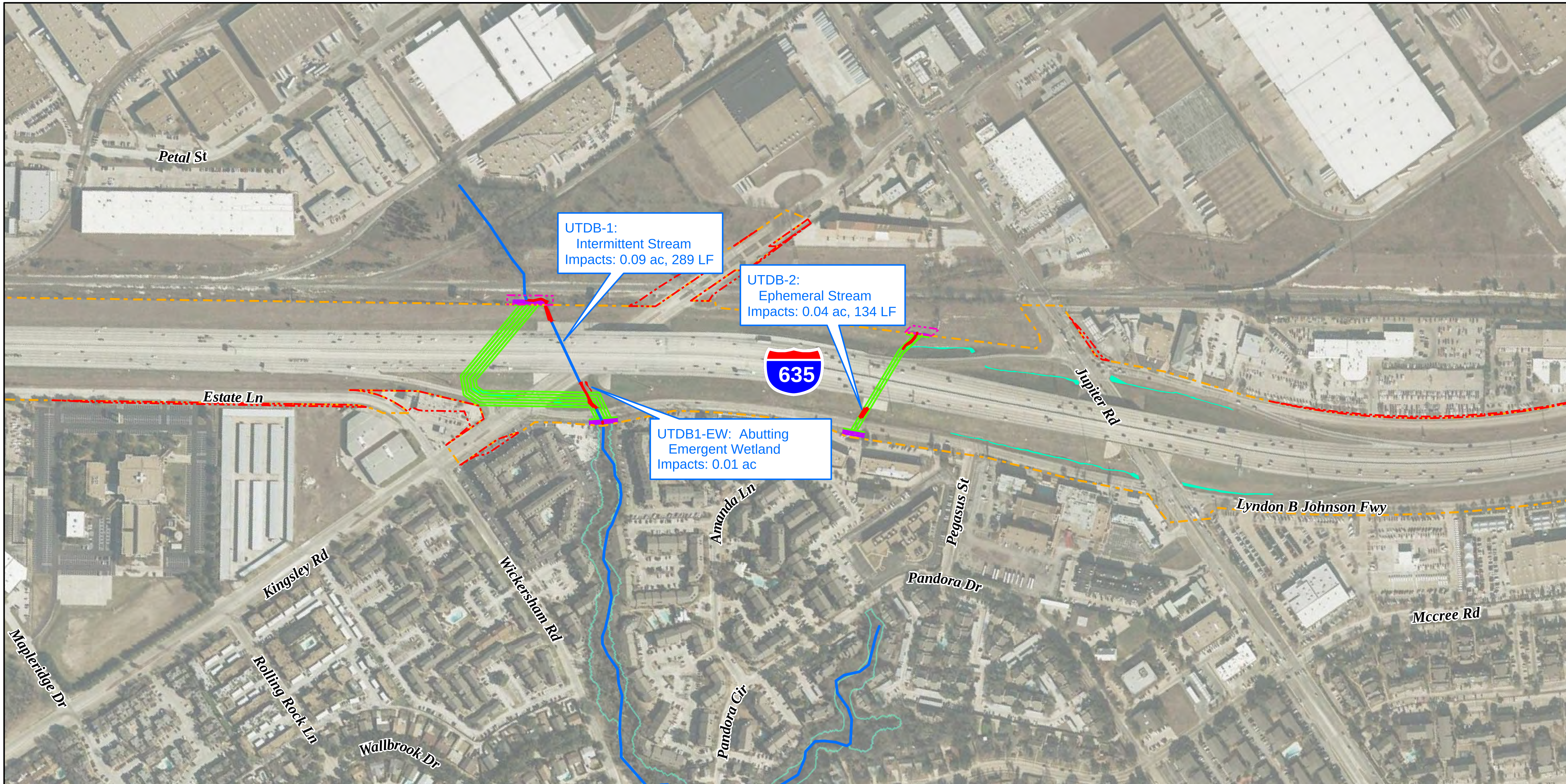
SCALE IN FEET

Date: 11/15/2016

Source / Year of Aerial Photograph: NCTCOG / 2015

WATER RESOURCES MAP
Page 5 of 13

IH 635 from US 75 to IH 30
Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180,
2374-01-183, 2374-02-053,
& 2374-02-144



Legend

Layer
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- Proposed Right of Way
- Drainage Easement
- Construction Easement

Proposed Drainage Structure
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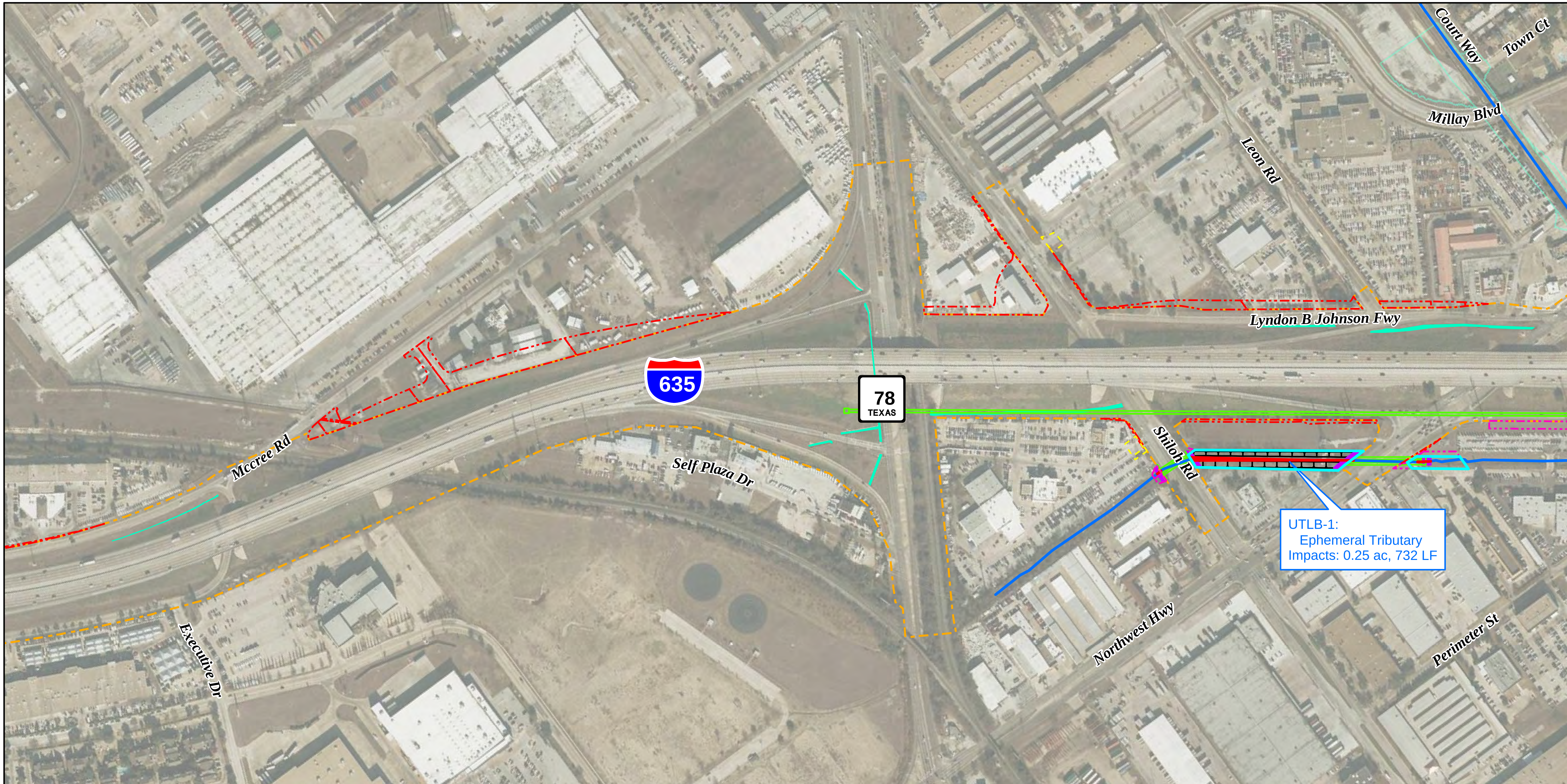
SCALE IN FEET

Date: 11/15/2016
Source / Year of Aerial Photograph: NCTCOG / 2015

WATER RESOURCES MAP
Page 6 of 13

IH 635 from US 75 to IH 30
Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144



Legend

Layer
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- Proposed Right of Way
- Drainage Easement
- Construction Easement

Proposed Drainage Structure
- Proposed Culvert/Pipe
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WATER RESOURCES MAP
Page 7 of 13

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Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180,
2374-01-183, 2374-02-053,
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Legend

Layer	Proposed Drainage Structure	Water Resources	Notes
Existing Right of Way	Proposed Culvert/Pipe	Stream	* WOUS=Waters of the United States, including wetlands
Proposed Right of Way	Drainage Outfall (Riprap, Concrete)	100 - Year Floodplain	** Non-jurisdictional feature
Drainage Easement	Proposed Grading	Permanent WOUS * Impact	
Construction Easement		Drainage Ditch **	

N E S W

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SCALE IN FEET

Date: 11/15/2016

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WATER RESOURCES MAP
Page 8 of 13

IH 635 from US 75 to IH 30
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WATER RESOURCES MAP
Page 9 of 13

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SCALE IN FEET

Date: 11/15/2016

Source / Year of Aerial Photograph: NCTCOG / 2015

WATER RESOURCES MAP
Page 10 of 13

IH 635 from US 75 to IH 30
Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180,
2374-01-183, 2374-02-053,
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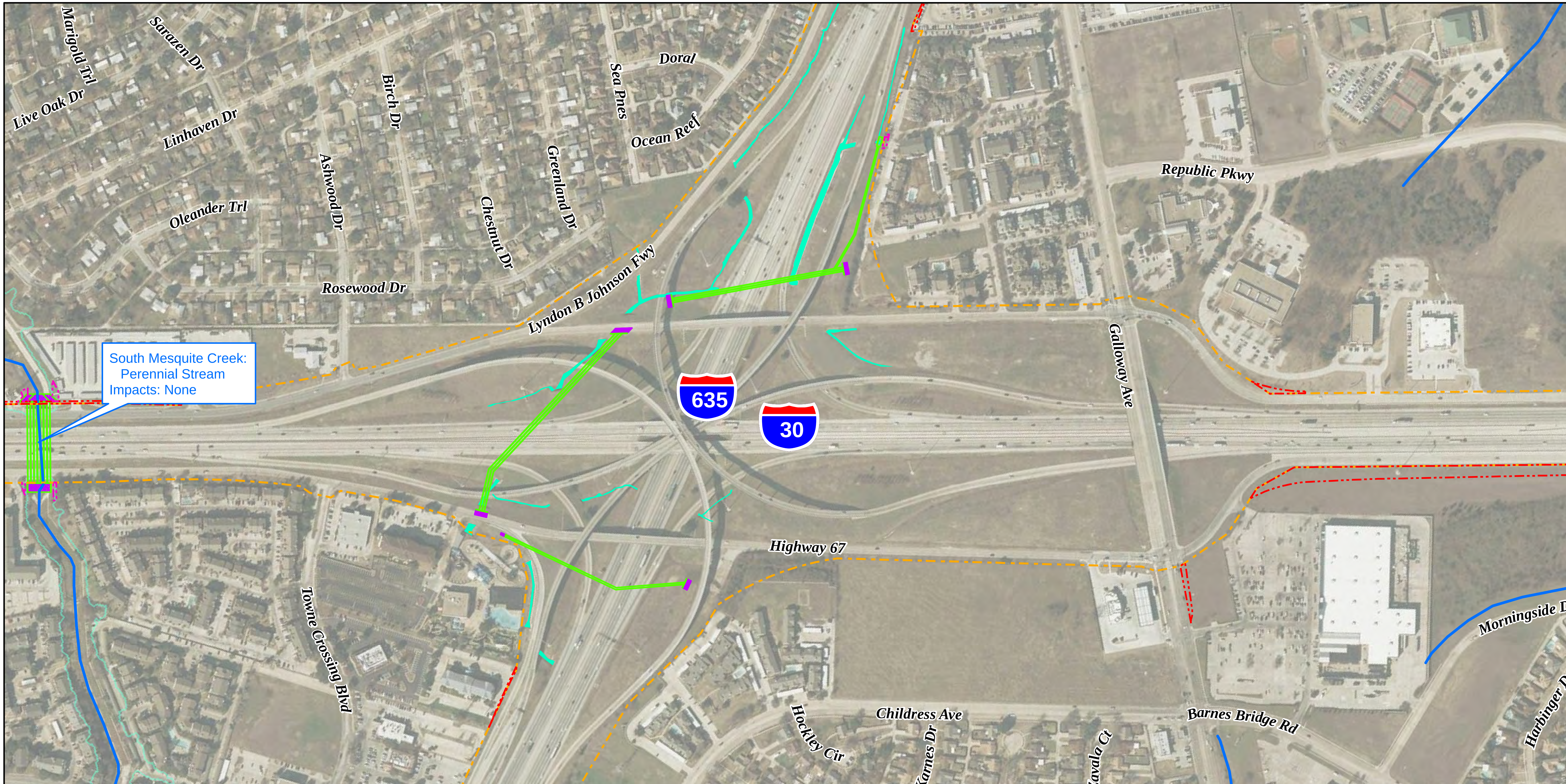

Legend

Layer
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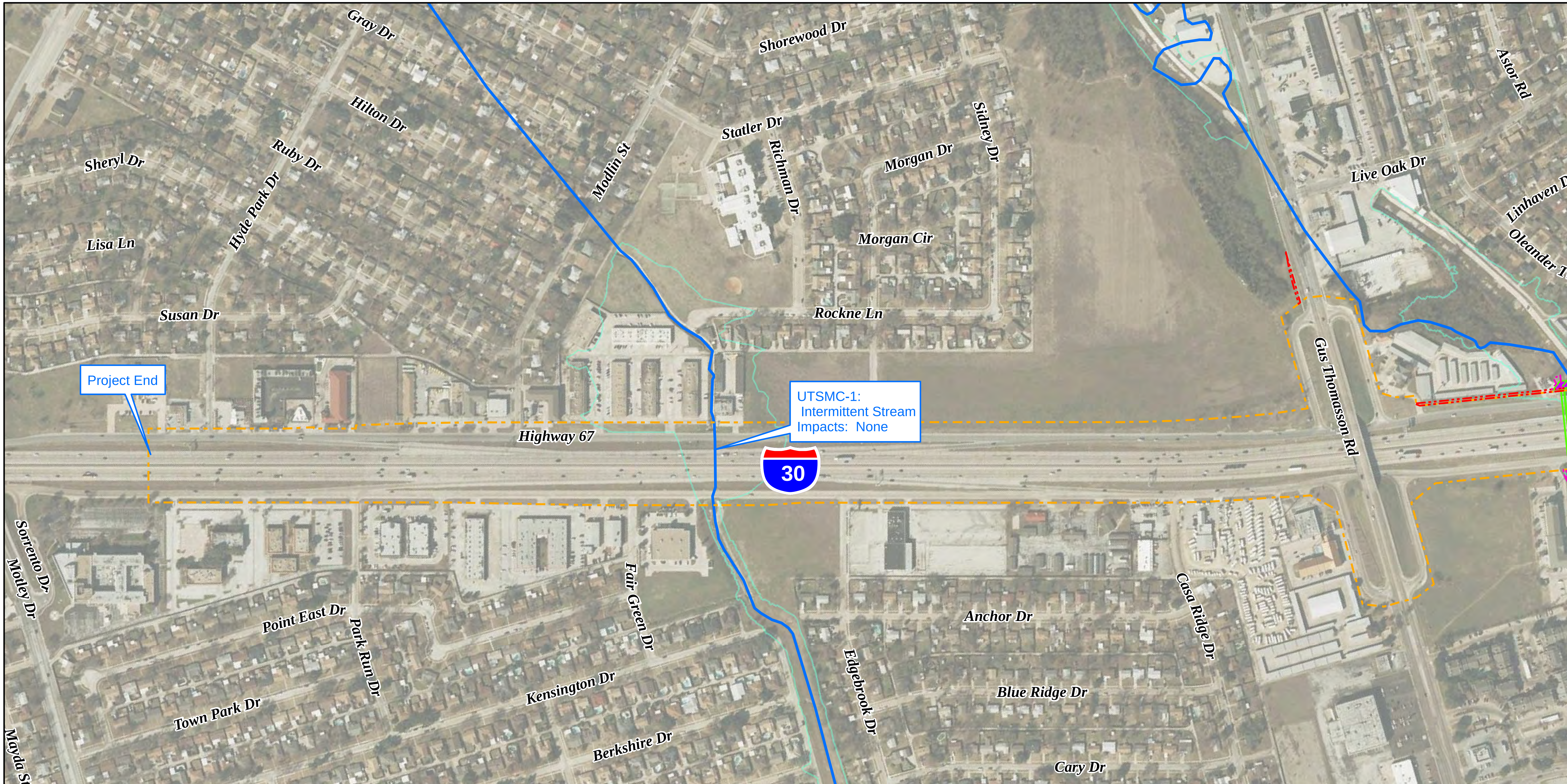
Date: 11/15/2016

Source / Year of Aerial Photograph: NCTCOG / 2015

WATER RESOURCES MAP
Page 11 of 13

IH 635 from US 75 to IH 30
Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144



Legend

Layer	Proposed Drainage Structure	Water Resources	Notes
Existing Right of Way	Proposed Culvert/Pipe	Stream	*WOUS=Waters of the United States, including wetlands
Proposed Right of Way	Drainage Outfall (Riprap, Concrete)	100 - Year Floodplain	**Non-jurisdictional feature
Drainage Easement	Proposed Grading	Permanent WOUS * Impact	
Construction Easement		Drainage Ditch **	

N E S W

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SCALE IN FEET

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Source / Year of Aerial Photograph: NCTCOG / 2015

WATER RESOURCES MAP
Page 12 of 13

IH 635 from US 75 to IH 30
Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144

Legend

Layer
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Source / Year of Aerial Photograph: NCTCOG / 2015

WATER RESOURCES MAP
Page 13 of 13

IH 635 from US 75 to IH 30
Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144

Photograph 1: View within project area representing dominant vegetation communities within the IH 635 right of way. Vegetation consists primarily of introduced grass species.

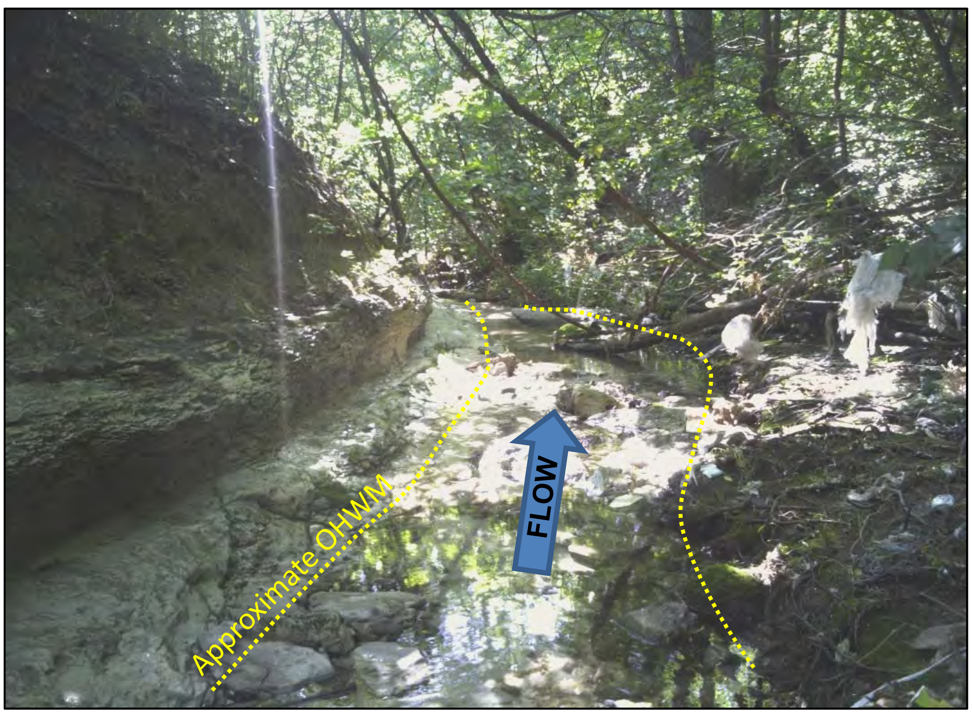
Photograph 2: View within project area representing man-made drainage ditches within the IH 635 right of way. Vegetation shown is largely hydrophytic intermixed with dominant grass species within right of way.

Photograph 3: View of Unnamed Tributary #1 to Jackson Branch (UTJB-1) upstream of IH 635 where it flows under IH 635. View is to the east.

Photograph 4: View of Unnamed Tributary #1 to Jackson Branch (UTJB-1) downstream of IH 635 where it flows away from IH 635. View is to the west.

Water-related Project Area Photographs
(Photos Taken between April 27 and May 3, 2016)
IH 635 from US 75 to IH 30
Dallas County, Texas
CSJ: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144

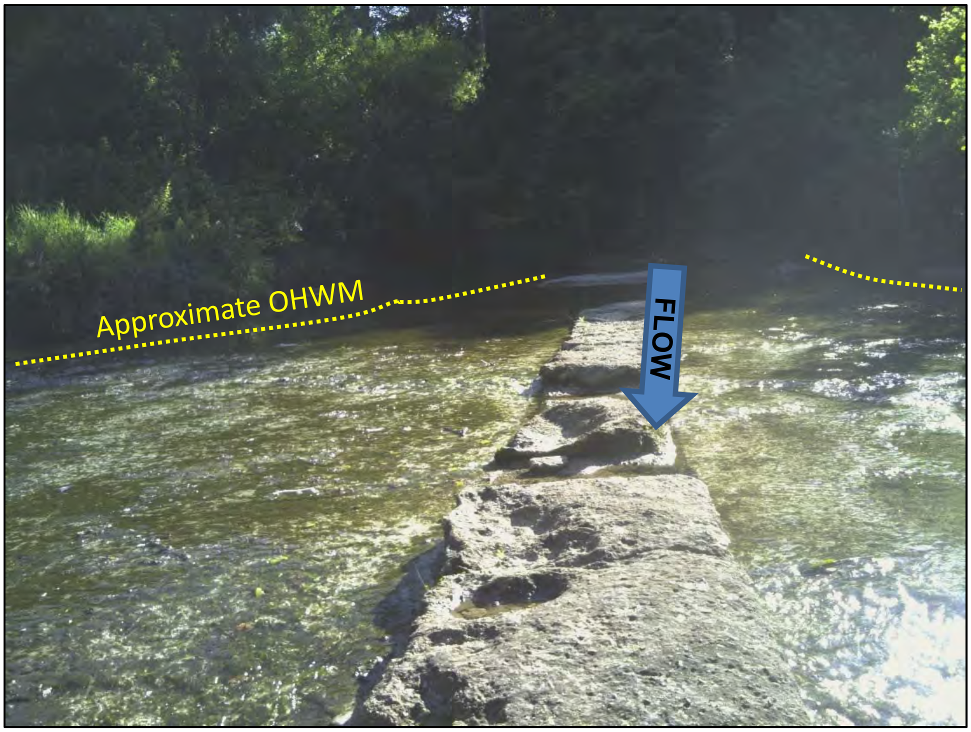
Photograph 5: View of cutoff channel of Jackson Branch (UTJB-2). Photo of upstream where the stream outflows from a large culvert. View is to the northwest.



Photograph 6: View of cutoff channel of Jackson Branch (UTJB-2). Photo in the downstream direction from the culvert outfall. View is to the southeast.

Photograph 7: Upstream view of the ephemeral Unnamed Tributary #3 to Jackson Branch (UTJB-3) just northeast of IH 635. View is to the east.

Photograph 8: View in the downstream direction of the ephemeral Unnamed Tributary #3 to Jackson Branch (UTJB-3). View is to the west.



Photograph 9: Representative view of Jackson Branch upstream IH 635. View is to the northeast.

Photograph 10: Representative view of Jackson Branch that passes under IH 635 through box culverts. View is to the southwest.

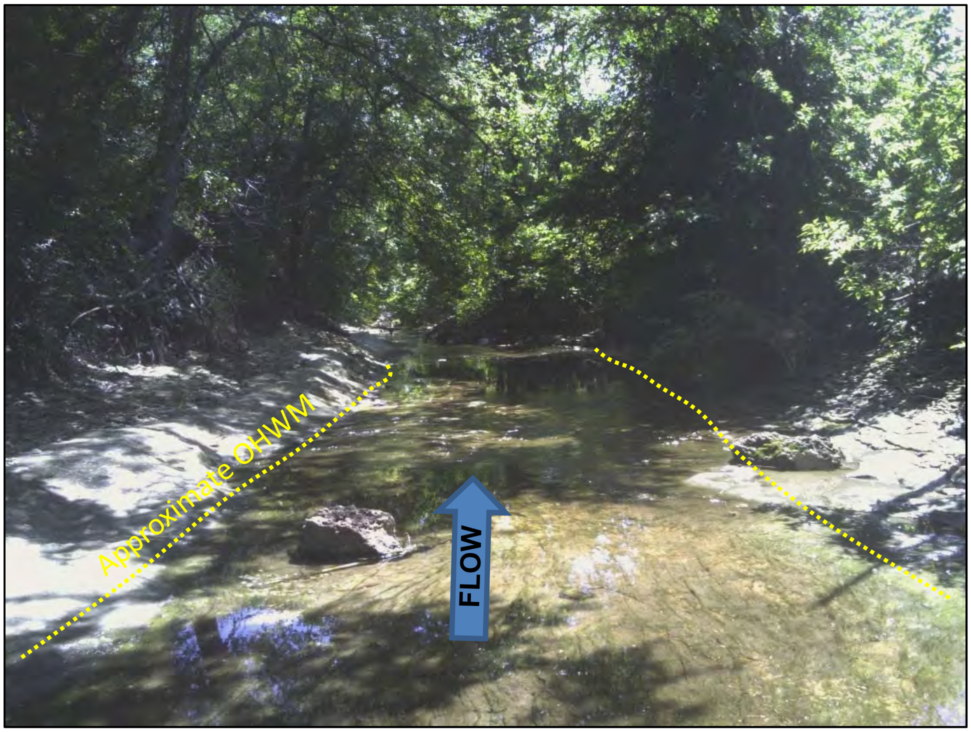
Photograph 11: Representative view of the Dixon Branch upstream of IH 635 showing progression into box culvert below IH 635. View is to the south.

Photograph 12: Representative view of the Dixon Branch downstream of IH 635. View is to the south.

Water-related Project Area Photographs
(Photos Taken between April 27 and May 3, 2016)
IH 635 from US 75 to IH 30
Dallas County, Texas
CSJ: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144

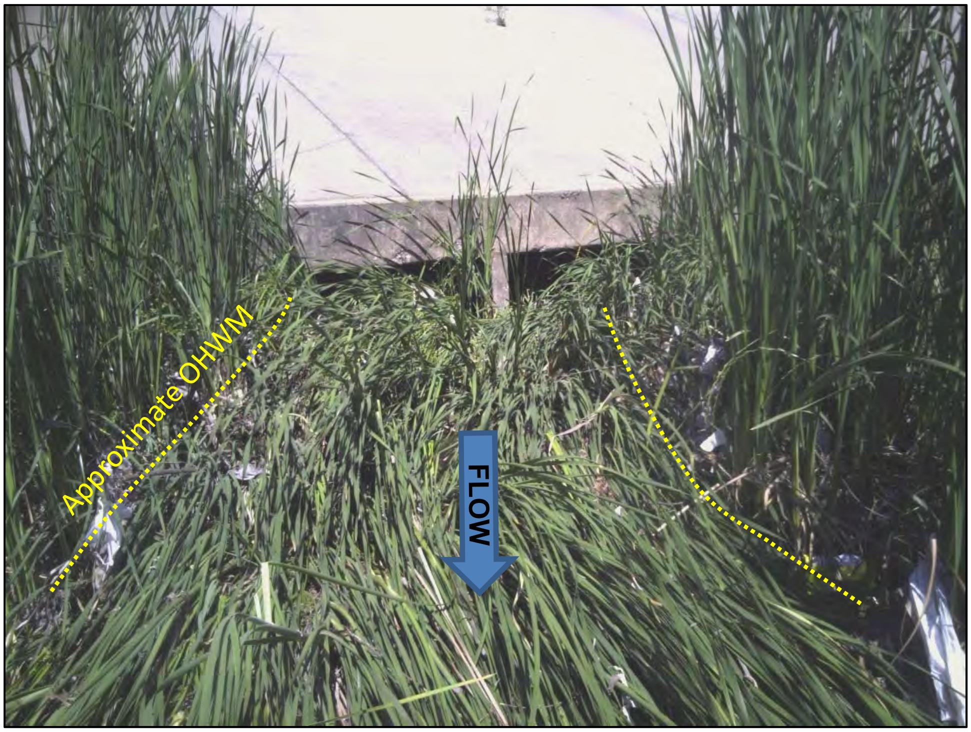
Photograph 13: Representative view of Unnamed Tributary to Dixon Branch #1 (UTDB-1) upstream of IH 635 progressing through box culvert. View is to the south.

Photograph 14: Representative view of Unnamed Tributary to Dixon Branch #1 (UTDB-1) downstream of IH 635 progressing from box culvert below Walnut Hill Lane. View is to the north.



Photograph 15: Representative view of Unnamed Tributary to Dixon Branch #1 (UTDB-1) downstream of eastbound service road to IH 635. View is to the south.

Photograph 16: Representative view of emergent wetland abutting Unnamed Tributary to Dixon Branch #1 (UTDB1-EW). Feature located south of Kingsley Road. View is to the south.



Photograph 17: Representative view of Unnamed Tributary to Dixon Branch #2 (UTDB-2) downstream of IH 635 progressing from box culvert. View is to the northeast.

Photograph 18: Representative view of Unnamed Tributary to Long Branch #1 (UTLB-1) downstream of Northwest Highway and south of IH 635. View is to the southeast.

Photograph 19: Representative view of Unnamed Tributary to Long Branch #1 (UTLB-1) upstream of Northwest Highway and south of IH 635. View is to the northwest.

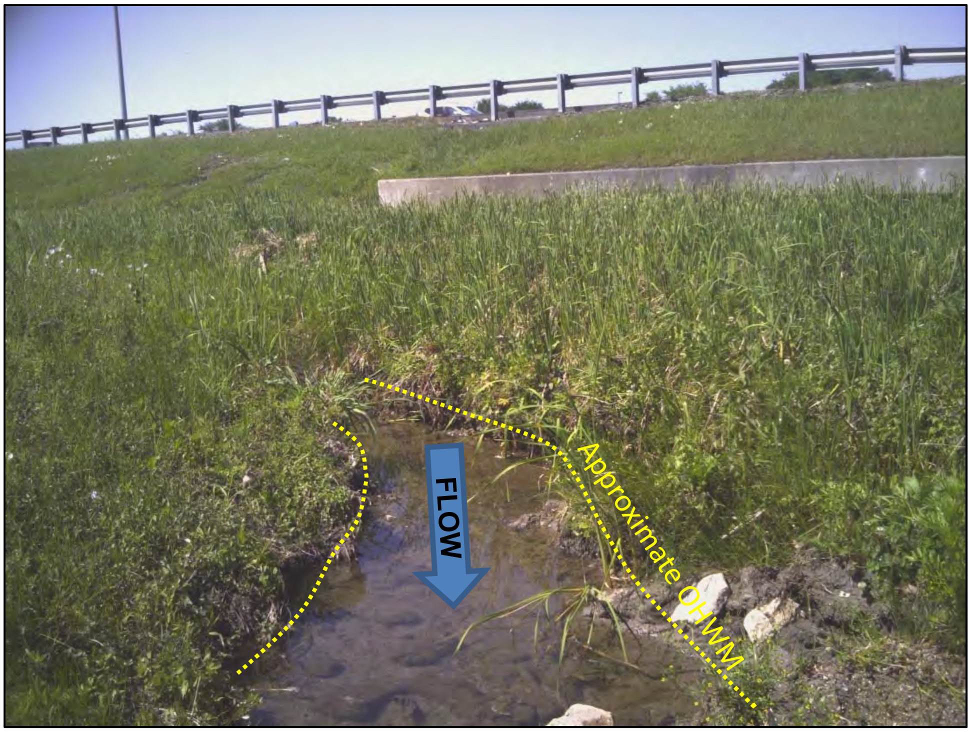
Photograph 20: Representative view of Long Branch crossing #1 upstream of Northwest Highway progressing through box culvert. This segment illustrates natural channel conditions. View is to the south.

Photograph 21: Representative view of Long Branch crossing #1 downstream of Northwest Highway progressing to box culvert under IH 635 service road. This segment is lined by articulated concrete blocks. View is to the south.

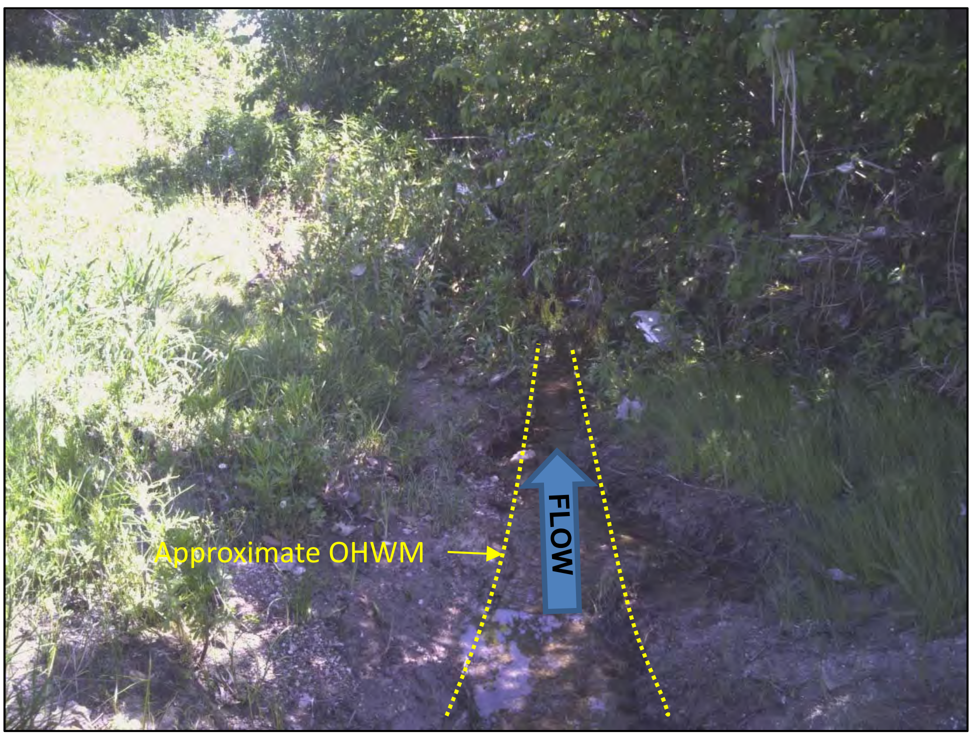
Photograph 22: Representative view of Long Branch crossing #1 downstream of IH 635 service road progressing to box culvert under IH 635. This segment is lined by articulated concrete blocks. View is to the northwest.

Photograph 23: Representative view of Long Branch crossing #1 downstream of IH 635 progressing from box culvert under IH 635. This segment regains natural channel conditions. View is to the north.

Water-related Project Area Photographs
(Photos Taken between April 27 and May 3, 2016)
IH 635 from US 75 to IH 30
Dallas County, Texas
CSJ: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144



Photograph 24: Representative view of Unnamed Tributary to Long Branch #2 (UTLB-2) downstream of IH 635 progressing from box culvert. View is to the north.



Photograph 25: Representative view of Unnamed Tributary to Long Branch #2 (UTLB-2) downstream of IH 635 progressing outside of the right of way. View is to the north.

Photograph 26: Representative view of Long Branch crossing #2 at La Prada Drive flowing from an impoundment through concrete/rock rip rap progressing under Woodmeadow Parkway. View is to the southwest.

Photograph 27: Representative view of Long Branch crossing #2 downstream of Woodmeadow Parkway progressing through box culverts below La Prada Drive within a natural channel. View is to the southeast.

Photograph 28: Representative view of Long Branch crossing #2 downstream of La Prada Drive progressing towards of IH 635. The stream is restricted within a concreted drainage channel View is to the east.

Photograph 29: Representative view of Long Branch crossing #2 downstream of IH 635 progressing from box culvert. Stream transitions from concreted channel to natural condition. View is to the west.

Water-related Project Area Photographs

(Photos Taken between April 27 and May 3, 2016)

IH 635 from US 75 to IH 30

Dallas County, Texas

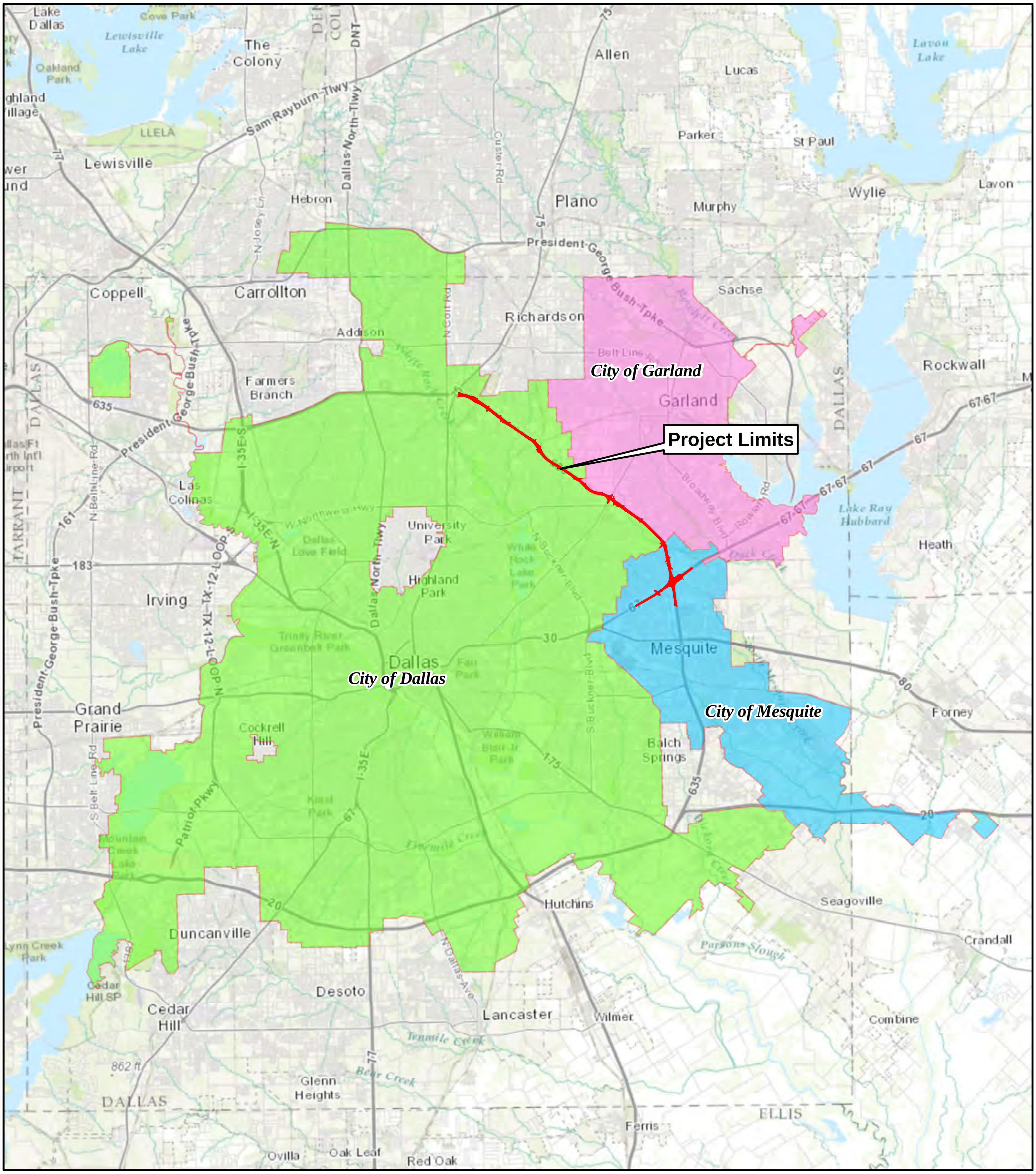
CSJ: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144

Photograph 30: Representative view of Unnamed Tributary to Long Branch #3 (UTLB-3) upstream of IH 635 progressing through box culvert. Channel is fully concrete lined. View is to the east.

Photograph 31: Representative view of Unnamed Tributary to Long Branch #3 (UTLB-3) downstream of IH 635 progressing from box to pipe culvert below downstream (east) of IH 635. View is to the east.

Photograph 32: Representative view of South Mesquite Creek downstream of the IH 30 service road progressing through a box culvert. Channel is silted in within a portion of the concrete-lined outfall. View is to the north.

Photograph 33: Representative view of South Mesquite Creek downstream of the IH 30 service road progressing outside of the right of way into a concrete lined channel. View is to the south.



Legend

- Project Limits
- City of Dallas
- City of Garland
- City of Mesquite

MS4 Area Map

IH 635 from US 75 to IH 30
Dallas County, Texas

CSJs: 2374-01-137, 2374-01-180, 2374-01-183,
2374-02-053, & 2374-02-144

N W E S

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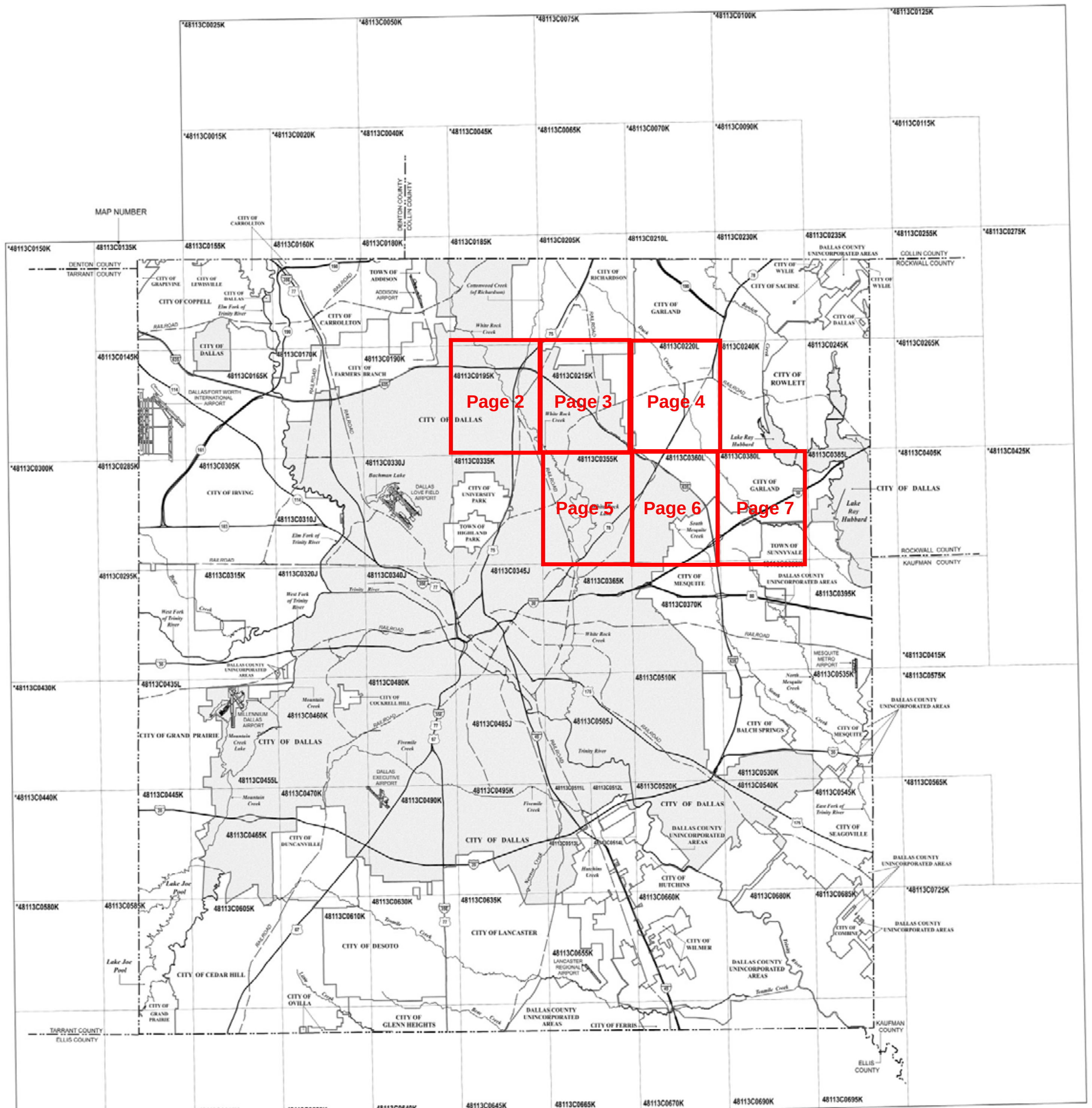
SCALE IN MILES

Source of Base Map: Esri



*PANEL NOT PRINTED - AREA OUTSIDE COUNTY BOUNDARY

MAP REPOSITORIES

(Maps available for reference only, not for distribution.)

ADDISON, TOWN OF:
Public Works Department
16801 Westgrove Drive
Addsion, Texas 75001

BALCH SPRINGS, CITY OF:
Public Works Department
3117 Hickory Tree Road
Balch Springs, Texas 75180

CARROLLTON, CITY OF:
City Engineering Department
1945 East Jackson Road
Carrollton, Texas 75006

CEDAR HILL, CITY OF:
City Hall
502 Cedar Street
Cedar Hill, Texas 75104

COCKRELL HILL, CITY OF:
City Hall
Department of Public Works
4125 West Clarendon Drive
Cockrell Hill, Texas 75211

COMBINE, CITY OF:
City Hall
123 Davis Road
Combine, Texas 75159

COPPELL, CITY OF:
City Engineering Department
255 Parkway Boulevard
Coppell, Texas 75019

DALLAS COUNTY
(UNINCORPORATED AREAS):
Dallas County Records Building
509 Main Street
Dallas, Texas 75202

DALLAS, CITY OF:
Department of Public Works
320 East Jefferson Boulevard
Room 321
Dallas, Texas 75203

DESOTO, CITY OF:
Development Services Department
211 East Pleasant Run Road
Building A
Desoto, Texas 75115

DUNCANVILLE, CITY OF:
City Hall
203 East Wheatland Road
Duncanville, Texas 75116

FARMERS BRANCH, CITY OF:
City Hall
13000 William Dodson Parkway
Farmers Branch, Texas 75234

FERRIS, CITY OF:
City Hall
100 Town Plaza
Ferris, Texas 75125

GARLAND, CITY OF:
City Hall
800 Main Street
Garland, Texas 75040

GLENN HEIGHTS, CITY OF:
City Hall
1938 South Hampton Road
Glenn Heights, Texas 75154

GRAND PRAIRIE, CITY OF:
City Development Center
206 West Church Street
Grand Prairie, Texas 75050

GRAPEVINE, CITY OF:
City Hall
413 South Main Street
Grapevine, Texas 76051

HIGHLAND PARK, TOWN OF:
Public Works Department
4700 Drexel Drive
Highland Park, Texas 75205

HUTCHINS, CITY OF:
City Hall
321 North Main Street
Hutchins, Texas 75141

IRVING, CITY OF:
Public Works Department
825 West Irving Boulevard
Irving, Texas 75060

LANCASTER, CITY OF:
City Hall
211 North Henry Street
Lancaster, Texas 75146

LEWISVILLE, CITY OF:
City Hall
1197 West Main Street
Lewisville, Texas 75067

MESQUITE, CITY OF:
City Engineering Services
1515 North Galloway Avenue
Mesquite, Texas 75185

OVILLA, CITY OF:
City Hall
105 South Cockrell Hill Road
Ovilla, Texas 75154

RICHARDSON, CITY OF:
Engineering Office
411 West Arapaho Road
Room 204
Richardson, Texas 75080

ROWLETT, CITY OF:
City Hall
4000 Main Street
Rowlett, Texas 75088

SACHSE, CITY OF:
City Hall
3815 Sachse Road
Sachse, Texas 75048

SEAGOVILLE, CITY OF:
City Hall
702 North Highway 175
Seagoville, Texas 75159

SUNNYVALE, TOWN OF:
Town Hall
537 Long Creek Road
Sunnyvale, Texas 75182

UNIVERSITY PARK, CITY OF:
Public Works Department
3800 University Boulevard
University Park, Texas 75205

WILMER, CITY OF:
City Hall
128 North Dallas Avenue
Wilmer, Texas 75172

WYLIE, CITY OF:
City Hall
300 Country Club Road
Wylie, Texas 75098

LISTING OF COMMUNITIES

COMMUNITY NAME	COMMUNITY NUMBER	LOCATED ON PANELS	INITIAL NFIP MAP DATE	INITIAL FIRM DATE	MOST RECENT FIRM PANEL DATE
ADDISON, TOWN OF	481089	0180, 0185, 0190	October 29, 1976	July 16, 1980	July 7, 2014
BALCH SPRINGS, CITY OF	480166	0510, 0530	March 8, 1974	September 3,1980	July 7, 2014
CARROLLTON, CITY OF	480167	0155, 0160, 0165, 0170, 0180	June 28, 1974	July 16, 1980	July 7, 2014
CEDAR HILL, CITY OF	480168	0465, 0585, 0595, 0605, 0610, 0615, 0620	March 1, 1974	April 1, 1981	July 7, 2014
COCKRELL HILL, CITY OF	480169	0460	December 7, 1973	August 23, 2001	July 7, 2014
COMBINE, CITY OF	480408	0685	July 2, 1976	August 23, 2001	July 7, 2014
COPPELL, CITY OF	480170	0135, 0145, 0155, 0160, 0165, 0170	March 8, 1974	August 1, 1980	July 7, 2014
DALLAS COUNTY (UNINCORPORATED AREAS)	480165	0215, 0230, 0235, 0240, 0310, 0315, 0320, 0380, 0390, 0455, 0460, 0465, 0490, 0511, 0512, 0513, 0514, 0520, 0530, 0535, 0540, 0545, 0620, 0630, 0635, 0640, 0645, 0655, 0660, 0665, 0670, 0680, 0685, 0690, 0695	September 1, 1970	July 19, 1982	July 7, 2014
DALLAS, CITY OF	480171	0155, 0165, 0170, 0180, 0185, 0190, 0195, 0205, 0215, 0220, 0235, 0240, 0245, 0310, 0320, 0330, 0335, 0340, 0345, 0355 0360, 0365, 0370, 0380, 0385, 0395, 0455, 0460, 0465, 0470 0480, 0485, 0490, 0495, 0505, 0510, 0511, 0512, 0513, 0520 0530, 0535, 0540, 0545, 0605, 0635, 0655	January 10, 1975	March 16, 1983	July 7, 2014
DESOTO, CITY OF	480172	0470, 0490, 0610, 0630	August 2, 1974	May 5, 1981	July 7, 2014
DUNCANVILLE, CITY OF	480173	0465, 0470, 0605, 0610	February 8, 1974	April 15, 1981	July 7, 2014
FARMERS BRANCH, CITY OF	480174	0160, 0165, 0170, 0180, 0190	April 12, 1974	February 15, 1978	July 7, 2014
FERRIS, CITY OF	481076	0665, 0670	February 1, 1974	August 22, 1978	July 7, 2014
GARLAND, CITY OF	485471	0210, 0215, 0220, 0230, 0235, 0240, 0360, 0380, 0385	*August 11, 1970	December 31, 1974	July 7, 2014
GLENN HEIGHTS, CITY OF	481265	0610, 0620, 0630, 0640	November 19, 1976	July 16, 1980	July 7, 2014
GRAND PRAIRIE, CITY OF	485472	0285, 0295, 0305, 0315, 0320, 0435, 0445, 0455, 0460, 0465, 0585, 0595, 0605	July 6, 1973	December 31, 1974	July 7, 2014
GRAPEVINE, CITY OF	480598	0135, 0145	June 28, 1974	November 17, 1982	July 7, 2014
HIGHLAND PARK, TOWN OF	480178	0330, 0335	May 3, 1974	July 16, 1979	July 7, 2014
HUTCHINS, CITY OF	480179	0511, 0512, 0513 0514, 0520, 0655	March 22, 1974	May 1, 1980	July 7, 2014
IRVING, CITY OF	480180	0135, 0145, 0155, 0160, 0165, 0170, 0285, 0295, 0305, 0310, 0315, 0320	June 19, 1970	November 19, 1980	July 7, 2014
LANCASTER, CITY OF	480182	0490, 0495, 0630, 0635, 0640, 0645, 0655	June 7, 1974	August 3, 1981	July 7, 2014
LEWISVILLE, CITY OF	480195	0135, 0155	March 15, 1974	October 18, 1988	July 7, 2014
MESQUITE, CITY OF	485490	0360, 0370, 0380, 0390, 0395, 0510, 0530, 0535, 0545	July 31, 1971	December 31, 1974	July 7, 2014
OVILLA, CITY OF	481155	0620, 0640	July 11, 1975	April 15, 1980	July 7, 2014
RICHARDSON, CITY OF	480184	0185, 0205, 0210, 0215, 0220	May 24, 1974	December 4, 1979	July 7, 2014
ROWLETT, CITY OF	480185	0230, 0235, 0240, 0245, 0380, 0385	July 19, 1974	September 1, 1978	July 7, 2014
SACHSE, CITY OF	480186	0230, 0235	February 22, 1974	September 1, 1978	July 7, 2014
SEAGOVILLE, CITY OF	480187	0535, 0540, 0545, 0680, 0685	February 1, 1974	June 15, 1981	July 7, 2014
SUNNYVALE, TOWN OF	480188	0380, 0385, 0390, 0395	June 28, 1974	February 1, 1980	July 7, 2014
UNIVERSITY PARK, CITY OF	480189	0330, 0335	May 24, 1974	November 15, 1979	July 7, 2014
WILMER, CITY OF	480190	0655, 0660, 0665, 0670, 0680, 0690	February 1, 1974	September 17, 1980	July 7, 2014
WYLIE, CITY OF	480759	0230, 0235	November 12, 1976	June 4, 1980	July 7, 2014

*Initial Identification is August 7, 1970. This is because on Garland's FHBM of August 11, 1970 is a note stating that the effective date of eligibility under the Emergency Flood Insurance Program is August 7,1970, four days before the FHBM became Effective.

FIRM Panel Dates For Printed Panels of Dallas County, TX And Incorporated Areas

Panel	Effective Date	Panel	Effective Date	Panel	Effective Date	Panel	Effective Date	Panel	Effective Date	Panel	Effective Date	Panel	Effective Date
0135K	July 7, 2014	0210L	July 7, 2014	0315K	July 7, 2014	0385L	July 7, 2014	0490K	July 7, 2014	0540K	July 7, 2014	0645K	July 7, 2014
0145K	July 7, 2014	0215K	July 7, 2014	0320J	August 23, 2001	0390K	July 7, 2014	0495K	July 7, 2014	0545K	July 7, 2014	0655K	July 7, 2014
0155K	July 7, 2014	0220L	July 7, 2014	0330J	August 23, 2001	0395K	July 7, 2014	0505J	August 23, 2001	0585K	July 7, 2014	0660K	July 7, 2014
0160K	July 7, 2014	0230K	July 7, 2014	0335K	July 7, 2014	0435L	July 7, 2014	0510K	July 7, 2014	0595K	July 7, 2014	0665K	July 7, 2014
0165K	July 7, 2014	0235K	July 7, 2014	0340J	August 23, 2001	0445K	July 7, 2014	0511L	July 7, 2014	0605K	July 7, 2014	0670K	July 7, 2014
0170K	July 7, 2014	0240K	July 7, 2014	0345J	August 23, 2001	0455L	July 7, 2014	0512L	July 7, 2014	0610K	July 7, 2014	0680K	July 7, 2014
0180K	July 7, 2014	0245K	July 7, 2014	0355K	July 7, 2014	0460K	July 7, 2014	0513L	July 7, 2014	0615K	July 7, 2014	0685K	July 7, 2014
0185K	July 7, 2014	0285K	July 7, 2014	0360L	July 7, 2014	0465K	July 7, 2014	0514L	July 7, 2014	0620K	July 7, 2014	0690K	July 7, 2014
0190K	July 7, 2014	0295K	July 7, 2014	0365K	July 7, 2014	0470K	July 7, 2014	0520K	July 7, 2014	0630K	July 7, 2014	0695K	July 7, 2014
0195K	July 7, 2014	0305K	July 7, 2014	0370K	July 7, 2014	0480K	July 7, 2014	0530K	July 7, 2014	0635K	July 7, 2014		
0205K	July 7, 2014	0310J	August 23, 2001	0380L	July 7, 2014	0485J	August 23, 2001	0535K	July 7, 2014	0640K	July 7, 2014		

NOTE TO USER

Future revisions to this FIRM Index will only be issued to communities that are located on FIRM panels being revised. This FIRM Index therefore remains valid for FIRM panels dated July 7, 2014 or earlier. Please refer to the "MOST RECENT FIRM PANEL DATE" column in the Listing of Communities table to determine the most recent FIRM Index date for each community.

MAP DATES

This FIRM Index displays the map date for each FIRM panel at the time that this Index was printed. Because this Index may not be distributed to unaffected communities in subsequent revisions, users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website at http://msc.fema.gov, or by calling the FEMA Map Information eXchange (FMIX) at 1-877-336-2627.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the FMIX at the number listed above.

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

MAP INDEX

FIRM

FLOOD INSURANCE RATE MAP

DALLAS COUNTY, TEXAS
AND INCORPORATED AREAS

(SEE LISTING OF COMMUNITIES TABLE)

MAP INDEX

PANELS PRINTED: 135, 145, 155, 160, 165, 170, 180, 185, 190, 195, 205, 210, 215, 220, 230, 235, 240, 245, 285, 295, 305, 310, 315, 320, 330, 335, 340, 345, 355, 360, 365, 370, 380, 385, 390, 395, 435, 445, 455, 460, 465, 470, 480, 485, 490, 495, 505, 510, 511, 512, 513, 514, 520, 530, 535, 540, 545, 585, 595, 605, 610, 615, 620, 630, 635, 640, 645, 655, 660, 665, 670, 680, 685, 690, 695

MAP NUMBER
48113CIND0D

MAP REVISED
July 7, 2014

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Texas State Plane North Central Zone (FIPS zone 4202). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base Map information shown on this FIRM was provided in digital format by the North Central Texas Council of Governments (NCTCOG). This information was photogrammetrically compiled at a scale of at least 1:24,000 from aerial photography dated 2001.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

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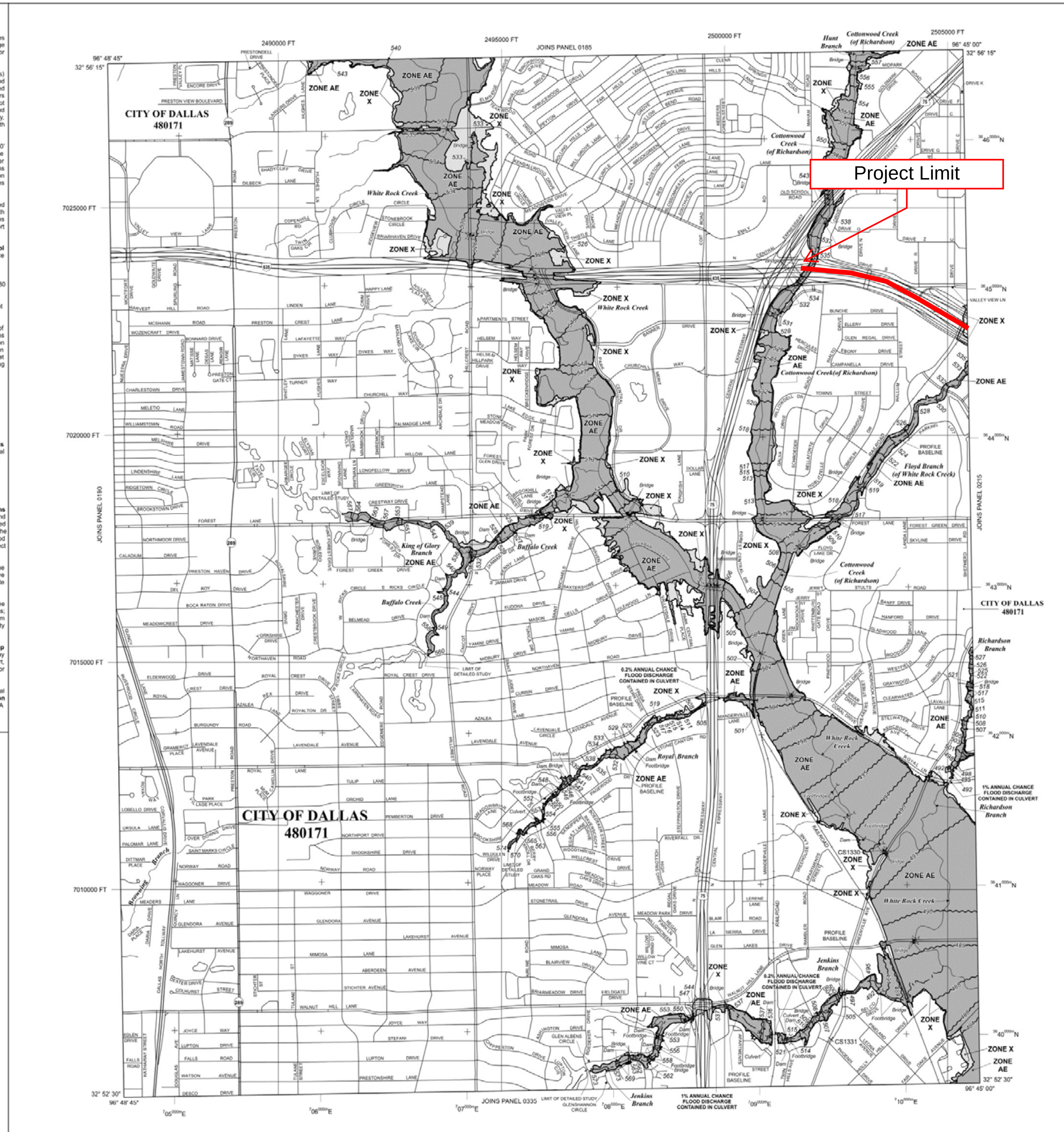

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.

~~ 513 ~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - - 23	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
3100000 FT	5000-foot ticks: Texas State Plane North Central Zone (FIPS Zone 4202), Lambert Conformal Conic projection
⁴⁹89⁰⁰⁰ᵐN	1000-meter Universal Transverse Mercator grid values, zone 14
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 23, 2001

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
July 7, 2014 - to change Base Flood Elevations, to change Special Flood Hazard Areas, to change floodway, to change zone designations, to reflect updated topographic information, to update map format, to update corporate limits, to add roads and road names and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

N

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0195K

FIRM
FLOOD INSURANCE RATE MAP
DALLAS COUNTY, TEXAS
AND INCORPORATED AREAS

PANEL 195 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DALLAS, CITY OF	480171	0195	K

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48113C0195K

MAP REVISED
JULY 7, 2014

Federal Emergency Management Agency

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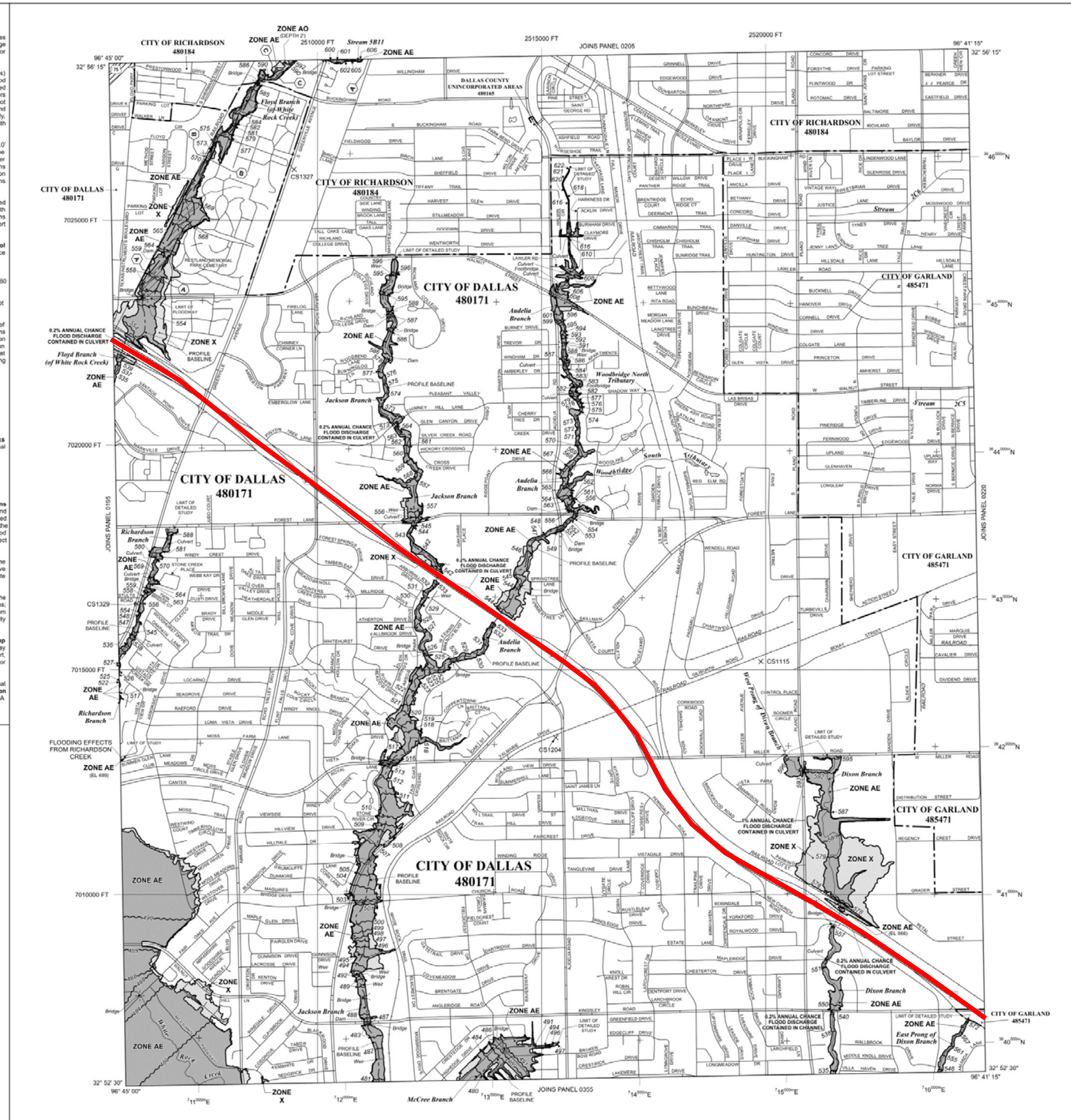

LEGEND

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	0.2% Annual Chance Floodplain Boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
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DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
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EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 23, 2001

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
July 7, 2014 - to change Base Flood Elevations, to change Special Flood Hazard Areas, to change floodway, to change zone designations, to reflect updated topographic information, to update map format, to update corporate limits, to add roads and road names and to incorporate previously issued Letters of Map Revision.

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MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0215K

FIRM
FLOOD INSURANCE RATE MAP
DALLAS COUNTY, TEXAS
AND INCORPORATED AREAS

PANEL 215 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DALLAS, CITY OF	480171	0215	K
DALLAS COUNTY, UNINCORPORATED AREAS	480165	0215	K
GARLAND, CITY OF	485471	0215	K
RICHARDSON, CITY OF	480184	0215	K

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48113C0215K

MAP REVISED
JULY 7, 2014

Federal Emergency Management Agency

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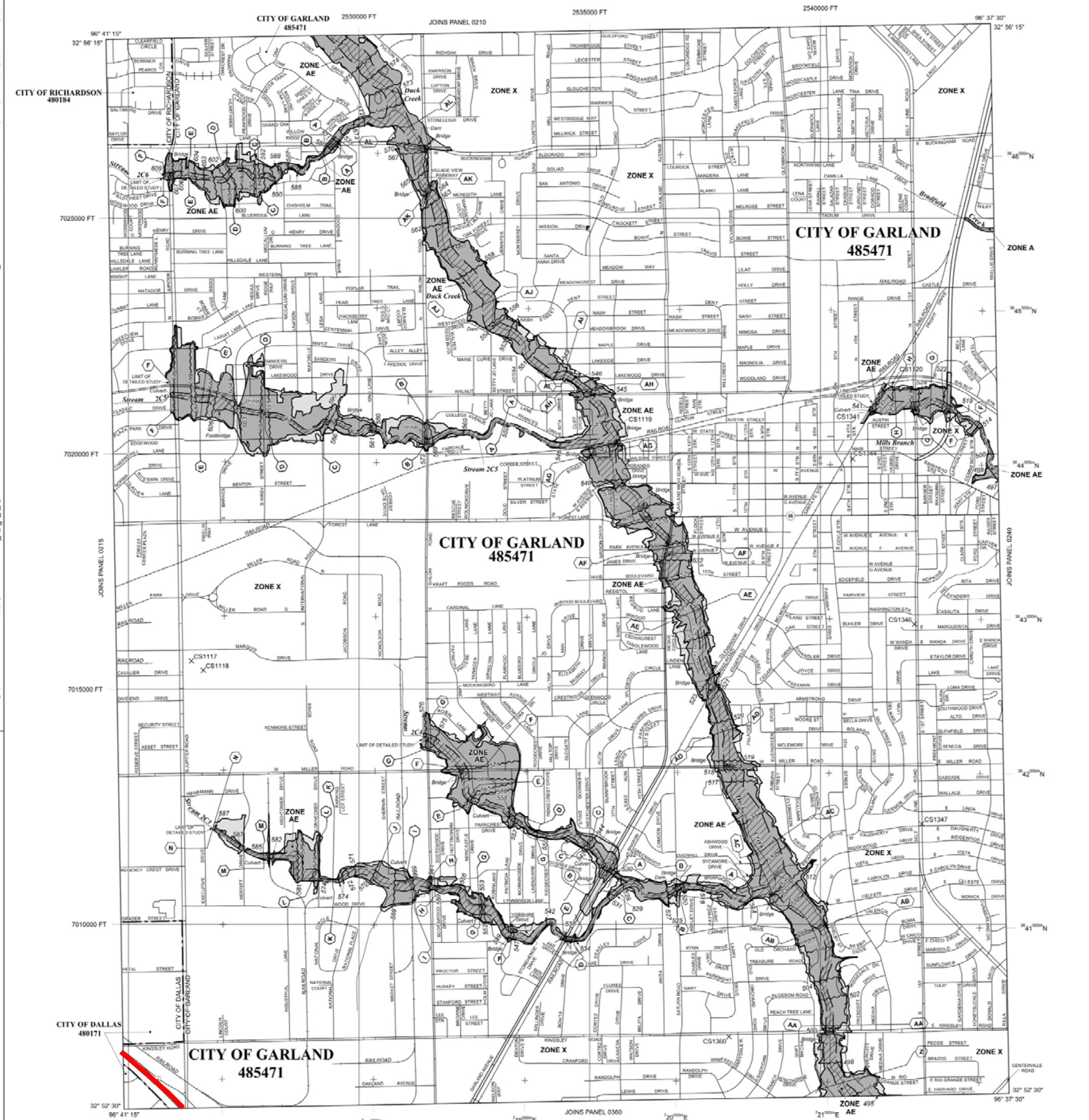

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.

~~ 513 ~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

(A)———(A)	Cross section line
(23)- - - - -(23)	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
3100000 FT	5000-foot ticks: Texas State Plane North Central Zone (FIPS Zone 4202), Lambert Conformal Conic projection
$^{48}89^{000m}$ N	1000-meter Universal Transverse Mercator grid values, zone 14
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 23, 2001

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
February 5, 2003

July 7, 2014 - to change Base Flood Elevations, to change Special Flood Hazard Areas, to change floodway, to change zone designations, to reflect updated topographic information, to update map format, to update corporate limits, to add roads and road names and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0220L

FIRM
FLOOD INSURANCE RATE MAP
DALLAS COUNTY, TEXAS
AND INCORPORATED AREAS

PANEL 220 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DALLAS, CITY OF	480171	0220	L
GARLAND, CITY OF	485471	0220	L
RICHARDSON, CITY OF	480184	0220	L

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48113C0220L

MAP REVISED
JULY 7, 2014

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Texas State Plane North Central Zone (FIPS zone 4202). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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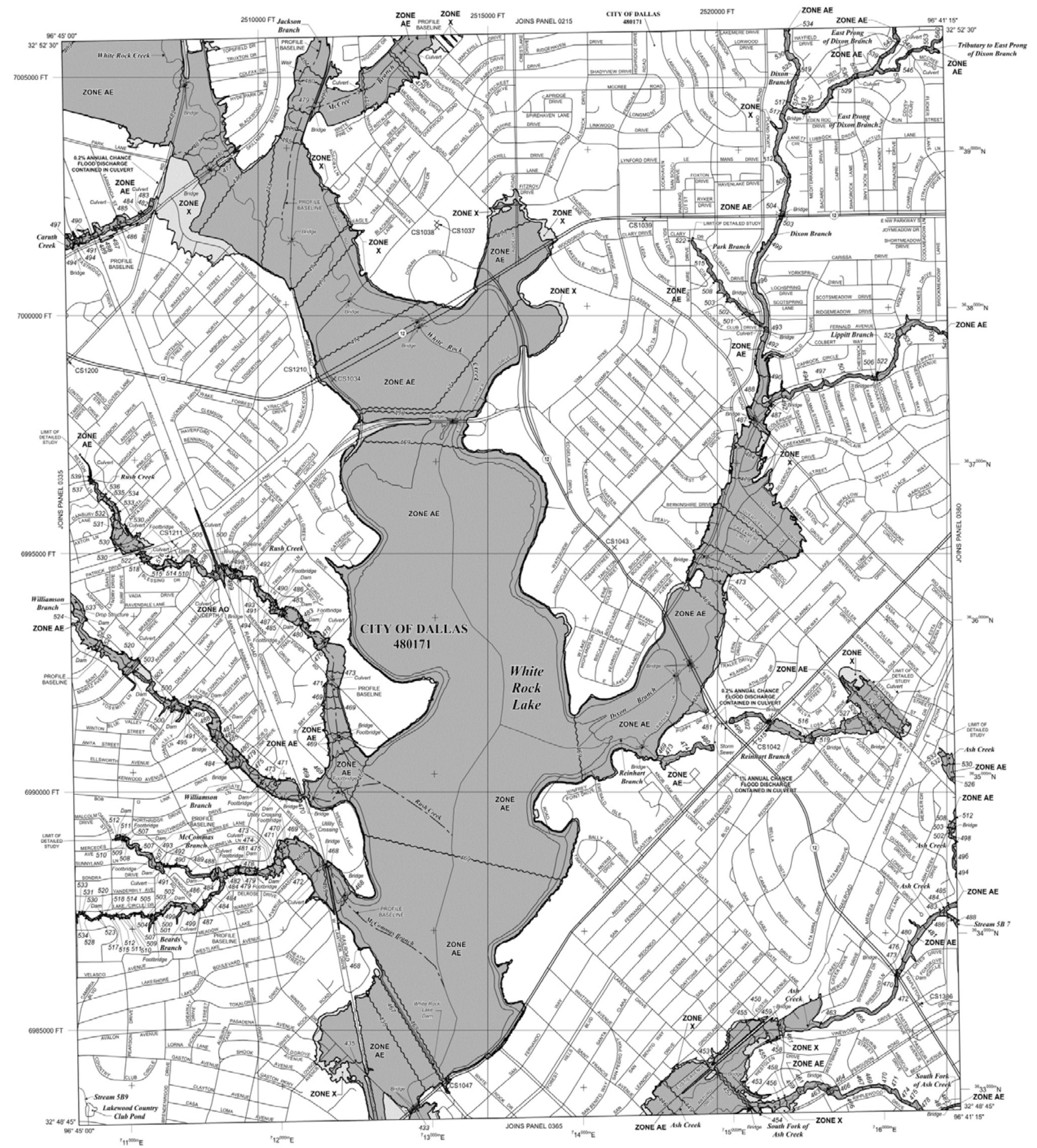

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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ZONE A	No Base Flood Elevations determined.
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ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% Annual Chance Floodplain Boundary
	0.2% Annual Chance Floodplain Boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - - 23	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
3100000 FT	5000-foot ticks: Texas State Plane North Central Zone (FIPS Zone 4202), Lambert Conformal Conic projection
$^{42}89^{000m}$ N	1000-meter Universal Transverse Mercator grid values, zone 14
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 23, 2001

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
July 7, 2014 - to change Base Flood Elevations, to change Special Flood Hazard Areas, to change floodway, to change zone designations, to reflect updated topographic information, to update map format, to update corporate limits, to add roads and road names and to incorporate previously issued Letters of Map Revision.

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MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0355K

FIRM

FLOOD INSURANCE RATE MAP

DALLAS COUNTY, TEXAS
AND INCORPORATED AREAS

PANEL 355 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DALLAS, CITY OF	480171	0355	K

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48113C0355K

MAP REVISED
JULY 7, 2014

Federal Emergency Management Agency

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National Geodetic Survey
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Silver Spring, Maryland 20910-3282
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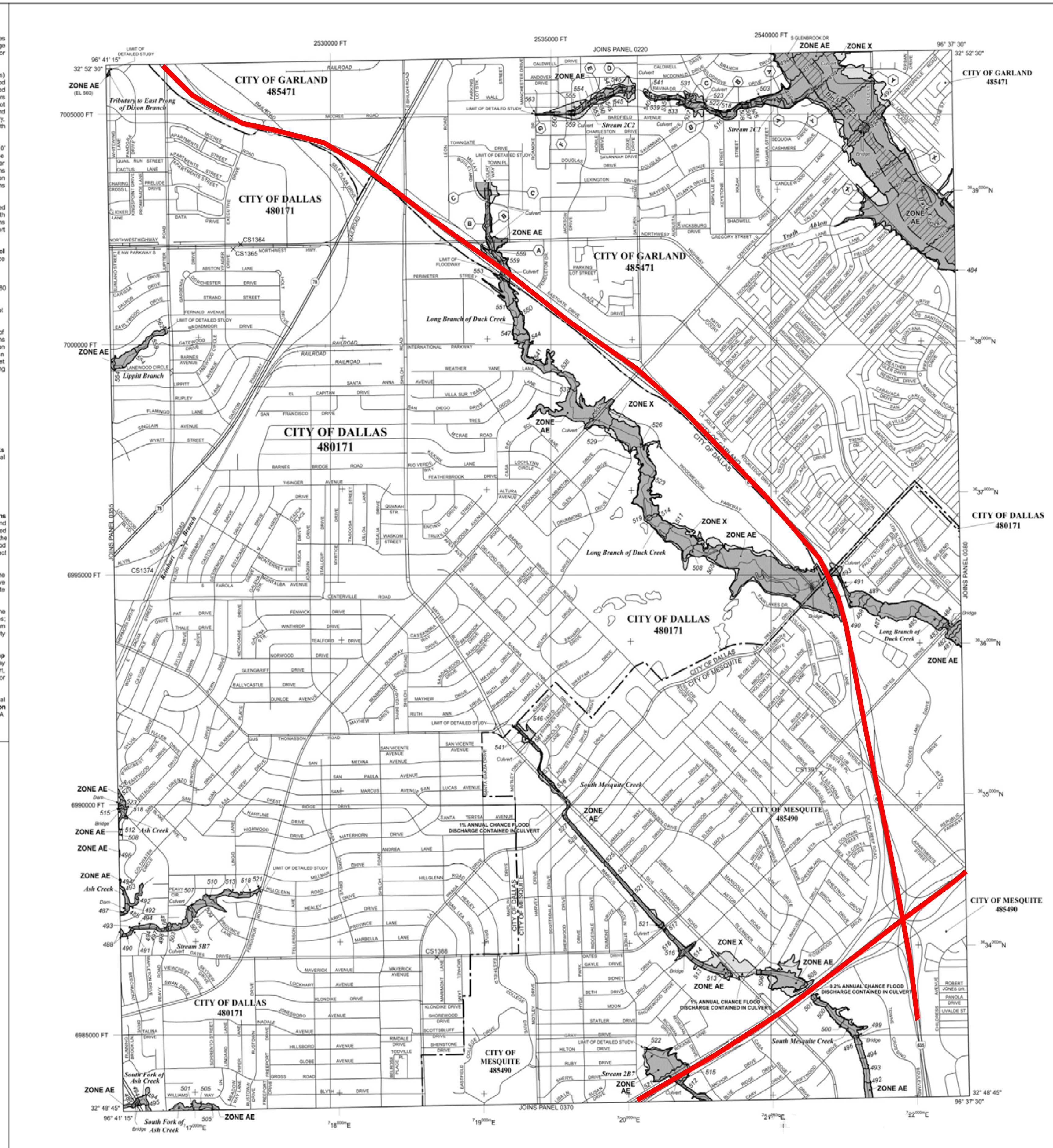

LEGEND

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ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
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COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

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1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.

~~ 513 ~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

(A)———(A)	Cross section line
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$^{45}89^{000m}$ N	1000-meter Universal Transverse Mercator grid values, zone 14
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 23, 2001

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
Feburary 5, 2003
July 7, 2014 - to change Base Flood Elevations, to change Special Flood Hazard Areas, to change floodway, to change zone designations, to reflect updated topographic information, to update map format, to update corporate limits, to add roads and road names and to incorporate previously issued Letters of Map Revision.

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N

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0360L

FIRM
FLOOD INSURANCE RATE MAP
DALLAS COUNTY, TEXAS
AND INCORPORATED AREAS

PANEL 360 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DALLAS, CITY OF	480171	0360	L
GARLAND, CITY OF	485471	0360	L
MESQUITE, CITY OF	485490	0360	L

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48113C0360L

MAP REVISED
JULY 7, 2014

Federal Emergency Management Agency

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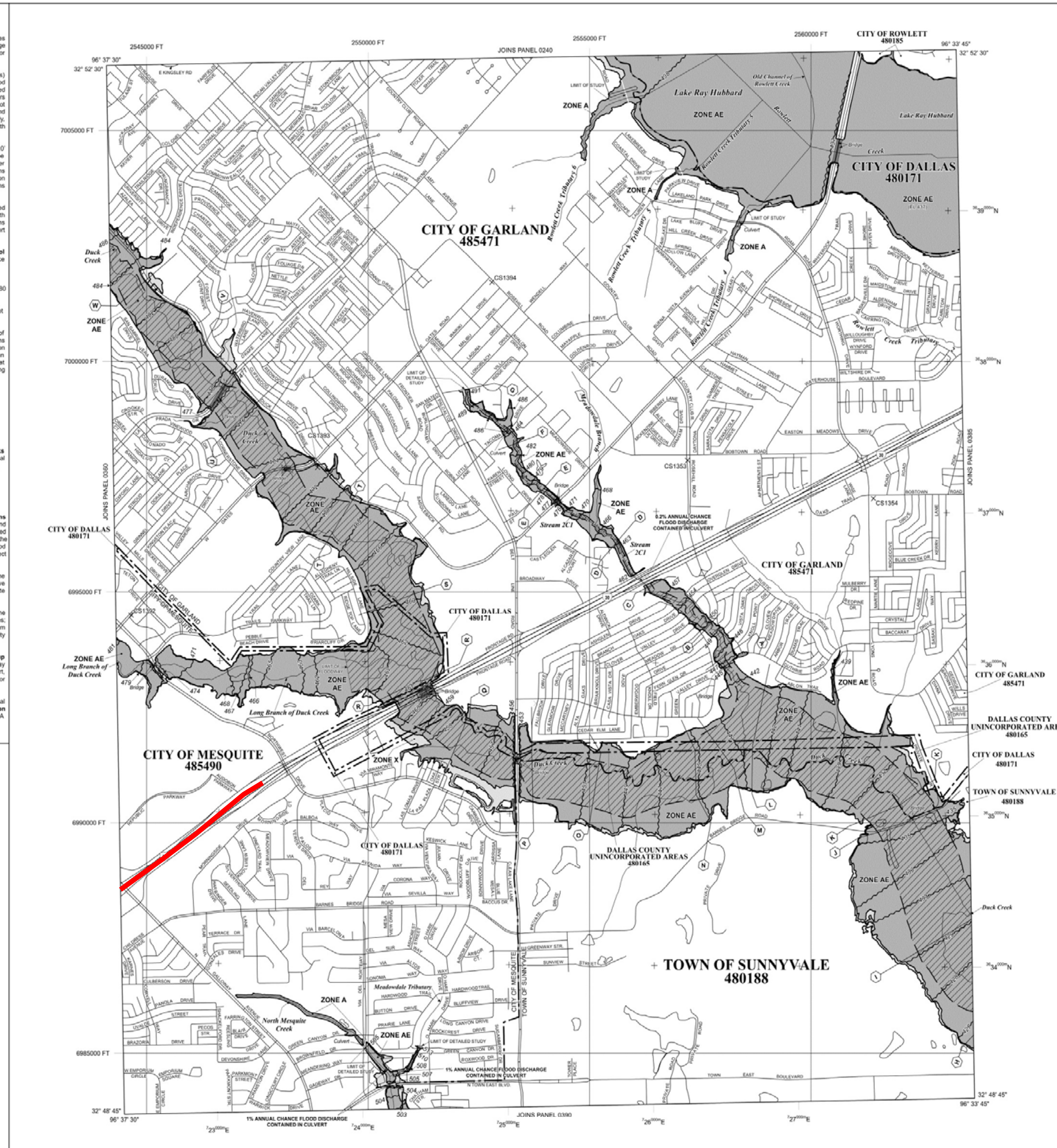
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map,** how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - - 23	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
3100000 FT	5000-foot ticks: Texas State Plane North Central Zone (FIPS Zone 4202), Lambert Conformal Conic projection
$^{42}89^{000m}$ N	1000-meter Universal Transverse Mercator grid values, zone 14
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 23, 2001

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
February 6, 2003
July 7, 2014 - to change Base Flood Elevations, to change Special Flood Hazard Areas, to change floodway, to change zone designations, to reflect updated topographic information, to update map format, to update corporate limits, to add roads and road names and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

N

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0380L

FIRM
FLOOD INSURANCE RATE MAP
DALLAS COUNTY, TEXAS
AND INCORPORATED AREAS

PANEL 380 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DALLAS, CITY OF	480171	0380	L
DALLAS COUNTY, UNINCORPORATED AREAS	480165	0380	L
GARLAND, CITY OF	485471	0380	L
MESQUITE, CITY OF	485490	0380	L
ROWLETT, CITY OF	480185	0380	L
SUNNYVALE, TOWN OF	480188	0380	L

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
48113C0380L

MAP REVISED
JULY 7, 2014

Federal Emergency Management Agency

Stream Data Form #: 1 (Jackson Branch)
Project Name: IH 635 LBJ Ultimate Project

Stream Data Form

CSJ: 2374-01-137 (Main CSJ)

Surveyor(s): C. Sanderson
Date of Field Work: 05/03/2016
USGS Stream Name: Jackson Branch
County/State: Dallas, TX
USGS Topo Quad Name: Garland
Stream Number [303(d) List]: N/A
Associated Wetland(s): N/A
GPS Data: 32.903696N -96.721966W

Stream Type: Perennial
Characteristics
Manipulated/Altered. Explain: Main creek channel is in natural state, areas close to IH 635 are concreted.
Bank Stability (e.g. highly eroding, sloughing banks, etc.):

Stream Flow Direction: Southwest
OHWM Width (ft): 26
OHWM Height (in): 6 - 10

Stream Bottom composition:

☒ Silts ☐ Cobbles ☐ Concrete ☐ Other:
☐ Sands ☒ Bedrock ☐ Muck
☐ Gravel ☐ Vegetation Type: Riparian Percent Cover 80

Aquatic Habitat: Indicate all types present within proposed ROW/project limits.

☐ Sand bar ☐ Sand/Gravel beach/bar ☐ Gravel riffles ☒ Aquatic vegetation
☒ Overhanging trees/shrubs ☐ Deep pool/ hole/ channel ☐ Other:

Stream has the following characteristics:

☒ Bed and banks
☒ OHWM (check all indicators that apply):

☒ clear, natural line impressed on the bank
☒ changes in the character of soil
☒ shelving
☒ vegetation matted down, bent, or absent
☒ leaf litter disturbed or washed away
☒ sediment deposition
☒ water staining
☐ other (list):
☒ the presence of litter and debris
☒ destruction of terrestrial vegetation
☐ the presence of wrack line
☐ sediment sorting
☐ scour
☐ multiple observed or predicted flow events
☐ abrupt change in plant community

Water Quality:

☒ Clear ☐ Slightly Turbid ☐ Turbid ☐ Very Turbid ☐ Oily film ☐ High organic content
☒ Other characteristics (pollutants, etc.) High concentration of urban litter (tires, plastic, paper, etc.)

Aquatic Organisms: List all species observed. This would include waterfowl, fish, snakes, turtles, frogs, invertebrates, etc.

Mosquito Fish (Gambusia spp.), Fathead Minows (Pimephales promelas)

Riparian Vegetation: List species observed.

Trees: American elm (Ulmus americana), hackberry (Celtis laevigata), cottonwood (Populus deltoides), cedar elm (Ulmus crassifolia), green ash (Fraxinus pennsylvanica), China-berry (Melia azedarach), Chinese tallow tree (Sapium sebiferum), Bradford pear (Pyrus calleryana), honey locust (Gleditsia triacanthos)
Forest Understory: Japanese privet (Ligustrum japonicum), Chinese privet (Ligustrum sinense), saw greenbrier (Smilax bona-nox), poison ivy (Toxicodendron radicans), grapevine (Vitis sp.), gum bumelia (Sideroxylon lanuginosum)

T&E Species/Suitable Habitat: List T&E species observed or which species the habitat is suitable for.

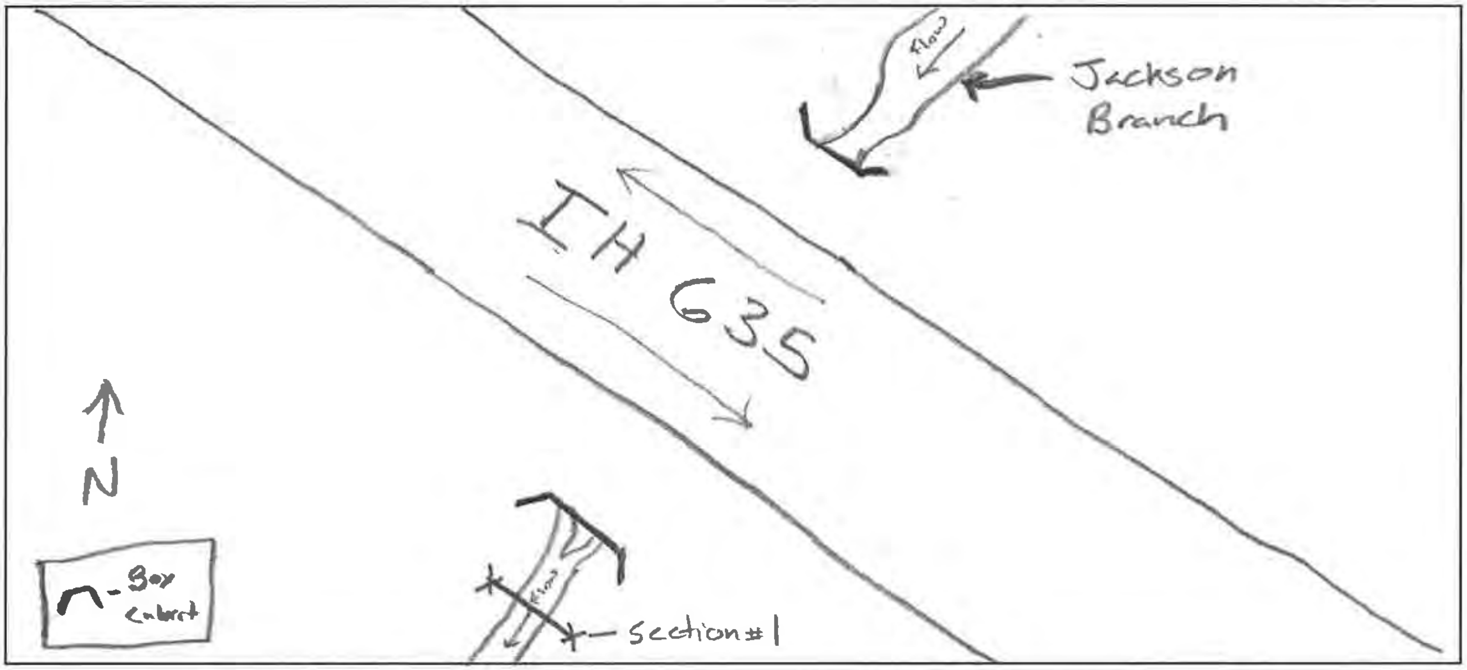
N/A

Stream Data Form #:	1 (Jackson Branch)
Project Name:	IH 635 LBJ Ultimate Project
CSJ:	2374-01-137 (Main CSJ)

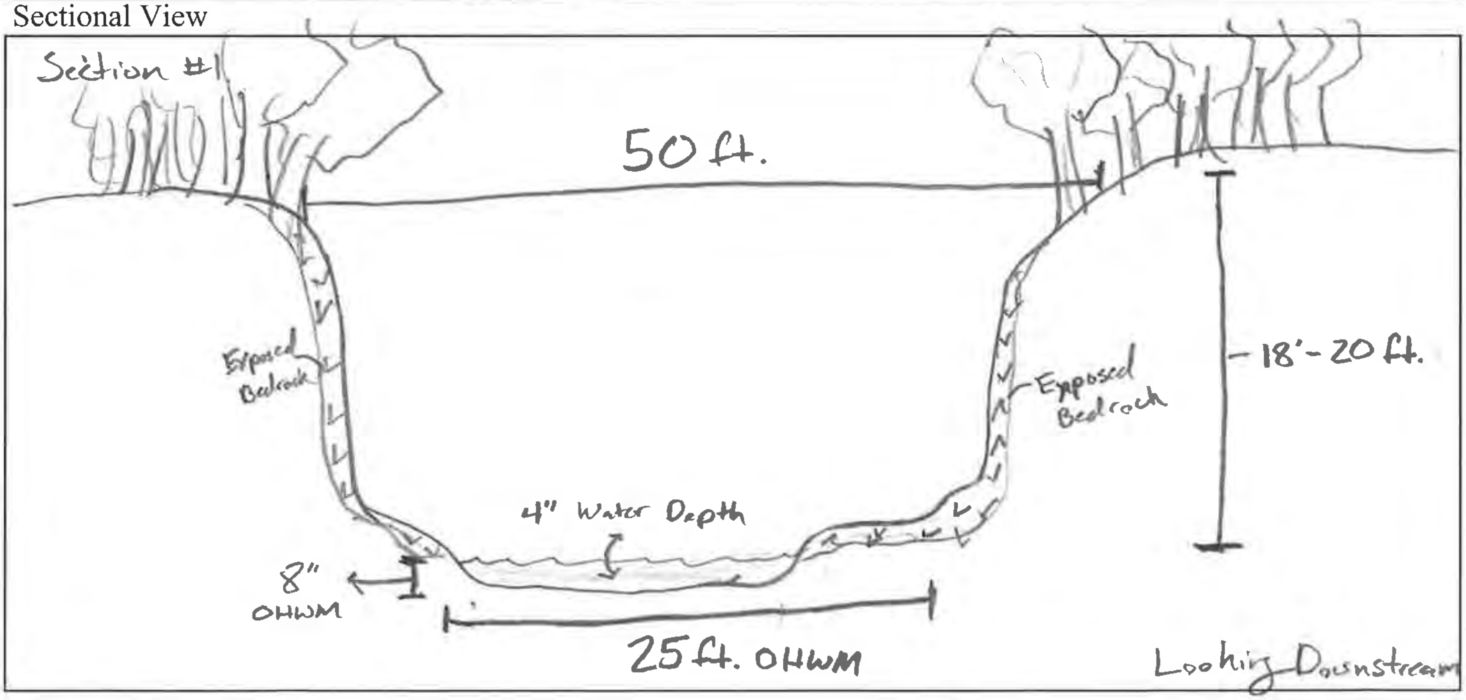
Stream Data Form (continued)
Please provide a plan and section view sketch of the stream channel.
Sketch should include:

- Directional arrow;
- Width of channel from top of bank to top of bank;
- Depth of channel,
- Approximate side slope; and,
- Width of stream from water edge to water edge.

Plan View



Sectional View



Stream Data Form #: 2 (UTJB-1)
Project Name: IH 635 LBJ Ultimate Project

Stream Data Form

CSJ: 2374-01-137 (Main CSJ)

Surveyor(s): C. Sanderson
Date of Field Work: 05/03/2016
USGS Stream Name: Unnamed Tributary 1 to Jackson Branch (UTJB-1)
County/State: Dallas, TX
USGS Topo Quad Name: Garland
Stream Number [303(d) List]: N/A
Associated Wetland(s): N/A
GPS Data: 32.906544N -96.726862W

Stream Type: Intermittent Characteristics
Manipulated/Altered. Explain: Main creek channel is in natural state, areas close to IH 635 are concreted
Bank Stability (e.g. highly eroding, sloughing banks, etc.): Slight erosion
Stream Flow Direction: Southeast
OHWM Width (ft): 12 - 15
OHWM Height (in): 4 - 6

Stream Bottom composition:

☒ Silts ☐ Cobbles ☐ Concrete ☐ Other:
☐ Sands ☒ Bedrock ☐ Muck
☐ Gravel ☐ Vegetation Type: Riparian Percent Cover 80

Aquatic Habitat: Indicate all types present within proposed ROW/project limits.

☐ Sand bar ☐ Sand/Gravel beach/bar ☐ Gravel riffles ☒ Aquatic vegetation
☒ Overhanging trees/shrubs ☐ Deep pool/ hole/ channel ☐ Other:

Stream has the following characteristics:

☒ Bed and banks
☒ OHWM (check all indicators that apply):

- ☒ clear, natural line impressed on the bank
- ☒ changes in the character of soil
- ☒ shelving
- ☒ vegetation matted down, bent, or absent
- ☒ leaf litter disturbed or washed away
- ☒ sediment deposition
- ☒ water staining
- ☐ other (list):
- ☒ the presence of litter and debris
- ☒ destruction of terrestrial vegetation
- ☐ the presence of wrack line
- ☐ sediment sorting
- ☐ scour
- ☐ multiple observed or predicted flow events
- ☐ abrupt change in plant community

Water Quality:

☒ Clear ☐ Slightly Turbid ☐ Turbid ☐ Very Turbid ☐ Oily film ☐ High organic content
☒ Other characteristics (pollutants, etc.) High concentration of urban litter (tires, plastic, paper, etc.)

Aquatic Organisms: List all species observed. This would include waterfowl, fish, snakes, turtles, frogs, invertebrates, etc.

Mosquito Fish (Gambusia spp.), Fathead Minows (Pimephales promelas)

Riparian Vegetation: List species observed.

Trees: American elm (Ulmus americana), cottonwood (Populus deltoides), green ash (Fraxinus pennsylvanica), bois d'arc (Maclura pomifera), black willow (Salix nigra), box elder (Acer negundo), hackberry (Celtis laevigata), red mulberry (Morus rubra), Chinese tallow tree (Sapium sebiferum), rough leaf dogwood (Cornus drummondii), soapberry (Sapindus saponaria var. drummondii), honey locust (Gleditsia triacanthos), live oak (Quercus virginiana)
Forest Understory: Japanese privet (Ligustrum japonicum), Chinese privet (Ligustrum sinense), saw greenbrier (Smilax bona-nox), New Deal weed (Baccharis neglecta), poison ivy (Toxicodendron radicans)

T&E Species/Suitable Habitat: List T&E species observed or which species the habitat is suitable for.

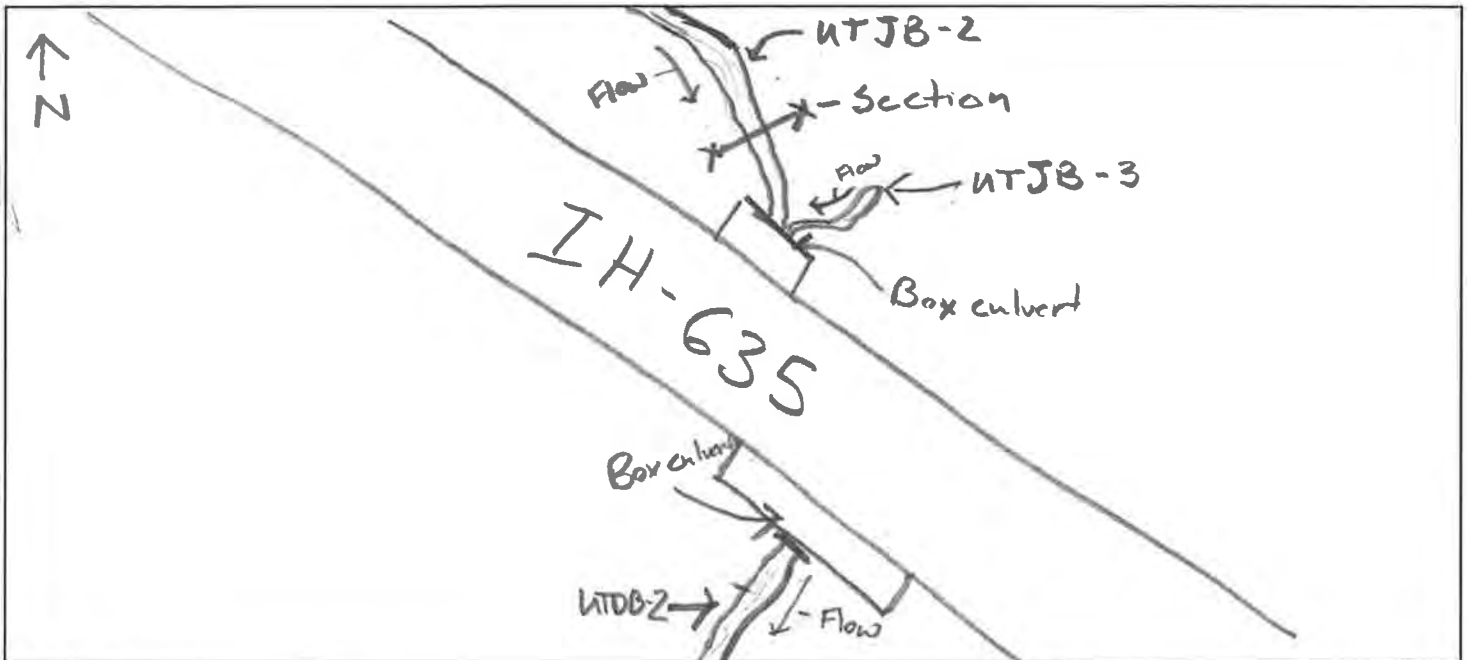
N/A

Stream Data Form #:	2
Project Name:	IH 635 LBJ Ultimate Project
CSJ:	2374-01-137 (Main CSJ)

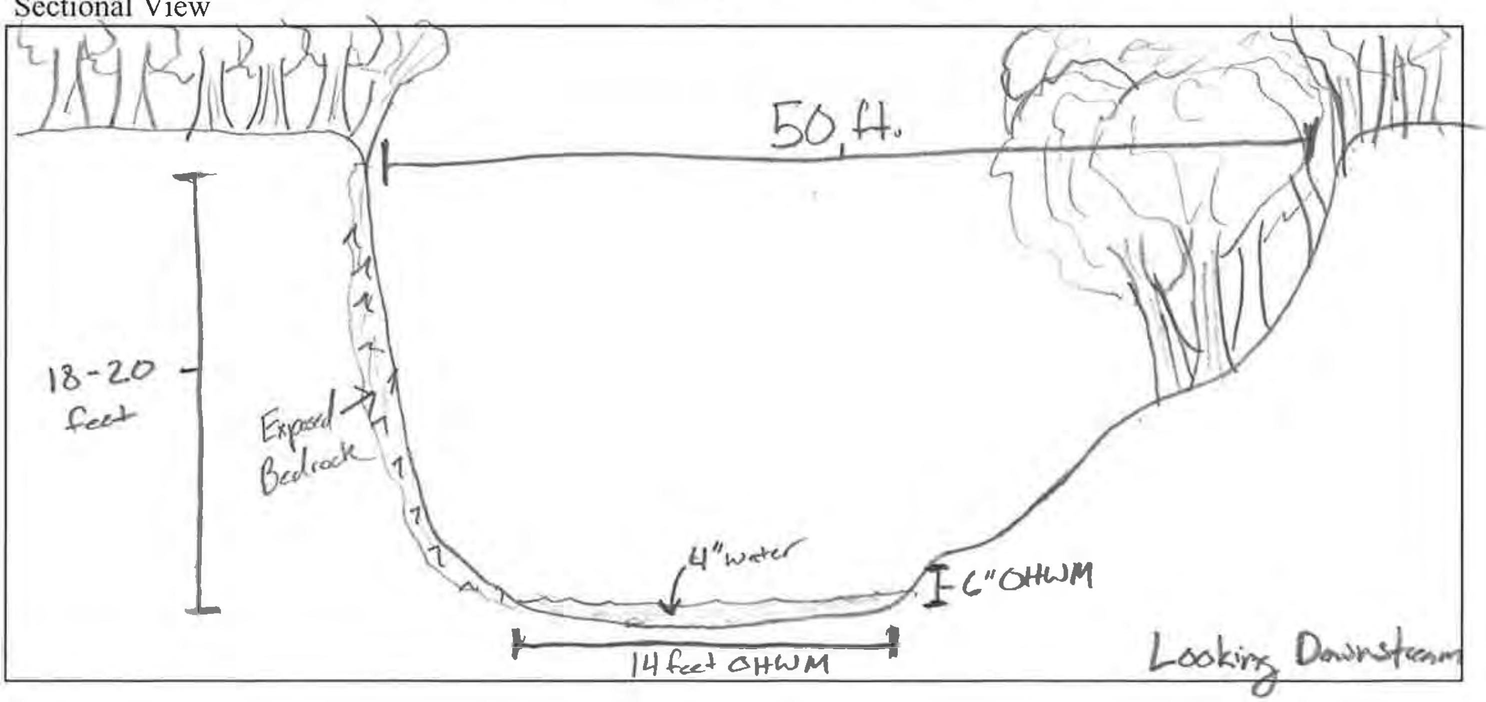
Stream Data Form (continued)
Please provide a plan and section view sketch of the stream channel.
Sketch should include:

- Directional arrow;
- Width of channel from top of bank to top of bank;
- Depth of channel,
- Approximate side slope; and,
- Width of stream from water edge to water edge.

Plan View



Sectional View



Stream Data Form #: 3 (UTJB-2)
Project Name: IH 635 LBJ Ultimate Project

Stream Data Form

CSJ: 2374-01-137 (Main CSJ)

Surveyor(s): C. Sanderson
Date of Field Work: 05/03/2016
USGS Stream Name: Unnamed Tributary 2 to Jackson Branch (UTJB-2)
County/State: Dallas, TX
USGS Topo Quad Name: Garland
Stream Number [303(d) List]: N/A
Associated Wetland(s): N/A
GPS Data: 32.907344N -96.728223W

Stream Type: Ephemeral Characteristics
Manipulated/Altered. Explain: Main creek channel is in natural state, areas close to IH 635 are concreted
Bank Stability (e.g. highly eroding, sloughing banks, etc.): Slight erosion
Stream Flow Direction: Southeast
OHWM Width (ft): 10
OHWM Height (in): 2 - 3

Stream Bottom composition:

☒ Silts ☐ Cobbles ☐ Concrete ☐ Other:
☐ Sands ☒ Bedrock ☐ Muck
☐ Gravel ☐ Vegetation Type: Riparian Percent Cover 80

Aquatic Habitat: Indicate all types present within proposed ROW/project limits.

☐ Sand bar ☐ Sand/Gravel beach/bar ☐ Gravel riffles ☒ Aquatic vegetation
☒ Overhanging trees/shrubs ☐ Deep pool/ hole/ channel ☐ Other:

Stream has the following characteristics:

☒ Bed and banks
☒ OHWM (check all indicators that apply):

- ☒ clear, natural line impressed on the bank
- ☒ changes in the character of soil
- ☒ shelving
- ☒ vegetation matted down, bent, or absent
- ☒ leaf litter disturbed or washed away
- ☒ sediment deposition
- ☒ water staining
- ☐ other (list):
- ☒ the presence of litter and debris
- ☒ destruction of terrestrial vegetation
- ☐ the presence of wrack line
- ☐ sediment sorting
- ☐ scour
- ☐ multiple observed or predicted flow events
- ☐ abrupt change in plant community

Water Quality:

☒ Clear ☐ Slightly Turbid ☐ Turbid ☐ Very Turbid ☐ Oily film ☐ High organic content
☒ Other characteristics (pollutants, etc.) High concentration of urban litter (tires, plastic, paper, etc.)

Aquatic Organisms: List all species observed. This would include waterfowl, fish, snakes, turtles, frogs, invertebrates, etc.
No species observed

Riparian Vegetation: List species observed.
Trees: cedar elm (Ulmus crassifolia), American elm (Ulmus americana), cottonwood (Populus deltoides), box elder (Acer negundo), green ash (Fraxinus pennsylvanica), China-berry (Melia azedarach), Bradford pear (Pyrus calleryana)
Forest Understory: Japanese privet (Ligustrum japonicum), saw greenbrier (Smilax bona-nox), grapevine (Vitis sp.)

T&E Species/Suitable Habitat: List T&E species observed or which species the habitat is suitable for.

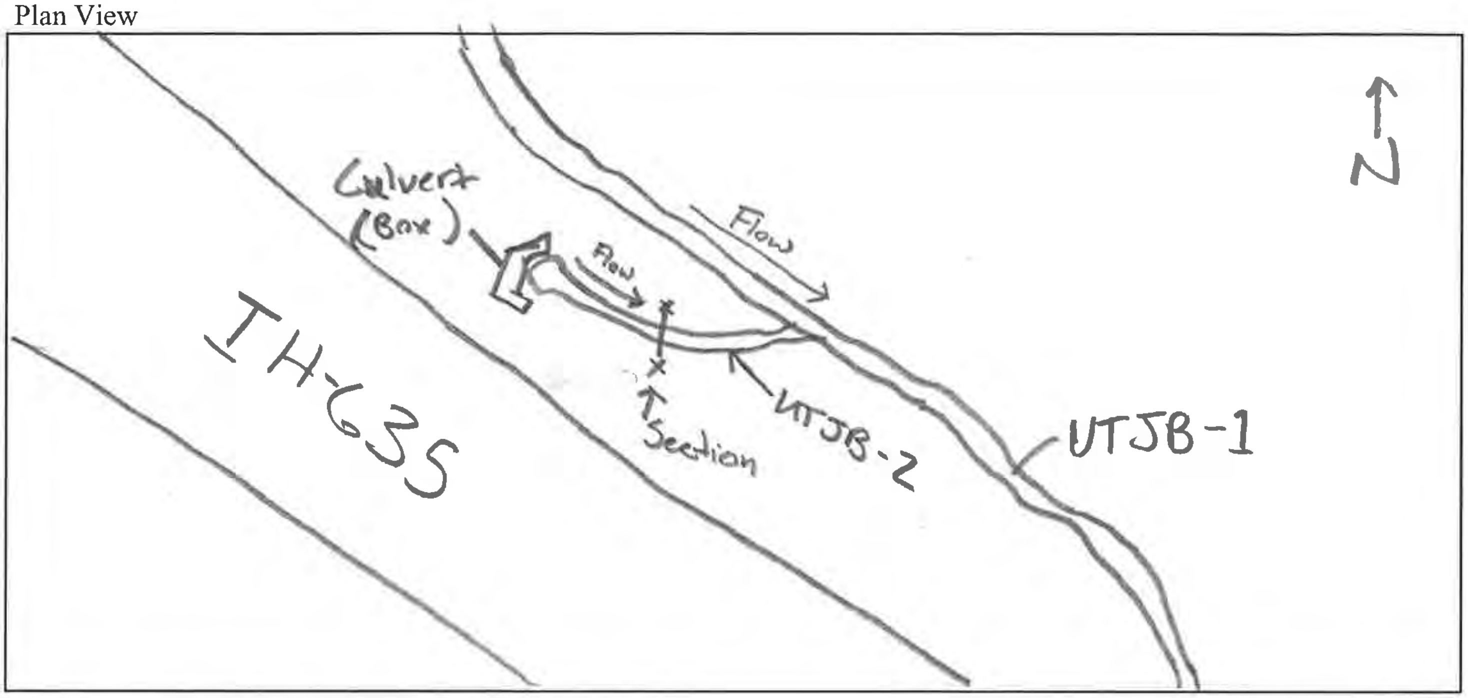
N/A

Stream Data Form #:	3
Project Name:	IH 635 LBJ Ultimate Project
CSJ:	2374-01-137 (Main CSJ)

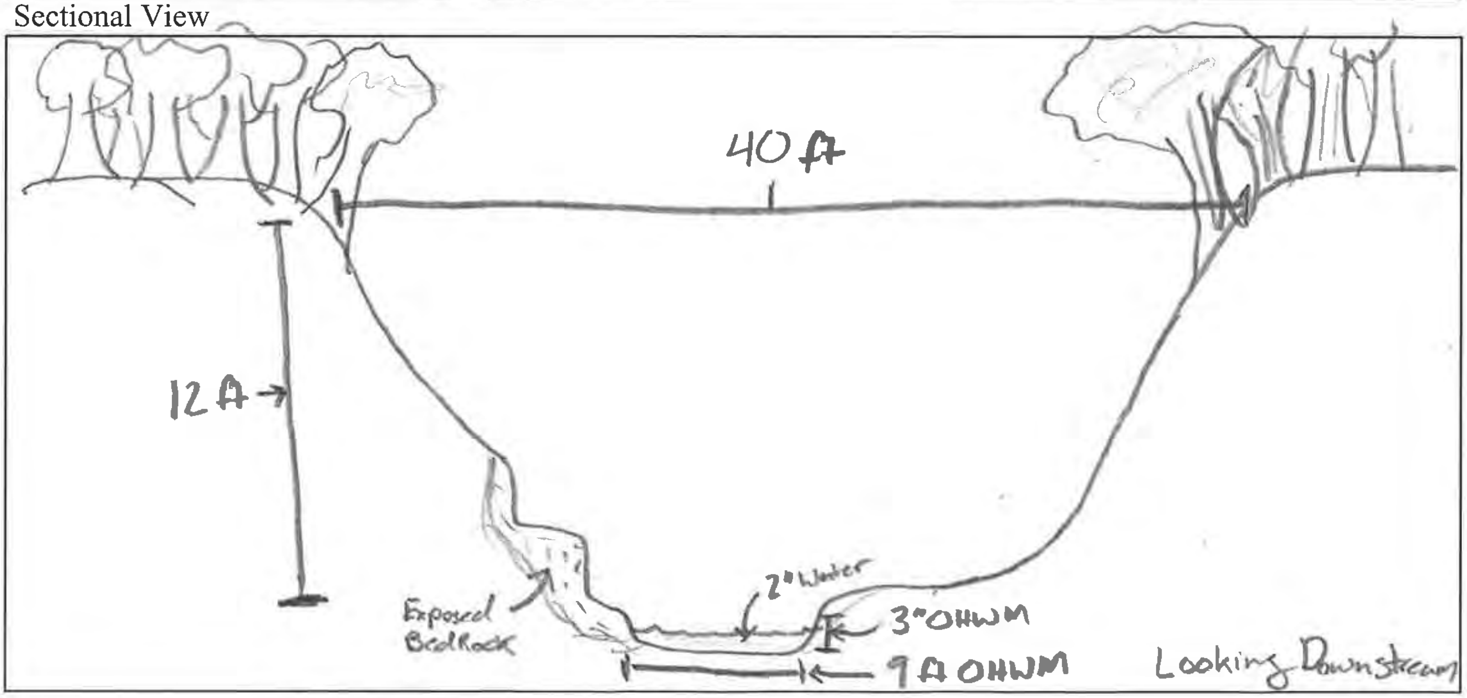
Stream Data Form (continued)
Please provide a plan and section view sketch of the stream channel.
Sketch should include:

- Directional arrow;
- Width of channel from top of bank to top of bank;
- Depth of channel,
- Approximate side slope; and,
- Width of stream from water edge to water edge.

Plan View



Sectional View



Stream Data Form #:	4 (UTJB-3)
Project Name:	IH 635 LBJ Ultimate Project
CSJ:	2374-01-137 (Main CSJ)

Stream Data Form

Surveyor(s): C. Sanderson
Date of Field Work: 05/03/2016
USGS Stream Name: Unnamed Tributary 3 to Jackson Branch (UTJB-3)
County/State: Dallas, TX
USGS Topo Quad Name: Garland
Stream Number [303(d) List]: N/A
Associated Wetland(s): N/A
GPS Data: 32.906367N -96.726582W

Stream Type: Ephemeral Characteristics Natural
Bank Stability (e.g. highly eroding, sloughing banks, etc.): High erosion
Stream Flow Direction: Southwest
OHWM Width (ft): 2 - 8
OHWM Height (in): 1 - 2

Stream Bottom composition:
☐ Silts ☐ Cobbles ☐ Concrete ☐ Other:
☐ Sands ☒ Bedrock ☐ Muck
☐ Gravel ☐ Vegetation Type: Riparian Percent Cover 80

Aquatic Habitat: Indicate all types present within proposed ROW/project limits.
☐ Sand bar ☐ Sand/Gravel beach/bar ☐ Gravel riffles ☐ Aquatic vegetation
☒ Overhanging trees/shrubs ☐ Deep pool/ hole/ channel ☐ Other:

Stream has the following characteristics:
☒ Bed and banks
☒ OHWM (check all indicators that apply):
- ☒ clear, natural line impressed on the bank
- ☒ changes in the character of soil
- ☒ shelving
- ☐ vegetation matted down, bent, or absent
- ☒ leaf litter disturbed or washed away
- ☐ sediment deposition
- ☒ water staining
- ☐ other (list):
- ☒ the presence of litter and debris
- ☒ destruction of terrestrial vegetation
- ☐ the presence of wrack line
- ☐ sediment sorting
- ☐ scour
- ☐ multiple observed or predicted flow events
- ☐ abrupt change in plant community

Water Quality:
☒ Clear ☐ Slightly Turbid ☐ Turbid ☐ Very Turbid ☐ Oily film ☐ High organic content
☐ Other characteristics (pollutants, etc.)

Aquatic Organisms: List all species observed. This would include waterfowl, fish, snakes, turtles, frogs, invertebrates, etc.
No species observed

Riparian Vegetation: List species observed.
Trees: cedar elm (Ulmus crassifolia), American elm (Ulmus americana), cottonwood (Populus deltoides), box elder (Acer negundo), green ash (Fraxinus pennsylvanica), China-berry (Melia azedarach), Bradford pear (Pyrus calleryana)
Forest Understory: Japanese privet (Ligustrum japonicum), saw greenbrier (Smilax bona-nox), grapevine (Vitis sp.)

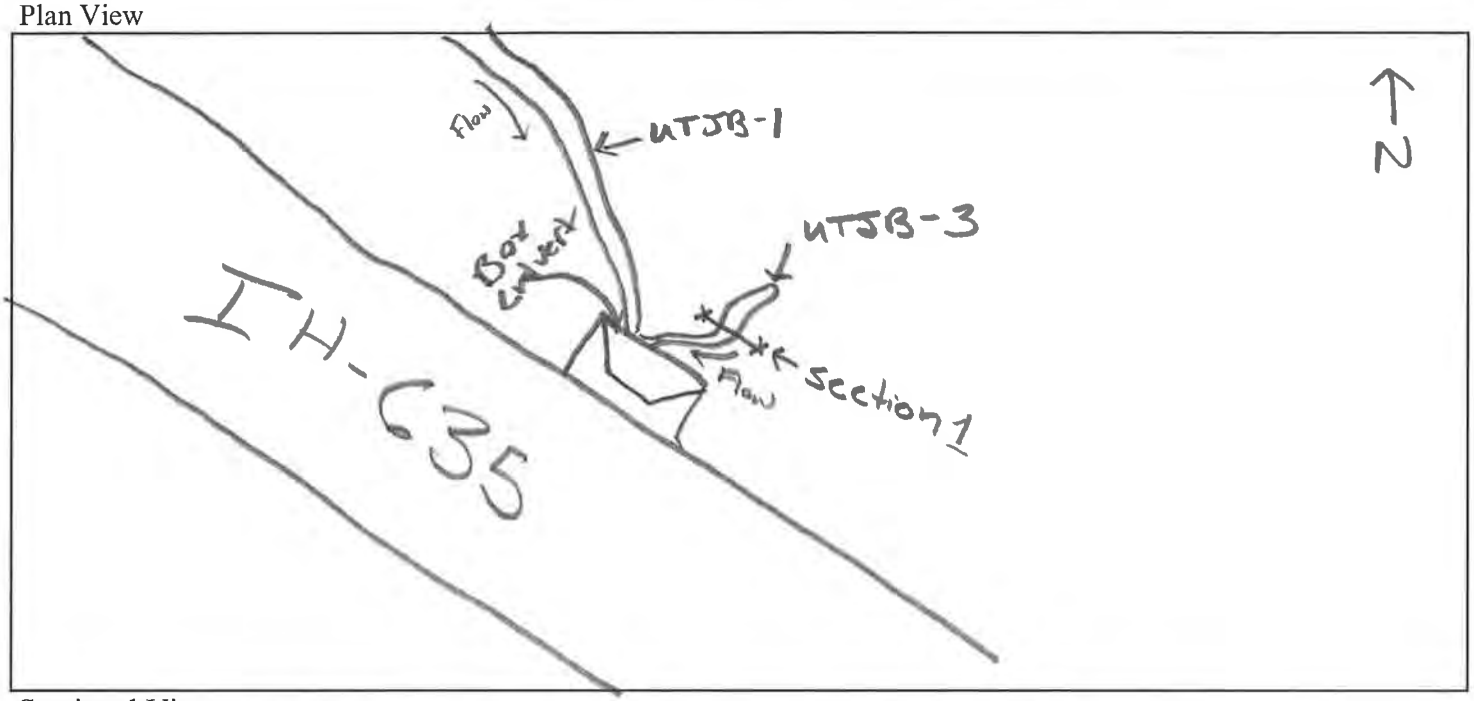
T&E Species/Suitable Habitat: List T&E species observed or which species the habitat is suitable for.
N/A

Stream Data Form #:	4
Project Name:	IH 635 LBJ Ultimate Project
CSJ:	2374-01-137 (Main CSJ)

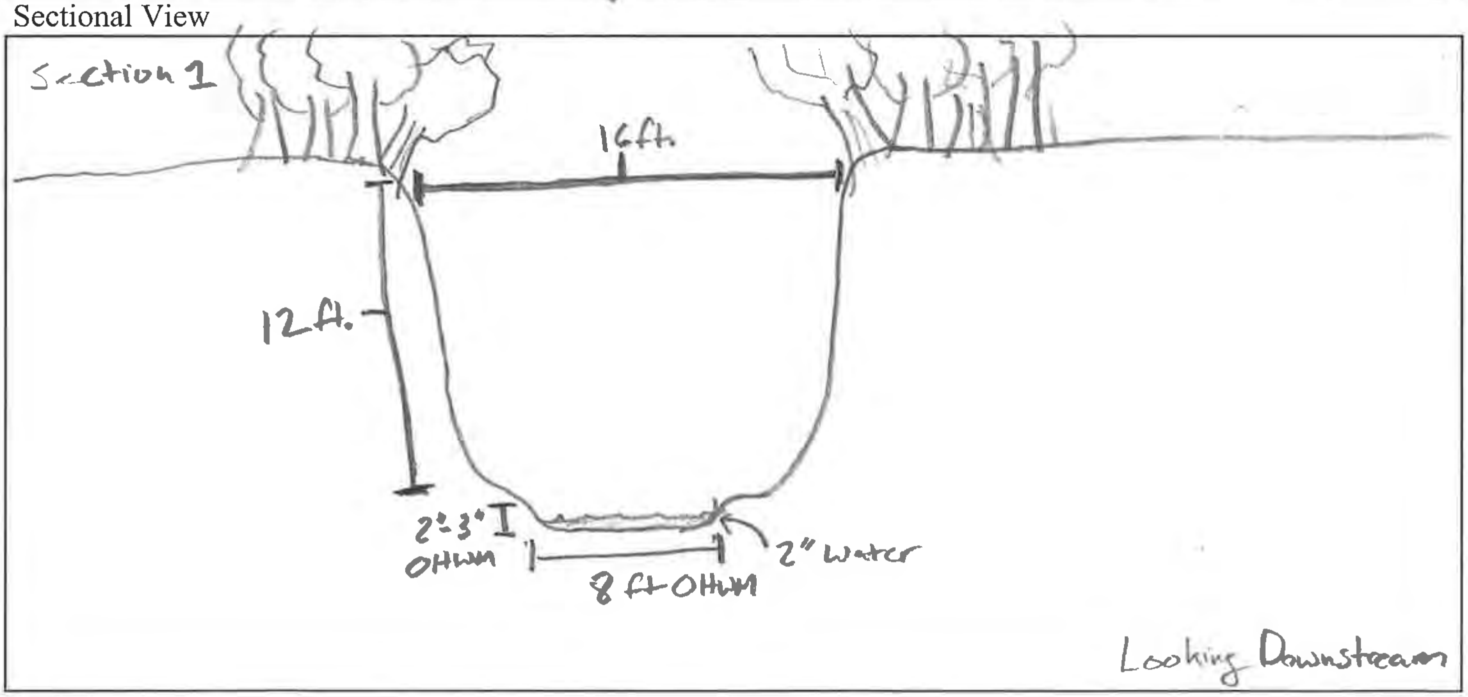
Stream Data Form (continued)
Please provide a plan and section view sketch of the stream channel.
Sketch should include:

- Directional arrow;
- Width of channel from top of bank to top of bank;
- Depth of channel,
- Approximate side slope; and,
- Width of stream from water edge to water edge.

Plan View



Sectional View



Stream Data Form #: 5 (Dixon Branch)
Project Name: IH 635 LBJ Ultimate Project
CSJ: 2374-01-137 (Main CSJ)

Stream Data Form

Surveyor(s): C. Sanderson
Date of Field Work: 05/03/2016
USGS Stream Name: Dixon Branch
County/State: Dallas, TX
USGS Topo Quad Name: Garland
Stream Number [303(d) List]: N/A
Associated Wetland(s): N/A
GPS Data: 32.884045N -96.698411W

Stream Type: Perennial
Characteristics

Manipulated/Altered. Explain: Creek channel upstream of IH 635 is contained within a concrete lined channel. Stream downstream of IH 635 is contained within a concrete channel that transitions to natural channel south of Estate Lane

Bank Stability (e.g. highly eroding, sloughing banks, etc.): Slight erosion

Stream Flow Direction: Southeast
OHWM Width (ft): 18 - 22
OHWM Height (in): 10 - 12

Stream Bottom composition:
☒ Silts ☐ Cobbles ☐ Concrete ☐ Other:
☐ Sands ☒ Bedrock ☐ Muck
☐ Gravel ☐ Vegetation Type: Riparian Percent Cover 80

Aquatic Habitat: Indicate all types present within proposed ROW/project limits.
☐ Sand bar ☐ Sand/Gravel beach/bar ☐ Gravel riffles ☒ Aquatic vegetation
☒ Overhanging trees/shrubs ☒ Deep pool/ hole/ channel ☐ Other:

Stream has the following characteristics:
☒ Bed and banks
☒ OHWM (check all indicators that apply):
- ☒ clear, natural line impressed on the bank
- ☒ changes in the character of soil
- ☒ shelving
- ☒ vegetation matted down, bent, or absent
- ☒ leaf litter disturbed or washed away
- ☒ sediment deposition
- ☒ water staining
- ☐ other (list):
- ☒ the presence of litter and debris
- ☒ destruction of terrestrial vegetation
- ☐ the presence of wrack line
- ☐ sediment sorting
- ☐ scour
- ☐ multiple observed or predicted flow events
- ☐ abrupt change in plant community

Water Quality:
☒ Clear ☐ Slightly Turbid ☐ Turbid ☐ Very Turbid ☐ Oily film ☐ High organic content
☒ Other characteristics (pollutants, etc.) High concentration of urban litter (tires, plastic, paper, etc.)

Aquatic Organisms: List all species observed. This would include waterfowl, fish, snakes, turtles, frogs, invertebrates, etc.
Mosquito Fish (Gambusia spp.), Fathead Minows (Pimephales promelas), yellow-bellied watersnake (Nerodia erythrogaster flavigaster)

Riparian Vegetation: List species observed.
Trees: American elm (Ulmus americana), hackberry (Celtis laevigata), eastern red cedar (Juniperus virginiana), tree-of-heaven (Ailanthus altissima), soapberry (Sapindus saponaria var. drummondii)
Forest Understory: Japanese honeysuckle (Lonicera japonica), grapevine (Vitis sp.), Chinese privet (Ligustrum sinense), saw greenbrier (Smilax bona-nox), poison ivy (Toxicodendron radicans)

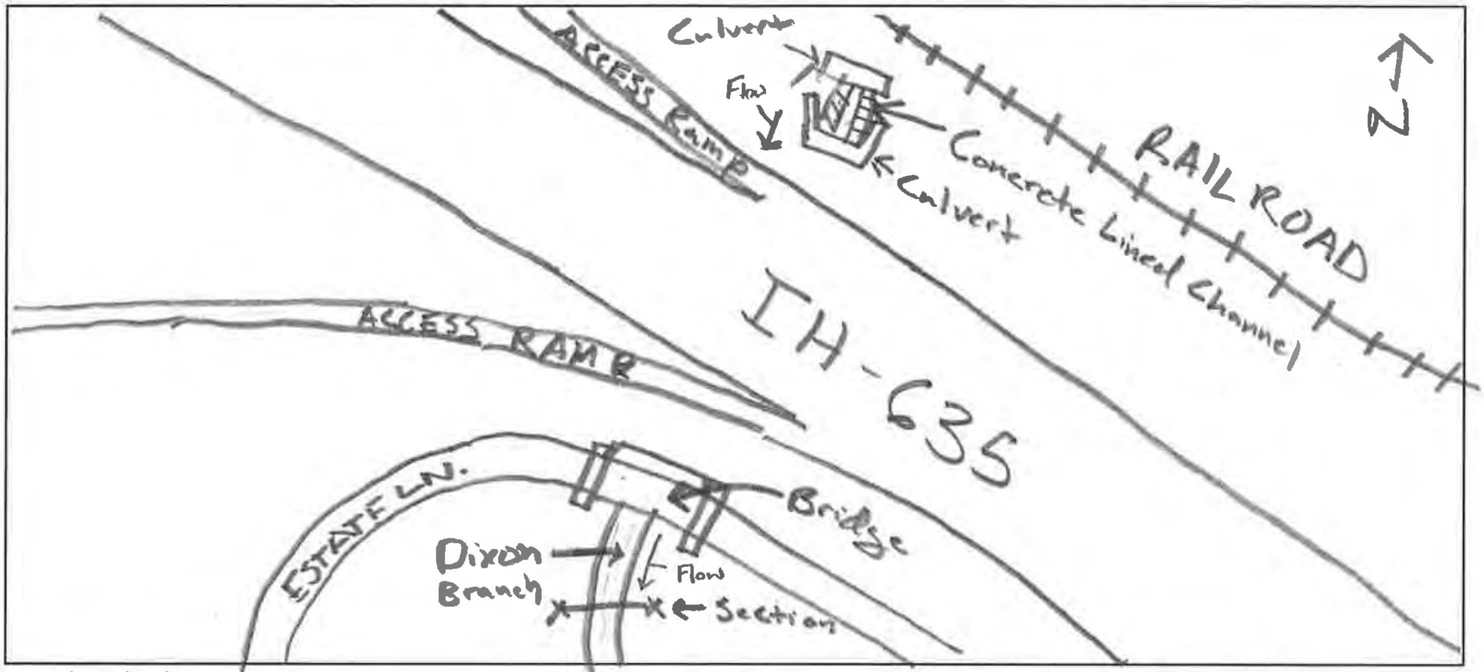
T&E Species/Suitable Habitat: List T&E species observed or which species the habitat is suitable for.
N/A

Stream Data Form #:	5
Project Name:	IH 635 LBJ Ultimate Project
CSJ:	2374-01-137 (Main CSJ)

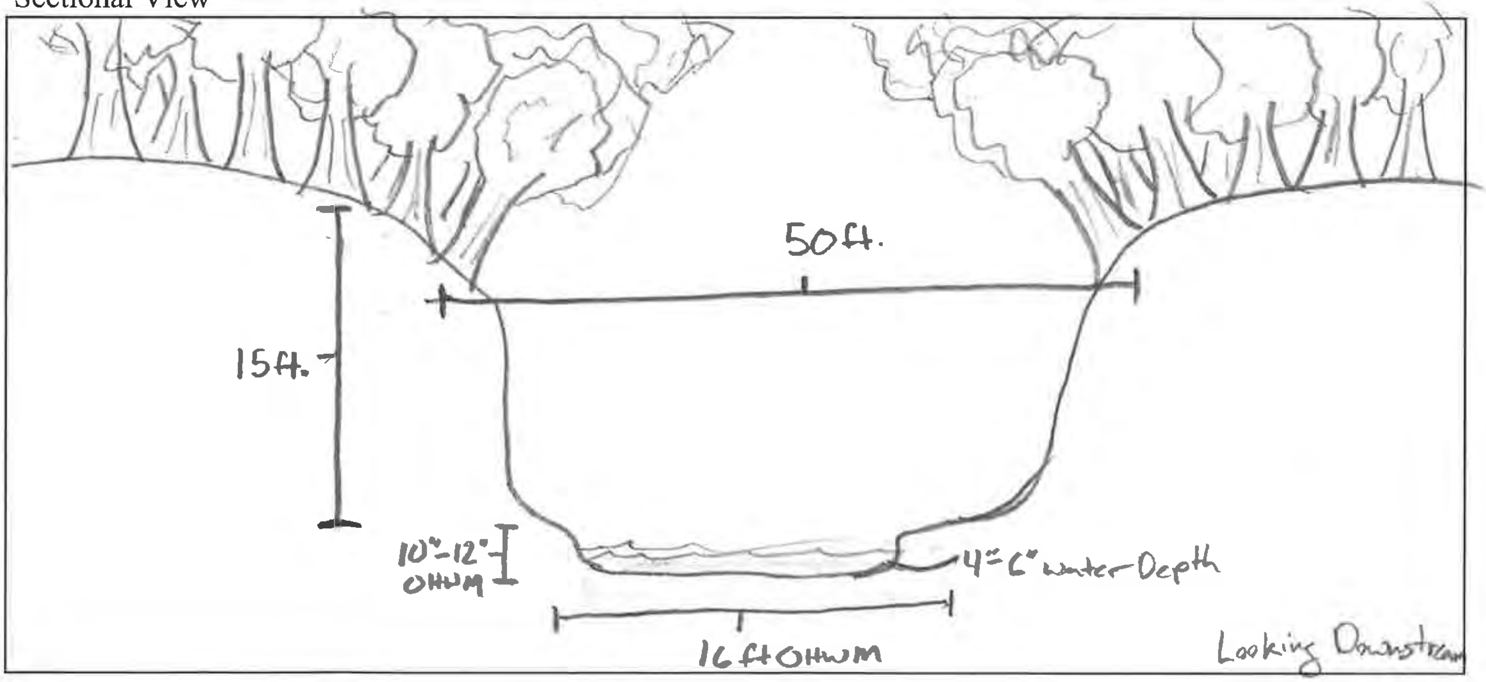
Stream Data Form (continued)
Please provide a plan and section view sketch of the stream channel.
Sketch should include:

- Directional arrow;
- Width of channel from top of bank to top of bank;
- Depth of channel,
- Approximate side slope; and,
- Width of stream from water edge to water edge.

Plan View



Sectional View



Stream Data Form #: 6 (UTDB-1)
Project Name: IH 635 LBJ Ultimate Project
CSJ: 2374-01-137 (Main CSJ)

Stream Data Form

Surveyor(s): C. Sanderson
Date of Field Work: 05/03/2016
USGS Stream Name: Unnamed Tributary 1 to Dixon Branch (UTDB-1)
County/State: Dallas, TX
USGS Topo Quad Name: Garland
Stream Number [303(d) List]: N/A
Associated Wetland(s): Emmergent Wetland (UTDB1-EW)
GPS Data: 32.878433N -96.688722W

Stream Type: Intermittent

Characteristics

Manipulated/Altered. Explain: Creek Channel within project area is higly altered with concrete channels and channelization. Creek channel south of the project area returns to natural state

Bank Stability (e.g. highly eroding, sloughing banks, etc.): Slight erosion

Stream Flow Direction: South

OHWM Width (ft): 7 - 14
OHWM Height (in): 4 - 12

Stream Bottom composition:

☒ Silts ☐ Cobbles ☒ Concrete ☐ Other:
☐ Sands ☒ Bedrock ☐ Muck
☒ Gravel ☒ Vegetation Type: Herbaceous Percent Cover 60

Aquatic Habitat: Indicate all types present within proposed ROW/project limits.

☐ Sand bar ☐ Sand/Gravel beach/bar ☐ Gravel riffles ☒ Aquatic vegetation
☒ Overhanging trees/shrubs ☐ Deep pool/ hole/ channel ☐ Other:

Stream has the following characteristics:

☒ Bed and banks
☒ OHWM (check all indicators that apply):

☒ clear, natural line impressed on the bank
☒ changes in the character of soil
☒ shelving
☒ vegetation matted down, bent, or absent
☒ leaf litter disturbed or washed away
☒ sediment deposition
☒ water staining
☐ other (list):

☒ the presence of litter and debris
☒ destruction of terrestrial vegetation
☐ the presence of wrack line
☐ sediment sorting
☐ scour
☐ multiple observed or predicted flow events
☐ abrupt change in plant community

Water Quality:

☒ Clear ☐ Slightly Turbid ☐ Turbid ☐ Very Turbid ☐ Oily film ☐ High organic content
☒ Other characteristics (pollutants, etc.) High concentration of urban litter (tires, plastic, paper, etc.)

Aquatic Organisms: List all species observed. This would include waterfowl, fish, snakes, turtles, frogs, invertebrates, etc.

None observed within project area. Red-eared slider (Trachemys scripta elegans) was observed north of project area

Riparian Vegetation: List species observed.

Trees: (south of IH 635 SB frontage road only) American elm (Ulmus americana), hackberry (Celtis laevigata), cedar elm (Ulmus crassifolia), green ash (Fraxinus pennsylvanica), bois d'arc (Maclura pomifera)
Forest Understory: (south of IH 635 SB frontage road only) Chinese privet (Ligustrum sinense), saw greenbrier (Smilax bona-nox), poison ivy (Toxicodendron radicans)

Herbaceous plants: (north of IH 635 SB frontage road only) annual rye grass (Lolium perenne), Japanese brome (Bromus japonicus), King Ranch bluestem (Bothriochloa ischaemum var. songarica), Bermuda grass (Cynodon dactylon), cultivated oat grass (Avena sativa), Texas winter grass (Nassella leucotricha), wild onion (Allium spp.), pincushions (Scabiosa atropurpurea), bee-blossum (Gaura suffulta), red-seed plantain (Plantago rhodosperma)

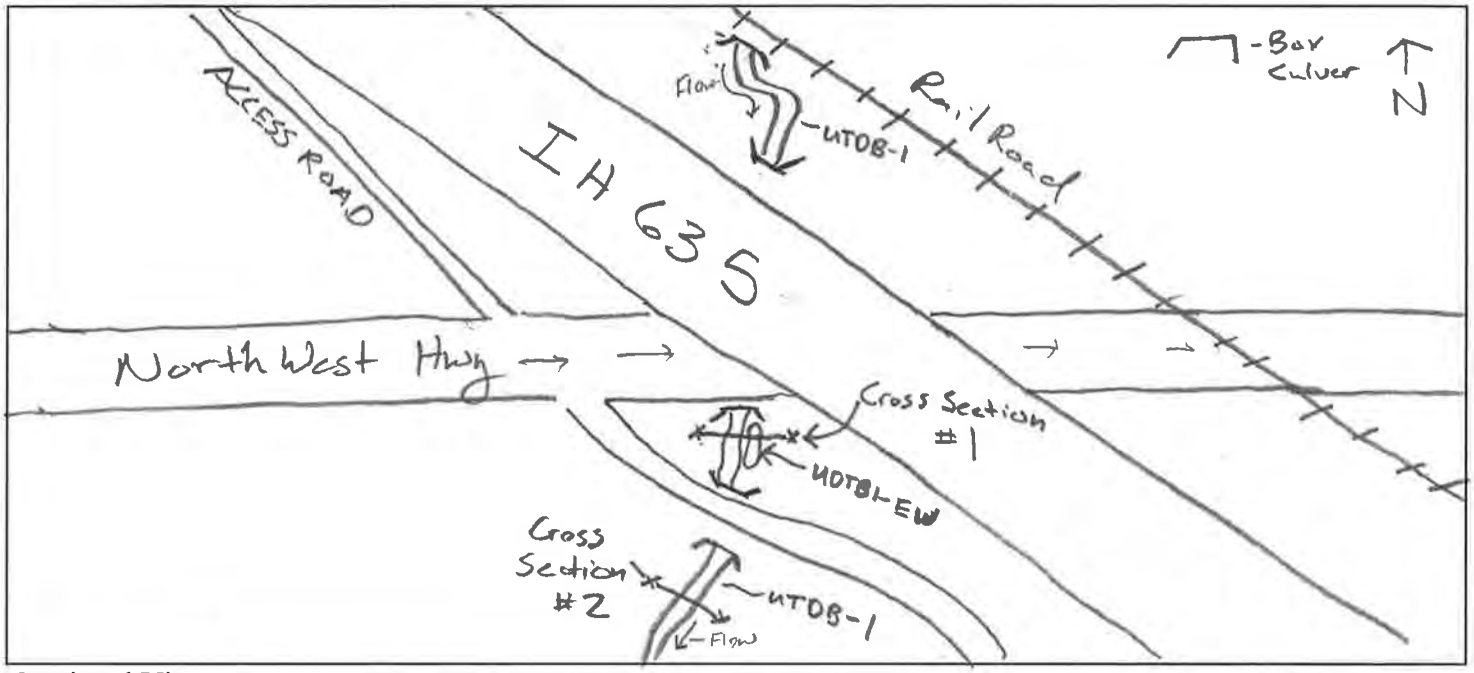
T&E Species/Suitable Habitat: List T&E species observed or which species the habitat is suitable for.

N/A

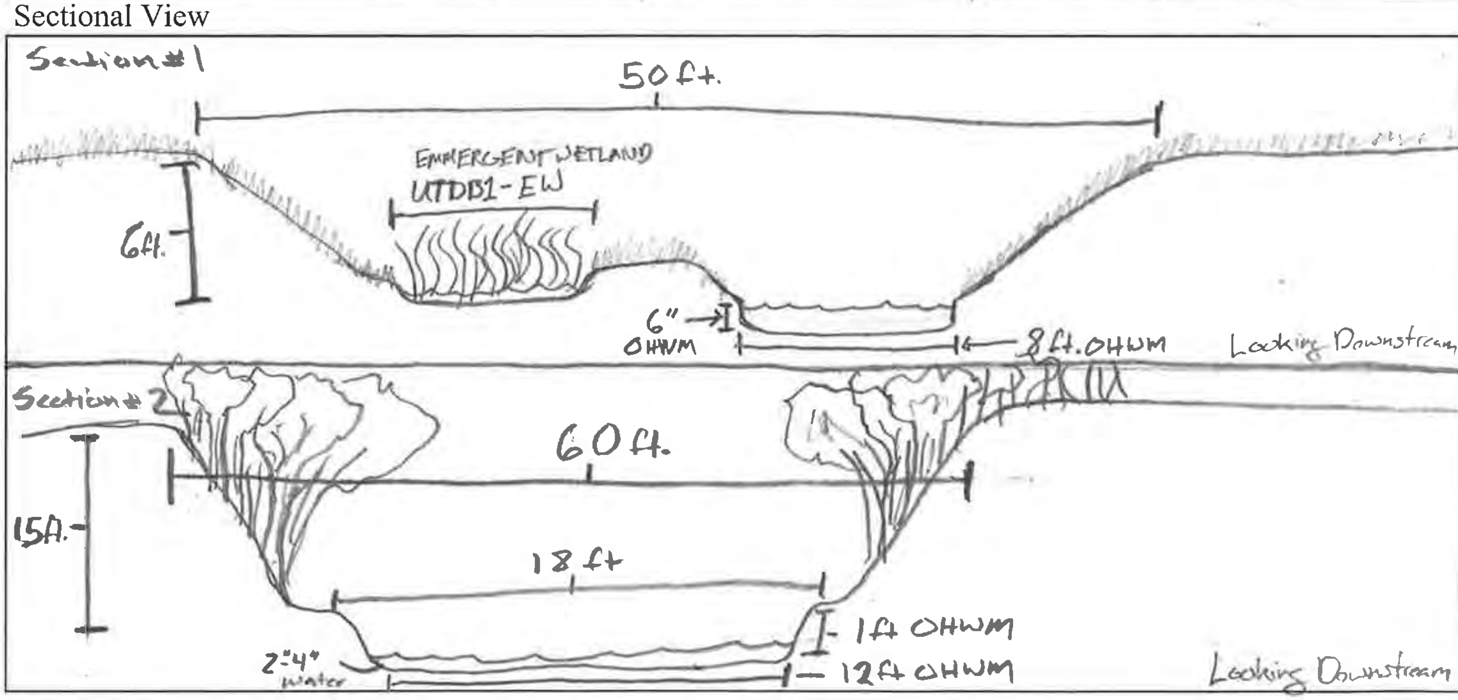
Stream Data Form (continued)
Please provide a plan and section view sketch of the stream channel.
Sketch should include:

- Directional arrow;
- Width of channel from top of bank to top of bank;
- Depth of channel,
- Approximate side slope; and,
- Width of stream from water edge to water edge.

Plan View



Sectional View



Stream Data Form #: 7 (UTDB-2)
Project Name: IH 635 LBJ Ultimate Project

Stream Data Form

CSJ: 2374-01-137 (Main CSJ)

Surveyor(s): C. Sanderson
Date of Field Work: 05/03/2016
USGS Stream Name: Unnamed Tributary 2 to Dixon Branch (UTDB-2)
County/State: Dallas, TX
USGS Topo Quad Name: Garland
Stream Number [303(d) List]: N/A
Associated Wetland(s): N/A
GPS Data: 32.876549N -96.68584W

Stream Type: Characteristics
Ephemeral

Manipulated/Altered. Explain: Creek Channel within project area is higly altered with concrete channels and channelization. Creek channel south of the project area returns to natural state

Bank Stability (e.g. highly eroding, sloughing banks, etc.): High erosion

Stream Flow Direction: South
OHWM Width (ft): 12 - 20
OHWM Height (in): 2 - 3

Stream Bottom composition:

- ☒ Silts ☐ Cobbles ☒ Concrete ☐ Other:
- ☐ Sands ☐ Bedrock ☒ Muck
- ☒ Gravel ☒ Vegetation Type: Herbaceous Percent Cover 75

Aquatic Habitat: Indicate all types present within proposed ROW/project limits.

- ☐ Sand bar ☐ Sand/Gravel beach/bar ☐ Gravel riffles ☒ Aquatic vegetation
- ☐ Overhanging trees/shrubs ☐ Deep pool/ hole/ channel ☐ Other:

Stream has the following characteristics:

- ☒ Bed and banks
- ☒ OHWM (check all indicators that apply):
  - ☒ clear, natural line impressed on the bank
  - ☒ changes in the character of soil
  - ☒ shelving
  - ☒ vegetation matted down, bent, or absent
  - ☐ leaf litter disturbed or washed away
  - ☒ sediment deposition
  - ☐ water staining
  - ☐ other (list):
  - ☒ the presence of litter and debris
  - ☒ destruction of terrestrial vegetation
  - ☐ the presence of wrack line
  - ☐ sediment sorting
  - ☐ scour
  - ☐ multiple observed or predicted flow events
  - ☐ abrupt change in plant community

Water Quality:

- ☒ Clear ☐ Slightly Turbid ☐ Turbid ☐ Very Turbid ☐ Oily film ☐ High organic content
- ☒ Other characteristics (pollutants, etc.) High concentration of urban litter (tires, plastic, paper, etc.)

Aquatic Organisms: List all species observed. This would include waterfowl, fish, snakes, turtles, frogs, invertebrates, etc.
None observed within project area.

Riparian Vegetation: List species observed.
Trees/Forest Understory: none
Herbaceous Plants: cattail (Typha angustifolia), annual rye grass (Lolium perenne), Japanese brome (Bromus japonicus), King Ranch bluestem (Bothriochloa ischaemum var. songarica), Bermuda grass (Cynodon dactylon), cultivated oat grass (Avena sativa), Texas winter grass (Nassella leucotricha), wild onion (Allium spp.), pincushions (Scabiosa atropurpurea), bee-blossum (Gaura suffulta), red-

seed plantain (Plantago rhodosperma)

T&E Species/Suitable Habitat: List T&E species observed or which species the habitat is suitable for.

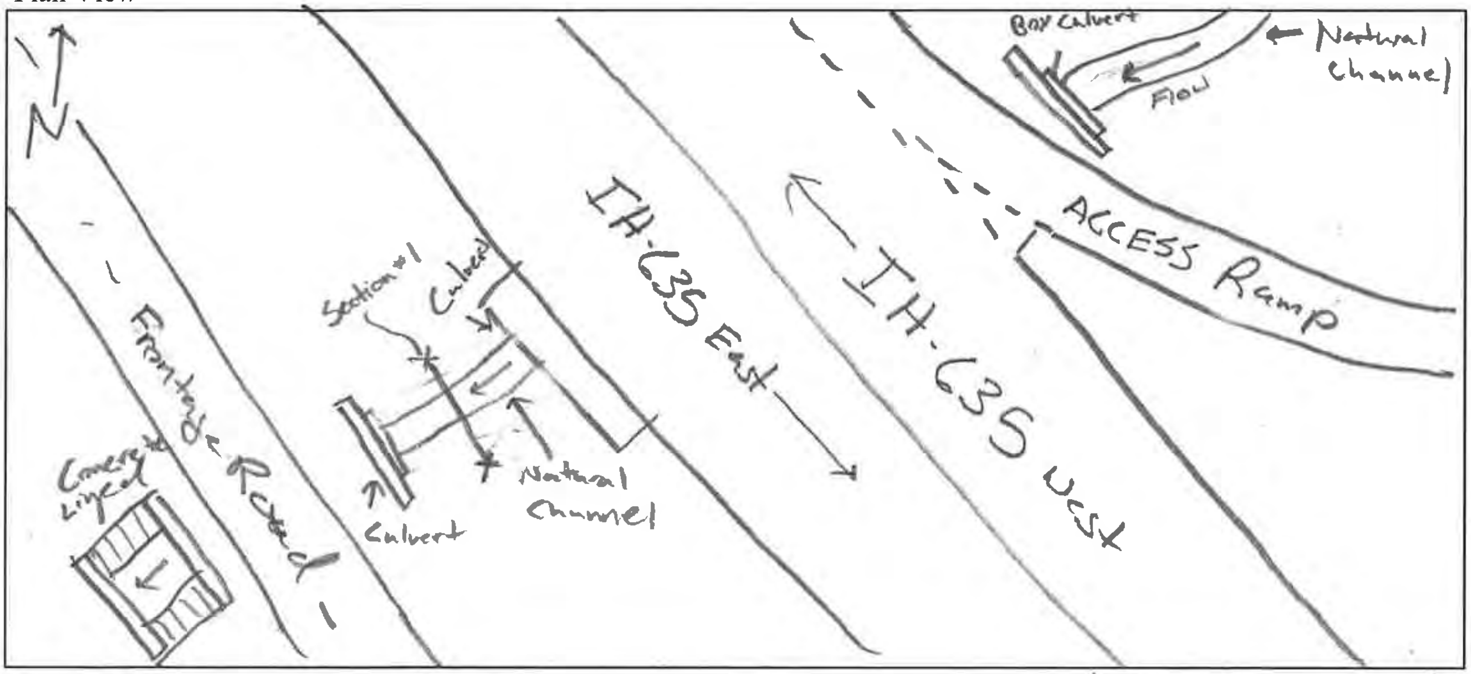
N/A

Stream Data Form #:	7
Project Name:	IH 635 LBJ Ultimate Project
CSJ:	2374-01-137 (Main CSJ)

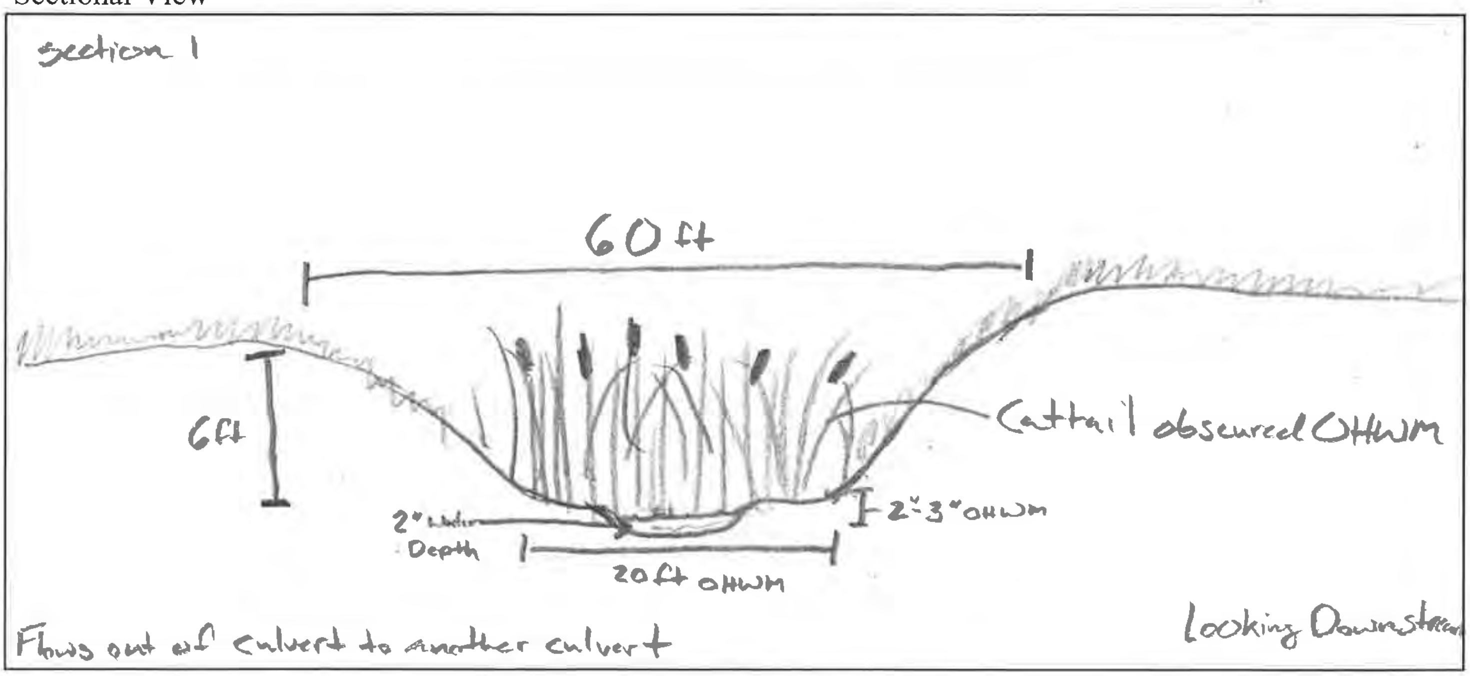
Stream Data Form (continued)
Please provide a plan and section view sketch of the stream channel.
Sketch should include:

- Directional arrow;
- Width of channel from top of bank to top of bank;
- Depth of channel,
- Approximate side slope; and,
- Width of stream from water edge to water edge.

Plan View



Sectional View



Stream Data Form #: 8 (Long Branch 1)
Project Name: IH 635 LBJ Ultimate Project
CSJ: 2374-01-137 (Main CSJ)

Stream Data Form

Surveyor(s): C. Sanderson
Date of Field Work: 05/03/2016
USGS Stream Name: Long Branch (Crossing 1)
County/State: Dallas, TX
USGS Topo Quad Name: White Rock Lake
Stream Number [303(d) List]: N/A
Associated Wetland(s): N/A
GPS Data: 32.862891N -96.658982W

Stream Type: Perennial

Characteristics

Manipulated/Altered. Explain: Creek Channel within project area is higly altered with concrete channels and channelization. Creek channel north and south of the project area returns to semi-natural state

Bank Stability (e.g. highly eroding, sloughing banks, etc.): High erosion

Stream Flow Direction: Southeast

OHWM Width (ft): 12 - 20
OHWM Height (in): 6 - 12

Stream Bottom composition:

- ☒ Silts
- ☐ Cobbles
- ☒ Concrete
- ☐ Other:
- ☐ Sands
- ☐ Bedrock
- ☒ Muck
- ☒ Gravel
- ☒ Vegetation Type: Herbaceous Percent Cover 75

Aquatic Habitat: Indicate all types present within proposed ROW/project limits.

- ☐ Sand bar
- ☐ Sand/Gravel beach/bar
- ☐ Gravel riffles
- ☒ Aquatic vegetation
- ☐ Overhanging trees/shrubs
- ☒ Deep pool/ hole/ channel
- ☐ Other:

Stream has the following characteristics:

- ☒ Bed and banks
- ☒ OHWM (check all indicators that apply):
  - ☒ clear, natural line impressed on the bank
  - ☒ changes in the character of soil
  - ☒ shelving
  - ☒ vegetation matted down, bent, or absent
  - ☒ leaf litter disturbed or washed away
  - ☒ sediment deposition
  - ☒ water staining
  - ☐ other (list):
  - ☒ the presence of litter and debris
  - ☒ destruction of terrestrial vegetation
  - ☐ the presence of wrack line
  - ☐ sediment sorting
  - ☐ scour
  - ☐ multiple observed or predicted flow events
  - ☐ abrupt change in plant community

Water Quality:

☒ Clear ☐ Slightly Turbid ☐ Turbid ☐ Very Turbid ☐ Oily film ☐ High organic content

☒ Other characteristics (pollutants, etc.) High concentration of urban litter (tires, plastic, paper, etc.)

Aquatic Organisms: List all species observed. This would include waterfowl, fish, snakes, turtles, frogs, invertebrates, etc.

Mosquito Fish (Gambusia spp.), Fathead Minows (Pimephales promelas), Bluegill (Lepomis spp.)

Riparian Vegetation: List species observed.

Trees/Forest Understory: none

Herbaceous Plants: (north of Northwest Highway and south of IH 635 only) Bermuda grass (Cynodon dactylon), annual rye grass (Lolium perenne), Japanese brome (Bromus japonicus), King Ranch bluestem (Bothriochloa ischaemum var. songarica), pincushions (Scabiosa atropurpurea), red-seed plantain (Plantago rhodosperma)

Herbaceous Plants: (south of Northwest Highway and north of IH 635 only) water-primrose (Ludwigia spp.), spike rush (Eleocharis spp.), cattail (Typha angustifolia), morning-glory (Ipomoea spp.)

T&E Species/Suitable Habitat: List T&E species observed or which species the habitat is suitable for.

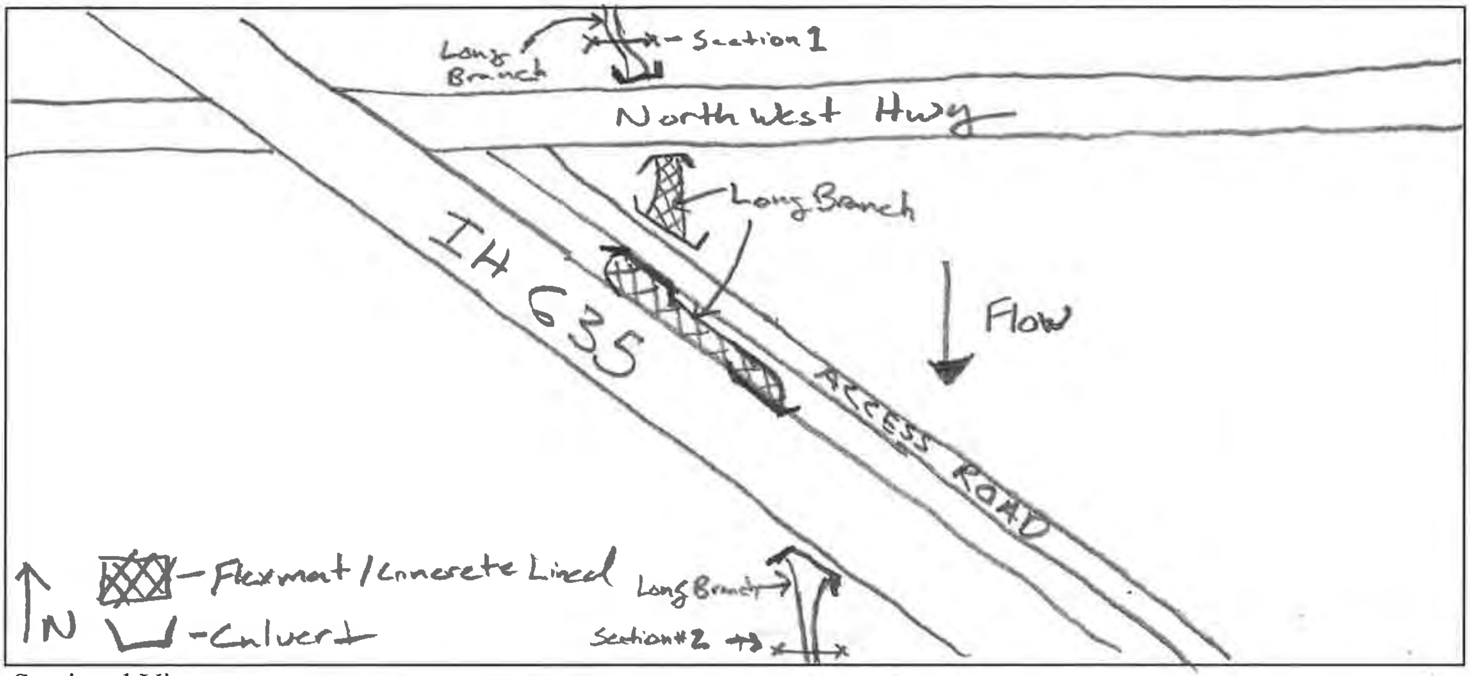
N/A

Stream Data Form #:	8
Project Name:	IH 635 LBJ Ultimate Project
CSJ:	2374-01-137 (Main CSJ)

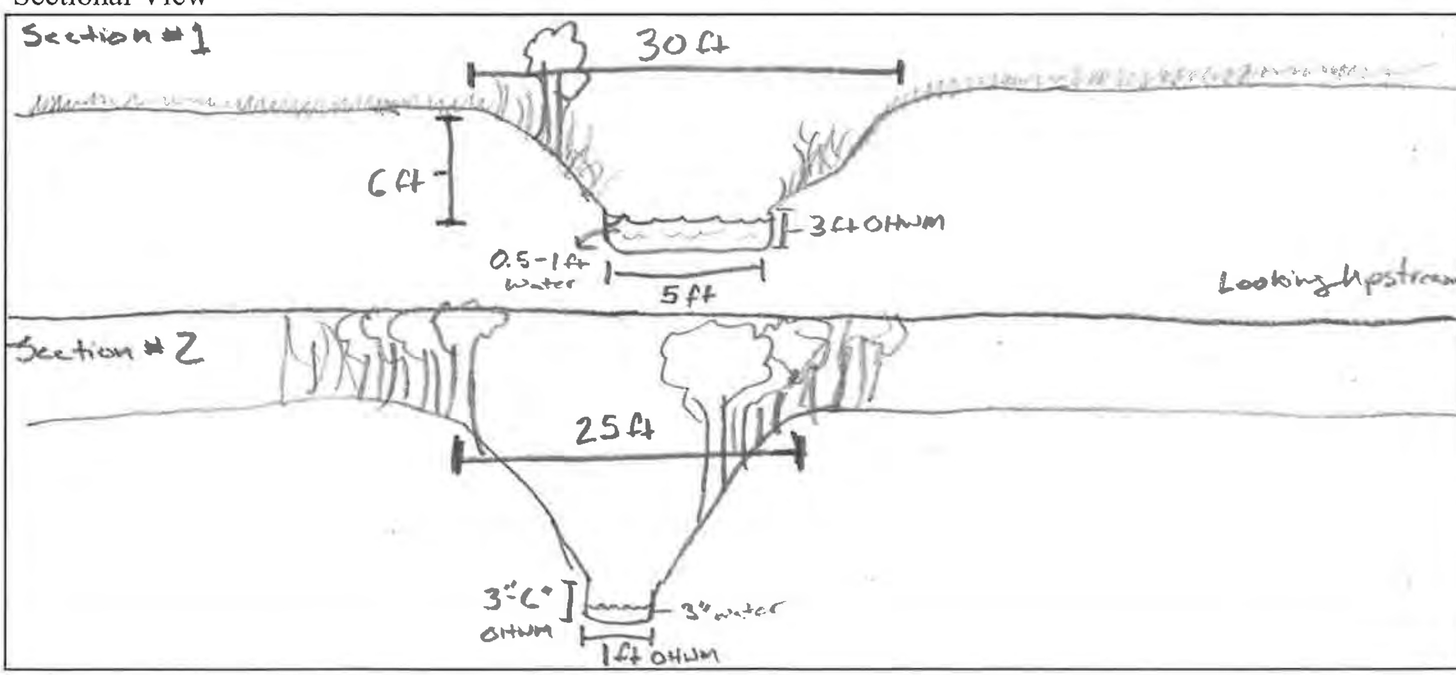
Stream Data Form (continued)
Please provide a plan and section view sketch of the stream channel.
Sketch should include:

- Directional arrow;
- Width of channel from top of bank to top of bank;
- Depth of channel,
- Approximate side slope; and,
- Width of stream from water edge to water edge.

Plan View



Sectional View



Stream Data Form #:	9 (Long Branch 2)
Project Name:	IH 635 LBJ Ultimate Project
CSJ:	2374-01-137 (Main CSJ)

Stream Data Form

Surveyor(s): C. Sanderson
Date of Field Work: 05/03/2016
USGS Stream Name: Long Branch (Crossing 2)
County/State: Dallas, TX
USGS Topo Quad Name: White Rock Lake
Stream Number [303(d) List]: N/A
Associated Wetland(s): N/A
GPS Data: 32.84271N -96.635066W

Stream Type: Perennial

Characteristics

Artificial (man-made). Explain: Majority of stream channel is within concrete lined channels with exception to downstream of La Prada Drive. This section is significantly altered and also man-made. Downstream reaches outside of the study area east of IH 635 regains natural channel but is lined by gabion structures

Bank Stability (e.g. highly eroding, sloughing banks, etc.): low erosion

Stream Flow Direction: East

OHWM Width (ft): 30 - 35 feet near La Prada Drive, 20 feet upstream of IH 635
OHWM Height (in): 4 - 12

Stream Bottom composition:

☒ Silts ☐ Cobbles ☒ Concrete ☐ Other:
☐ Sands ☒ Bedrock ☒ Muck
☒ Gravel ☐ Vegetation Type: Herbaceous Percent Cover 40

Aquatic Habitat: Indicate all types present within proposed ROW/project limits.

☐ Sand bar ☐ Sand/Gravel beach/bar ☐ Gravel riffles ☒ Aquatic vegetation
☐ Overhanging trees/shrubs ☒ Deep pool/ hole/ channel ☐ Other:

Stream has the following characteristics:

☒ Bed and banks
☒ OHWM (check all indicators that apply):

☒ clear, natural line impressed on the bank
☒ changes in the character of soil
☒ shelving
☒ vegetation matted down, bent, or absent
☒ leaf litter disturbed or washed away
☒ sediment deposition
☒ water staining
☐ other (list):
☒ the presence of litter and debris
☒ destruction of terrestrial vegetation
☐ the presence of wrack line
☐ sediment sorting
☐ scour
☐ multiple observed or predicted flow events
☐ abrupt change in plant community

Water Quality:

☐ Clear ☒ Slightly Turbid ☐ Turbid ☐ Very Turbid ☐ Oily film ☐ High organic content
☒ Other characteristics (pollutants, etc.) High concentration of urban litter in downstream portion (tires, plastic, paper, etc.)

Aquatic Organisms: List all species observed. This would include waterfowl, fish, snakes, turtles, frogs, invertebrates, etc.
Mosquito Fish (Gambusia spp.), Fathead Minows (Pimephales promelas), Bluegill (Lepomis spp.)

Riparian Vegetation: List species observed.
Trees: (east of IH 635 only) American elm (Ulmus americana), green ash (Fraxinus pennsylvanica), hackberry (Celtis laevigata), pecan (Carya illinoinensis), Chinese tallow tree (Sapium sebiferum), rough leaf dogwood (Cornus drummondii), cedar elm (Ulmus

crassifolia), mimosa (Albizia julibrissin)
Forest Understory: (east of IH 635 only) Chinese privet (Ligustrum sinense), saw greenbrier (Smilax bona-nox), poison ivy (Toxicodendron radicans)
Herbaceous Plants: (west of IH 635 only) Bermuda grass (Cynodon dactylon), annual rye grass (Lolium perenne), Japanese brome (Bromus japonicus), King Ranch bluestem (Bothriochloa ischaemum var. songarica), pincushions (Scabiosa atropurpurea), red-seed plantain (Plantago rhodosperma)

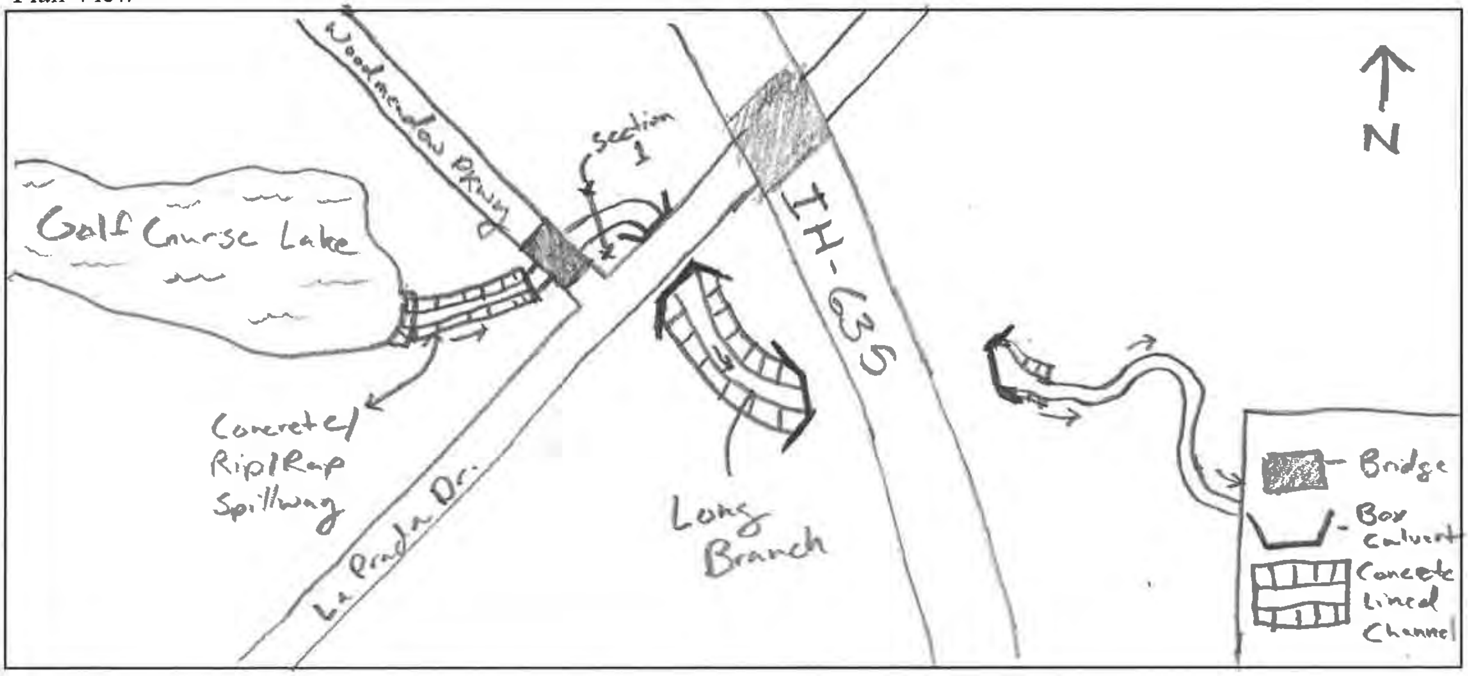
T&E Species/Suitable Habitat: List T&E species observed or which species the habitat is suitable for.
N/A

Stream Data Form #:	9
Project Name:	IH 635 LBJ Ultimate Project
CSJ:	2374-01-137 (Main CSJ)

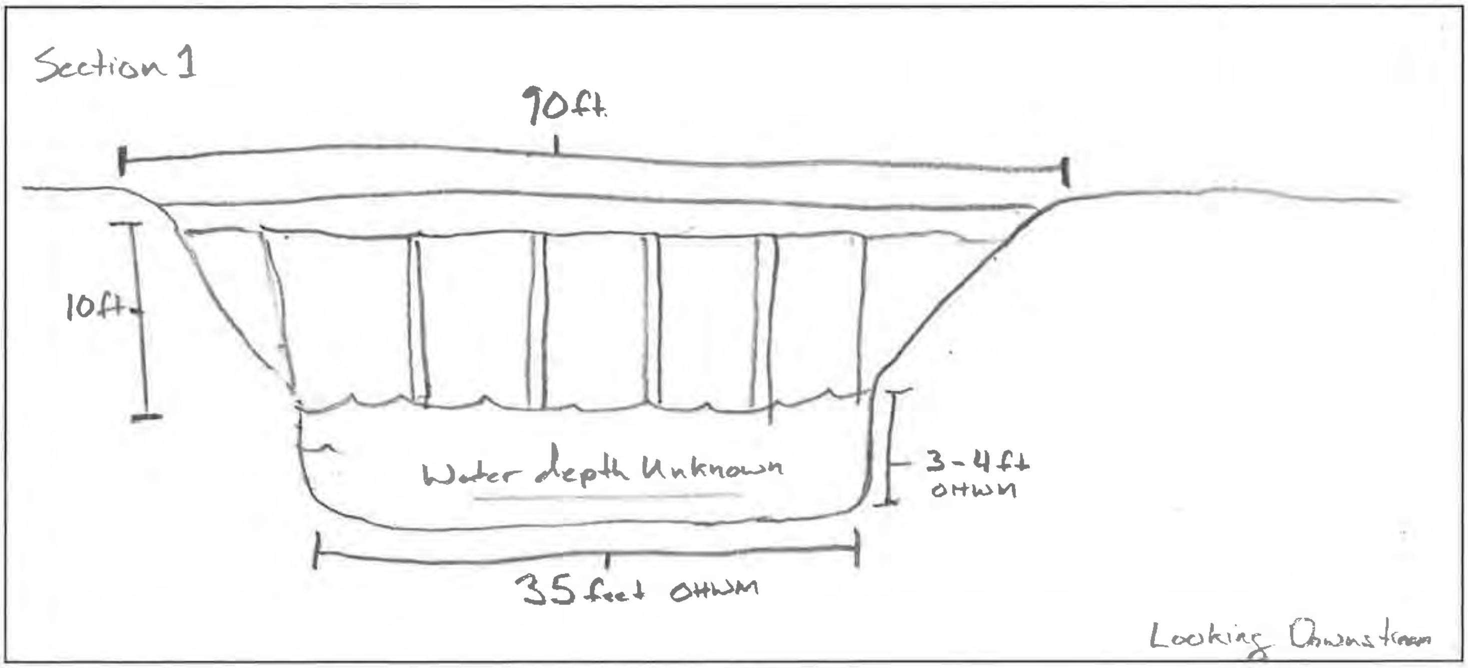
Stream Data Form (continued)
Please provide a plan and section view sketch of the stream channel.
Sketch should include:

- Directional arrow;
- Width of channel from top of bank to top of bank;
- Depth of channel,
- Approximate side slope; and,
- Width of stream from water edge to water edge.

Plan View



Sectional View



Stream Data Form #: 10 (UTLB-1)
Project Name: IH 635 LBJ Ultimate Project
CSJ: 2374-01-137 (Main CSJ)

Stream Data Form

Surveyor(s): C. Sanderson
Date of Field Work: 05/03/2016
USGS Stream Name: Unnamed Tributary 1 to Long Branch (UTLB-1)
County/State: Dallas, TX
USGS Topo Quad Name: White Rock Lake
Stream Number [303(d) List]: N/A
Associated Wetland(s): N/A
GPS Data: 32.864879N -96.664737W

Stream Type: Ephemeral

Characteristics

Artificial (man-made). Explain: The entire extent of the stream appears to have been channelized in the past. The stream channel between Northwest Hwy and Shiloh Rd is now within a wide established channel with dense ripariain cover. The stream channel south of Northwest Hwy narrowns and is within a maintained easement that is dominated by herbaceous vegetation.

Bank Stability (e.g. highly eroding, sloughing banks, etc.): low erosion

Stream Flow Direction: East
OHWM Width (ft): 2 -15
OHWM Height (in): 2 - 6

Stream Bottom composition:
☒ Silts ☐ Cobbles ☒ Concrete ☐ Other:
☐ Sands ☒ Bedrock ☒ Muck
☒ Gravel ☐ Vegetation Type: Riparian Percent Cover 60

Aquatic Habitat: Indicate all types present within proposed ROW/project limits.
☐ Sand bar ☐ Sand/Gravel beach/bar ☐ Gravel riffles ☐ Aquatic vegetation
☒ Overhanging trees/shrubs ☐ Deep pool/ hole/ channel ☐ Other:

Stream has the following characteristics:
☒ Bed and banks
☒ OHWM (check all indicators that apply):

- ☒ clear, natural line impressed on the bank
- ☒ changes in the character of soil
- ☒ shelving
- ☒ vegetation matted down, bent, or absent
- ☒ leaf litter disturbed or washed away
- ☒ sediment deposition
- ☒ water staining
- ☐ other (list):
- ☒ the presence of litter and debris
- ☒ destruction of terrestrial vegetation
- ☐ the presence of wrack line
- ☐ sediment sorting
- ☒ scour
- ☐ multiple observed or predicted flow events
- ☐ abrupt change in plant community

Water Quality:
☐ Clear ☒ Slightly Turbid ☐ Turbid ☐ Very Turbid ☐ Oily film ☐ High organic content
☒ Other characteristics (pollutants, etc.) High concentration of urban litter (tires, plastic, paper, etc.)

Aquatic Organisms: List all species observed. This would include waterfowl, fish, snakes, turtles, frogs, invertebrates, etc.
None observed

Riparian Vegetation: List species observed.

Trees: (north of Northwest Highway only) American elm (Ulmus americana), green ash (Fraxinus pennsylvanica), Chinese tallow tree (Sapium sebiferum), rough leaf dogwood (Cornus drummondii), hackberry (Celtis laevigata), cedar elm (Ulmus crassifolia)

Forest Understory: (north of Northwest Highway only) Chinese privet (Ligustrum sinense), saw greenbrier (Smilax bona-nox), poison ivy (Toxicodendron radicans)

Herbaceous plants: (south of Northwest Highway only) Bermuda grass (Cynodon dactylon), annual rye grass (Lolium perenne), Japanese brome (Bromus japonicus), King Ranch bluestem (Bothriochloa ischaemum var. songarica), pincushions (Scabiosa atropurpurea), red-seed plantain (Plantago rhodosperma)

T&E Species/Suitable Habitat: List T&E species observed or which species the habitat is suitable for.

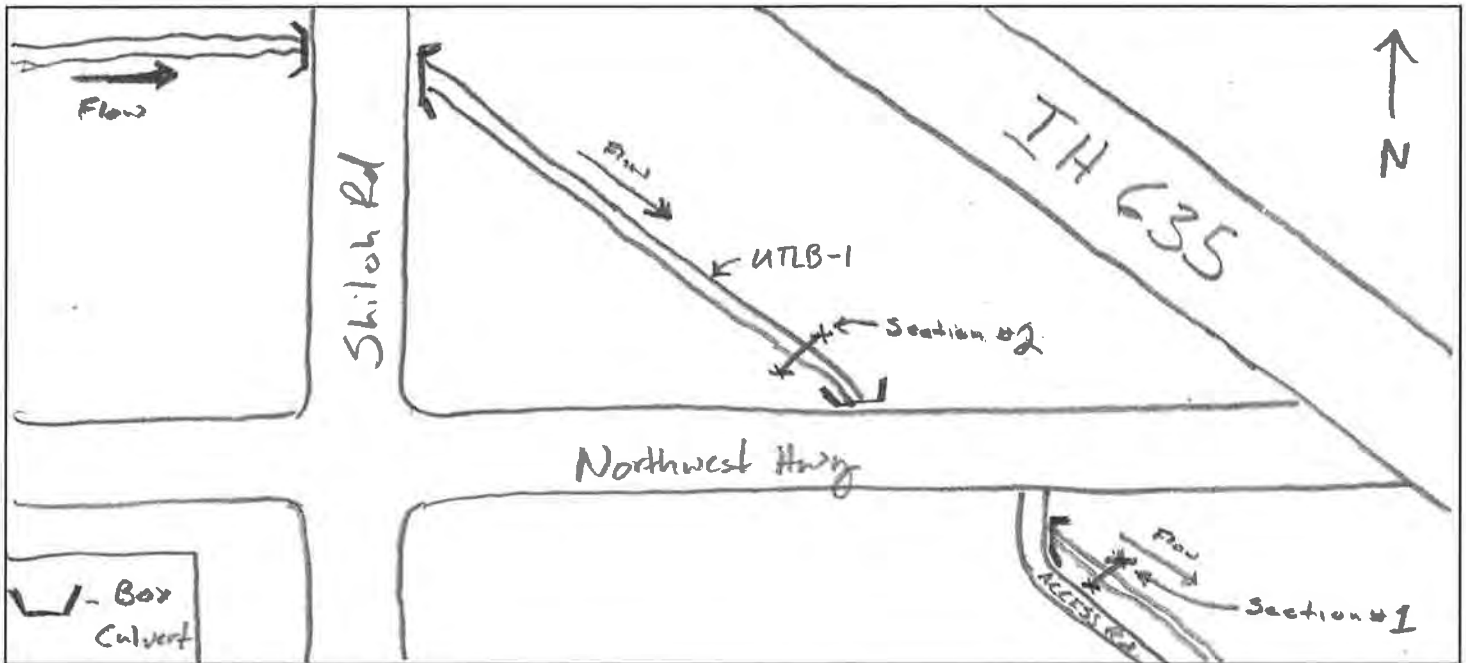
N/A

Stream Data Form #:	10
Project Name:	IH 635 LBJ Ultimate Project
CSJ:	2374-01-137 (Main CSJ)

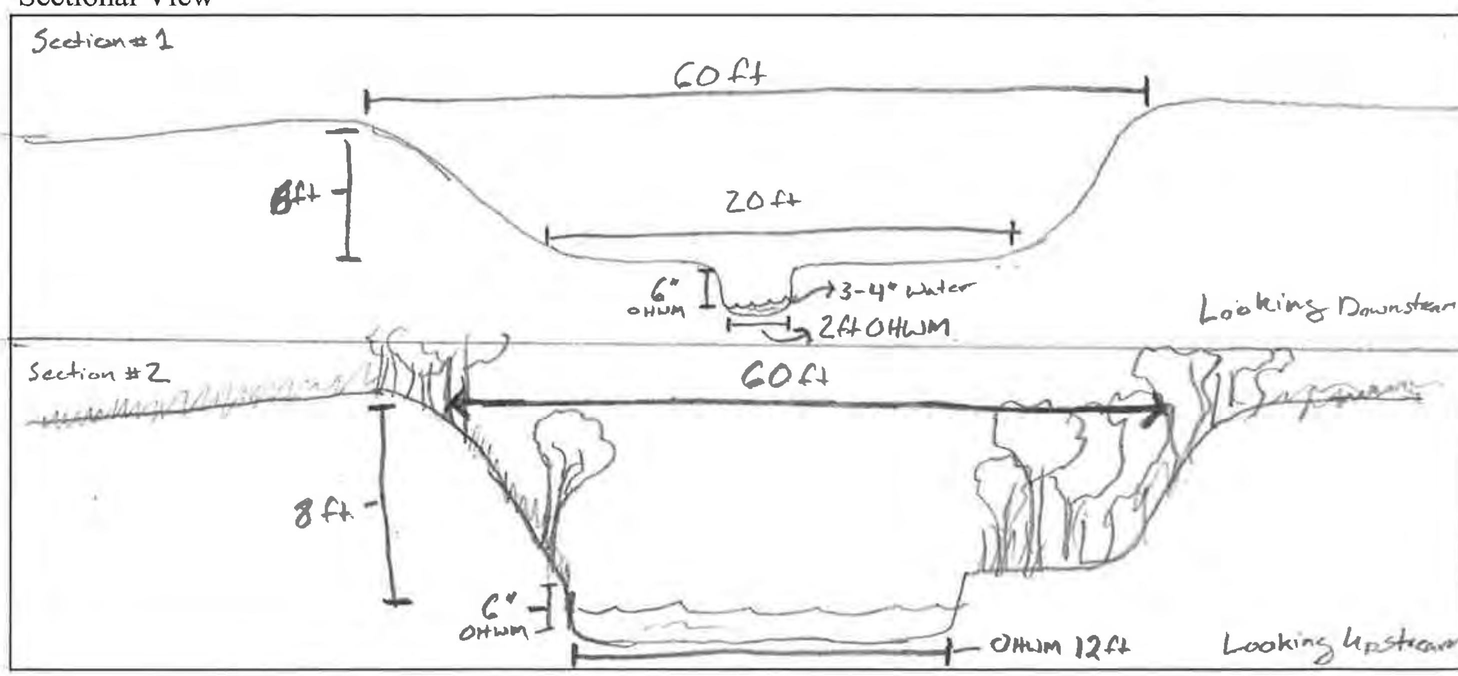
Stream Data Form (continued)
Please provide a plan and section view sketch of the stream channel.
Sketch should include:

- Directional arrow;
- Width of channel from top of bank to top of bank;
- Depth of channel,
- Approximate side slope; and,
- Width of stream from water edge to water edge.

Plan View



Sectional View



Stream Data Form #: 11 (UTLB-2)
Project Name: IH 635 LBJ Ultimate Project
CSJ: 2374-01-137 (Main CSJ)

Stream Data Form

Surveyor(s): C. Sanderson
Date of Field Work: 05/03/2016
USGS Stream Name: Unnamed Tributary 2 to Long Branch (UTLB-2)
County/State: Dallas, TX
USGS Topo Quad Name: White Rock Lake
Stream Number [303(d) List]: N/A
Associated Wetland(s): N/A
GPS Data: 32.859057N -96.6542527W

Stream Type: Characteristics
Ephemeral

Manipulated/Altered. Explain: Majority of stream channel is within concrete lined channels with exception to downstream of IH 635. High ammount of alteration throughout

Bank Stability (e.g. highly eroding, sloughing banks, etc.): high erosion downstream of IH 635

Stream Flow Direction: South
OHWM Width (ft): 2 - 4
OHWM Height (in): 2 - 3

Stream Bottom composition:

☒ Silts ☐ Cobbles ☒ Concrete ☐ Other:
☐ Sands ☐ Bedrock ☒ Muck
☐ Gravel ☐ Vegetation Type: Herbaceous Percent Cover 40

Aquatic Habitat: Indicate all types present within proposed ROW/project limits.

☐ Sand bar ☐ Sand/Gravel beach/bar ☐ Gravel riffles ☒ Aquatic vegetation
☐ Overhanging trees/shrubs ☐ Deep pool/ hole/ channel ☐ Other:

Stream has the following characteristics:

☒ Bed and banks
☒ OHWM (check all indicators that apply):

☒ clear, natural line impressed on the bank
☒ changes in the character of soil
☒ shelving
☒ vegetation matted down, bent, or absent
☒ leaf litter disturbed or washed away
☒ sediment deposition
☒ water staining
☐ other (list):
☒ the presence of litter and debris
☒ destruction of terrestrial vegetation
☐ the presence of wrack line
☐ sediment sorting
☒ scour
☐ multiple observed or predicted flow events
☐ abrupt change in plant community

Water Quality:

☐ Clear ☐ Slightly Turbid ☒ Turbid ☐ Very Turbid ☐ Oily film ☐ High organic content
☒ Other characteristics (pollutants, etc.) High concentration of urban litter (tires, plastic, paper, etc.)

Aquatic Organisms: List all species observed. This would include waterfowl, fish, snakes, turtles, frogs, invertebrates, etc.
None observed

Riparian Vegetation: List species observed.
Trees/Forest Understory: none
Herbaceous Plants: annual rye grass (Lolium perenne), Japanese brome (Bromus japonicus), King Ranch bluestem (Bothriochloa ischaemum var. songarica), Bermuda grass (Cynodon dactylon), cultivated oat grass (Avena sativa), Texas winter grass (Nassella leucotricha), wild onion (Allium spp.), pincushions (Scabiosa atropurpurea), bee-blossum (Gaura suffulta), red-seed plantain (Plantago

rhodosperma)

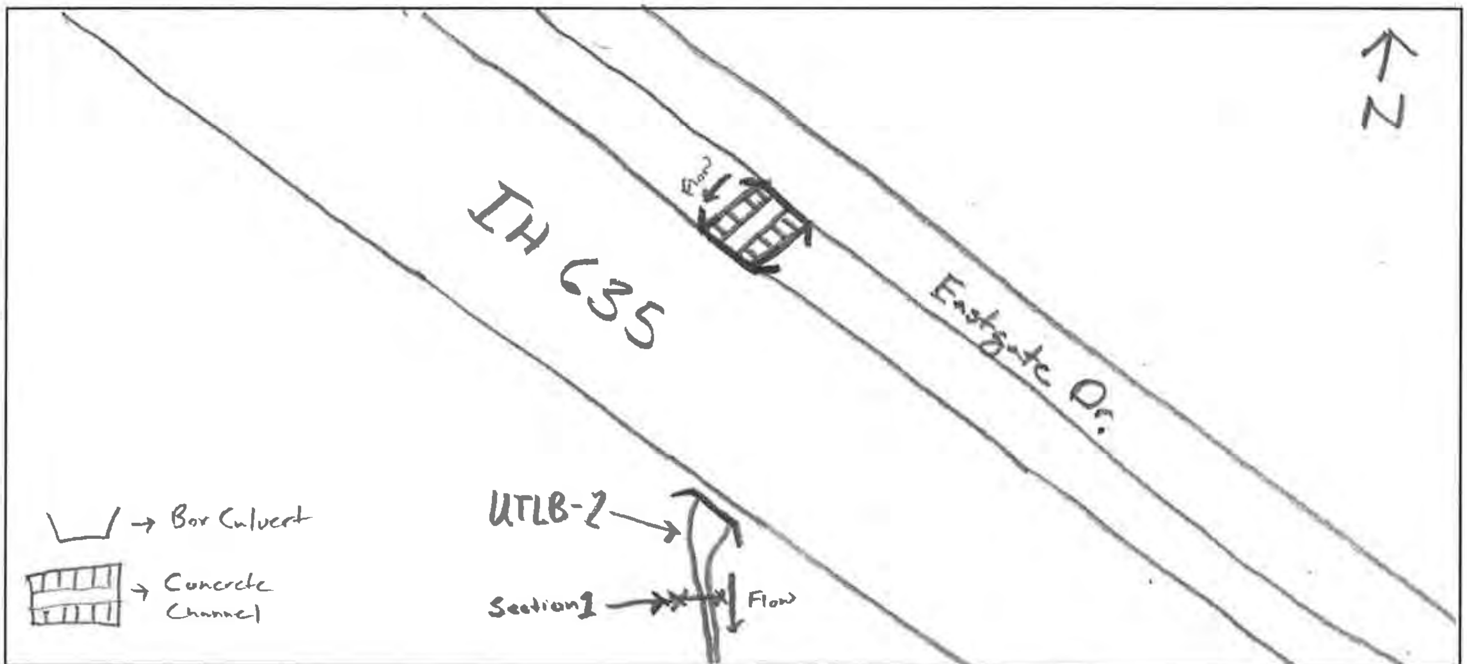
T&E Species/Suitable Habitat: List T&E species observed or which species the habitat is suitable for.

N/A

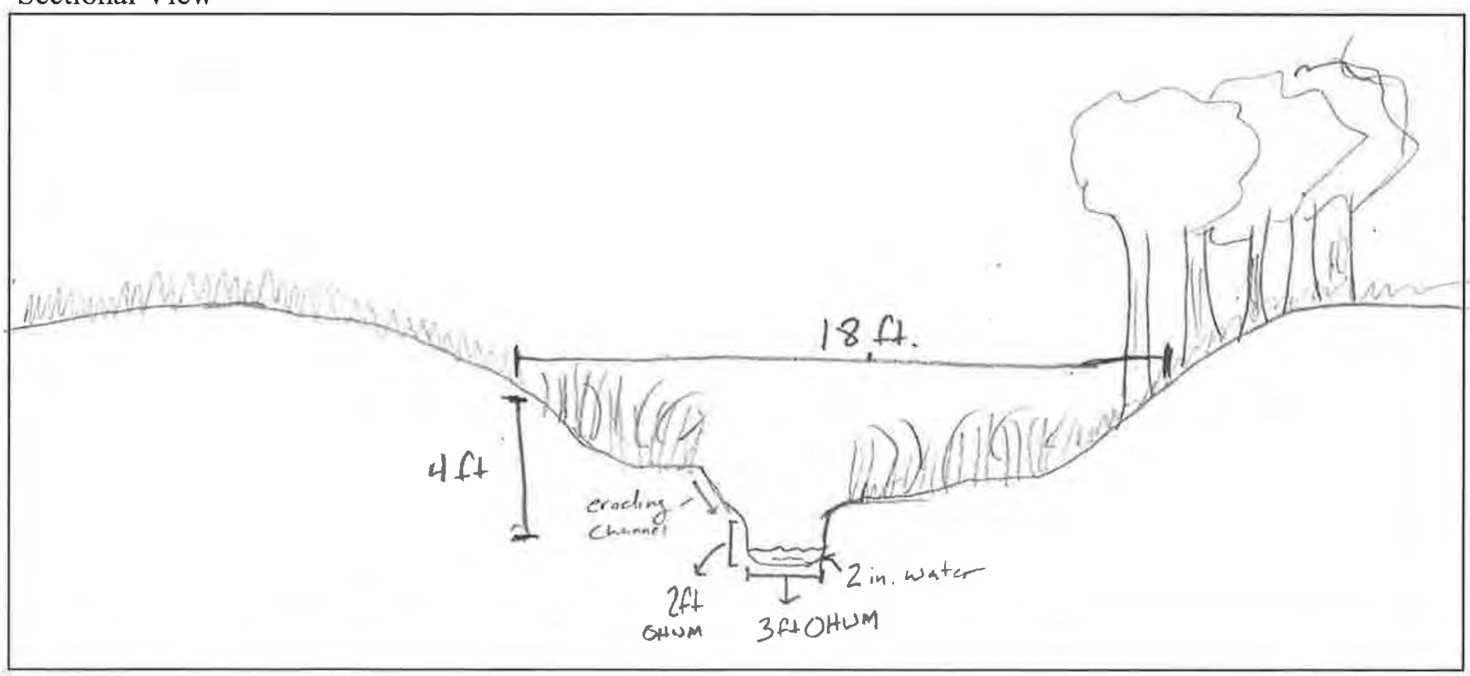
Stream Data Form (continued)
Please provide a plan and section view sketch of the stream channel.
Sketch should include:

- Directional arrow;
- Width of channel from top of bank to top of bank;
- Depth of channel,
- Approximate side slope; and,
- Width of stream from water edge to water edge.

Plan View



Sectional View



Stream Data Form #: 12 (UTLB-3)
Project Name: IH 635 LBJ Ultimate Project
CSJ: 2374-01-137 (Main CSJ)

Stream Data Form

Surveyor(s): C. Sanderson
Date of Field Work: 05/03/2016
USGS Stream Name: Unnamed Tributary 3 to Long Branch (UTLB-3)
County/State: Dallas, TX
USGS Topo Quad Name: White Rock Lake
Stream Number [303(d) List]: N/A
Associated Wetland(s): Emmergent Wetland (UTLB3-EW1)
GPS Data: 32.839993N -96.632822W

Stream Type: Characteristics
Ephemeral

Manipulated/Altered. Explain: Stream channel is within concrete lined west of IH 635 and transitions to a highly modified channel east of IH 635 (prior channelization evident).

Bank Stability (e.g. highly eroding, sloughing banks, etc.): high erosion downstream of IH 635

Stream Flow Direction: South
OHWM Width (ft): 2 - 4
OHWM Height (in): 1 - 2

Stream Bottom composition:

- ☒ Silts ☐ Cobbles ☒ Concrete ☐ Other:
- ☐ Sands ☐ Bedrock ☐ Muck
- ☒ Gravel ☐ Vegetation Type: Herbaceous Percent Cover 20

Aquatic Habitat: Indicate all types present within proposed ROW/project limits.

- ☐ Sand bar ☐ Sand/Gravel beach/bar ☐ Gravel riffles ☒ Aquatic vegetation
- ☐ Overhanging trees/shrubs ☐ Deep pool/ hole/ channel ☐ Other:

Stream has the following characteristics:

- ☒ Bed and banks
- ☒ OHWM (check all indicators that apply):
  - ☒ clear, natural line impressed on the bank
  - ☐ changes in the character of soil
  - ☒ shelving
  - ☒ vegetation matted down, bent, or absent
  - ☒ leaf litter disturbed or washed away
  - ☒ sediment deposition
  - ☒ water staining
  - ☐ other (list):
  - ☒ the presence of litter and debris
  - ☒ destruction of terrestrial vegetation
  - ☐ the presence of wrack line
  - ☐ sediment sorting
  - ☒ scour
  - ☐ multiple observed or predicted flow events
  - ☐ abrupt change in plant community

Water Quality:

☒ Clear ☐ Slightly Turbid ☐ Turbid ☐ Very Turbid ☐ Oily film ☐ High organic content
☒ Other characteristics (pollutants, etc.) High concentration of urban litter (tires, plastic, paper, etc.)

Aquatic Organisms: List all species observed. This would include waterfowl, fish, snakes, turtles, frogs, invertebrates, etc.
None observed

Riparian Vegetation: List species observed.
Trees/Forest Understory: none
Herbaceous Plants: Bermuda grass (Cynodon dactylon), annual rye grass (Lolium perenne), Japanese brome (Bromus japonicus), King Ranch bluestem (Bothriochloa ischaemum var. songarica), spearmint (Mentha spicata), pincushions (Scabiosa atropurpurea), red-seed plantain (Plantago rhodosperma)

T&E Species/Suitable Habitat: List T&E species observed or which species the habitat is suitable for.

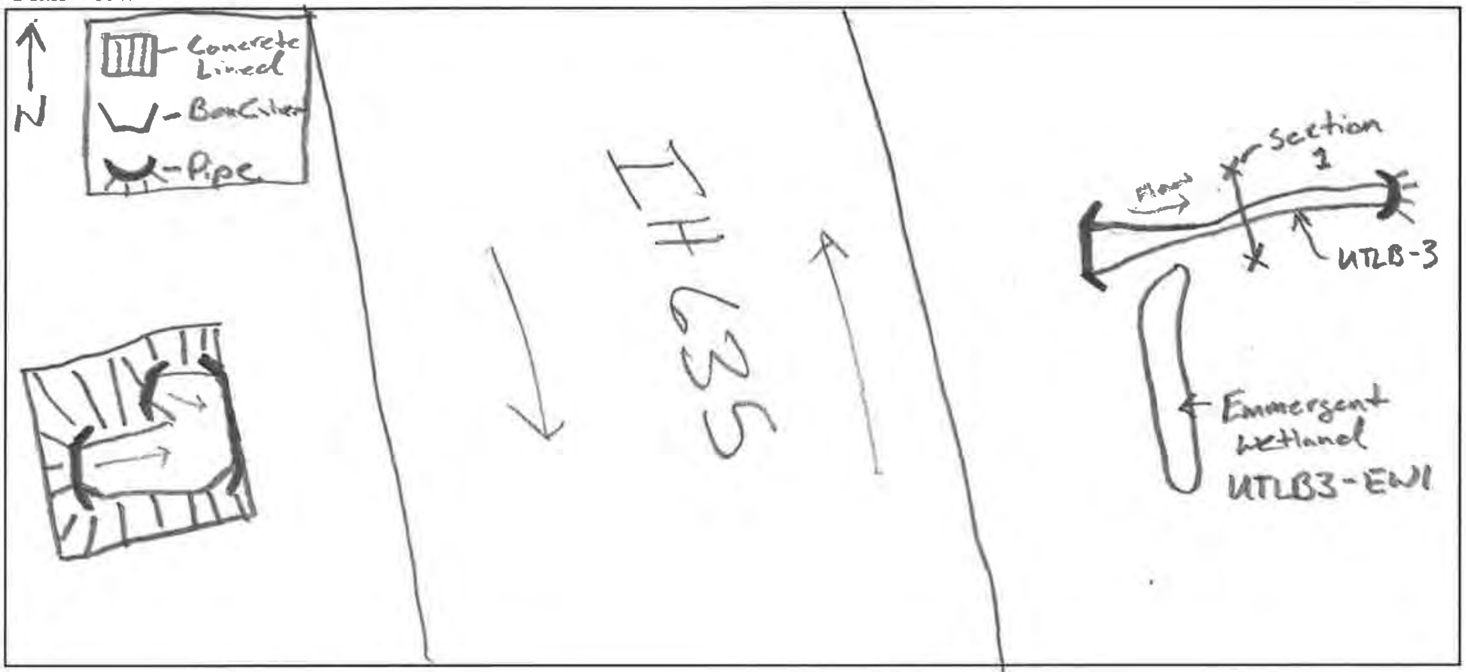
N/A

Stream Data Form #: 12
Project Name: IH 635 LBJ Ultimate Project
CSJ: 2374-01-137 (Main CSJ)

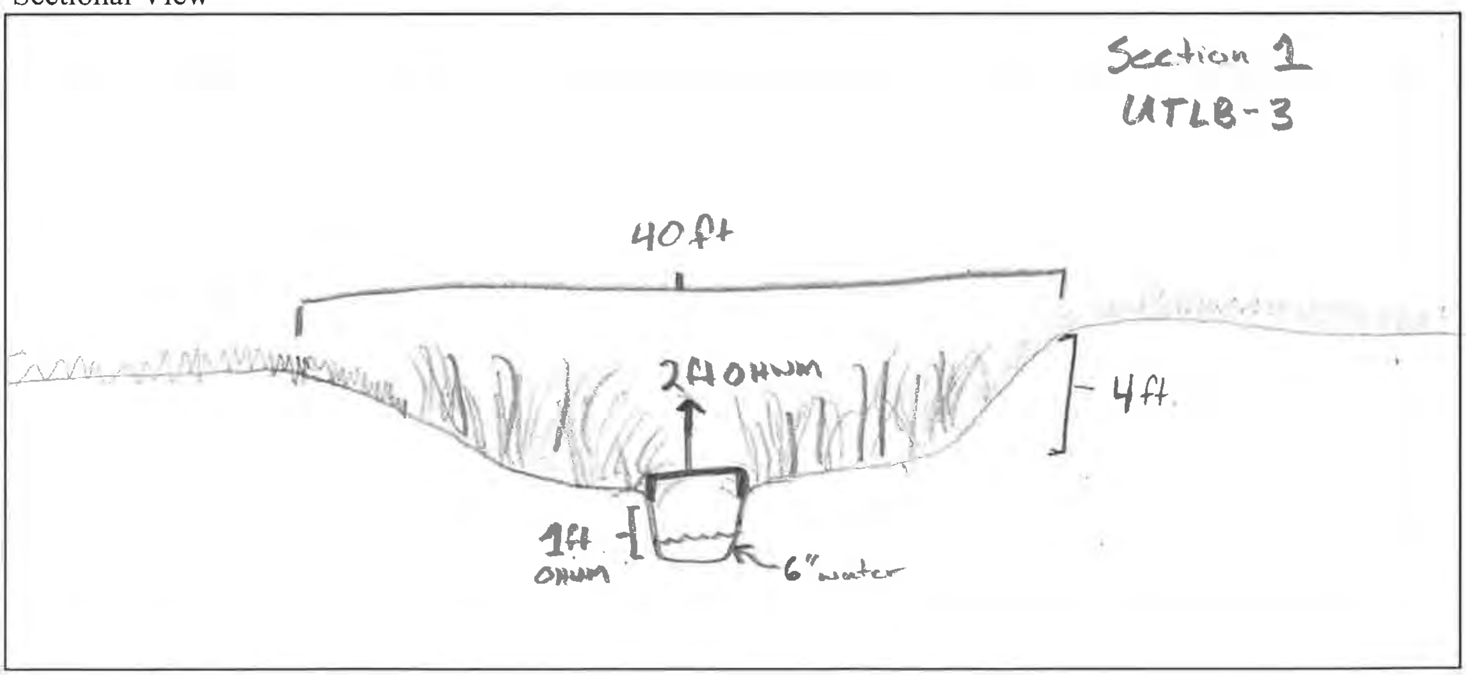
Stream Data Form (continued)
Please provide a plan and section view sketch of the stream channel.
Sketch should include:

- Directional arrow;
- Width of channel from top of bank to top of bank;
- Depth of channel,
- Approximate side slope; and,
- Width of stream from water edge to water edge.

Plan View



Sectional View



WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: IH 635 LBJ Ultimate Project City/County: Dallas/Dallas Sampling Date: 04/28/2016

Applicant/Owner: TXDOT State: TX Sampling Point: T1-DP1

Investigator(s): Sanderson, C. and Jaynes, R. Section, Township, Range: NA

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR): J - Southwestern Prairies Lat: 32.878579 Long: -96.688632 Datum: NAD 83

Soil Map Unit Name: 32 - Eddy-Urban land complex, 4 to 8 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓	No	
Wetland Hydrology Present?	Yes ✓	No	

Remarks:

Data point was taken inside WETLAND UTDB1-EW

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 5')			
1. *Eleocharis geniculata*	100	Y	FACW
2. *Carex meadii*	20	N	FAC
3. *Ambrosia trifida*	10	N	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
= Total Cover	130		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

SOIL

Sampling Point: T1-DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					Silty Clay	Gravel/Sand Intermixed
3-16	10YR 3/1	80	10YR 3/6	20	C	P	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ✓ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ✓ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 6"

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0 - 16"

Wetland Hydrology Present? **Yes** ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: IH 635 LBJ Ulimate Project City/County: Dallas/Dallas Sampling Date: 04/28/2016

Applicant/Owner: TXDOT State: TX Sampling Point: T1-DP2

Investigator(s): Sanderson, C. and Jaynes, R. Section, Township, Range: NA

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR): J - Southwestern Prairies Lat: 32.878559 Long: -96.688669 Datum: NAD 83

Soil Map Unit Name: 32 - Eddy-Urban land complex, 4 to 8 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	Is the Sampled Area within a Wetland? Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:
Upland data point associated with WETLAND UTDB1-EW

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 5')			
1. *Lolium perenne*	70	Y	FACU
2. *Sorghum halepense*	50	Y	FACU
3. *Carex meadii*	20	N	FAC
4. *Allium canadense*	40	N	FACU
5. *Daucus carota*	15	N	UPL
6. *Oenothera speciosa*	15	N	NI/UPL
7. *Plantago rhodosperma*	10	N	FACU
8.			
9.			
10.			
= Total Cover	220		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: T1-DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/1	100					Silty Clay	30% large weathered gravel
6-16	10YR 3/1	80	10YR 3/6	20	C	P	Clay	40% small weathered gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present? **Yes** ✓ **No** ____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: IH 635 LBJ Ulimate Project City/County: Dallas/Dallas Sampling Date: 05/03/2016

Applicant/Owner: TXDOT State: TX Sampling Point: T2-DP1

Investigator(s): Sanderson, C. and Jaynes, R. Section, Township, Range: NA

Landform (hillslope, terrace, etc.): Ditch Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR): J - Southwestern Prairies Lat: 32.839888 Long: -96.632879 Datum: NAD 83

Soil Map Unit Name: 34 - Ferris-Heiden complex, 5 to 12 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? **Yes** ___ **No** ✓

Remarks:
Data point associated with the WETLAND UTLB3-EW

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 5')			
1. *Eleocharis palustris*	60	Y	OBL
2. *Paspalum dilatatum*	30	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
= Total Cover	90		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 40

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✓

Remarks:

SOIL

Sampling Point: T2-D1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/1	90	10YR 4/6	10			Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR F**)
___ 1 cm Muck (A9) (**LRR F, G, H**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
✓ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR I, J**)
___ Coast Prairie Redox (A16) (**LRR F, G, H**)
___ Dark Surface (S7) (**LRR G**)
___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ______
Depth (inches): ______

Hydric Soil Present? **Yes** ✓ **No** ______

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

✓ Surface Water (A1)
___ High Water Table (A2)
✓ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
✓ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
___ Presence of Reduced Iron (C4)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
✓ Sparsely Vegetated Concave Surface (B8)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
___ Crayfish Burrows (C8)
✓ Saturation Visible on Aerial Imagery (C9)
✓ Geomorphic Position (D2)
___ FAC-Neutral Test (D5)
___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ✓ No ______ Depth (inches): 6" - 1'
Water Table Present? Yes ______ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 0" - 4"

Wetland Hydrology Present? **Yes** ✓ **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: IH 635 LBJ Ulimate Project City/County: Dallas/Dallas Sampling Date: 05/03/2016

Applicant/Owner: TXDOT State: TX Sampling Point: T2-DP2

Investigator(s): Sanderson, C. and Jaynes, R. Section, Township, Range: NA

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR): J - Southwestern Prairies Lat: 32.839876 Long: -96.632898 Datum: NAD 83

Soil Map Unit Name: 34 - Ferris-Heiden complex, 5 to 12 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? **Yes** ___ **No** ✓

Remarks:
Upland data point associated with the WETLAND UTLB3-EW

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 5')			
1. *Medicago lupulina*	40	Y	FACU
2. *Lolium perenne*	60	Y	FACU
3. *Lathyrus hirsutus*	15	N	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
= Total Cover	115		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✓

Remarks:

SOIL

Sampling Point: T2-DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100					Silty Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ______ **No** ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? **Yes** ______ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Biological Evaluation Form

Biological Evaluation Form

Main CSJ: 2374-01-137, etc.

Date of Evaluation: December 1, 2016

Proposed Letting Date: September 2018

District(s): Dallas

County(ies): Dallas

Roadway Name: IH 635

Limits From: Miller Road

Limits To: West of the KCS RR (West of SH 78)

Project Description: Reconstruct IH 635 to add mainlanes, tolled-managed lanes, and frontage roads. SEE ATTACHED MAPS/DESCRIPTION.

☐ *Project has no Federal nexus.*

☐ *Project not assigned to TxDOT under the NEPA Assignment MOU*

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 16, 2014, and executed by FHWA and TxDOT.

Endangered Species Act (ESA)

Yes Is the action area of the proposed project within the range and in suitable habitat of federally protected species?

Date that the IPaC system was accessed: November 18, 2016

No Would the proposed project affect federally protected species and/or habitat?

*Explain:

The action area of the proposed project is within the range of six federally-listed threatened or endangered bird species with the potential of occurring within the action area, provided that preferred habitat is found in sufficient quantity and quality to attract these species. The Official Species List, dated November 18, 2016, states that piping plover and red knot only need consideration for wind energy projects. As the proposed project is a transportation project no adverse effect to these two species are anticipated. Based on the habitat preferences for all six federally-listed birds, as compared to the type and quantity of habitat inventoried within the project area, the biologist evaluating available habitat determined that suitable habitat for each of the six federally-protected bird species is absent within the IH 635 corridor action area. The habitat preferences for these species, a brief discussion of habitat availability, and an assessment of potential adverse effects on federally-listed threatened or endangered species is included in the attached Species Impact Table. In summary, TxDOT has determined that there would be no effect to black-capped vireo, golden-cheeked warbler, least tern, piping plover, red knot, or whooping crane species as a result of the proposed project.

Resources consulted or activities conducted to make effect determination (if applicable):

- [x] TPWD County List
- [x] USFWS Critical Habitat Maps
- [ ] Species Expert Consulted
- [x] Aerial Photography
- [ ] Coastal Areas Maps
- [x] Site Visit
- [x] Topographic Map
- [ ] Species Study Conducted
- [ ] Karst Zone Maps
- [x] Ecological Mapping System of Texas (EMST)
- [x] Natural Diversity Database (NDD)

Other:

Migratory Bird Treaty Act (MBTA)

Yes — Is there potential for nesting birds to be present in the project action area during construction?

Yes — Were active nests identified during the site survey?

Yes — Will BMPs will be incorporated to protect migratory bird nests?

Bald and Golden Eagle Protection Act (BGEPA)

No — Does the proposed project have the potential to impact Bald or Golden Eagles?

Comments:

The IH 635 project corridor is comprised almost entirely of paved surfaces, mowed turf grass, and other urban landscapes. Non-urban areas are primarily small patches of riparian hardwood forests associated with stream crossings of IH 635 and IH 30. The largest perennial streams that cross IH 635 and IH 30 within project limits are characterized by steep banks that deeply cut into adjacent soils and bedrock. Water flowing in these streams is generally shallow (i.e., less than 6 inches deep). Vegetation along and near the stream banks is typically mature hardwood trees, with a thick understory of vines and shrubs (see the attached representative photographs of such habitat in the Habitat-related Project Area Photographs). The available non-urban habitat is not of sufficient quality or size to attract bald or golden eagles, which require larger bodies of water and adjacent open area to allow birds of their size to maneuver when hunting for food. Additionally, such areas are available to these birds several miles from the project area (e.g., Lake Ray Hubbard).

Fish and Wildlife Coordination Act (FWCA)

Yes — Does the project have impacts on one or more Waters of the U.S. or wetlands?

Yes — Is the project covered by a Nationwide Permit?

No — Is the project covered by an Individual Permit from the USACE?

Comments:

It is anticipated that the stream crossings of the IH 635 corridor would be covered by Nationwide Permit 14, with Preconstruction Notification (PCN) required for several of the crossings.

Executive Order 13112 on Invasive Species

Yes — Would the project be in compliance with EO 13112?

Comments:

In accordance with Executive Order 13112 on Invasive Species, seeding and replanting with TxDOT-approved seed mixes containing native species would be done where possible. Soil disturbance would be minimized in the ROW in order to minimize invasive species establishment.

Executive Memorandum on Beneficial Landscaping

Yes — Would landscaping be included in the proposed projects?

Describe landscaping activities:

Seeding and replanting of disturbed areas with TxDOT-approved seed mixes that are in compliance with Executive Memorandum on Beneficial Landscaping would be done where possible.

Yes — Would the proposed project be in compliance with the Executive Memorandum on Beneficial Landscaping?

Farmland Protection Policy Act (FPPA)

Yes — Would the project require new ROW or permanent easements (do not include temporary easements)?

No — Is the project located in a "non-urbanized area" that contain areas mapped as prime, unique, statewide important or locally important farmland by the NRCS Web Soil Survey or Census Bureau?

Date that the Web Soil Survey was accessed: See General Comments

General Comments

The NRCS regulation that defines "farmland" for purposes of the FFPA (7 CFR Section 658.2) excludes lands identified as "urbanized area (UA) on the Census Bureau Map." The Census Bureau Website (https://tigerweb.geo.census.gov/tigerweb/) was accessed on 11/18/2016, which indicated the entire proposed project corridor is identified as part of an urbanized area. Accordingly, the FPPA does not apply to any of the proposed project area. An attached 2010 Census Urban Area Map, generated by the Census Bureau Website, documents this result.

TPWD Analysis Section

Texas Parks and Wildlife Coordination Conditions

1. No — Is the project limited to a maintenance activity exempt from coordination?
   http://txdot.gov/inside-txdot/division/environmental/maintenance-program.html
2. No — Has the project previously completed coordination with TPWD?

Tier I Site Assessment

MOU Triggers

1. Yes — Is the project within range of a state threatened or endangered species or SGCN and suitable habitat is present?

*Explanation:

A review of results from the NDD search revealed that there are two recorded Element Occurrence (EO) Sites within 1.5 miles of the proposed project area. The first site has the EO Site identification number (EOID) 11916 for a tallgrass prairie remnant area. A summary of EOID 11916 is included in the table below, the location is indicated in the attached TPWD Natural Diversity Database (NDD) Map, and a detailed description is included in the attached Element Occurrence Records (see page 42 of 57). This prairie remnant area is not federally-listed or state-listed, but represents relatively rare prehistoric prairie habitat.

The second site within 1.5 miles of the proposed project area is for A Cave Obligate Isopod (EOID 12827) (Caecidotea bilineata) found within a spring. The area associated with this species overlaps with the IH 635 corridor, but is not expected to be found in this highly urbanized corridor as the type of natural spring habitat preferred by the species was not observed during the biological field survey. A description of this EOID is found in the Element Occurrence Records (see page 7 of 57).

Although unlikely to occur within this highly urbanized setting, there is a possibility that the state-listed threatened timber rattlesnake and two SGCNs (plains spotted skunk and Texas garter snake) may utilize forested riparian habitat along the various perennial streams that cross IH 635 within the project area. Potential impacts to riparian forest areas would affect approximately 4.1 acres.

Field biological visits were conducted for this project on April 7, 27, and 28, 2016, and on May 3, 2016, with particular emphasis on riparian and aquatic habitat associated with stream crossings of IH 635 and IH 30 within project limits. During these visits, an assessment was made regarding the suitability of perennial streams with potential project impacts (i.e., Jackson Branch, Dixon Branch, and Long Branch) as habitat for the following state-listed mussel species: Louisiana pigtoe, sandbank pocketbook, Texas heelsplitter, and Texas pigtoe. The larger of the perennial streams crossing IH 635 and IH 30 are characterized by shallow water (less than 6 inches in depth) flowing across limestone or mudstone bedrock, with occasional pools that vary from a few inches to 2 feet in depth (see Habitat-related Project Area Photographs 5, 6 and 8, for representative views of these three perennial streams). These streams are fed by large areas of impervious surfaces typical of highly-urbanized watersheds, and show evidence of substantial and frequent stream flow and scouring from storm runoff. Such conditions, combined with the normally low level of flow and the stony/bedrock substrate indicate that project area streams would not likely be preferred habitat for mussels. During field visits, stream shorelines and shallow water were visually examined for the presence of live mussels or shells, but no evidence of any mollusks was noted other than a few Asian clams (Corbicula fluminea).

Although Texas milk vetch plants were not observed during field visits, virtually all of the non-paved portions of the project area could potentially serve as preferred habitat for this annual species. That is, the project area is characterized by calcareous soils with high clay content, which is preferred habitat. Athough nearly all non-paved areas within the SH 635 ROW are dominated by non-native grass species and subject to mowing during the growing season, this SGCN has the potential to occur in the project area and could be affected by construction.

Suitable habitat is not present within the IH 635 project area for any other state-listed species or SGCN that could potentially be found in Dallas County, nor is it expected that the proposed project would adversely affect any federally-listed or state-listed species, or any SGCN. A species-by-species assessment of habitat availability and potential impacts is provided in the attached Species Impacts Table.

Date TPWD County List Accessed: November 8, 2016

Date that the NDD was accessed: November 8, 2016

What agency performed the NDD search? TPWD

NDD Search Results for EOIDs and Tracked Managed Areas

EOID Number	Common Name	Scientific Name	Listing Status	Buffer Zone
11916	Vertisol Blackland Prairie	*Schizachyrium scoparium - Sorghastrum nutans - Andropogon gerardii - Biflora americana Vertisol Grassland*	None	1.5 Mile
12827	A Cave Obligate Isopod	*Caecidotea bilineata*	None	1.5 Mile

1.1 Yes Does the BMP PA eliminate the requirement to coordinate for all species?

*Explanation:

The presence of habitat that may be suitable for several species triggers the following BMPs that are noted in the Species Impact Table.
Plains Spotted Skunk and Texas Garter Snake -- apply species-specific BMP (see Table 1 in BMP PA).
Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, and Texas Pigtoe - apply Freshwater Mussel BMPs (see Table 2 in BMP PA).
Timber Rattlesnake - apply species-specific BMP (see Table 2 in BMP PA).

2. Yes NDD and TCAP review indicates adverse impacts to remnant vegetation?

*Explanation:

As noted above under MOU Triggers Item 1, Texas milk vetch may potentially occur within roadway ROW throughout the project area even though nearly all available habitat is dominated by non-native grass species and subject to frequent mowing during the growing season. Although the presence of this SGCN was not confirmed during field visits, impacts to this plant may occur as a result of construction activities. The BMP PA does not prescribe a species-specific BMP for the Texas milk vetch, nor are the general Vegetation BMPs applicable to this species.

No other impacts are anticipated for any other rare plant species or remnant vegetation within the project area (see Species Impact Table for a discussion of relevant plant habitat characteristics).

3. Yes Does the project require a NWP with PCN or IP by USACE?

*Explanation:

A NWP 14 with PCN would be required due to impacts to two emergent wetlands located at Kingsley Road and 1,700 feet north of Oates Avenue (each with 0.01 acre impact). In addition, two stream crossings would result in impacts that would exceed 0.1 acre, which would be met by NWP 14 with PCN: Long Branch near La Prada Drive (0.22 acre impact); and an unnamed tributary to Long Branch near Shiloh Road (0.25 acre impact).

4. Yes Does the project include more than 200 linear feet of stream channel for each single and complete crossing of one or more of the following that is not already channelized or otherwise maintained:

Yes Channel realignment; or

Yes Stream bed or stream bank excavation, scraping, clearing, or other permanent disturbance.

*Explanation:

The proposed project would have greater than 200 linear feet of stream channel impacts at the following five stream crossings of IH 635:
1. Unnamed tributary to Jackson Branch (located 2,000 feet southeast of Forest Lane), 218 linear feet of channel impacts from the placement of stream bed within box culverts.
2. Unnamed tributary to Dixon Branch (located near Kingsley Road), 289 linear feet of channel realignment.
3. Unnamed tributary to Long Branch (located near Shiloh Road), 732 linear feet of stream bed scraping.
4. Long Branch crossing (located 1,150 feet southeast of Northwest Highway), 216 linear feet of channel impacts from placement of stream bed within box culverts.
5. Long Branch crossing (located at La Prada Drive), 289 linear feet of channel realignment and placement on riprap.

5. No — Does the project contain known isolated wetlands outside the TxDOT ROW that will be directly impacted by the project?

Comments:

IH 635 EMST & Observed Land Cover Summary.xlsx

6. Yes — Would the project impact at least 0.10 acre of riparian vegetation?

*Explanation:

The project is expected to affect approximately 4.09 acres of riparian hardwood forest, and 0.13 acre of riparian evergreen shrubland, totaling 4.22 acres of impacts to the Riparian MOU Land Cover Type.

7. Yes — Does project disturb a habitat type in an area equal to or greater than the area of disturbance indicated in the Threshold Table Programmatic Agreement?

*Explanation:

The project would affect greater than 0.1 acre of riparian vegetation within the Texas Blackland Prairies Ecoregion.

*Attach associated file of EMST output (Mapper Report or other Excel File which includes MOU Type, Ecosystem Name, Common/Vegetation Type Name) in ECOS

Excel File Name:

IH 635 EMST & Observed Land Cover Summary.xlsx

7.1 Yes — Is there a discrepancy between actual habitat(s) and EMST mapped habitat(s)?

*Explanation:

Nearly all of the proposed project corridor was mapped by EMST and from field observations and aerial photography interpretation as urban landscape. The attached Non-Urban Land Cover Map: Observed and EMST shows all areas that were not mapped as urban landscape by either EMST or field observations and interpretation of aerial photography (see callout boxes that point out the areas mapped by EMST as non-urban landscape). The EMST map correctly mapped 0.03 acre of Central Texas: Floodplain Hardwood Forest and 0.03 acre of Central Texas: Riparian Hardwood Forest. Other than these two riparian/ floodplain forested habitat areas, all observed riparian or upland forest habitat shown in the Non-Urban Land Cover Map: Observed and EMST (approximately 4.5 acres) were incorrectly mapped as urban land cover. Representative photographs of riparian forest areas incorrectly mapped by EMST as urban are included in the Habitat-related Project Area Photographs (see Photographs 3-6 and 9). The EMST data incorrectly identified 0.09 acre of urban cover as Blackland Prairie: Disturbance or Tame Grassland; was several pixel-sized areas located along the edge of IH 30 southbound frontage road. The EMST data shows that an area of 0.75 acre of deciduous woodland at the IH 635/IH 30 interchange was mapped incorrectly as urban landscape by EMST.

Attach file showing discrepancy between actual and EMST mapped habitat(s).
File Name:

Non-Urban Land Cover Map: Observed and EMST

Is TPWD Coordination Required?

Yes

☒ Early Coordination

☐ Administrated Coordination - Must be conducted through ENV-NRM

BMPs Implemented or EPICs included (as necessary):

Texas garter snake BMP: Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered.

Plains spotted skunk BMP: Contractors will be advised of potential occurrence in the project area, to avoid harming the species if encountered, and to avoid unnecessary impacts to dens.

Timber/canebrake rattlesnake BMP: Contractors will be advised of potential occurrence in the project, and to avoid harming the species if encountered.

Freshwater Mussel BMPs: (1) When work is in the water, survey project footprints for state-listed species where appropriate habitat exists. (2) When work is in the water and mussels are discovered during surveys, relocate state-listed and SGCN mussels under TPWD permit and implement Water Quality BMPs. (3) When work is adjacent to the water, Water Quality BMPs implemented as part of the SWPPP for a construction general permit or any conditions of the 401 water quality certification for the project will be implemented.

The following MBTA language is included in the project EPIC sheet for birds and their active nests protected under the MBTA: The Migratory Bird Treaty Act of 1918 states that it is unlawful to kill, capture, collect, possess, buy, sell, trade or transport any migratory bird, nest, young, feather, or egg in part or in whole, without a Federal permit issued in accordance within the Act's policies and regulations. The contractor would remove all old migratory bird nests from any structure where work would be done from October 1 to February 15. In addition, the contractor would be prepared to prevent migratory birds from building nest(s) between February 15 and October 1. In the event that migratory birds are encountered on-site during project construction, efforts to avoid adverse impacts on protected birds, eggs, and/or young would be observed.

The following language is included in the EPIC sheet to address EO 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping: Preserve native vegetation to the extent practical. Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751 & 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

TxDOT Contact Information

Name:

Phone Number:

E-mail:

Findings

Endangered Species Act (ESA)

According to the U.S. Fish and Wildlife Service (USFWS), the project action area is within the range and in suitable habitat of a federally protected species. Based on the following information, the proposed project will not affect protected species and/or their habitat and will not impact areas that have been designated as critical habitat by the USFWS.

The action area of the proposed project is within the range of six federally-listed threatened or endangered bird species with the potential of occurring within the action area, provided that preferred habitat is found in sufficient quantity and quality to attract these species. The Official Species List, dated November 18, 2016, states that piping plover and red knot only need consideration for wind energy projects. As the proposed project is a transportation project no adverse effect to these two species are anticipated. Based on the habitat preferences for all six federally-listed birds, as compared to the type and quantity of habitat inventoried within the project area, the biologist evaluating available habitat determined that suitable habitat for each of the six federally-protected bird species is absent within the IH 635 corridor action area. The habitat preferences for these species, a brief discussion of habitat availability, and an assessment of potential adverse effects on federally-listed threatened or endangered species is included in the attached Species Impact Table. In summary, TxDOT has determined that there would be no effect to black-capped vireo, golden-cheeked warbler, least tern, piping plover, red knot, or whooping crane species as a result of the proposed project.

Consultation with the U.S. Fish and Wildlife Service (USFWS) will not be required. The USFWS IPaC website was accessed on November 18, 2016.

Essential Fish Habitat (EFH)

Essential fish habitat is defined by the Magnuson-Stevens Fishery Conservation and Management Act (MSA) as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Tidally influenced waters do not occur within the project action area. Coordination with National Marine Fisheries Service (NMFS) is not required.

Coastal Barrier Resources Act (CBRA)

This project is not located within a designated CBRA map unit. Coordination with the U.S. Fish and Wildlife Service (USFWS) is not required.

Marine Mammal Protection Act (MMPA)

Marine mammals are protected under the Marine Mammal Protection Act (MMPA). The Texas coast provides suitable habitat and is within range of several marine mammals including the West Indian Manatee (*Trichechus manatus*), and bottlenose dolphin (*Tursiops truncatus*).

The project area does not contain suitable habitat for marine mammals. Coordination with NMFS is not required.

Migratory Bird Treaty Act (MBTA)

The Migratory Bird Treaty Act (MBTA) states that it is unlawful to kill, capture, collect, possess, buy, sell, trade, or transport any migratory bird, nest, young, feather, or egg in part or in whole, without a federal permit issued in accordance within the Act’s policies and regulations.

A site survey identified active nests within the project action area. TxDOT will take all appropriate actions to prevent the take of migratory birds, their active nests, eggs, or young by the use of proper phasing of the project or other appropriate actions.

A MBTA appropriate EPIC will be included in the project file.

Bald and Golden Eagle Protection Act (BGEPA)

The proposed project does not have the potential to impact Bald or Golden Eagles.

Fish and Wildlife Coordination Act (FWCA)

The Fish and Wildlife Coordination Act (FWCA) of 1958 requires that federal agencies obtain comments from USFWS and TPWD. This coordination is required whenever a project involves impounding, diverting, or deepening a stream channel or other body of water.

The proposed project is authorized under a Section 404 of the Clean Water Act Nationwide Permit; therefore, no coordination under FWCA would be required.

Executive Order 13112 on Invasive Species (EO 13112)

Re-vegetation of disturbed areas would be in compliance with the Executive Order on Invasive Species (EO 13112). Regionally native and non-invasive plants will be used to the extent practicable in landscaping and re-vegetation.

Executive Memorandum on Beneficial Landscaping

Landscaping would be a part of the proposed project activities. Re-vegetation of disturbed areas would be in compliance with the Executive Memorandum on Beneficial Landscaping (26Apr94). Regionally native and non-invasive plants will be used to the extent practicable in landscaping and re-vegetation.

Seeding and replanting of disturbed areas with TxDOT-approved seed mixes that are in compliance with Executive Memorandum on Beneficial Landscaping would be done where possible.

Farmland Protection Policy Act (FPPA)

Coordination with the National Resources Conservation Service (NRCS) for FPPA would not be required because the project is not located in areas mapped as prime, unique, statewide or locally important nor is it located in an “urbanized area” identified by the NRCS Web Soil Survey or Census Bureau.

Signatures:

No Was this form completed by TxDOT environmental staff?

Prepared By: Rich Jaynes, Halff Associates, Inc. Title: Environmental Scientist

Rich Jaynes Digitally signed by Rich Jaynes
Date: 2016.12.01 07:44:58 -06'00' Date: December 1, 2016

Signature

TxDOT Reviewer: Title:

Date:

Signature

Suggested Attachments

Aerial Map (with delineated project boundaries)

USFWS T&E List

TPWD T&E List

Species Impact Table

NDD EOID List and Tracked Managed Areas (**Required for TPWD Coordination**)

NOAA EFH Mapper Printout

USFWS CBRA Mapper Printout

EMST Project MOU Summary Table (**Required for TPWD Coordination**)

TPWD SGCN List

FPPA Documentation

NRCS Web Soil Survey Map

Census Bureau Urbanized Area Map

Landscaping Plans

Photos (**Required for TPWD Coordination**)

Previous TPWD Coordination Documentation (if applicable)

The following table shows the revision history for this guidance document.

Revision History	
Effective Date Month, Year	Reason for and Description of Change
May 2014	Version 1 released.
August 2015	Version 2 released. Revised the overall appearance to be more consistent with a form. Upgraded the District and County selection fields for increased simplicity. Included the NEPA Assignment MOU language for projects that are assigned to TxDOT under the NEPA Assignment MOU. Revised the Endangered Species Act to distinguish between take/no take and affect based on the project having or not having a federal nexus. Updated the Farmland Protection Policy Act questions to be more consistent with the applicable regulations.

Biological Evaluation

for

IH 635 from US 75 to IH 30

Dallas County, Texas

Attachments

Description	Number of Pages
Project Description	1
Project Location Map	1
Non-Urban Land Cover Map: Observed and EMST (plus Index Map)	14
TxDOT-TPWD MOU Land Cover Type Summary	1
Habitat-related Project Area Photographs	4
TPWD Annotated County List of Rare Species: Dallas County	4
USFWS Threatened and Endangered Species List	8
Species Impact Table	9
TPWD Natural Diversity Database (NDD) Map	1
Element Occurrence Records	57
Species of Greatest Conservation Need List	2
2010 Census Urban Area Map	1

Project Description

Re-Evaluation consultation is being conducted for the proposed reconstruction and improvement to an 11.2-mile section of IH 635 in Dallas County, Texas. The proposed project extends along IH 635 through portions of the cities of Dallas, Garland, and Mesquite (see **Project Location Map**). The original IH 635 Environmental Assessment (EA) received environmental clearance through a Federal Highway Administration (FHWA) Finding of No Significant Impact (FONSI) issued on January 30, 2003.

Proposed Improvements

The proposed IH 635 improvements from east of US 75 to Miller Road would include constructing one additional 12-foot-wide general-purpose lane in each direction, two 12-foot-wide tolled-managed lanes in each direction, and two to three frontage road lanes in each direction. From near Royal Lane/Miller Road to La Prada Drive, the proposed project would provide one additional general-purpose lane in each direction, two non-tolled express lanes in each direction, and two to three frontage road lanes in each direction. From La Prada Drive to south of IH 30, the project would reconstruct IH 635 to provide lane balance transitions between the general purpose lanes, proposed express lanes, and IH 30 interchange. Auxiliary lanes would be provided as needed to accommodate traffic demand volumes associated with ramp movements. The general purpose lanes would include 10-foot-wide outside and inside shoulders. The tolled managed/express lanes would include 10-foot-wide outside shoulders and 4-foot wide inside shoulders. The proposed project would also include the construction of general purpose lane ramps, tolled managed/express lane ramps, and direct-connecting ramps between IH 30 and IH 635. The proposed frontage roads along IH 635 would typically consist of 11-foot wide inside lane(s) and a 14-foot-wide outside shared use lane in each direction. Inside curb offsets would vary from 1 to 2-feet wide. Outside curb offsets adjacent to shared use lanes would be 2-feet wide. Continuous sidewalks would be provided along the proposed frontage roads.

The proposed IH 30 improvements (from west of Gus Thomasson Road to east of Galloway Avenue) would include constructing three to four 12-foot-wide general purpose lanes. Auxiliary lanes would be constructed as needed to accommodate traffic demand volumes associated with ramp movements. The general purpose lanes would include 10-foot-wide outside and inside shoulders. Two to three continuous frontage road lanes would be constructed in each direction, which would typically consist of 11-foot wide inside lane(s) and a 14-foot wide outside shared use lane in each direction. Inside curb offsets would vary from 1 to 2-feet wide and outside curb offsets adjacent to shared use lanes would be 2-feet wide. Continuous sidewalks would be provided along the proposed frontage roads.

The proposed project includes the construction of multiple noise walls located along the project corridor, where reasonable and feasible. The project would require approximately 16.3 acres of proposed ROW as well as 0.5 acres of temporary construction easements and 9.1 acres of drainage easements.

Legend

Project Limits

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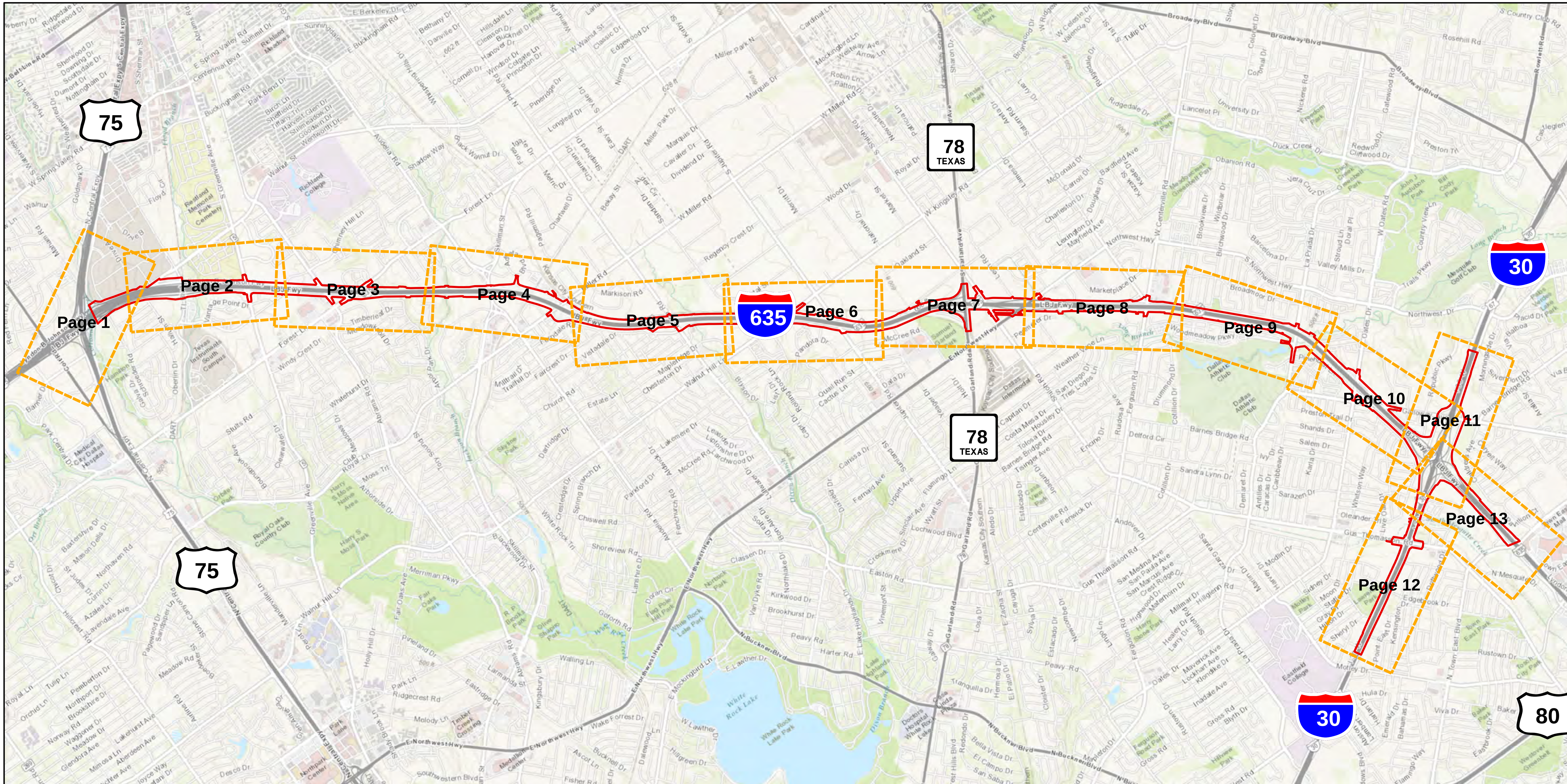
SCALE IN MILES

Base Map Source: NCTCOG

Project Location Map

IH 635 from US 75 to IH 30
Dallas County, Texas

CSJs: 2374-01-137, 2374-01-180,
2374-01-183, 2374-02-053, & 2374-02-144



Legend

Map Grid

IH 635 Project Limits

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SCALE IN FEET

N E S W

Base Map Source: Esri World Topographic Map

Index Map for Non-Urban Land Cover Map: Observed and EMST

IH 635 from US 75 to IH 30
Dallas County, Texas

CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144

Legend

IH 635 Project Limits

100-Year Floodplain Area

Field-Observed Land Cover Types

- Riparian Hardwood Forest
- Riparian Evergreen Shrubland
- Deciduous Woodland Upland Scrub

EMST Map Non-Urban Areas

- Central Texas: Riparian Hardwood Forest
- Central Texas: Floodplain Hardwood Forest
- Blackland Prairie: Disturbance or Tame Grassland

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0 400 800

SCALE IN FEET

N E S W

Source / Year of Aerial Base Map Imagery: NCTCOG / 2015

100-Year Floodplain Data: FEMA DFIRMs for Dallas County (2014)

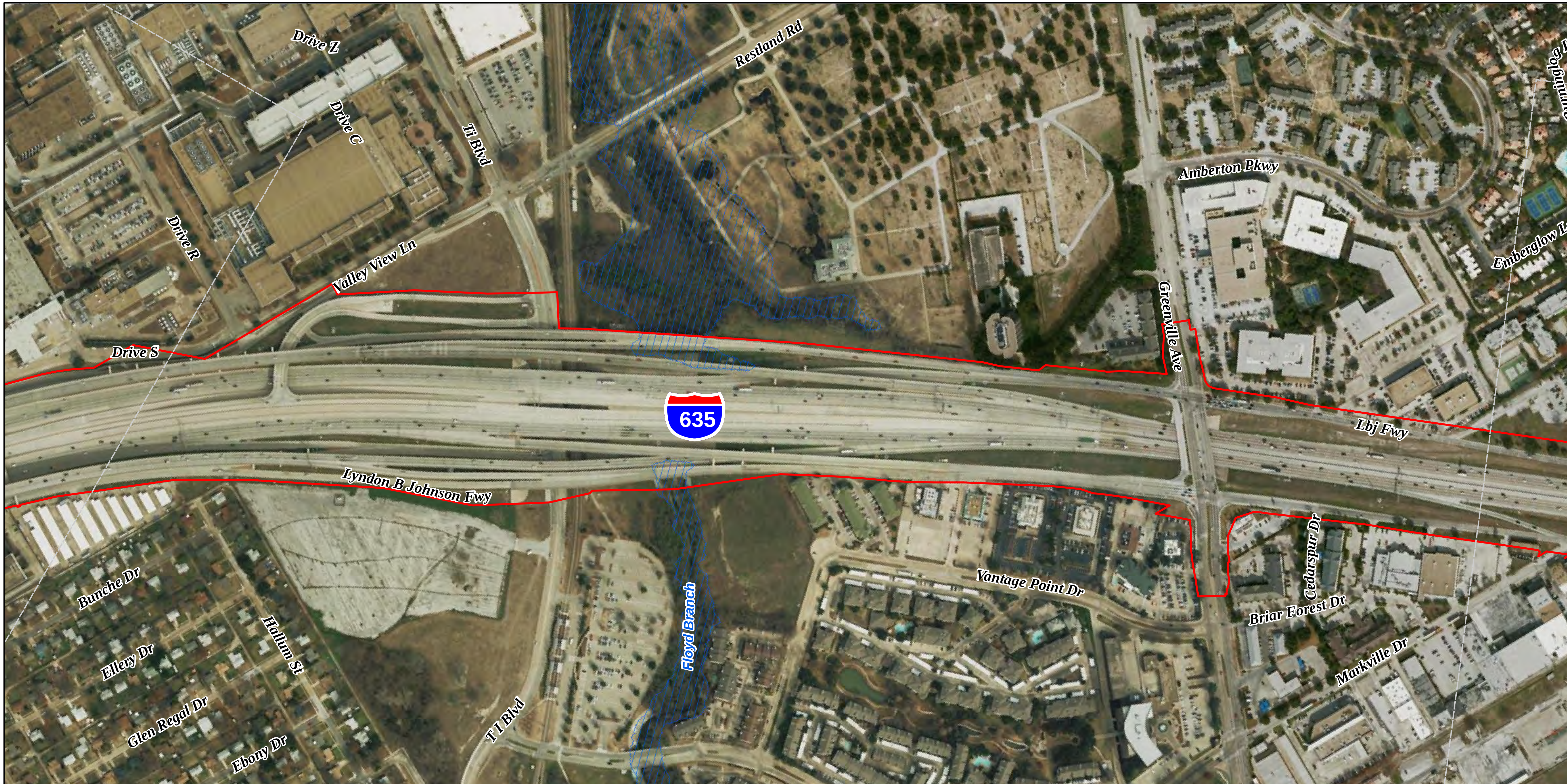
Non-Urban Land Cover Map: Observed and EMST *

Page 1 of 13

IH 635 from US 75 to IH 30

Dallas County, Texas

CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144



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Non-Urban Land Cover Map: Observed and EMST *
Page 2 of 13

IH 635 from US 75 to IH 30
Dallas County, Texas

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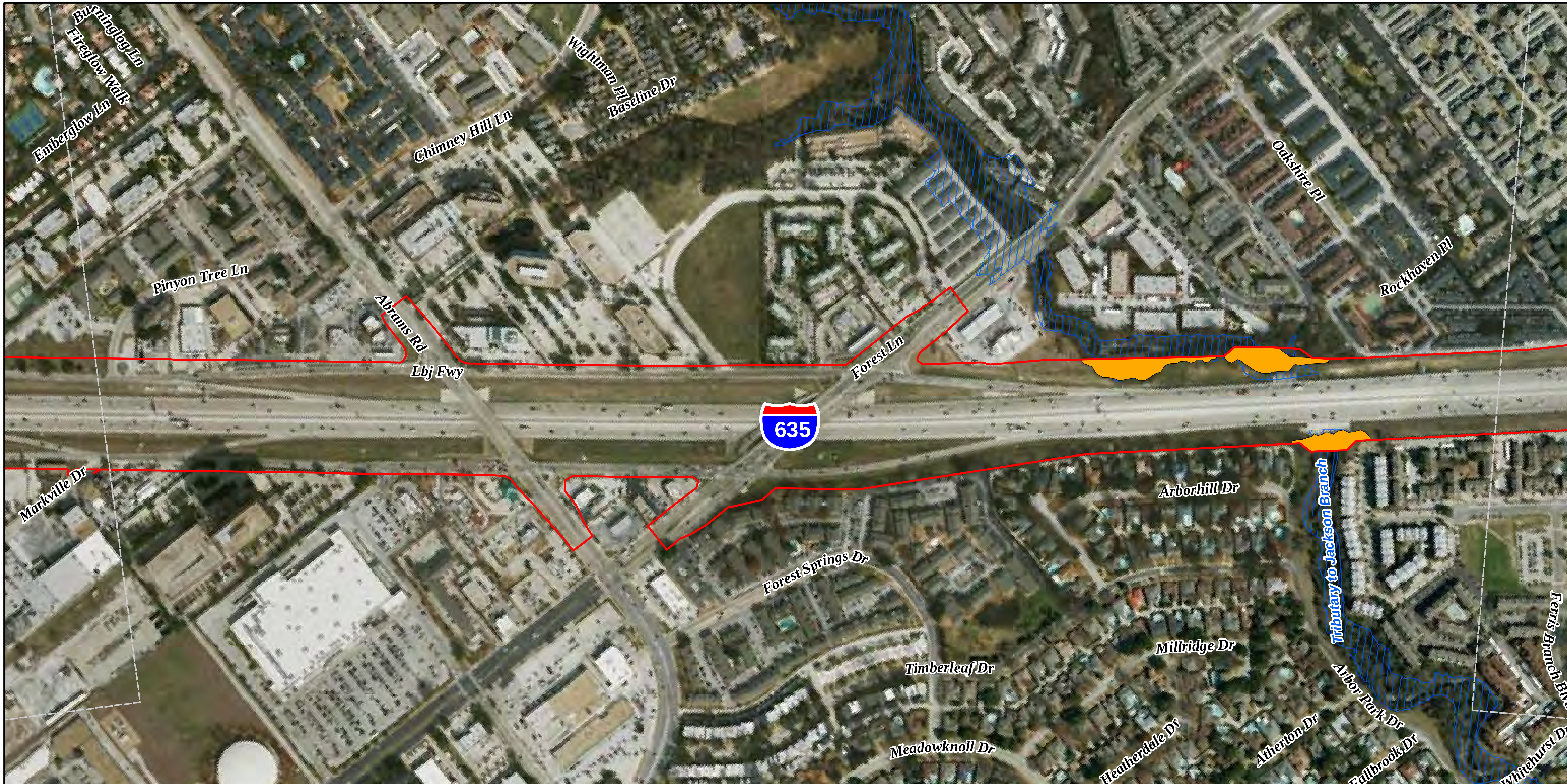

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100-Year Floodplain Data: FEMA DFIRMs for Dallas County (2014)

Non-Urban Land Cover Map: Observed and EMST * Page 3 of 13

IH 635 from US 75 to IH 30
Dallas County, Texas

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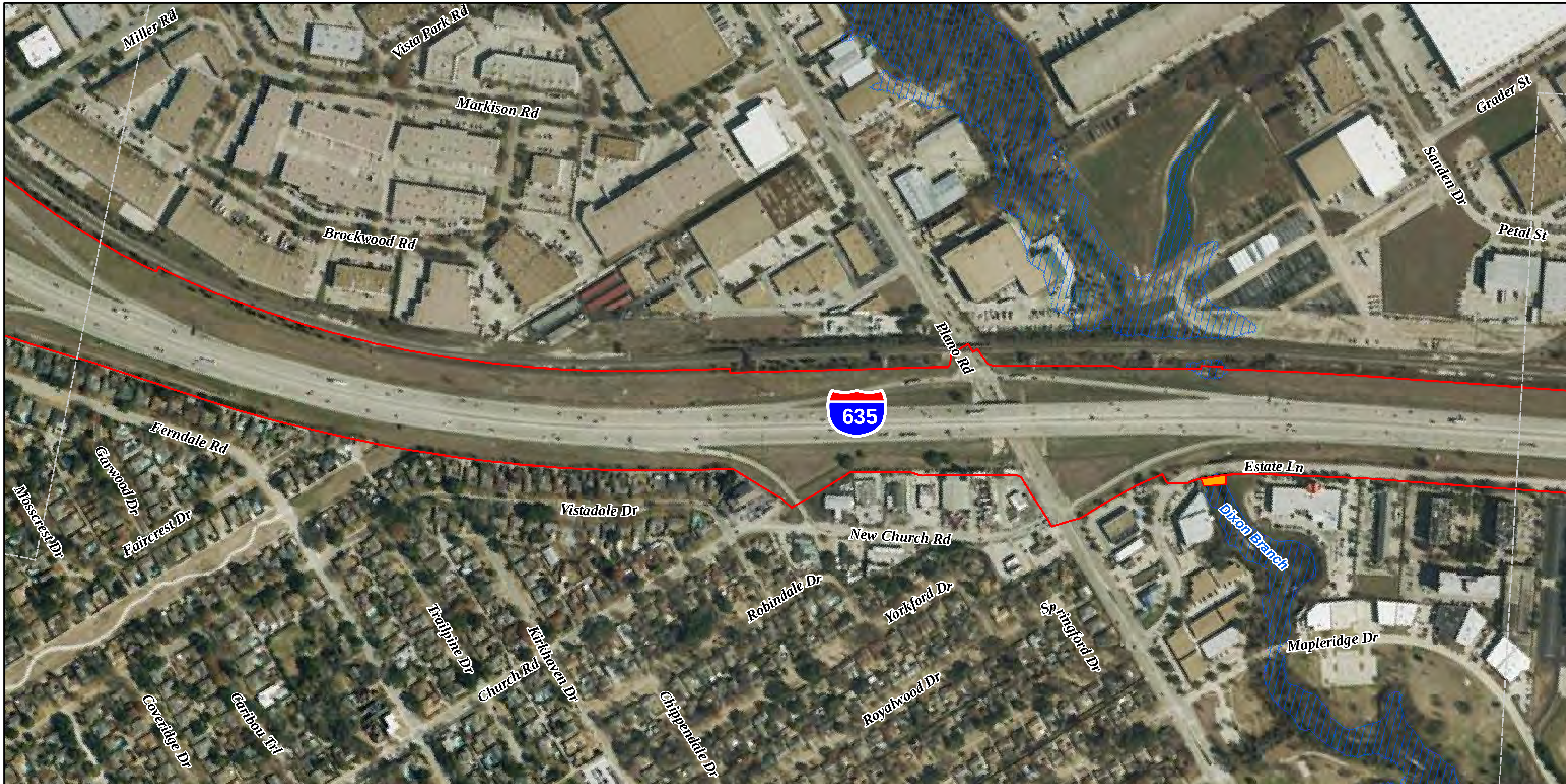

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Dallas County, Texas

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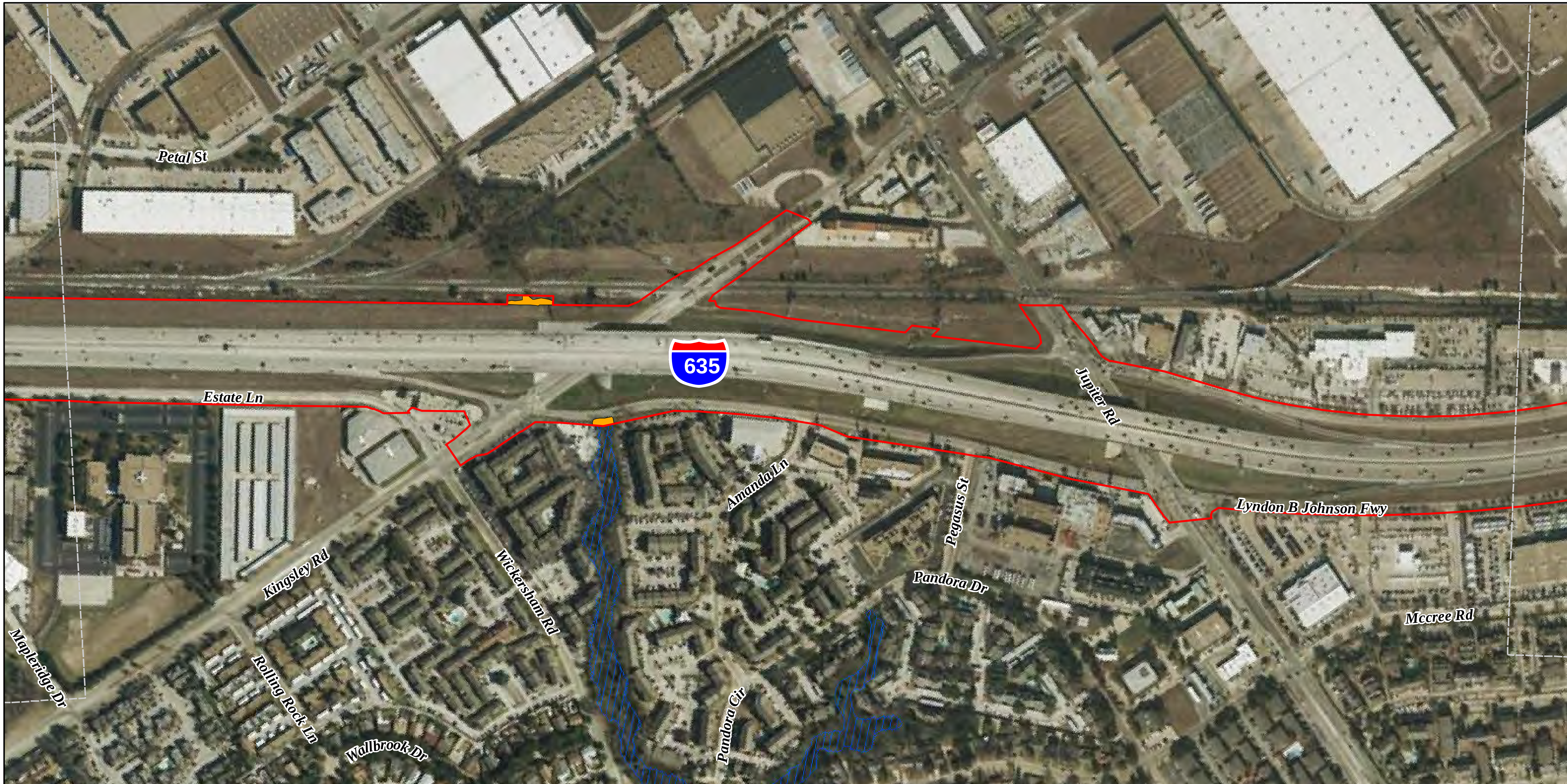

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Non-Urban Land Cover Map: Observed and EMST *

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Dallas County, Texas

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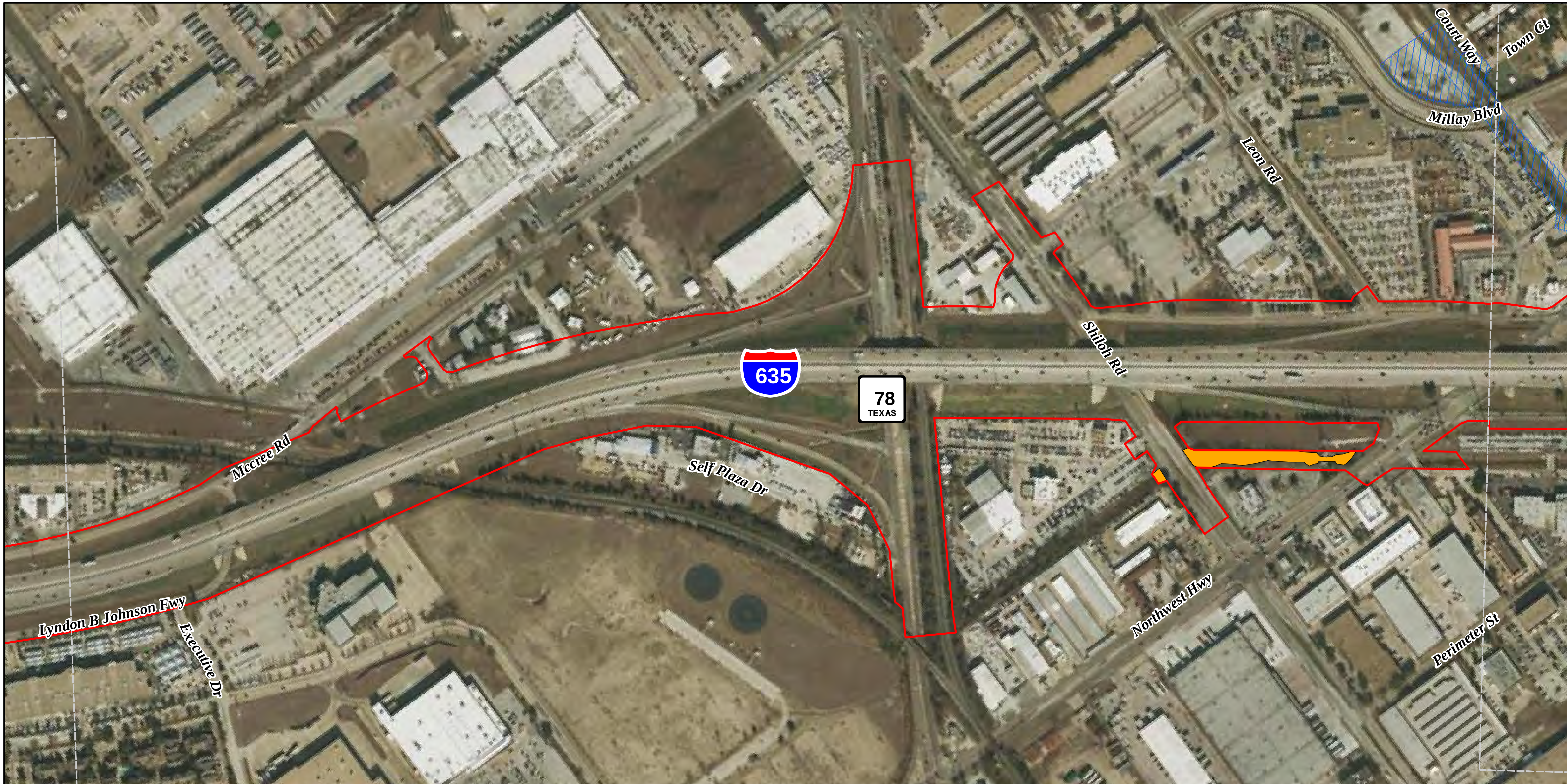

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Non-Urban Land Cover Map: Observed and EMST *
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Non-Urban Land Cover Map: Observed and EMST *

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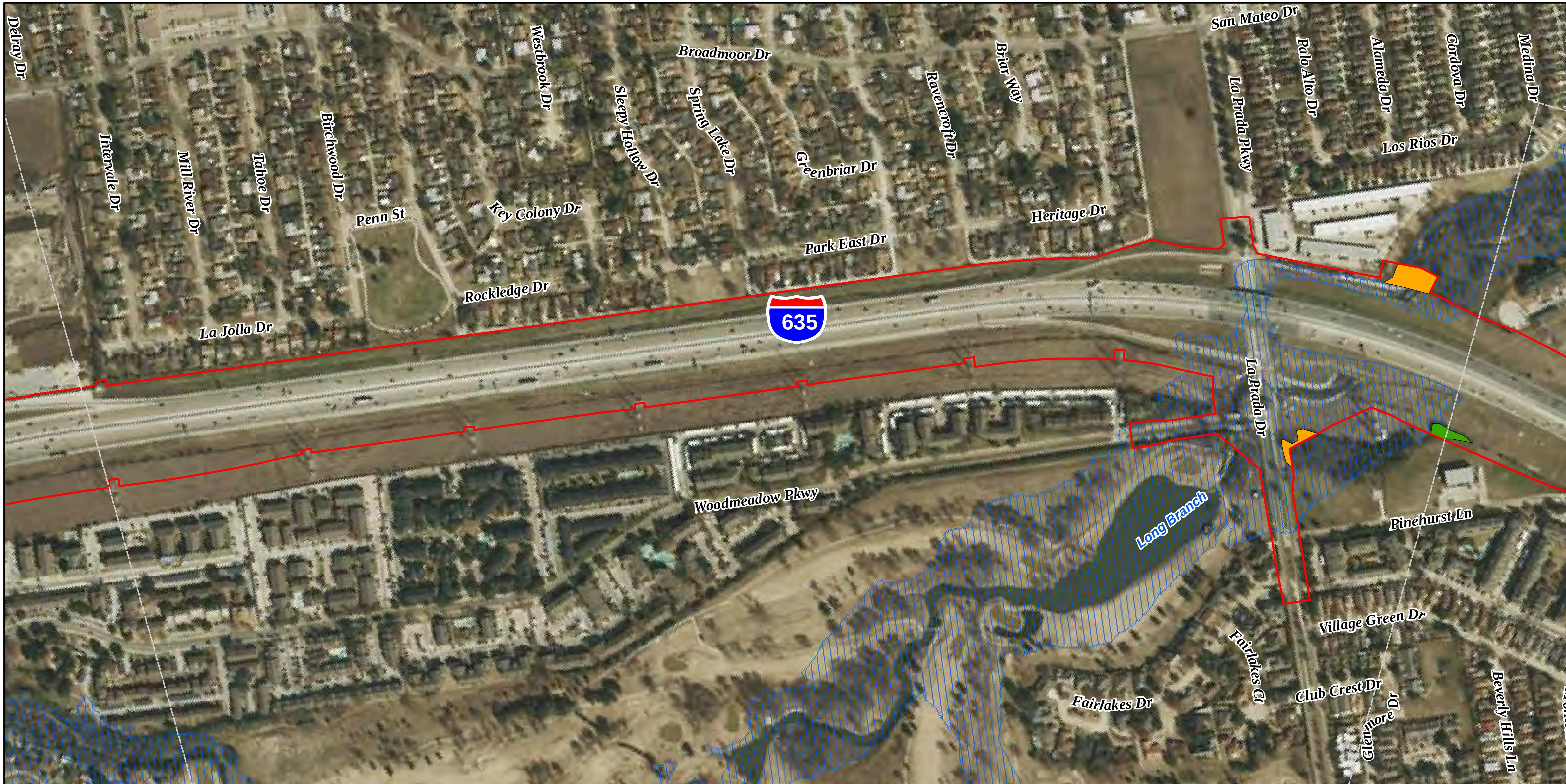

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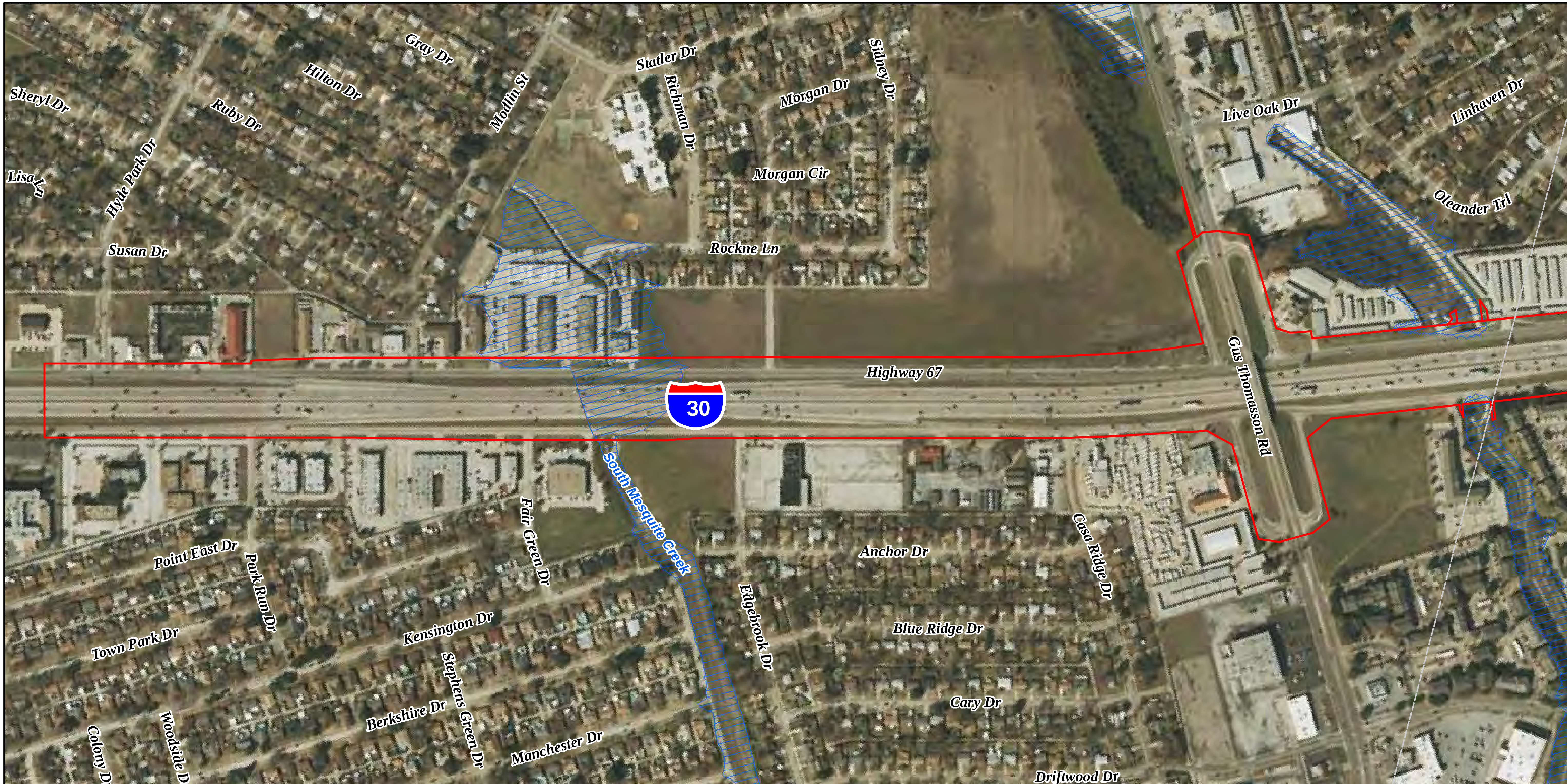

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Non-Urban Land Cover Map: Observed and EMST *
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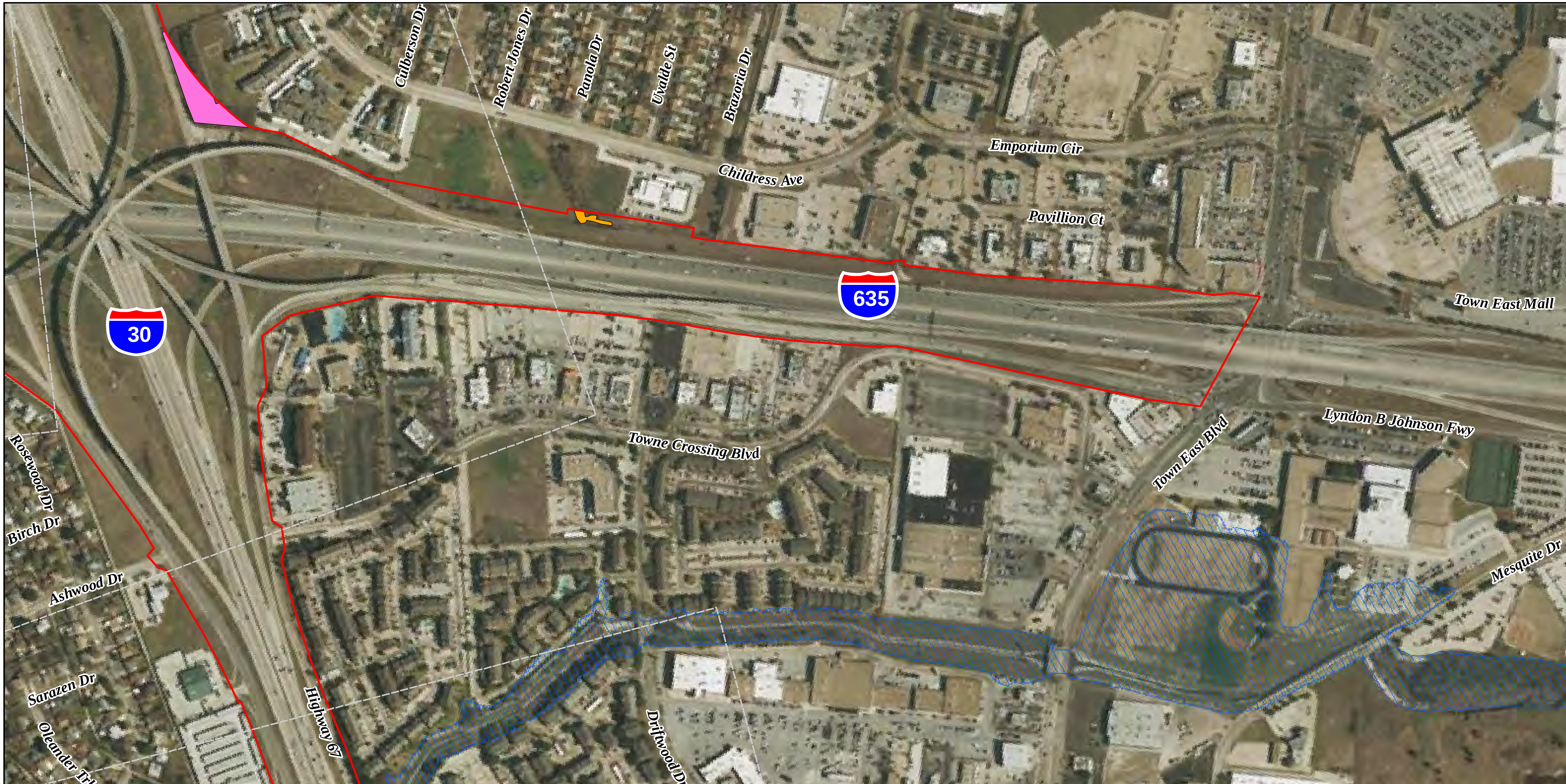
IH 635 from US 75 to IH 30
Dallas County, Texas

CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144



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TxDOT-TPWD MOU Land Cover Type Summary

IH 635 from US 75 to IH 30

Mapping Units from the Ecological Mapping Systems of Texas (EMST)

Converted from EMST Map ID / Common Name => NatureServe Ecological System (EcoSys) ID / Name => MOU Land Cover Type

EMST Map ID #	EMST Map Common Name	NatureServe ID	NatureServe EcoSys	MOU Land Cover Type	Area (acres)
207	Blackland Prairie: Disturbance or Tame Grassland	CES205.684	Texas Blackland Tallgrass Prairie	Tallgrass Prairie, Grassland	**0.09**
1804	Central Texas: Floodplain Hardwood Forest	CES205.710	Southeastern Great Plains Floodplain Forest	Floodplain	**0.03**
1904	Central Texas: Riparian Hardwood Forest	CES205.709	Southeastern Great Plains Riparian Forest	Riparian	**0.03**
9410	Urban High Intensity	TPW101.003	Urban	Urban	**865.63**
9411	Urban Low Intensity				
				TOTAL	**865.78**

Existing Land Cover Types Based on Field Observations and Interpretation of Aerial Photography

Observed Land Cover* Classified by EMST Map ID / Common Name, then Converted => NatureServe Ecological System (EcoSys) ID / Name => MOU Land Cover Type

*** Observations of dominant vegetation cover are summarized in parentheses following the closest matching EMST Common Name.**

EMST Map ID #	EMST Map Common Name	NatureServe ID	NatureServe EcoSys	MOU Land Cover Type	Area (acres)
1904	Central Texas: Riparian Hardwood Forest (forest with trees to 70 feet high, ranging in width from saplings to >24 inches; dominant trees include American elm, cedar elm, green ash, and hackberry)	CES205.709	Southeastern Great Plains Riparian Forest	Riparian (Note: no project-related impacts are expected to a total of 0.34 acre for four forested areas at the northern project terminus.)	**4.43**
1905	Central Texas: Riparian Evergreen Shrubland (area dominated by scrubby eastern red cedar trees, found along roadside drainage ditch)	CES205.709	Southeastern Great Plains Riparian Forest	Riparian	**0.13**
				Total Riparian Impacts: 4.22 acres	
9104	Native Invasive: Deciduous Woodland (scrub trees <20 feet tall and <6 inches in diameter, dominant trees: hackberry, eastern red cedar, and honey locust)	TPW101.001	Native Invasive Shrub and Woodland	Disturbed Prairie	**0.75**
9410/11	Urban High and Low Intensity	TPW101.003	Urban	Urban	**860.47**
				TOTAL	**865.78**

File name:
IH 635 EMST & Observed Land Cover Summary.xlsx

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Photograph 1: Typical view of mowed grass area within the IH 635 right of way, which is dominated by non-native grasses (e.g., Japanese brome and perennial ryegrass). Photo taken near Northwest Highway, looking southeast.

Photograph 2: View within project area that is representative of man-made drainage ditches within the IH 635 right of way. Vegetation shown is largely hydrophytic intermixed with dominant non-native grass species.

Habitat-related Project Area Photographs*

(* All photographs were taken between April 7 and May 3, 2016.)

IH 635 from US 75 to IH 30

Dallas County, Texas

CSJ: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144

Photograph 3: Typical view of riparian hardwood forest found within existing or proposed IH 635 right of way. This area is near Long Branch just south of La Prada Drive. The riparian habitat shown here was incorrectly mapped by EMST as urban. View is to the south.

Photograph 4: View of a riparian hardwood habitat along a tributary to Jackson Branch downstream of IH 635. This site is located approximately 1,000 feet southeast of Forest Lane crossing of IH 635. The riparian habitat shown here was incorrectly mapped by EMST as urban. View is to the west.

Habitat-related Project Area Photographs

(* All photographs were taken between April 7 and May 3, 2016.)

IH 635 from US 75 to IH 30

Dallas County, Texas

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Photograph 5: View of Jackson Branch on the south side of IH 635. This stream channel is typical of streams crossing IH 635, which are deeply incised into the landscape, often covered by tree canopy. The riparian habitat shown here was incorrectly mapped by EMST as urban. View is to the southwest.

Photograph 6: Representative view of riparian hardwood forest habitat along the Dixon Branch downstream of IH 635, which is typical of habitat along perennial streams in the IH 635 project area. The riparian habitat shown here was incorrectly mapped by EMST as urban. View is to the south.

Habitat-related Project Area Photographs

(* All photographs were taken between April 7 and May 3, 2016.)

IH 635 from US 75 to IH 30

Dallas County, Texas

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Photograph 7: Representative view of IH 635 right of way that is dominated by non-native grasses that are periodically mowed. Photo was taken approx. 1,000 feet north of Oates Drive (east side of IH 635). View is to the north.

Photograph 8: View of Long Branch in the downstream direction after it crosses under IH 635 via box culverts near La Prada Drive. Stream transitions from concrete channel to natural condition. The riparian forest habitat shown here was incorrectly mapped by EMST as urban. View is to the east.

Habitat-related Project Area Photographs

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IH 635 from US 75 to IH 30

Dallas County, Texas

CSJ: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144

Last Revision: 5/16/2016 5:47:00 PM

DALLAS COUNTY

BIRDS

		Federal Status	State Status
American Peregrine Falcon	*Falco peregrinus anatum*	DL	T

year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Arctic Peregrine Falcon	*Falco peregrinus tundrius*	DL	

migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Bald Eagle	*Haliaeetus leucocephalus*	DL	T

found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Black-capped Vireo	*Vireo atricapilla*	LE	E

oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer

Golden-cheeked Warbler	*Setophaga chrysoparia*	LE	E

juniper-oak woodlands; dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer

Henslow's Sparrow	*Ammodramus henslowii*		

wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking

Interior Least Tern	*Sterna antillarum athalassos*	LE	E

subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony

Peregrine Falcon	*Falco peregrinus*	DL	T

both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.

DALLAS COUNTY

BIRDS		Federal Status	State Status
Piping Plover	*Charadrius melodus*	LT	T

wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats

Red Knot	*Calidris canutus rufa*	T	

Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. A small plump-bodied, short-necked shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Its bill is dark, straight and, relative to other shorebirds, short-to-medium in length. After molting in late summer, this species is in a drab gray-and-white non-breeding plumage, typically held from September through April. In the non-breeding plumage, the knot might be confused with the omnipresent Sanderling. During this plumage, look for the knot's prominent pale eyebrow and whitish flanks with dark barring. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Primary prey items include coquina clam (Donax spp.) on beaches and dwarf surf clam (Mulinia lateralis) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore.

Sprague's Pipit	*Anthus spragueii*		

only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.

Western Burrowing Owl	*Athene cunicularia hypugaea*		

open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

White-faced Ibis	*Plegadis chihi*		T

prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats

Whooping Crane	*Grus americana*	LE	E

potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties

Wood Stork	*Mycteria americana*		T

forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960

INSECTS		Federal Status	State Status
Black Lordithon rove beetle	*Lordithon niger*		

historically known from Texas

DALLAS COUNTY

MAMMALS

Federal Status | State Status

Cave myotis bat *Myotis velifer*

colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore

Plains spotted skunk *Spilogale putorius interrupta*

catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie

MOLLUSKS

Federal Status | State Status

Louisiana pigtoe *Pleurobema riddellii* T

streams and moderate-size rivers, usually flowing water on substrates of mud, sand, and gravel; not generally known from impoundments; Sabine, Neches, and Trinity (historic) River basins

Sandbank pocketbook *Lampsilis satura* T

small to large rivers with moderate flows and swift current on gravel, gravel-sand, and sand bottoms; east Texas, Sulfur south through San Jacinto River basins; Neches River

Texas heelsplitter *Potamilus amphichaenus* T

quiet waters in mud or sand and also in reservoirs. Sabine, Neches, and Trinity River basins

Texas pigtoe *Fusconaia askewi* T

rivers with mixed mud, sand, and fine gravel in protected areas associated with fallen trees or other structures; east Texas River basins, Sabine through Trinity rivers as well as San Jacinto River

REPTILES

Federal Status | State Status

Alligator snapping turtle *Macrochelys temminckii* T

perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October

Texas garter snake *Thamnophis sirtalis annectens*

wet or moist microhabitats are conducive to the species occurrence, but is not necessarily restricted to them; hibernates underground or in or under surface cover; breeds March-August

Texas horned lizard *Phrynosoma cornutum* T

open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September

DALLAS COUNTY

REPTILES		Federal Status	State Status
Timber rattlesnake	*Crotalus horridus*		T

swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto

PLANTS		Federal Status	State Status
Glass Mountains coral-root	*Hexalectris nitida*		

GLOBAL RANK: G3; Apparently rare in mixed woodlands in canyons in the mountains of the Brewster County, but encountered with regularity, albeit in small numbers, under Juniperus ashei in woodlands over limestone on the Edwards Plateau, Callahan Divide and Lampasas Cutplain; Perennial; Flowering June-Sept; Fruiting July-Sept

Glen Rose yucca *Yucca necopina*

Texas endemic; grasslands on sandy soils and limestone outcrops; flowering April-June

Hall's prairie clover *Dalea hallii*

GLOBAL RANK: G3; In grasslands on eroded limestone or chalk and in oak scrub on rocky hillsides; Perennial; Flowering May-Sept; Fruiting June-Sept

Osage Plains false foxglove *Agalinis densiflora*

GLOBAL RANK: G3; Most records are from grasslands on shallow, gravelly, well drained, calcareous soils; Prairies, dry limestone soils; Annual; Flowering Aug-Oct

Plateau milkvine *Matelea edwardsensis*

GLOBAL RANK: G3 ; Occurs in various types of juniper-oak and oak-juniper woodlands; Perennial; Flowering March-Oct; Fruiting May-June

Texas milk vetch *Astragalus reflexus*

GLOBAL RANK: G3; Grasslands, prairies, and roadsides on calcareous and clay substrates; Annual; Flowering Feb-June; Fruiting April-June

Tree dodder *Cuscuta exaltata*

GLOBAL RANK: G3; Parasitic on various Quercus, Juglans, Rhus, Vitis, Ulmus, and Diospyros species as well as Acacia berlandieri and other woody plants; Annual; Flowering May-Oct; Fruiting July-Oct

Warnock's coral-root *Hexalectris warnockii*

in leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creekbeds in canyons; in the Trans Pecos in oak-pinyon-juniper woodlands in higher mesic canyons (to 2000 m [6550 ft]), primarily on igneous substrates; in Terrell County under Quercus fusiformis mottes on terrraces of spring-fed perennial streams, draining an otherwise rather xeric limestone landscape; on the Callahan Divide (Taylor County), the White Rock Escarpment (Dallas County), and the Edwards Plateau in oak-juniper woodlands on limestone slopes; in Gillespie County on igneous substrates of the Llano Uplift; flowering June-September; individual plants do not usually bloom in successive years

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arlington Ecological Services Field Office
2005 NE GREEN OAKS BLVD, SUITE 140
ARLINGTON, TX 76006
PHONE: (817)277-1100 FAX: (817)277-1129
URL: www.fws.gov/southwest/es/arlingtontexas/;
www.fws.gov/southwest/es/EndangeredSpecies/lists/

Consultation Code: 02ETAR00-2017-SLI-0200 November 18, 2016
Event Code: 02ETAR00-2017-E-00208
Project Name: IH 635

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, which may occur within the boundary of your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under section 7(a)(1) of the Act, Federal agencies are directed to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Under and 7(a)(2) and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether their actions may affect threatened and endangered species and/or designated critical habitat. A Federal action is an activity or program authorized, funded, or carried out, in whole or in part, by a Federal agency (50 CFR 402.02).

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For Federal actions other than major construction activities, the Service suggests that a biological evaluation (similar to a Biological Assessment) be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

After evaluating the potential effects of a proposed action on federally listed species, one of the following determinations should be made by the Federal agency:

1. *No effect* - the appropriate determination when a project, as proposed, is anticipated to have no effects to listed species or critical habitat. A "no effect" determination does not require section 7 consultation and no coordination or contact with the Service is necessary. However, the action agency should maintain a complete record of their evaluation, including the steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related information.
2. *May affect, but is not likely to adversely affect* - the appropriate determination when a proposed action's anticipated effects are insignificant, discountable, or completely beneficial. Insignificant effects relate to the size of the impact and should never reach the scale where "take" of a listed species occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not be able to meaningfully measure, detect, or evaluate insignificant effects, or expect discountable effects to occur. This determination requires written concurrence from the Service. A biological evaluation or other supporting information justifying this determination should be submitted with a request for written concurrence.
3. *May affect, is likely to adversely affect* - the appropriate determination if any adverse effect to listed species or critical habitat may occur as a direct or indirect result of the proposed action, and the effect is not discountable or insignificant. This determination requires formal section 7 consultation.

The Service recommends that candidate species, proposed species, and proposed critical habitat be addressed should consultation be necessary. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:
http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (
http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

For additional information concerning migratory birds and eagle conservation plans, please contact the Service's Migratory Bird Office at 505-248-7882.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: IH 635

Official Species List

Provided by:

Arlington Ecological Services Field Office
2005 NE GREEN OAKS BLVD
SUITE 140
ARLINGTON, TX 76006
(817) 277-1100
http://www.fws.gov/southwest/es/arlingtontexas/
http://www.fws.gov/southwest/es/EndangeredSpecies/lists/

Consultation Code: 02ETAR00-2017-SLI-0200
Event Code: 02ETAR00-2017-E-00208

Project Type: TRANSPORTATION

Project Name: IH 635
Project Description: The proposed IH 635 improvements from east of US 75 to south of IH 30 would include constructing one additional 12-foot-wide general-purpose lane in each direction, two 12-foot-wide tolled-managed lanes in each direction, and two to three frontage road lanes in each direction. From near Royal Lane/Miller Road to La Prada Drive, the proposed project would provide one additional general-purpose lane in each direction, two non-tolled express lanes in each direction, and two to three frontage road lanes in each direction. From La Prada Drive to south of IH 30, the project would reconstruct IH 635 to provide lane balance transitions between the general purpose lanes, proposed express lanes, and IH 30 interchange. Auxiliary lanes would be provided as needed to accommodate traffic demand volumes associated with ramp movements. The general purpose lanes would include 10-foot-wide outside and inside shoulders. The tolled managed/express lanes would include 10-foot-wide outside shoulders and 4-foot wide inside shoulders. The proposed project would also include the construction of general purpose lane ramps, tolled managed/express lane ramps, and direct-connecting ramps between IH 30 and IH 635. The proposed frontage roads along IH 635 would typically consist of 11-foot wide inside lane(s) and a 14-foot-wide outside shared use lane in each direction. Inside curb offsets would vary from 1 to 2-feet wide. Outside curb offsets adjacent to shared use lanes would be 2-feet wide. Continuous sidewalks would be provided along the proposed frontage roads.

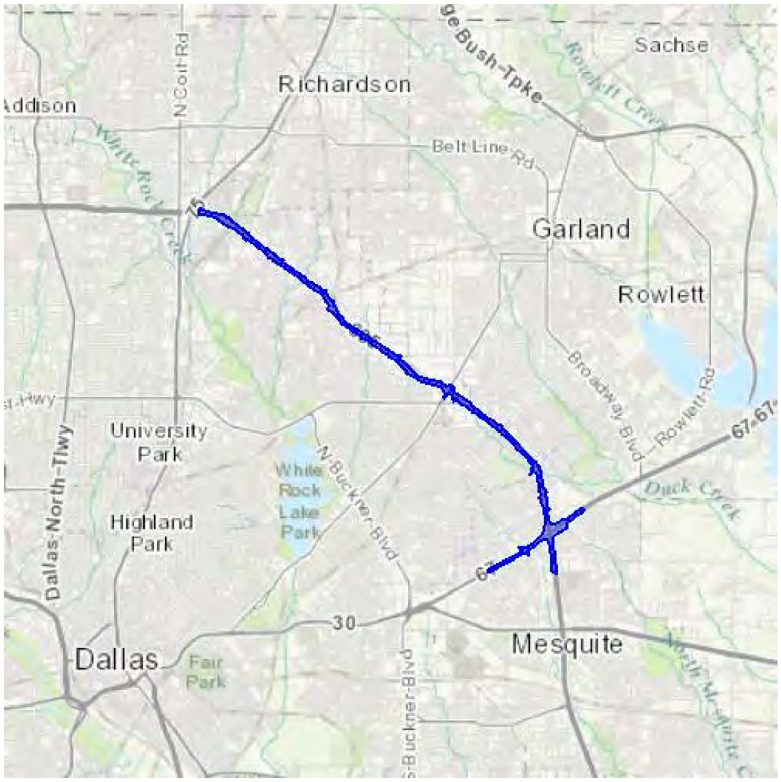
The proposed IH 30 improvements (from west of Gus Thomasson Road to east of Galloway Avenue) would include constructing three to four 12-foot-wide general purpose lanes. Auxiliary lanes would be constructed as needed to accommodate traffic demand volumes associated with ramp movements. The general purpose lanes would include 10-foot-wide outside and inside shoulders. Two to three continuous frontage road lanes would be constructed in each direction, which would typically consist of 11-foot wide inside lane(s) and a 14-foot wide outside shared use lane in each direction. Inside curb offsets would vary from 1 to 2-feet wide and outside curb offsets adjacent to shared use lanes would be 2-feet wide. Continuous sidewalks would be provided along the proposed frontage roads.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

United States Department of Interior
Fish and Wildlife Service

Project name: IH 635

Project Location Map:



Project Coordinates: The coordinates are too numerous to display here.

Project Counties: Dallas, TX

Endangered Species Act Species List

There are a total of 6 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Birds	**Status**	**Has Critical Habitat**	**Condition(s)**
Black-Capped Vireo *(Vireo atricapilla)* Population: Wherever found	Endangered		
golden-cheeked warbler *(Dendroica chrysoparia)* Population: Wherever found	Endangered		
Least tern *(Sterna antillarum)* Population: interior pop.	Endangered		
Piping Plover *(Charadrius melodus)* Population: except Great Lakes watershed	Threatened	Final designated	Wind Energy Projects
Red Knot *(Calidris canutus rufa)* Population: Wherever found	Threatened		Wind Energy Projects
Whooping crane *(Grus americana)* Population: Wherever found, except where listed as an experimental population	Endangered	Final designated	

Critical habitats that lie within your project area

There are no critical habitats within your project area.

Please see notes at the end of the Species Impact Table for abbreviations, acronyms, and source information.

SPECIES IMPACT TABLE

Species	USFWS Federal Listing	TPWD State Listing	Description of Preferred Habitat	Habitat Present (Yes/No)	Relevant Habitat Characteristics	ESA Section 7 Determin-ation	Texas Parks & Wildlife Code Determin-ation	MOU-Trigger and BMP
Birds								
American Peregrine Falcon *Falco peregrinus anatum*	DL	T	A year-round resident and local breeder in west Texas, and nests in tall cliff eyries; also a migrant across Texas from northern breeding areas in the U.S. and Canada; winters along coast and farther south; occupies many habitats during migration, including urban habitats with concentrations along the coast and barrier islands; a low-altitude migrant, stopovers occur at leading landscape edges such as lake shores, coastlines, and barrier islands.	No	Potential migrant, but is not likely to use the highly urbanized IH 635 project area for stopover habitat due to lack of lake shore habitat and the availability of such habitat nearby (e.g., Lake Ray Hubbard).	N/A	No Impact	N/A
Arctic Peregrine Falcon *Falco peregrinus tundrius*	DL	--	Migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	No	Potential migrant, but is not likely to use the highly urbanized IH 635 project area for stopover habitat due to lack of lake shore habitat and the availability of such habitat nearby (e.g., Lake Ray Hubbard).	N/A	No Impact	N/A
Bald Eagle *Halilaeetus leucocephalus*	DL	T	Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds.	No	There are no rivers, large lakes or cliffs within the IH 635 project limits, and preferred habitat is available nearby (e.g., Lake Ray Hubbard).	N/A	No Impact	N/A

SPECIES IMPACT TABLE

Species	USFWS Federal Listing	TPWD State Listing	Description of Preferred Habitat	Habitat Present (Yes/No)	Relevant Habitat Characteristics	ESA Section 7 Determin-ation	Texas Parks & Wildlife Code Determin -ation	MOU-Trigger and BMP
Black-Capped Vireo *Vireo atricapilla*	E	E	Oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer.	No	There were no oak-juniper woodlands with open grassy spaces observed within the proposed project limits.	No Effect	No Impact	N/A
Golden-cheeked Warbler *Dendroica chrysoparia*	E	E	Juniper-oak woodlands; dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer.	No	Habitat impacts There were no oak-juniper woodlands with open grassy spaces observed within the proposed project limits.	No Effect	No Impact	N/A
Henslow's Sparrow *Ammodramus henslowii*	--	SGCN	Wintering individuals (not flocks) found in weedy fields or cutover areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking. This bird is now believed to be extirpated throughout much of its former range but could be an unlikely migrant in the project area.	No	Unlikely to use the IH 635 corridor for stopover because open areas are dominated by mowed Bermuda sod. Limited bunch grasses, vines, and brambles were observed.	N/A	No Impact	N/A
Least Tern *Sterna antillarum* [Includes Interior Least Tern *Sterna antillarum athalassos*]	E	E	Prefers salt flats, broad sandbars, and barren shores along reservoirs and wide, shallow rivers. Nests along sand and gravel bars within braided streams, rivers, but may also nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc.); eats small fish and crustaceans, when breeding forages within a few hundred feet of its colony.	No	No sand and gravel bars within braided streams or rivers were observed within the highly urbanized IH 635 corridor. The project area does not include other habitat as described.	No Effect	No Impact	N/A

SPECIES IMPACT TABLE

Species	USFWS Federal Listing	TPWD State Listing	Description of Preferred Habitat	Habitat Present (Yes/No)	Relevant Habitat Characteristics	ESA Section 7 Determin-ation	Texas Parks & Wildlife Code Determin-ation	MOU-Trigger and BMP
Peregrine Falcon *Falco peregrinus*	DL	T	Both subspecies migrate across the state from more northern breeding areas in U.S. and Canada to winter along coast and farther south; although *F.p. tundrius* is no longer listed in Texas, reference is generally made only to the species level because the subspecies are not easily distinguishable at a distance.	No	See explanation for both subspecies above.	N/A	No Impact	N/A
Piping Plover *Charadrius melodus*	T	T	Wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats.	No	There are no beaches or bayside mud or salt flats within the project limits that would serve as stopover habitat for this migrant species.	No Effect	No Impact	N/A
Red Knot *Callidris canutus rufa*	T	--	Nesting in dry, slightly elevated tundra locations, often on windswept slopes with little vegetation. Foraging sites are located in freshwater wetlands. Habitats in migration and wintering areas are generally coastal marine and estuarine areas with large areas of intertidal sediments. In North America, commonly found along sandy, gravel, or cobble beaches, tidal mudflats, salt marshes, shallow coastal impoundments and lagoons, and peat banks.	No	The project area does not include shorelines, mudflats, or other preferred habitat as described, that would serve as stopover habitat for this migrant.	No Effect	No Impact	N/A
Sprague's Pipit *Anthus spragueii*	C	SGCN	Only in Texas during migration and winter, mid-September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.	No	The project area does not include native upland prairies or coastal grasslands that would serve as stopover habitat for this migrant species.	N/A	No Impact	N/A
Western Burrowing Owl *Athene cunicularia hypugaea*	--	--	Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows.	No	Although species may nest and roost in abandoned burrows in grassy areas found in the IH 635 corridor, the habitat value would be diminished by occasional mowing.	N/A	No Impact	N/A

SPECIES IMPACT TABLE

Species	USFWS Federal Listing	TPWD State Listing	Description of Preferred Habitat	Habitat Present (Yes/No)	Relevant Habitat Characteristics	ESA Section 7 Determin-ation	Texas Parks & Wildlife Code Determin-ation	MOU-Trigger and BMP
White-faced Ibis *Plegadis chihi*	--	T	Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.	No	Marsh, slough, and/or rice field habitat were not observed within the highly urbanized IH 635 corridor.	N/A	No Impact	N/A
Whooping Crane *Grus americana*	E	E	Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties; stopover habitat includes freshwater marshes, tidal flats, barrier islands, and wet prairies.	No	There are no marshes, tidal flats, or other preferred stopover habitat within the project limits that would serve as stopover habitat for this migrant species.	No Effect	No Impact	N/A
Wood Stork *Mycteria americana*	--	T	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas.	No	There are no prairie ponds, flooded pastures or fields that could serve as stopover habitat. The only shallow standing water is in bar ditches adjacent to a busy highway within an urbanized corridor, and would not likely attract this species as stopover habitat, particularly when such habitat is in the vicinity (e.g., Lake Ray Hubbard).	N/A	No Impact	N/A
Insects								
Black lordithon rove beetle *Lordithon niger*	--	--	Historically known from Texas; no information available from TPWD regarding preferred habitat.	No	Unable to assess based on lack of TPWD information regarding preferred habitat.	N/A	N/A	N/A

TABLE CONTINUES ON NEXT PAGE

SPECIES IMPACT TABLE

Species	USFWS Federal Listing	TPWD State Listing	Description of Preferred Habitat	Habitat Present (Yes/No)	Relevant Habitat Characteristics	ESA Section 7 Determin-ation	Texas Parks & Wildlife Code Determin-ation	MOU-Trigger and BMP
Mammals								
Cave Myotis Bat *Myotis velifer*	--	SGCN	Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore.	No	The project area does not contain caves or rock crevices, but does contain potential man-made habitat (i.e., bridges). Field examination of bridges within the project area indicated no recent evidence of this species.	N/A	No Impact	N/A
Plains Spotted Skunk *Spilogale putorius interrupta*	--	--	Prefers open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie.	Yes	Potential habitat may occur along fence rows or within riparian areas that include wooded, brushy areas. The project area is otherwise urban landscape within a busy transportation corridor with little preferred habitat as described.	N/A	No Impact with species BMP	Apply BMP for this species
Mollusks								
Louisiana Pigtoe *Pleurobema riddellii*	--	T	Streams and moderate-size rivers, usually flowing water on substrates of mud, sand, and gravel; not generally known from impoundments; historically in Trinity River basins.	Yes	Several perennial streams cross IH 635 within project limits, but this species was not observed during the field biological survey. Although these are shallow and generally have a substrate that is bedrock, mollusks may occur.	N/A	No Impact with BMPs	Apply mussel BMPs

SPECIES IMPACT TABLE

Species	USFWS Federal Listing	TPWD State Listing	Description of Preferred Habitat	Habitat Present (Yes/No)	Relevant Habitat Characteristics	ESA Section 7 Determin-ation	Texas Parks & Wildlife Code Determin-ation	MOU-Trigger and BMP
Sandbank Pocketbook *Lampsilis satura*	--	T	Small to large rivers with moderate flows and swift current on gravel, gravel-sand, and sand bottoms; east Texas, Sulfur south through San Jacinto River basins; Neches River.	Yes	Several perennial streams cross IH 635 within project limits, but this species was not observed during the field biological survey. Although these are shallow and generally have a substrate that is bedrock, mollusks may occur.	N/A	No Impact with BMPs	Apply mussel BMPs
Texas Heelsplitter *Potamilus amphichaenus*	--	T	This species is found in perennial streams and rivers; sometimes in reservoirs; in mud, sand, gravel, and silt substrates; found in the Sabine, Neches, and Trinity River Basins.	Yes	Several perennial streams cross IH 635 within project limits, but this species was not observed during the field biological survey. Although these are shallow and generally have a substrate that is bedrock, mollusks may occur.	N/A	No Impact with BMPs	Apply mussel BMPs
Texas Pigtoe *Fusconia askewi*	--	T	Rivers with mixed mud, sand, and fine gravel in protected areas associated with fallen trees or other structures; east Texas River basins, Sabine through Trinity rivers as well as San Jacinto River.	Yes	Several perennial streams cross IH 635 within project limits, but this species was not observed during the field biological survey. Although these are shallow and generally have a substrate that is bedrock, mollusks may occur.	N/A	No Impact with BMPs	Apply mussel BMPs

TABLE CONTINUES ON NEXT PAGE

SPECIES IMPACT TABLE

Species	USFWS Federal Listing	TPWD State Listing	Description of Preferred Habitat	Habitat Present (Yes/No)	Relevant Habitat Characteristics	ESA Section 7 Determin-ation	Texas Parks & Wildlife Code Determin -ation	MOU-Trigger and BMP
Reptiles								
Alligator Snapping Turtle *Macrochelys temminckii*	--	T	Perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October.	No	Although several perennial streams cross IH 635 within project limits, this species was not observed during the field biological survey and it is not likely to occur due to shallow water depth of local streams.	N/A	No Impact	N/A
Texas Garter Snake *Thamnophis sirtalis annectens*	--	SGCN	Wet or moist microhabitats are conducive to the species occurrence, but is not necessarily restricted to them; hibernates underground or in or under surface cover; breeds March-August.	Yes	Wet/moist microhabitats occur in riparian areas and within bar ditches along IH 635.	N/A	No Impact with species BMP	Apply BMP for this species
Texas Horned Lizard *Phrynosoma cornutum*	--	T	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September.	No	There are no open, arid and semi-arid regions with sparse vegetation, cactus, scattered brush, or scrubby trees within the proposed project limits.	N/A	No Impact	N/A
Timber Rattlesnake *Crotalus horridus*	--	T	Swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto.	Yes	Floodplains and riparian corridors cross IH 635, some containing dense ground cover.	N/A	No Impact with species BMP	Apply BMP for this species
Plants								
Glass Mountains Coral-root *Hexalectris nitida*	--	SGCN	Apparently rare in mixed woodlands in canyons in the mountains of the Brewster County, but encountered with regularity, albeit in small numbers, under *Juniperus ashei* in woodlands over limestone on the Edwards Plateau, Callahan Divide and Lampasas Cutplain; perennial; flowering and fruiting June-Sep.	No	No *Juniperus ashei* woodlands were observed within project limits during the biological field survey, nor are conditions within this urbanized corridor conducive to the growth of this species.	N/A	No Impact	N/A

SPECIES IMPACT TABLE

Species	USFWS Federal Listing	TPWD State Listing	Description of Preferred Habitat	Habitat Present (Yes/No)	Relevant Habitat Characteristics	ESA Section 7 Determin-ation	Texas Parks & Wildlife Code Determin-ation	MOU-Trigger and BMP
Glen Rose Yucca *Yucca necopina*	--	--	Texas endemic; grasslands on sandy soils and limestone outcrops; flowering April-June.	No	No natural grassland areas or limestone outcrops were observed within project limits and soils within the project corridor have heavy clay texture.	N/A	No Impact	N/A
Hall's Prairie Clover *Dalea hallii*	--	SGCN	In grasslands on eroded limestone or chalk and in oak scrub on rocky hillsides. Perennial; flowering May-Sep.; fruiting Aug.-Oct.	No	No grasslands on eroded limestone or chalk, or oak scrub on rocky hillsides were observed within the project limits.	N/A	No Impact	N/A
Osage Plains False Foxglove *Agalinis densiflora*	--	SGCN	Most records are from grasslands on shallow, gravelly, well drained, calcareous soils; prairies, dry limestone soils; annual; flowering Aug-Oct.	No	No prairies, dry limestone soils, or grasslands on shallow, gravelly, well drained, calcareous soils were observed within the IH 635 project limits.	N/A	No Impact	N/A
Plateau Milkvine *Matalea edwardsensis*	--	--	Occurs in various types of juniper-oak and oak-juniper woodlands; perennial; flowering March-Oct; fruiting May-June.	No	No oak-juniper or juniper-oak woodlands were observed within the IH 635 project limits.	N/A	No Impact	N/A
Texas Milk Vetch *Astragalus reflexus*	--	SGCN	Grasslands, prairies, and roadsides on calcareous and clay substrates; annual; flowering Feb-June; fruiting April-June.	Yes	No unmaintained or native prairies or grasslands were observed within the IH 635 project limits. Roadsides with clay soils are common to the project area, and although dominated by nonnative species and frequently mowed during the growing season, such areas may provide habitat for this species.	N/A	May Impact	N/A

SPECIES IMPACT TABLE

Species	USFWS Federal Listing	TPWD State Listing	Description of Preferred Habitat	Habitat Present (Yes/No)	Relevant Habitat Characteristics	ESA Section 7 Determin-ation	Texas Parks & Wildlife Code Determin-ation	MOU-Trigger and BMP
Tree Dodder *Cuscuta exaltata*	--	SGCN	Parasitic on various *Quercus, Juglans, Rhus, Vitis, Ulmus,* and *Diospyros* species as well as *Acacia berlandieri* and other woody plants; annual; flowering May-Oct; fruiting July-Oct.	No	Parasitic dodder vines were not observed on typical host species during field biological survey.	N/A	No Impact	N/A
Warnock's Coral-root *Hexalectris warnockii*	--	SGCN	In leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creek beds in canyons such as the White Rock Escarpment in Dallas County; flowering June-September; individual plants do not usually bloom in successive years.	No	No oak-juniper woodlands or shaded slopes, or rocky creek beds within limestone canyons were observed within the project area. This species would not be expected to occur within the dense riparian vegetation or urban landscapes within the project corridor.	N/A	No Impact	N/A

Abbreviations and Acronyms:

Key to Abbreviations Used for Federal and State of Texas Species Regulatory Listing Status:
E, T: Federal or state listing as Endangered or Threatened, respectively
C: Federal Candidate for Listing
DL, PDL: Federally Delisted/Proposed for Delisting
-- : Not federally or state listed Rare, but a species of concern without any regulatory listing status
SGCN: TPWD designation for Species of Greatest Conservation Need

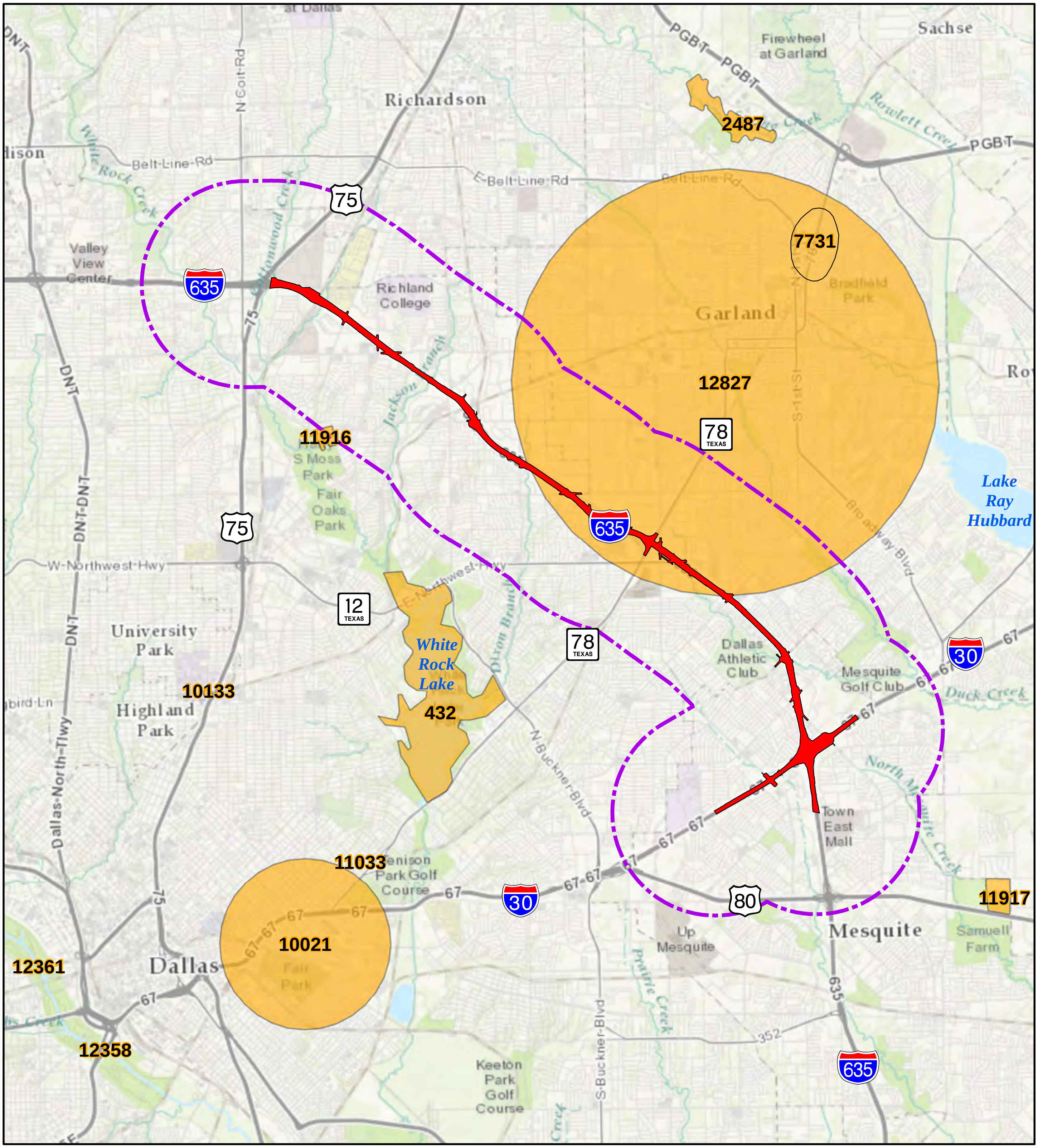
Key to Other Abbreviations or Acronyms Used:
BMP: Best Management Practice
N/A: Not Applicable
TPWD: Texas Parks and Wildlife Department
USFWS: U.S. Fish and Wildlife Service

Key to Species Effect / Impact Determinations:
No Effect = No adverse effect on federally-listed species.
No Impact = No adverse impact on state listed species, SGCN, or other state species of concern.

Data Sources:

U.S. Fish and Wildlife Service, Texas Parks and Wildlife Department and site visit/survey of project area on 11/18/2016.

Dates Agency Sources Accessed:
USFWS List: 11/18/2016
TPWD List: 11/8/2016 (Dallas County rare species list was last updated 5/16/2016)



Legend

Element Occurrence Site (EOID # Shown)

1.5-Mile Buffer Around Project Area

IH 635 Project Area

N W E S

0 2 4

SCALE IN MILES

Data Source: TPWD (11/2016)

Source Base Map: Esri World Topographic Map

TPWD Natural Diversity Database (NDD) Map

IH 635 from US 75 to IH 30

Dallas County, Texas

CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144

Element Occurrence Record

Scientific Name: Astragalus reflexus
Occurrence #: 6 **Eo Id:** 10200
Common Name: Texas milk vetch
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G3 **State Rank:** S3
Federal Status:

Location Information:

Directions

Near Bachmans Dam.

Survey Information:

First Observation: 1940-04-26 **Survey Date:** **Last Observation:** 1940-04-26

Eo Type: **Eo Rank:** H **Eo Rank Date:** 2006-12-07

Observed Area:

Comments:

General Description: Sandy woodland.

Comments: complete label citation: near Bachmans Dam in sandy woodland, 26 Apr 1940, C.L. Lundell & A.A. Lundell 8577 (TEX-LL). Also: Bachman and Denton Drives, NW side of Dallas, one plant in limestone gravel of railroad, 26 May 1949, L.H. Shinners 11211 (BRIT/SMU).

Protection Comments:

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Lundell, C.L. & A.A. Lundell (8577). 1940. TEX-LL.

Specimen:

Lundell, C.L. & A.A. Lundell (8577). 1940. TEX-LL. (S40LUNTXTXUS)

Shinners, L.H. (11211). 1949. BRIT/SMU. (S49SHISMTXUS)

Element Occurrence Record

Scientific Name: Astragalus reflexus
Occurrence #: 7 **Eo Id:** 10133
Common Name: Texas milk vetch
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G3 **State Rank:** S3
Federal Status:

Location Information:

Directions

Vacant lot, Dublin and Potomac, E of SMU stadium, N side of Dallas.

Survey Information:

First Observation: 1947-05-14 **Survey Date:** **Last Observation:** 1947-05-14

Eo Type: **Eo Rank:** H **Eo Rank Date:** 2006-12-07

Observed Area:

Comments:

General Description: Blackland prairie clay in vacant lot.

Comments: Complete label citation: Vacant lot, Dublin and Potomac, E of SMU stadium, N side of Dallas, blackland prairie clay, uncommon and inconspicuous, 14 May 1947, L.H. Shinners 9295 (BRIT/SMU). Also: SMU campus, University Park, Dallas, lawn weed in calcareous clay, 3 May 1962, L.H. Shinners 29834 (TEX-LL).

Protection Comments:

Management Comments:

Data:

EO Data: 1947: Described by collector as uncommon and inconspicuous at this site.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Shinners, L.H. (9295). 1947. BRIT/SMU.

Specimen:

Shinners, L.H. (9295). 1947. BRIT/SMU. (S47SHISMTXUS)

Shinners, L.H. (29834). 1962. TEX-LL. (S62SHITXTXUS)

Element Occurrence Record

Scientific Name: Astragalus reflexus

Occurrence #: 9 **Eo Id:** 10021

Common Name: Texas milk vetch

Track Status: Track all extant and selected historical EOs

Identification Confirmed: Y - Yes

TX Protection Status:

Global Rank: G3 **State Rank:** S3

Federal Status:

Location Information:

Directions

Fair Park, Dallas. [Site of Cotton Bowl.]

Survey Information:

First Observation: 1939-05-06 **Survey Date:** **Last Observation:** 1939-05-06

Eo Type: **Eo Rank:** H **Eo Rank Date:** 2006-12-07

Observed Area:

Comments:

General Description:

Comments: Complete label citation: Fair Park, Dallas, 6 May 1939, H.R. Reed s.n. or 31833 (TAES).

Protection Comments:

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Reed, H.R. (s.n. or 31833). 1939. TAES.

Specimen:

Reed, H.R. (s.n. or 31833). 1939. TAES. (S39REEAMTXUS)

Element Occurrence Record

Scientific Name: Caecidotea bilineata
Occurrence #: 2 **Eo Id:** 12813
Common Name: A Cave Obligate Isopod
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G2G3 **State Rank:** S1
Federal Status:

Location Information:

Directions

Specimens were collected at Max's Well, 1 mile east of Rowlett, Dallas Co.

Survey Information:

First Observation: 1975-05-24 **Survey Date:** 1975-05-24 **Last Observation:** 1975-05-24

Eo Type: **Eo Rank:** H **Eo Rank Date:** 1975-05-24

Observed Area:

Comments:

General Description:

Comments: In Lewis and Bowman, 1996 there are also two collections by A. G. Grubbs (15 Aug 1975 and 2 June 1976) of C. bilineata from Chinkapin Spring in Dallas Co. These observations are not mapped as the location of Chinkapin Spring could not be determined.

Protection Comments:

Management Comments:

Data:

EO Data: 24 May 1975: At least 8 males and 2 females were collected.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Lewis, Julian J., and T. E. Bowman. 1996. The subterranean asellids of Texas (Crustacea: Isopoda: Asellidae). Proceedings of the Biological Society of Washington 109(3):482-500.

Specimen:

Element Occurrence Record

Scientific Name: Caecidotea bilineata **Occurrence #:** 4 **Eo Id:** 12827

Common Name: A Cave Obligate Isopod **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G2G3 **State Rank:** S1 **Federal Status:**

Location Information:

Directions

Specimens were collected from Salix Spring, Garland in Dallas Co.

Survey Information:

First Observation: 1976-06-05 **Survey Date:** 1976-06-05 **Last Observation:** 1976-06-05

Eo Type: **Eo Rank:** H **Eo Rank Date:** 1976-06-05

Observed Area:

Comments:

General Description:

Comments: In Lewis and Bowman, 1996 there are also two collections by A. G. Grubbs (15 Aug 1975 and 2 June 1976) of C. bilineata from Chinkapin Spring in Dallas Co. These observations are not mapped as the location of Chinkapin Spring could not be determined.

Protection Comments:

Management Comments:

Data:

EO Data: 5 June 1976: At least 7 male and 5 female specimens were collected.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Lewis, Julian J., and T. E. Bowman. 1996. The subterranean asellids of Texas (Crustacea: Isopoda: Asellidae). Proceedings of the Biological Society of Washington 109(3):482-500.

Specimen:

Element Occurrence Record

Scientific Name: Conepatus leuconotus **Occurrence #:** 3 **Eo Id:** 12799
Common Name: Western hog-nosed skunk **Track Status:** Track all extant and selected historical EOs
Identification Confirmed: Y - Yes **TX Protection Status:**
Global Rank: G4 **State Rank:** S4 **Federal Status:**

Location Information:

Directions

The specimen label states that it was located at Wylie, NH. Watson Farm, Collin County, TX.

Survey Information:

First Observation: 1965-SU **Survey Date:** 1965-SU **Last Observation:** 1965-SU
Eo Type: **Eo Rank:** H **Eo Rank Date:** 1965-SU
Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: Summer 1965: Skull and mandibles of one preserved specimen of unknown sex.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Ferguson, Adam. 2014. Texas Skunk Record Database regarding five specices of skunk in Texas.

Specimen:

Dallas Museum of Natural History, Dallas, TX; unknown (#unknown), Catalog #MAM000446, Summer 1965, DaMNH.

Element Occurrence Record

Scientific Name: Dalea hallii
Occurrence #: 4 **Eo Id:** 11033
Common Name: Hall's prairie clover
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G3 **State Rank:** S3
Federal Status:

Location Information:

Directions

1 1/2 mi SW of White Rock Lake, corner of Cordove and E. Grand Ave., Dallas.

Survey Information:

First Observation: 1947-06-14 **Survey Date:** **Last Observation:** 1947-06-14

Eo Type: **Eo Rank:** H **Eo Rank Date:** 2006-12-07

Observed Area:

Comments:

General Description: Vacant lot, gray clay, full sun.

Comments: Complete label citation: 1 1/2 mi SW of White Rock Lake, corner of Cordova and E. Grand Ave., Dallas, vacant lot, gray clay, full sun, rare, 14 Jun 1947, R. E. Niblack 6 (BRIT/SMU, TEX-LL).

Protection Comments:

Management Comments:

Data:

EO Data: 1947-06-14: Described by collector as rare.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Niblack, R.E. (6). 1947. BRIT/SMU, TEX-LL.

Specimen:

Niblack, R.E. (6). 1947. BRIT/SMU, TEX-LL. (S47NIBSMTXUS)

Element Occurrence Record

Scientific Name: Echinacea atrorubens
Occurrence #: 6 **Eo Id:** 9977
Common Name: Topeka purple-coneflower
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G3 **State Rank:** S3
Federal Status:

Location Information:

Directions

W side of county road ca. 0.6 mi W of in. FM 205 and FM 549, ca. 2.4 mi SSE of I-30, just E of Wallace Lake on Little Buffalo Creek.

Survey Information:

First Observation: 1990-05-20 **Survey Date:** **Last Observation:** 1990-05-20

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description: Rolling blackland prairie.

Comments:

Protection Comments:

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Bridges, E.L. and K. Kindscher (13693). 1990. TEX-LL.

Specimen:

Bridges, E.L. and K. Kindscher (13693). 1990. TEX-LL. (S90BRITXTXUS)

Element Occurrence Record

Scientific Name: Lampsilis satura | **Occurrence #:** 2 | **Eo Id:** 9771

Common Name: Sandbank Pocketbook | **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: ? - Questionable | **TX Protection Status:** T

Global Rank: G2 | **State Rank:** S1 | **Federal Status:**

Location Information:

Directions

Mussels were observed in the Elm Fork Trinity River upstream (north) of Spur 348 (W Northwest Hwy) in Dallas. The directions were created by database staff.

Survey Information:

First Observation: 2012-07-09 | **Survey Date:** 2012-07-13 | **Last Observation:** 2012-07-13

Eo Type: | **Eo Rank:** E | **Eo Rank Date:** 2012-07-13

Observed Area:

Comments:

General Description:

Comments: Dec 2015, Ben Hutchins, TPWD invertebrate biologist: L. satura is not historically known from the Trinity River basin. Hence, the identification of this observation/record is considered questionable. 9 July 2012: The search area was 50 meters in length; area was searched for 2.2 person-hours. 9-13 July 2012: Survey was a tactile scuba survey for 256 person-minutes.

Protection Comments:

Management Comments:

Data:

EO Data: 9 July 2012: A single recently dead shell was observed. 9-13 July 2012: A single relatively recently dead valve and one very-long dead valve were observed.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Zara Environmental LLC. 2012. Relocation and monitoring for protected mussels in the Elm Fork of the Trinity River at California Crossing bridge. CSJ-0918-45-756, Dallas County, Texas. 19 pp plus appendix. Prepared for Texas Dept. of Transportation. August 2012.

Hutchins, Ben. 2015. Multiple emails in December to Dr. Charles Randklev, Institute of Renewable Natural Resources, and Sandy Birnbaum, Texas Natural Diversity Database, addressing the identification of Lampsilis satura observations in the Trinity River and Fusconaia askewi observations in the Trinity and San Jacinto rivers.

Ford, Neil. 2012. Annual report for Texas Parks and Wildlife Dept. scientific research permit. Submitted to Wildlife Permits, Texas Parks & Wildlife Dept.

Specimen:

Element Occurrence Record

Scientific Name: Lampsilis satura **Occurrence #:** 40 **Eo Id:** 12358

Common Name: Sandbank Pocketbook **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: ? - Questionable **TX Protection Status:** T

Global Rank: G2 **State Rank:** S1 **Federal Status:**

Location Information:

Directions

Mussels were observed in the Trinity River at the IH-35E bridge (US 77 and US 67; northbound lanes) in Dallas. The directions were created by database staff.

Survey Information:

First Observation: 2013-08-13 **Survey Date:** 2013-08-13 **Last Observation:** 2013-08-13

Eo Type: **Eo Rank:** E **Eo Rank Date:** 2013-08-13

Observed Area:

Comments:

General Description: 13 August 2013: The mussel was collected on a substrate of 50.0% sand and 50.0% silt at a depth of 1.52 meters. The site is heavily channelized with steep banks and a relatively flat channel. There is no submerged vegetation except for a few very narrow strips along the shoreline where the emergent riparian vegetation is rooted within the channel. Submerged debris was mostly organic and consisted of trees and sticks; inorganic debris consisted of litter, likely thrown from the bridge or washed downstream (tires, bottles, etc.). The project area is buffered by flood control levees with very little riparian vegetation, except for narrow strips along the shorelines.

Comments: Dec 2015, Ben Hutchins, TPWD invertebrate biologist: L. satura is not historically known from the Trinity River basin. The morphology of this specimen is atypical and lacks genetic material for confirmation. Texas malacologists are uncertain of its identity; therefore, the identification of this observation/record is considered questionable. 13 August 2013: Divers spent 152 person-minutes performing SCUBA based surveys of 200 sq. meters. The specimen was slightly deformed; internal morphological characteristics were used to make the identification.

Protection Comments:

Management Comments:

Data:

EO Data: 13 August 2013: A single live male mussel (length 73.4 mm; height 56.3 mm, and width 45.8 mm) was collected for verification.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Hutchins, Ben. 2015. Multiple emails in December to Dr. Charles Randklev, Institute of Renewable Natural Resources, and Sandy Birnbaum, Texas Natural Diversity Database, addressing the identification of Lampsilis satura observations in the Trinity River and Fusconaia askewi observations in the Trinity and San Jacinto rivers.

Texas Dept. of Transportation. 2014. Relocation of rare and state-listed mussel species; bridge replacement over the Trinity River at IH 30 and IH 35 in downtown Dallas, Dallas County, Texas. CSJ: 1068-04-116. 22 January 2014.

McDermid, Krista, N. Ford, and S. Robertson. 2013. First record of a live sandbank pocketbook, Lampsilis satura, from the Trinity River near Dallas, Texas. Ellipsaria 15(4):26-28.

Specimen:

Invertebrate Collection, University of Texas, Tyler, TX; Zara Environmental and Neil Ford (# unknown), Accession # UTT 191, 13 Aug 2013, UTT.

Element Occurrence Record

Scientific Name: Onychoprion fuscatus **Occurrence #:** 31 **Eo Id:** 7284

Common Name: Interior Least Tern **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:** E

Global Rank: G4T2Q **State Rank:** S1B **Federal Status:** LE

Location Information:

Directions

GRAVEL MINE NEAR BELT LINE AND POST OAK ROADS IN SOUTHEAST DALLAS, EAST OF I-45

Survey Information:

First Observation: 2000-08-04 **Survey Date:** **Last Observation:** 2000-08-04

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description: GRAVEL MINE

Comments: SEE REPORT (U01BOY01TXUS) FOR MORE DETAILS; HIGH PROBABILITY THAT THESE BIRDS ARE THE SAME ONES OR OF THE SAME COLONY AS THOSE OBSERVED AT SOUTHSIDE WASTEWATER TREATMENT PLANT CA. 2 AIR MILES NORTHEAST OF GRAVEL MINE (SEE OCCURRENCE 032)

Protection Comments:

Management Comments:

Data:

EO Data: 4 AUGUST 2000, FIVE ADULTS AND FOUR FLEDGLINGS OBSERVED

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

BOYLAN, JEANETTE. 2001. RESULTS OF THE 2000 INTERIOR LEAST TERN MONITORING PROJECT AT THE SOUTHSIDE WASTEWATER TREATMENT PLANT IN DALLAS.

Specimen:

Element Occurrence Record

Scientific Name: Onychoprion fuscatus
Occurrence #: 32 **Eo Id:** 2874
Common Name: Interior Least Tern
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status: E
Global Rank: G4T2Q **State Rank:** S1B
Federal Status: LE

Location Information:

Directions

SOUTHSIDE WASTEWATER TREATMENT PLANT, SOUTHEAST DALLAS, JUST EAST OF TRINITY RIVER

Survey Information:

First Observation: 1992 **Survey Date:** **Last Observation:** 2000-08-28

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description: WASTEWATER TREATMENT PLANT

Comments: MONITORING PROJECT BEGAN FOR THIS SITE IN 1998; MONITORS ARE VOLUNTEERS FROM THE DALLAS COUNTY AUDUBON SOCIETY AND THE DALLAS ZOO; OTHER BIRDS OBSERVED (HIGHEST NUMBER SEEN ON ANY PARTICULAR DAY): WOOD STORKS (150), WHITE-FACED IBIS (25), WHITE IBIS (4), GREEN HERONS (4), ROSEATE SPOONBILLS, BLACK TERNS, AND COMMON MOORHENS; THE REPORT (U01BOY01TXUS) CONTAINS DAILY OBSERVATIONS FROM MAY-AUGUST 2000 INCLUDING OBSERVERS, WEATHER, AND NUMBER OF ADULTS AND EGGS/CHICKS

Protection Comments:

Management Comments:

Data:

EO Data: IN 1998 AND 1999 CA. 4 CHICKS PRODUCED; 30 MAY 2000 BREEDING COLONY DISCOVERED IN MONOFILL (AREA OF PLANT WHERE SLUDGE IS MIXED WITH SAND), HIGHEST NUMBER OF ADULTS SEEN WAS 21 WITH 4-6 NESTS, AFTER SEVERAL HEAVY RAINS TERNS ABANDONED THIS NEST SITE; 23 JUNE 2000 TERNS OBSERVED COURTING IN FIELD A; JUNE-JULY 2000 TERNS SELDOM SEEN, SO SEARCH AREA EXPANDED, OBSERVED POSSIBLE NESTING AT GRAVEL MINE SOUTHWEST OF PLANT (SEE OCCURRENCE 031); 28 AUGUST 2000 TWO JUVENILES AND 6 SUBADULTS OBSERVED FLYING AND FISHING OVER, AND LOAFING ON A SANDBAR IN PULICH POND

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

BOYLAN, JEANETTE. 2001. RESULTS OF THE 2000 INTERIOR LEAST TERN MONITORING PROJECT AT THE SOUTHSIDE WASTEWATER TREATMENT PLANT IN DALLAS.

REID, JEFFERY A. 1993. MEMO TO USFWS FIELD SUPERVISOR RE: ABANDONMENT OF BALD EAGLE NEST ON RAY ROBERTS RESERVOIR (INCLUDES MAPS FOR BALD EAGLE AND INTERIOR LEAST TERN NESTING LOCALITIES). MAY 3, 1993.

Specimen:

Element Occurrence Record

Scientific Name: Pleurobema riddellii **Occurrence #:** 1 **Eo Id:** 9494

Common Name: Louisiana Pigtoe **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:** T

Global Rank: G1G2 **State Rank:** S1 **Federal Status:**

Location Information:

Directions

Mussels were observed in the Elm Fork Trinity River downstream of the California Crossing Dam and the California Crossing bridge in Dallas/Irving. The directions are generalized as this record consists of multiple observations.

Survey Information:

First Observation: 2012-07-13 **Survey Date:** 2012-09-28 **Last Observation:** 2012-09-28

Eo Type: **Eo Rank:** E **Eo Rank Date:** 2012-09-28

Observed Area:

Comments:

General Description: 24, 26-28 Sep 2012: Substrate in which the mussels were found included silt and clay, and sand.

Comments: 9-13 July 2012: The survey was a tactile SCUBA survey for 958 person-minutes. The mussels were marked with a PIT tag and redundant color-coded bead with a unique number before relocating to two sites (EO ID: 9969) approx. 1.5 miles upstream of the California Crossing bridge. Dr. Neil Ford, University of Texas - Tyler collected the mussel for a genetic and morphological study. 24, 26-28 Sep 2012: Quadrat sampling was conducted using SCUBA due to the average water depths ranging from approx. 4 to 12 feet (1.2 to 4 meters). The mussels were observed in a total of 7 quadrats (total area of 69 sq. meters; total survey time: 135 person-minutes). The mussels were marked with a PIT tag and redundant color-coded bead with a unique number before relocating to a site (EO ID: 9969) approx. 1.6 miles upstream of the dam. March and September 2013: During monitoring efforts of the relocated mussels from the bridge site, identification of three mussels originally identified as Texas pigtoe (Fusconaia askewi) were changed to Louisiana pigtoe (Pleurobema riddellii).

Protection Comments:

Management Comments:

Data:

EO Data: 9-13 July 2012: A total of four live individuals were collected at the bridge site. One was retained for a genetic and morphological study. The rest were relocated upstream (EO ID: 9969). 24, 26-28 Sep 2012: A total of 5 live individuals were collected from the dam site and relocated upstream (EO ID: 9969). Also, 2 long dead shells were observed at the dam site.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

11/15/2016

Reference:

Citation:

Zara Environmental LLC. 2012. Relocation and monitoring for protected mussels in the Elm Fork of the Trinity River at California Crossing bridge. CSJ-0918-45-756, Dallas County, Texas. 19 pp plus appendix. Prepared for Texas Dept. of Transportation. August 2012.

Halff Associates, Inc. 2013. Western dams rehabilitation project Elm Fork Trinity River, Dallas County, Texas presence/absence survey and relocation of state-listed threatened mussels & fish recovery and relocation. Prepared for Dallas Water Utilities, City of Dallas. March 2013. 56 pp plus appendices.

Zara Environmental LLC. 2014. Interim report: Second monitoring event for relocated mussels in the Elm Fork of the Trinity River at California Crossing Bridge, Dallas County, Texas. CSJ: 0918-45-756. Prepared for Texas Dept. of Transportation. 11 pages. 11 February 2014.

Specimen:

Element Occurrence Record

Scientific Name: Pleurobema riddellii
Occurrence #: 11 **Eo Id:** 9969
Common Name: Louisiana Pigtoe
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status: T
Global Rank: G1G2 **State Rank:** S1
Federal Status:

Location Information:

Directions

Mussels were relocated to two sites in the Elm Fork Trinity River from approx. 0.4 to 0.8 mile north of Spur 348 (W. Northwest Hwy) in northwest Dallas. The directions are generalized as this record consists of multiple observations.

Survey Information:

First Observation: 2012-07-09 **Survey Date:** 2013-09 **Last Observation:** 2013-09

Eo Type: **Eo Rank:** E **Eo Rank Date:** 2013-09

Observed Area:

Comments:

General Description: 24, 26-27 Sep 2012: Substrate within the relocation site included cobble, silt and clay, and gravel. Sep 2013: The subsurface morphology has changed since the initial relocation and the first monitoring event. There is significant accumulation of surface and subsurface debris including trees/limbs, monofilament and other entanglement hazards. The survey area was covered in a layer of silt approx. 46 cm deep.

Comments: 9-13 July and 24-28 Sep 2012: In total 304 and 1,141 mussels (rare and common species), respectively, were relocated to this site. Tagged ones were placed in quadrats; the rest placed throughout relocation sites. The mussels were relocated from sites (EO ID: 9494) downstream just below the California Crossing Dam and at the California Crossing Rd. bridge. Each mussel was marked with a Passive Integrated Transponder (PIT) tag and redundant color-coded bead with a unique number. Mussels were placed in and around 1 sq. meter rebar squares that were weighted down and placed along the bottom of the river channel in pre-selected areas. The location of the rebar squares was documented to facilitate potential post-relocation monitoring. March 2013: Several of the quadrats were displaced; their original location was approximated. Sep 2013: The quadrats were remarked with long metal stakes. In total 45 live mussels (rare and common species) and shells or valves of 58 dead mussels were collected, representing 16 species. The recapture rate was 19% with 27 marked mussels being collected. Seven of these were first-time recaptures.

Protection Comments:

Management Comments:

Data:

EO Data: 9-13 July 2012: A total of 3 live mussels from a downstream site were relocated to 2 permanent quadrats at one site. 24, 26-27 Sep 2012: Five live individuals from a downstream site were relocated to one site. March 2013: A total of two live mussels were recaptured at one site. Sep 2013: A total of two live and one dead were recaptured at one site.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Element Occurrence Record

Reference:

Citation:

Halff Associates, Inc. 2013. Western dams rehabilitation project Elm Fork Trinity River, Dallas County, Texas presence/absence survey and relocation of state-listed threatened mussels & fish recovery and relocation. Prepared for Dallas Water Utilities, City of Dallas. March 2013. 56 pp plus appendices.

Zara Environmental LLC. 2014. Interim report: Second monitoring event for relocated mussels in the Elm Fork of the Trinity River at California Crossing Bridge, Dallas County, Texas. CSJ: 0918-45-756. Prepared for Texas Dept. of Transportation. 11 pages. 11 February 2014.

Zara Environmental LLC. 2012. Relocation and monitoring for protected mussels in the Elm Fork of the Trinity River at California Crossing bridge. CSJ-0918-45-756, Dallas County, Texas. 19 pp plus appendix. Prepared for Texas Dept. of Transportation. August 2012.

Specimen:

Element Occurrence Record

Scientific Name: Pleurobema riddellii | **Occurrence #:** 21 | **Eo Id:** 12357

Common Name: Louisiana Pigtoe | **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes | **TX Protection Status:** T

Global Rank: G1G2 | **State Rank:** S1 | **Federal Status:**

Location Information:

Directions

Mussels were observed in the Trinity River between the north and southbound lanes /bridges of IH-35E (US 77 and US 67) in Dallas. The directions were created by database staff.

Survey Information:

First Observation: 2013-08-12 | **Survey Date:** 2013-08-21 | **Last Observation:** 2013-08-21

Eo Type: | **Eo Rank:** E | **Eo Rank Date:** 2013-08-21

Observed Area:

Comments:

General Description: 12-21 Aug 2013: The mussels were collected at a depth of 2.13 meters. One mussel was collected on substrate of 100% silt; the other on 75.0% silt and 25.0% gravel. Overall the substrate at this site is 52.5% silt; 22.5% sand; 12.5% cobble; 10.0% gravel; 2.5% boulders. The site is heavily channelized with steep banks and a relatively flat channel. There is no submerged vegetation except for a few very narrow strips along the shoreline where the emergent riparian vegetation is rooted within the channel. Submerged debris was mostly organic and consisted of trees and sticks; inorganic debris consisted of litter, likely thrown from the bridge or washed downstream (tires, bottles, etc.). The project area is buffered by flood control levees with very little riparian vegetation , except for narrow strips along the shorelines.

Comments: 12-21 Aug 2013:The mussels were collected, marked with a Passive Integrated Transponder (PIT) tag and color-coded tag with a unique number, and relocated to a permanently marked site approx. 6.8 miles downstream (See EO ID: 12360). Divers spent 419 person-minutes performing SCUBA based surveys of 360 sq. meters.

Protection Comments:

Management Comments:

Data:

EO Data: 12-21 Aug 2013: A total of 2 live mussels were collected from one site, marked, and relocated downstream.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Texas Dept. of Transportation. 2014. Relocation of rare and state-listed mussel species; bridge replacement over the Trinity River at IH 30 and IH 35 in downtown Dallas, Dallas County, Texas. CSJ: 1068-04-116. 22 January 2014.

Specimen:

Element Occurrence Record

Scientific Name: Pleurobema riddellii | **Occurrence #:** 22 | **Eo Id:** 12360

Common Name: Louisiana Pigtoe | **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes | **TX Protection Status:** T

Global Rank: G1G2 | **State Rank:** S1 | **Federal Status:**

Location Information:

Directions

Mussels were relocated to a site in the Trinity River approx. 0.2 miles upstream of the SH 12 bridge in Dallas. The directions were created by database staff.

Survey Information:

First Observation: 2013-08-12 | **Survey Date:** 2013-08-21 | **Last Observation:** 2013-08-21

Eo Type: | **Eo Rank:** E | **Eo Rank Date:**

Observed Area:

Comments:

General Description:

Comments: 12-21 August 2013: In total 756 mussels (rare and common species) were relocated to this site.

Protection Comments:

Management Comments:

Data:

EO Data: 12-21 August 2013: A total of 2 live mussels were collected upstream from one site, marked, and relocated to this site.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Texas Dept. of Transportation. 2014. Relocation of rare and state-listed mussel species; bridge replacement over the Trinity River at IH 30 and IH 35 in downtown Dallas, Dallas County, Texas. CSJ: 1068-04-116. 22 January 2014.

Specimen:

Element Occurrence Record

Scientific Name: Pleurobema riddellii | **Occurrence #:** 23 | **Eo Id:** 12361

Common Name: Louisiana Pigtoe | **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes | **TX Protection Status:** T

Global Rank: G1G2 | **State Rank:** S1 | **Federal Status:**

Location Information:

Directions

Mussels were observed in the Trinity River at the Continental Avenue bridge in Dallas . The directions were created by database staff.

Survey Information:

First Observation: 2013-07-24 | **Survey Date:** 2013-07-24 | **Last Observation:** 2013-07-24

Eo Type: | **Eo Rank:** E | **Eo Rank Date:** 2013-07-24

Observed Area:

Comments:

General Description: 24 July 2013: Substrate within the entire survey area (2,094 sq. meters) mostly consisted of silt (45.1%) or sand (30.4%), but also included gravel (11.4%), organic debris (7%), clay (4.4%), and cobble (1.6%). Substrate of areas of direct impacts was dominated by hard packed clay, silt, and organic debris. The areas of indirect impacts were dominated by sand, silt, cobble, and gravel.

Comments: 2013: Visual and tactile searches were performed in the shallow areas up to 0.9 meters in depth. In areas over 0.9 meters deep, SCUBA was used to perform tactile searches. In total the site was surveyed for 1,658 person-minutes covering 2,094 sq. meters during surveys of 22-24 and 29-30 July.

Protection Comments:

Management Comments:

Data:

EO Data: 24 July 2013: A single, recently dead shell was collected as a voucher specimen.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Halff Associates, Inc. 2013. Presence/absence survey & relocation of state-listed threatened mussel species, Continental Bridge improvement project, Trinity River, Dallas, Texas. Prepared for City of Dallas, Trinity Watershed Management. October 2013. 30 pp plus appendices.

Specimen:

Element Occurrence Record

Scientific Name: Potamilus amphichaenus
Occurrence #: 1 **Eo Id:** 9883
Common Name: Texas Heelsplitter
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status: T
Global Rank: G1G2 **State Rank:** S1
Federal Status:

Location Information:

Directions

Mussels were observed at multiple sites in Lewisville Lake. The directions are generalized as this record consists of multiple observations.

Survey Information:

First Observation: 1977-WI **Survey Date:** 1999-09-22 **Last Observation:** 1999-09-22

Eo Type: **Eo Rank:** E **Eo Rank Date:** 1999-09-22

Observed Area:

Comments:

General Description:

Comments: Winter 1977-Fall 1978: Sampling coincided with an extended drought which resulted in substantial lowering of the reservoir level. Shells were extremely abundant and readily counted. Survey transects were 4 meters wide along the water edge for varying distances. Length of transects varied from 50-70 meters, but some were extended beyond 70 meters in order to increase sample number. Representative specimens have been deposited in the Dallas Museum of Natural History. 31 August and 1, 7, and 22 September1999: The data were unclear if the species was observed on all dates or a subset of dates.

Protection Comments:

Management Comments:

Data:

EO Data: Winter 1977-Fall 1978: At least 41 shells were observed at 10 sites. 31 Aug and 1, 7, and 22 Sep 1999: Living individuals were observed at one site.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Neck, Raymond W. 1990. Geological substrate and human impact as influences on bivalves of Lake Lewisville, Trinity River, Texas. The Nautilus 104(1):16-25.

Howells, Robert G. 2000. Distributional surveys of freshwater bivalves in Texas: progress report for 1999. Management Data Series No. 170. Texas Parks and Wildlife Dept., Inland Fisheries Division. 49 pp.

Specimen:

Element Occurrence Record

Scientific Name: Quercus buckleyi series **Occurrence #:** 4 **Eo Id:** 2487

Common Name: Texas Oak Series **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G3 **State Rank:** S3 **Federal Status:**

Location Information:

Directions

4.1 MILES EAST OF JUNCTION OF BELTLINE ROAD AND U.S. HWY 75, THEN NORTHWEST 0.8 MILES, THEN NORTHEAST TO SPRING CREEK

Survey Information:

First Observation: 1984 **Survey Date:** 1984-07-12 **Last Observation:** 1984-07-12

Eo Type: **Eo Rank:** A **Eo Rank Date:**

Observed Area: 110.00

Comments:

General Description: OLD GROWTH QUERCUS MICHAUXII, Q. SHUMARDII, ULMUS AMERICANA FOREST

Comments:

Protection Comments: CITY OF GARLAND HAS DEDICATED A CONSERVATION EASEMENT HERE

Management Comments:

Data:

EO Data: OLD GROWTH, UNIQUE QUERCUS MICHAUXII, Q. SHUMARDII, ULMUS AMERICANA FOREST; MORE HIGHLY DEVELOPED IN THE NORTH SECTION THAN IN THE SOUTHERN PART

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

DIAMOND, D. D. 1984. FIELD SURVEY TO SPRING CREEK OF JULY 12, 1984.

Specimen:

Element Occurrence Record

Scientific Name: Rookery | **Occurrence #:** 336 | **Eo Id:** 5782

Common Name: | **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes | **TX Protection Status:**

Global Rank: G5 | **State Rank:** SNR | **Federal Status:**

Location Information:

Directions

WOODED LOT AT CITY OF SEAGOVILLE; EASTERN EDGE

Survey Information:

First Observation: 1979 **Survey Date:** **Last Observation:** 1983

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description: HACKBERRY AND CEDAR ELM TREES, 5 METERS

Comments: COLONY NUMBER 555-051

Protection Comments:

Management Comments:

Data:

EO Data: NESTING COLONY OF THE YELLOW-CROWNED NIGHT-HERON

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

TEXAS COLONIAL WATERBIRD SOCIETY AND TEXAS PARKS & WILDLIFE DEPARTMENT. 1981-1985. TEXAS COLONIAL WATERBIRD CENSUS SUMAMRY.

Mullins, L.M. ET.AL. 1982. An atlas and census of Texas waterbird colonies, 1973-1980. Texas Colonial Waterbird Society.

Specimen:

Element Occurrence Record

Scientific Name: Rookery
Occurrence #: 337 **Eo Id:** 2952
Common Name:
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G5 **State Rank:** SNR
Federal Status:

Location Information:

Directions

WILDLIFE REFUGE, WOODED TRACT IN CITY OF DALLAS, RIPARIAN, NO TRIBUTARIES; ADJACENT TO IH-35E

Survey Information:

First Observation: 1973 **Survey Date:** **Last Observation:** 1990

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description: HACKBERRY, CEDAR ELM, AND OSAGE ORANGE TREES TO 5-6 METERS; HUMAN DISTURBANCE CAREFULLY CONTROLLED; HERONRY IS A WILDLIFE REFUGE

Comments: COLONY NUMBER 555-050

Protection Comments:

Management Comments:

Data:

EO Data: NESTING COLONY OF THE CATTLE EGRET, LITTLE BLUE HERON, GREAT EGRET, BLACK-CROWNED NIGHT-HERON, SNOWY EGRET

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Martin, Catrina. 1991. Texas Colonial Waterbird Census Summary - 1990. Compiled for Texas Parks & Wildlife Dept. and Texas Colonial Waterbird Society. 13 March 1991.

Mullins, L.M. ET.AL. 1982. An atlas and census of Texas waterbird colonies, 1973-1980. Texas Colonial Waterbird Society.

Specimen:

Element Occurrence Record

Scientific Name: Rookery **Occurrence #:** 468 **Eo Id:** 561

Common Name: **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G5 **State Rank:** SNR **Federal Status:**

Location Information:

Directions

PORTIONS OF DALLAS HUNTING AND FISHING CLUB LAKE AND LANCASTER CLUB LAKE, AS WELL AS ADJACENT STRETCH OF TRINITY RIVER, EAST-SOUTHEAST OF HUTCHINS

Survey Information:

First Observation: 1981 **Survey Date:** **Last Observation:** 1981

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description: NESTS NOT SUBJECT TO FLOODING

Comments: COLONY NUMBER 555-059

Protection Comments:

Management Comments:

Data:

EO Data: NESTING COLONY OF THE CATTLE EGRET

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

TEXAS COLONIAL WATERBIRD SOCIETY AND TEXAS PARKS & WILDLIFE DEPARTMENT. 1981-1985. TEXAS COLONIAL WATERBIRD CENSUS SUMAMRY.

Specimen:

Element Occurrence Record

Scientific Name: Rookery
Occurrence #: 474 **Eo Id:** 1439
Common Name:
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G5 **State Rank:** SNR
Federal Status:

Location Information:

Directions

INTERSECTION OF SIMPSON STUART AND BONNIE VIEW ROADS INCLUDING FIVEMILE CREEK TRIBUTARY AND SEVERAL PONDS, WEST-NORTHWEST OF HUTCHINS

Survey Information:

First Observation: 1988 **Survey Date:** **Last Observation:** 1990

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description:

Comments: COLONY NUMBER 555-065

Protection Comments:

Management Comments:

Data:

EO Data: NESTING COLONY OF THE GREAT EGRET, SNOWY EGRET, LITTLE BLUE HERON, CATTLE EGRET, BLACK-CROWNED NIGHT-HERON

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Martin, Catrina. 1991. Texas Colonial Waterbird Census Summary - 1990. Compiled for Texas Parks & Wildlife Dept. and Texas Colonial Waterbird Society. 13 March 1991.

TEXAS COLONIAL WATERBIRD SOCIETY AND TEXAS PARKS & WILDLIFE DEPARTMENT. 1986-1989. TEXAS COLONIAL WATERBIRD CENSUS SUMMARY. SPECIAL ADMINISTRATIVE REPORTS.

Specimen:

Element Occurrence Record

Scientific Name: Rookery
Occurrence #: 475 **Eo Id:** 7731
Common Name:
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G5 **State Rank:** SNR
Federal Status:

Location Information:

Directions

BOTH SIDES OF HIGHWAY 78 JUST NORTH OF GARLAND

Survey Information:

First Observation: 1989 **Survey Date:** **Last Observation:** 1990

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description:

Comments: COLONY NUMBER 555-066

Protection Comments:

Management Comments:

Data:

EO Data: NESTING COLONY OF THE GREAT EGRET, SNOWY EGRET, LITTLE BLUE HERON, CATTLE EGRET

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Martin, Catrina. 1991. Texas Colonial Waterbird Census Summary - 1990. Compiled for Texas Parks & Wildlife Dept. and Texas Colonial Waterbird Society. 13 March 1991.

TEXAS COLONIAL WATERBIRD SOCIETY AND TEXAS PARKS & WILDLIFE DEPARTMENT. 1986-1989. TEXAS COLONIAL WATERBIRD CENSUS SUMMARY. SPECIAL ADMINISTRATIVE REPORTS.

Specimen:

Element Occurrence Record

Scientific Name: Rookery
Occurrence #: 477 **Eo Id:** 6868
Common Name:
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G5 **State Rank:** SNR
Federal Status:

Location Information:

Directions

AT FISH HATCHERIES NORTH OF LOG CABIN ROAD, SOUTH OF KLEBERG

Survey Information:

First Observation: 1990 **Survey Date:** **Last Observation:** 1990

Eo Type: **Eo Rank:** **Eo Rank Date:**

Observed Area:

Comments:

General Description:

Comments: COLONY NUMBER 555-068

Protection Comments:

Management Comments:

Data:

EO Data: NESTING COLONY OF THE GREAT EGRET, SNOWY EGRET, LITTLE BLUE HERON, CATTLE EGRET, WHITE-FACED IBIS

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Martin, Catrina. 1991. Texas Colonial Waterbird Census Summary - 1990. Compiled for Texas Parks & Wildlife Dept. and Texas Colonial Waterbird Society. 13 March 1991.

Specimen:

Element Occurrence Record

Scientific Name: Rookery | **Occurrence #:** 479 | **Eo Id:** 3672
Common Name: | **Track Status:** Track all extant and selected historical EOs
Identification Confirmed: Y - Yes | **TX Protection Status:**
Global Rank: G5 | **State Rank:** SNR | **Federal Status:**

Location Information:

Directions

AT INTERSECTION OF JOSEY LANE AND KELLER SPRINGS ROAD AND SURROUNDING, IN NORTH CARROLLTON

Survey Information:

First Observation: 1990 | **Survey Date:** | **Last Observation:** 1990

Eo Type: | **Eo Rank:** | **Eo Rank Date:**

Observed Area:

Comments:

General Description:

Comments: COLONY NUMBER 555-070

Protection Comments:

Management Comments:

Data:

EO Data: NESTING COLONY OF THE SNOWY EGRET, LITTLE BLUE HERON, CATTLE EGRET

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Martin, Catrina. 1991. Texas Colonial Waterbird Census Summary - 1990. Compiled for Texas Parks & Wildlife Dept. and Texas Colonial Waterbird Society. 13 March 1991.

Specimen:

11/15/2016

Element Occurrence Record

Scientific Name: Schizachyrium scoparium - Andropogon gerardii - Sorghastrum nutans - Bifora americana Mollisol Grassland

Occurrence #: 5 **Eo Id:** 11564

Common Name: Mollisol Blackland Prairie

Track Status: Track all extant and selected historical EOs

Identification Confirmed: Y - Yes

TX Protection Status:

Global Rank: G1G2 **State Rank:** SNR

Federal Status:

Location Information:

Directions

The site is located approximately 4.0 air miles directly south of Rockwall, 3.0 northeast of Heath, and 11.0 miles directly east of Dallas, to the east of Lake Ray Hubbard, south of County Line Road, northeast of FM 3097/Horizon Road, and west of H Wallace Lane. The directions were created by database staff.

Survey Information:

First Observation: 2009-03-14 **Survey Date:** 2009-03-14 **Last Observation:** 2009-03-14

Eo Type: **Eo Rank:** E **Eo Rank Date:** 2009-03-14

Observed Area:

Comments:

General Description: 14 March 2009: There are several ponds and a creek on the property; This site is an excellent representative prairie remnant; See the Composition Tab for other species within the area.

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: 14 March 2009: One plant community of high quality grass species; Forb species are high quality; Exotic species are present; Woody cover is 1-5 percent.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:
Andropogon gerardii	Herb (field)	Y	Graminoid	SFID: 25652
Bifora americana	Herb (field)	Y	Forb	SFID: 25652
Celtis laevigata	Tree (canopy & subcanopy)	N	Broad-leaved deciduous tree	SFID: 25652
Juniperus virginiana	Tree (canopy & subcanopy)	N	Needle-leaved tree	SFID: 25652
Schizachyrium scoparium	Herb (field)	Y	Graminoid	SFID: 25652
Sorghastrum nutans	Herb (field)	Y	Graminoid	SFID: 25652

Element Occurrence Record

Reference:

Citation:

Native Prairies Association of Texas. 2011. Tallgrass prairie survey project that includes shapefiles, excel files, documents, images, and protocol for multiple counties in Texas (2000-2013).

Specimen:

Element Occurrence Record

Scientific Name: Schizachyrium scoparium - Sorghastrum nutans - Andropogon gerardii - Bifora americana Vertisol Grassland

Occurrence #: 26 **Eo Id:** 11916

Common Name: Vertisol Blackland Prairie

Track Status: Track all extant and selected historical EOs

Identification Confirmed: Y - Yes

TX Protection Status:

Global Rank: G1G2 **State Rank:** SNR

Federal Status:

Location Information:

Directions

The site is located approximately 7.0 air miles west-southwest of Garland, and 5.0 air miles directly south of Richardson, on the south side of Royal Lane just east of Greenville Avenue. The directions were created by database staff.

Survey Information:

First Observation: 2009-03-21 **Survey Date:** 2009-03-21 **Last Observation:** 2009-03-21

Eo Type: **Eo Rank:** E **Eo Rank Date:** 2009-03-21

Observed Area:

Comments:

General Description: See the Composition Tab for other species within the area.

Comments:

Protection Comments:

Management Comments: 21 March 2009: Managers could potentially work with Dallas Parks and Recreation to manage this site as a prairie.

Data:

EO Data: 21 March 2009: One plant community site of unknown quality grass species; Forb species are low quality; Exotic species are present; Woody cover is 51-75 percent.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:
Andropogon gerardii	Herb (field)	Y	Graminoid	SFID:25752
Bifora americana	Herb (field)	Y	Flowering forb	SFID:25752
Juniperus virginiana	Tree (canopy & subcanopy)	Y	Needle-leaved tree	SFID:25752
Schizachyrium scoparium	Herb (field)	Y	Graminoid	SFID:25752
Sorghastrum nutans	Herb (field)	Y	Graminoid	SFID:25752

Element Occurrence Record

Reference:

Citation:

Native Prairies Association of Texas. 2011. Tallgrass prairie survey project that includes shapefiles, excel files, documents, images, and protocol for multiple counties in Texas (2000-2013).

Specimen:

Element Occurrence Record

Scientific Name: Schizachyrium scoparium - Sorghastrum nutans - Andropogon gerardii - Bifora americana Vertisol Grassland

Occurrence #: 27 **Eo Id:** 11917

Common Name: Vertisol Blackland Prairie

Track Status: Track all extant and selected historical EOs

Identification Confirmed: Y - Yes

TX Protection Status:

Global Rank: G1G2 **State Rank:** SNR

Federal Status:

Location Information:

Directions

The site is located approximately 2.0 air miles northeast of Mesquite, and 7.5 air miles almost directly south of Rowlett, on the north side of U.S. Highway 80, in Samuell Mesquite Park. The directions were created by database staff.

Survey Information:

First Observation: 2009-03-21 **Survey Date:** 2009-03-21 **Last Observation:** 2009-03-21

Eo Type: **Eo Rank:** E **Eo Rank Date:** 2009-03-21

Observed Area:

Comments:

General Description: See the Composition Tab for other species within the area.

Comments:

Protection Comments:

Management Comments: 21 March 2009: Managers could potentially work with Dallas Parks and Recreation to manage this site as a prairie.

Data:

EO Data: 21 March 2009: One plant community site of high quality grass species; Forb species are low quality; Exotic species are present; Woody cover is 51-75 percent.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:
Andropogon gerardii	Herb (field)	Y	Graminoid	SFID:25755
Bifora americana	Herb (field)	Y	Flowering forb	SFID:25755
Juniperus virginiana	Tree (canopy & subcanopy)	Y	Needle-leaved tree	SFID:25755
Lupinus texensis	Herb (field)	N	Flowering forb	SFID:25755
Schizachyrium scoparium	Herb (field)	Y	Graminoid	SFID:25755
Sorghastrum nutans	Herb (field)	Y	Graminoid	SFID:25755

Element Occurrence Record

Reference:

Citation:

Native Prairies Association of Texas. 2011. Tallgrass prairie survey project that includes shapefiles, excel files, documents, images, and protocol for multiple counties in Texas (2000-2013).

Specimen:

Element Occurrence Record

Scientific Name: Schizachyrium scoparium - Sorghastrum nutans - Andropogon gerardii - Bifora americana Vertisol Grassland

Occurrence #: 28 **Eo Id:** 11918

Common Name: Vertisol Blackland Prairie

Track Status: Track all extant and selected historical EOs

Identification Confirmed: Y - Yes

TX Protection Status:

Global Rank: G1G2 **State Rank:** SNR

Federal Status:

Location Information:

Directions

The site is located approximately 3.5 air miles northwest of Seagoville, and 6.0 air miles almost directly south of Mesquite, surrounded by Seagoville Road to the north, South Belt Line Road to the west, and U.S. Highway 175/CF Hawn Freeway to the south. The directions were created by database staff.

Survey Information:

First Observation: 2009-03-21 **Survey Date:** 2009-03-21 **Last Observation:** 2009-03-21

Eo Type: **Eo Rank:** E **Eo Rank Date:** 2009-03-21

Observed Area:

Comments:

General Description: See the Composition Tab for other species within the area.

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: 21 March 2009: One plant community site of poor quality grass species; Forb species are low quality; Exotic species are present; Woody cover is 1-5 percent horticulture trees.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:
Andropogon gerardii	Herb (field)	Y	Graminoid	SFID:25754
Bifora americana	Herb (field)	Y	Flowering forb	SFID:25754
Schizachyrium scoparium	Herb (field)	Y	Graminoid	SFID:25754
Sorghastrum nutans	Herb (field)	Y	Graminoid	SFID:25754

Reference:

Element Occurrence Record

Citation:

Native Prairies Association of Texas. 2011. Tallgrass prairie survey project that includes shapefiles, excel files, documents, images, and protocol for multiple counties in Texas (2000-2013).

Specimen:

Element Occurrence Record

Scientific Name: Schizachyrium scoparium - Sorghastrum nutans - Andropogon gerardii - Bifora americana Vertisol Grassland

Occurrence #: 29 **Eo Id:** 11919

Common Name: Vertisol Blackland Prairie

Track Status: Track all extant and selected historical EOs

Identification Confirmed: Y - Yes

TX Protection Status:

Global Rank: G1G2 **State Rank:** SNR

Federal Status:

Location Information:

Directions

The site is located approximately 2.0 air miles southwest of Hutchins, and 2.5 air miles northeast of Lancaster, on the east side of Lancaster Hutchins Road. The directions were created by database staff.

Survey Information:

First Observation: 2009-03-14 **Survey Date:** 2009-03-14 **Last Observation:** 2009-03-14

Eo Type: **Eo Rank:** E **Eo Rank Date:** 2009-03-14

Observed Area:

Comments:

General Description: 14 March 2009: This site is noted as having a stream. See the Composition Tab for other species within the area.

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: 14 March 2009: One plant community site of poor quality grass species; Forb species are less than 5 percent medium quality, and in low abundance; Exotic species are present; Woody cover is 51-75 percent.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:
Andropogon gerardii	Herb (field)	Y	Graminoid	SFID:25753
Bifora americana	Herb (field)	Y	Flowering forb	SFID:25753
Bothriochloa laguroides	Herb (field)	Y	Graminoid	SFID:25753
Juniperus virginiana	Tree (canopy & subcanopy)	Y	Needle-leaved tree	SFID:25753
Nassella leucotricha	Herb (field)	Y	Graminoid	SFID:25753
Schizachyrium scoparium	Herb (field)	Y	Graminoid	SFID:25753
Sorghastrum nutans	Herb (field)	Y	Graminoid	SFID:25753

Element Occurrence Record

Reference:

Citation:

Native Prairies Association of Texas. 2011. Tallgrass prairie survey project that includes shapefiles, excel files, documents, images, and protocol for multiple counties in Texas (2000-2013).

Specimen:

Element Occurrence Record

Scientific Name: Schizachyrium scoparium-sorghastrum nutans series
Occurrence #: 11 **Eo Id:** 4573
Common Name: Little Bluestem-indiangrass Series
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G2 **State Rank:** S2
Federal Status:

Location Information:

Directions

AT JUNCTION OF FM 549 AND FM 205, TURN WEST 0.6 MILE; MEADOW IS ON WEST SIDE OF ROAD

Survey Information:

First Observation: 1984 **Survey Date:** 1984-06-27 **Last Observation:** 1984-06-27

Eo Type: **Eo Rank:** A **Eo Rank Date:**

Observed Area: 30.00

Comments:

General Description: EXCELLENT CONDITION PRAIRIE WITH A WOODED DRAIN AND PRAIRIE CORDGRASS; GOOD FORB COMPOSITION; WITH LITTLE BLUESTEM, BIG BLUESTEM, INDIANGRASS, TALL DROPSEED, GAMMAGRASS, SIDEOATS

Comments:

Protection Comments:

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

DIAMOND, D. D. 1984. FIELD SURVEY TO ROCKWALL COUNTY OF JUNE 27-28, 1984.

Specimen:

Element Occurrence Record

Scientific Name: Spilogale putorius **Occurrence #:** 5 **Eo Id:** 12604

Common Name: Eastern spotted skunk **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G4 **State Rank:** S4 **Federal Status:**

Location Information:

Directions

Multiple observations located throughout the Dallas/Fort Worth (DFW) Metroplex. Directions were created by database staff. The directions are generalized as this record consists of multiple observations.

Survey Information:

First Observation: 1950-10-12 **Survey Date:** 2015-03-20 **Last Observation:** 2015-03-20

Eo Type: **Eo Rank:** E **Eo Rank Date:** 2015-03-20

Observed Area:

Comments:

General Description: 20 March 2015: This observation was recorded in bottomland hardwoods.

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: 12 October 1950: Skin and skull of one male preserved specimen; 8 November 1959: One adult male preserved specimen; 28 July 1964: One preserved specimen of unknown sex and age; June 1967: One adult female preserved specimen; 15 March 1972: One adult male preserved specimen; 15 June 1973: One female preserved specimen; 20 March 2015: One eastern spotted skunk photo was captured by a Moultrie game camera at 5:16 a.m. The temperature was noted as 45 degrees Fahrenheit. The game camera was deployed on 16 February 2015, the batteries ran out on 15 May 2015, and the camera was picked up on 26 May 2015. Derek Broman, Texas Parks and Wildlife Department Urban Wildlife Biologist, confirmed the identification of the observation.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Element Occurrence Record

Citation:

Ferguson, Adam. 2014. Texas Skunk Record Database regarding five specices of skunk in Texas.

Barker, Alex W. 1995. Letter and printout of catalogue cards of April to Peggy Horner, Texas Parks and Wildlife Department, Conservation Scientist, regarding Vulpes velox, Vulpes macrotis, and Spilogale putorius interrupta from the Dallas Museum of Natural History in Fair Park, Dallas, TX.

Denkhaus, R. 2015. Email of 27 May to Derek Broman, Texas Parks and Wildlife Department Urban Wildlife Biologist, about an eastern spotted skunk at The Fort Worth Nature Center and Refuge, Fort Worth, TX.

Voss, William J. 1995. Letter of 7 April to Peggy Horner regarding specimens of swift and kit foxes, and spotted skunks, including scans of records, at the Fort Worth Museum of Science and History, Fort Worth, TX.

Specimen:

Dallas Museum of Natural History, Dallas, TX; unknown (#unknown), Catalog #MAM000052, 12 October 1950, DaMNH.

Fort Worth Museum of Science and History, Fort Worth, TX; J. M. Goode (#unknown), Catalog #6, 8 November 1959, FWMSH.

University of Texas at Arlington, Arlington, TX; unknown (#unknown), Catalog #1066, 15 March 1972, UTA

Fort Worth Museum of Science and History, Fort Worth, TX; Ted Klepper (#unknown), Catalog #95H-1830, June 1967, FWMSH.

Fort Worth Museum of Science and History, Fort Worth, TX; unknown (#unknown), Catalog #95H-1848, 15 June 1973, FWMSH.

Fort Worth Museum of Science and History, Fort Worth, TX; W. L. Pratt (#unknown), Catalog #95H-1824, 28 July 1964, FWMSH.

Element Occurrence Record

Scientific Name: Spilogale putorius **Occurrence #:** 35 **Eo Id:** 12797

Common Name: Eastern spotted skunk **Track Status:** Track all extant and selected historical EOs

Identification Confirmed: Y - Yes **TX Protection Status:**

Global Rank: G4 **State Rank:** S4 **Federal Status:**

Location Information:

Directions

The specimen label states that it was located at Wylie, NH. Watson Farm, Collin County, TX.

Survey Information:

First Observation: 1962-01-02 **Survey Date:** 1962-01-02 **Last Observation:** 1962-01-02

Eo Type: **Eo Rank:** H **Eo Rank Date:** 1962-01-02

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data: 2 January 1962: Skull of one male preserved specimen.

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Ferguson, Adam. 2014. Texas Skunk Record Database regarding five specices of skunk in Texas.

Barker, Alex W. 1995. Letter and printout of catalogue cards of April to Peggy Horner, Texas Parks and Wildlife Department, Conservation Scientist, regarding Vulpes velox, Vulpes macrotis, and Spilogale putorius interrupta from the Dallas Museum of Natural History in Fair Park, Dallas, TX.

Specimen:

Dallas Museum of Natural History, Dallas, TX; unknown (#unknown), Catalog #MAM000241, 2 January 1962, DaMNH.

Element Occurrence Record

Scientific Name: Thamnophis sirtalis annectens
Occurrence #: 19 **Eo Id:** 432
Common Name: Texas Garter Snake
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G5T4 **State Rank:** S1
Federal Status:

Location Information:

Directions

WHITE ROCK LAKE, NORTHEAST OF DALLAS

Survey Information:

First Observation: **Survey Date:** **Last Observation:** 1948-07-02

Eo Type: **Eo Rank:** H **Eo Rank Date:** 2006-12-07

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

CURTIS, L. 1948. SPECIMEN COLLECTION BCB 4643, 2 JULY 1948; BRYCE C. BROWN PRIVATE COLLECTION (NOW HOUSED AT STRECKER MUSEUM AT BAYLOR?).

Specimen:

Baylor University, Bryce C. Brown Collection. 1948. L. Curtis, Catalog # 4643 BCB. 2 July 1948.

CURTIS, L. 1948. SPECIMEN COLLECTION BCB 4643, 2 JULY 1948; BRYCE C. BROWN PRIVATE COLLECTION (NOW HOUSED AT STRECKER MUSEUM AT BAYLOR?). (S48CURSMTXUS)

Element Occurrence Record

Scientific Name: Thamnophis sirtalis annectens
Occurrence #: 20 **Eo Id:** 434
Common Name: Texas Garter Snake
Track Status: Track all extant and selected historical EOs
Identification Confirmed: Y - Yes
TX Protection Status:
Global Rank: G5T4 **State Rank:** S1
Federal Status:

Location Information:

Directions

LAKE DALLAS

Survey Information:

First Observation: **Survey Date:** **Last Observation:**

Eo Type: **Eo Rank:** U **Eo Rank Date:** 2006-12-12

Observed Area:

Comments:

General Description:

Comments:

Protection Comments:

Management Comments:

Data:

EO Data:

Community Information:

Scientific Name:	Stratum:	Dominant:	Lifeform:	Composition Note:

Reference:

Citation:

Kirby, H. (s.n.). No date. Specimen No. 4644 BCB.

Specimen:

Baylor University, Bryce C. Brown Collection at Strecker Museum. No Date. H. Kirby, Catalog # 4644 BCB, SM.

Kirby, H. (s.n.). No date. Specimen No. 4644 BCB. (S??KIRXXTXUS)

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TEXAS BLACKLAND PRAIRIES SPECIES OF GREATEST CONSERVATION NEED

Note: Other ecoregions are included in this ecoregion's list for cross-reference and coordination on conservation actions as needed

Scientific Name	Common Name	Status Federal	Status State	Abundance Ranking Global	Abundance Ranking State	TBPR	ECPL	CHIH - AZNM	HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM Upper	GCPM Mid	GCPM lower	STPL	General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
MAMMALS																			W.B. Davis and D.J. Schmidly. 1997 and 1994. Mammals of Texas (online and in print). Texas Tech University (1997) and Texas Parks and Wildlife Department (1994). http://www.nsrl.ttu.edu/tmot1/Default.htm (accessed 2011)		
Blarina hylophaga plumblea	Elliot's short-tailed shrew			G5T1Q	S1	TBPR	ECPL								GCPM-UP	GCPM-MID			Savanna/Open Woodland		N
Geomys attwateri	Attwater's pocket gopher			G4	S4	TBPR	ECPL								GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Shrubland		Y
Lutra canadensis	River otter			G5	S4	TBPR	ECPL				WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID			Riparian	Appendix II, CITES	N
Mustela frenata	Long-tailed weasel			G5	S5	TBPR	ECPL	CHIH	HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Forest, Woodland, Desert Scrub, Shrubland, Savanna/Open Woodland	Statewide	N
Myotis austroriparius	Southeastern myotis			G3G4	S3	TBPR	ECPL				WGCP				GCPM-UP				Caves/Karst, Forest, Riparian		N
Myotis velifer	Cave myotis			G5	S4	TBPR	ECPL	CHIH	HIPL	SWTB		CRTB	CGPL	EDPT				STPL	Caves/Karst,		N
Puma concolor	Mountain lion			G5	S2	TBPR	ECPL	CHIH	HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	(GCPM-LWR)	STPL	Forest, Woodland, Desert Scrub, Shrubland, Savanna/Open Woodland, Riparian	Statewide	N
Spilogale putorius	Eastern spotted skunk			G4T	S4	TBPR	ECPL		HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Savanna/Open Woodland, Grassland		N
Sylvilagus aquaticus	Swamp rabbit			G5	S5	TBPR	ECPL				WGCP	CRTB		EDPT	GCPM-UP	GCPM-MID			Riparian, Freshwater Wetland		N
Tadarida brasiliensis	Brazilian free-tailed bat			G5	S5	TBPR	ECPL	CHIH	HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	(GCPM-LWR)	STPL	Cave/Karst, Artificial Refugia	Statewide	N
Taxidea taxus	American badger			G5	S5	TBPR	ECPL	CHIH	HIPL	SWTB		CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Grassland, Desert scrub, Woodland, Savanna/Open Woodland, Forest		N
Ursus americanus	Black bear	SAT	T	G5	S3	TBPR	ECPL	CHIH						EDPT					Forest, Woodland, Savanna/Open Woodland, Desert Scrub, Shrubland	see also Louisiana black bear; may overlap with Louisiana black bear in TBPR, ECPL	N
BIRDS																			The Birds of North America Online (A. Poole, Ed.). 2005 (with current updates by species). Retrieved from The Birds of North America Online database: http://bna.birds.cornell.edu/BNA/ (accessed 2011). Supported by information from the Cornell Lab of Ornithology and the American Ornithologists' Union (http://www.aou.org/).		BIRDS ONLY: instead of endemism these numbers are for taxonomic sorting
Anas acuta	Northern Pintail			G5	S3B,S5N	TBPR	ECPL		HIPL	SWTB	WGCP	CRTB	CGPL		GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Lacustrine, freshwater wetland, saltwater wetland, coastal, marine	Winter	2
Colinus virginianus	Northern Bobwhite			G5	S4B	TBPR	ECPL	CHIH	HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Grassland, Shrubland, Savanna/Open Woodland	deleted for CHIH	4
Tympanuchus cupido	Greater Prairie-Chicken (Interior)			G4	S1B	TBPR						CRTB							Grassland	Year-round	6
Meleagris gallopavo	Wild Turkey			G5	S5B	TBPR	ECPL	CHIH		SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Shrubland, Savanna/Open Woodland, Forest, Riparian, Agricultural	Year-round, added ***merriami*** for CHIH	8
Ixobrychus exilis	Least Bittern			G5	S4B	TBPR	ECPL				WGCP				GCPM-UP	GCPM-MID	GCPM-LWR		Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary	Breeding	11
Egretta thula	Snowy Egret			G5	S5B	TBPR	ECPL				WGCP	CRTB			GCPM-UP	GCPM-MID	GCPM-LWR		Riparian, Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Cultural Aquatic	Breeding	12
Egretta caerulea	Little Blue Heron			G5	S5B	TBPR	ECPL				WGCP	CRTB			GCPM-UP	GCPM-MID	GCPM-LWR		Riparian, Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Cultural Aquatic	Breeding	13
Butorides virescens	Green Heron			G5	S5B	TBPR	ECPL				WGCP	CRTB			GCPM-UP	GCPM-MID	GCPM-LWR		Riparian, Riverine, Lacustrine, Freshwater Wetland, Cultural Aquatic	Breeding	16
Mycteria americana	Wood Stork		T	G4	SHB,S2N	TBPR	ECPL				WGCP				GCPM-UP	GCPM-MID	GCPM-LWR		Riverine, Freshwater wetland	Migrant	18
Ictinia mississippiensis	Mississippi Kite			G5	S4B	TBPR	(ECPL)		HIPL	SWTB	WGCP	CRTB	CGPL		GCPM-UP	GCPM-MID	GCPM-LWR		Woodland, Forest, Riparian, Developed:Urban/Suburban/Rural	Breeding	20
Haliaeetus leucocephalus	Bald Eagle			G5	S3B,S3N	TBPR	ECPL				WGCP	CRTB	CGPL		GCPM-UP	GCPM-MID	GCPM-LWR		Riparian, Lacustrine, Freshwater Wetland, Saltwater Wetland	Year-round, added CRTB	22
Circus cyaneus	Northern Harrier			G5	S2B,S3N	TBPR	ECPL	CHIH	HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Grassland, Shrubland	Year-round	23
Buteo lineatus	Red-shouldered Hawk			G5	S4B	TBPR	ECPL				WGCP	CRTB		EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Woodland, Forest, Riparian, Freshwater Wetland	Year-round	26
Pluvialis dominica	American Golden-Plover			G5	S3	TBPR	ECPL				WGCP	CRTB	CGPL		GCPM-UP	GCPM-MID	GCPM-LWR		Grassland, Freshwater Wetland, Agricultural	Migrant	39
Charadrius montanus	Mountain Plover	PT		G3	S2	TBPR		CHIH	HIPL							GCPM-MID		STPL	Agricultural, Grassland	Winter	43
Scolopax minor	American Woodcock			G5	S2B,S3N	TBPR	ECPL				WGCP				GCPM-UP	GCPM-MID	GCPM-LWR		Woodland, Forest, Riparian	Winter (some breeding during that time)	51
Sternula antillarum	Least Tern	LE*	E*	G4	S3B	TBPR	ECPL			SWTB		CRTB	CGPL					STPL	Industrial	Year-round; subspecies ***athalassos***	54
Asio flammeus	Short-eared Owl			G5	S4N	TBPR	ECPL		HIPL	SWTB		CRTB	CGPL		GCPM-UP	GCPM-MID	GCPM-LWR		Grassland, Shrubland, Agricultural	Winter	65
Caprimulgus carolinensis	Chuck-will's-widow			G5	S3S4B	TBPR	ECPL			SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID			Woodland, Forest, Riparian	Breeding	66
Melanerpes erythrocephalus	Red-headed Woodpecker			G5	S3B	TBPR	ECPL			SWTB	WGCP	CRTB	CGPL						Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Year-round	67
Dryocopus pileatus	Pileated Woodpecker			G5	S4B	TBPR	ECPL				WGCP				GCPM-UP	GCPM-MID			Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Year-round	69
Tyrannus forficatus	Scissor-tailed Flycatcher			G5	S3B	TBPR	ECPL	CHIH	HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Desert Scrub, Grassland, Shrubland, Agricultural, Developed	Breeding	71
Lanius ludovicianus	Loggerhead Shrike			G4	S4B	TBPR	ECPL	CHIH	HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Desert Scrub, Grassland, Shrubland, Savanna/Open Woodland, Agricultural, Developed	Year-round	73
Vireo bellii	Bell's Vireo			G5	S3B	TBPR	ECPL	CHIH		SWTB		CRTB		EDPT				STPL	Desert scrub, Shrubland, Riparian	Breeding	74
Poecile carolinensis	Carolina Chickadee			G5	S5B	TBPR	ECPL			SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID			Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Year-round	76
Thryomanes bewickii (bewickii)	Bewick's Wren			G5	S5B	TBPR	ECPL				WGCP				GCPM-UP	GCPM-MID			Shrubland, Savanna/Open Woodland, Woodland, Developed: Urban/Suburban/Rural	Year-round, red-backed form only	77
Cistothorus platensis	Sedge Wren			G5	S4	TBPR	ECPL				WGCP				GCPM-UP	GCPM-MID			Grassland, Freshwater Wetland	Winter	78
Hylocichla mustelina	Wood Thrush			G5	S4B	TBPR	ECPL				WGCP				GCPM-UP				Woodland, Forest, Riparian	Breeding	79
Anthus spragueii	Sprague's Pipit	C		G4	S3N	TBPR	ECPL					CRTB	CGPL	EDPT		GCPM-MID	GCPM-LWR	STPL	Barren/Sparse Vegetation, Grassland, Shrubland, Agricultural	Winter	80
Dendroica dominica	Yellow-throated Warbler			G5	S4B	TBPR	ECPL				WGCP			EDPT	GCPM-UP				Woodland, Forest, Riparian	Breeding	84
Protonotaria citrea	Prothonotary Warbler			G5	S3B	TBPR	ECPL				WGCP				GCPM-UP	GCPM-MID			Woodland, Forest, Riparian, Lacustrine, Freshwater Wetland	Breeding	86
Limnothlypis swainsonii	Swainson's Warbler			G4	S3B	TBPR	ECPL				WGCP				GCPM-UP	GCPM-MID			Woodland, Forest, Riparian	Breeding	88
Seiurus motacilla	Louisiana Waterthrush			G5	S3B	TBPR	ECPL				WGCP			EDPT	GCPM-UP	GCPM-MID			Woodland, Forest, Riparian	Breeding	89
Oporornis formosus	Kentucky Warbler			G5	S3B	TBPR	ECPL				WGCP								Woodland, Forest	Breeding	90
Spizella pusilla	Field Sparrow			G5	S5B	TBPR	ECPL		HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Grassland, Shrubland, Savanna/Open Woodland	Year-round	96
Ammodramus savannarum	Grasshopper Sparrow			G5	S3B	TBPR	ECPL	CHIH	HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Grassland, Agricultural	Year-round	97
Chondestes grammacus	Lark Sparrow			G5	S4B	TBPR	ECPL	CHIH	HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Grassland, Shrubland, Savanna/Open Woodland	Year-round	98
Ammodramus henslowii	Henslow's Sparrow			G4	S2S3N,SXB	TBPR	ECPL				WGCP				GCPM-UP	GCPM-MID			Grassland, Savanna/Open Woodland	Winter	100
Ammodramus leconteii	Le Conte's Sparrow					TBPR	ECPL				WGCP	CRTB		EDPT	GCPM-UP	GCPM-MID	GCPM-LWR		Grassland	Winter	101
Zonotrichia querula	Harris's Sparrow			G5	S4	TBPR	ECPL			SWTB		CRTB	CGPL	EDPT		GCPM-MID			Shrubland, Agricultural	Winter	103
Calcarius mccownii	McCown's Longspur			G4	S4	TBPR	ECPL	CHIH	HIPL	SWTB		CRTB	CGPL						Grassland, Agricultural	Winter, TBPR (northern), ECPL (northern)	104
Calcarius pictus	Smith's Longspur					TBPR	ECPL												Grassland, Agricultural	Winter	105
Piranga rubra	Summer Tanager			G5	S5B	TBPR	ECPL	CHIH			WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Breeding	106
Passerina ciris	Painted Bunting			G5	S4B	TBPR	ECPL	CHIH		SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Shrubland, Agricultural	Breeding	107
Spiza americana	Dickcissel			G5	S4B	TBPR	ECPL		HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Grassland, Agricultural	Breeding	108
Sturnella magna	Eastern Meadowlark			G5	S5B	TBPR	ECPL	CHIH	HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Grassland, Shrubland, Savanna/Open Woodland	Year-round; subspecies ***lilliana*** added for CHIH	109
Euphagus carolinus	Rusty Blackbird			G4	S3	TBPR	ECPL				WGCP				GCPM-UP	GCPM-MID			Woodland, Forest, Riparian, Lacustrine, Freshwater Wetland	Winter	110
Icterus spurius	Orchard Oriole			G5	S4B	TBPR	ECPL	CHIH	HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Shrubland, Savanna/Open Woodland, Woodland, Riparian	Breeding	111
REPTILES AND AMPHIBIANS																			J.E. Werler and J.R. Dixon. 2000. Texas Snakes: Identification, Distribution, and Natural History. University of Texas Press, Austin. 519 pgs. J.R. Dixon. 1987. Amphibians and Reptiles of Texas. Texas A&M University Press, College Station. 434 pp.		
Anaxyrus (Bufo) woodhousii	Woodhouse's toad			G5	SU	TBPR	ECPL	CHIH	HIPL	SWTB		CRTB	CGPL	EDPT					woodland, forest, freshwater wetland		N
Apalone mutica	smooth softshell turtle					TBPR	ECPL		HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP				riparian, riverine, lacustrine, freshwater wetland	added	N
Apalone spinifera	spiny softshell turtle					TBPR	ECPL	CHIH	HIPL	SWTB	WGCP		CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	riparian, riverine, lacustrine, freshwater wetland	added, not AZNM	N
Cheylydra serpentina	Common snapping turtle					TBPR	ECPL	CHIH	HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID		STPL	riparina, riverine	added	N
Crotalus atrox	Western diamondback rattlesnake				S4	TBPR	ECPL	CHIH	HIPL	SWTB		CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	barren/sparse vegetation, desert scrub, grassland, shrubland, savanna, woodland, caves/karst		N
Crotalus horridus	Timber (Canebrake) Rattlesnake		T	G4	S4	TBPR	ECPL				WGCP	CRTB			GCPM-UP	GCPM-MID			woodland, forest, riparian		N
Graptemys caglei	Cagle's map turtle		T	G3	S1	TBPR	ECPL							EDPT					riparian, riverine		Y
Graptemys versa	Texas map turtle			G4	SU	TBPR						CRTB	CGPL	EDPT					riparian, riverine		Y
Heterodon nasicus	Western hognosed snake					TBPR	ECPL	CHIH	HIPL	SWTB		CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	desert scrub, grassland, shrubland	added	N
Macrochelys temminckii	alligator snapping turtle		T	G3G4	S3	TBPR	ECPL				WGCP	CRTB	CGPL		GCPM-UP	GCPM-MID			riparian, riverine, cultural aquatic	added	N
Ophisaurus attenuatus	western slender glass lizard					TBPR	ECPL				WGCP		CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR		grassland, savanna	added	N
Phrynosoma cornutum	Texas horned lizard		T	G4G5	S4	TBPR	ECPL	CHIH	HIPL	SWTB		CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	desert scrub, grassland, savanna		N
Pseudacris streckeri	Strecker's Chorus Frog			G5	S3	TBPR	ECPL				WGCP	CRTB		EDPT	GCPM-UP	GCPM-MID	GCPM-LWR		grassland, savanna, woodland, riparian, cultural aquatic, freshwater wetland		N
Sistrurus catenatus	massasauga					TBPR		CHIH	HIPL	SWTB		CRTB	CGPL	EDPT		GCPM-MID	GCPM-LWR	STPL	grassland, barren/sparse vegetation, shrubland, coastal,	added	N
Terrapene carolina	Eastern box turtle			G5	S3	TBPR	ECPL				WGCP			EDPT	GCPM-UP	GCPM-MID	GCPM-LWR		grasslands, savanna, woodland		N
Terrapene ornata	Ornate box turtle			G5	S3	TBPR	ECPL	CHIH	HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	grassland, barren/sparse vegetation, deset scrub, savanna, woodland		N
Thamnophis sirtalis annectans	Texas Garter Snake (Eastern/Texas/ New Mexico)			G5	S2	TBPR	ECPL			SWTB		CRTB	CGPL	EDPT					riparian, around lacustrine and cultural aquatic sites		Y
Trachemys scripta	Red-eared slider					TBPR	ECPL	CHIH	HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	riparian, riverine, lacustrine, freshwater wetland, cultural aquatic	added	N
FRESHWATER FISHES																			C. Thomas, T.H. Bonner and B.G. Whiteside. 2007. Freshwater Fishes of Texas: A Field Guide. Sponsored by The River Systems Institute at Texas State University, published by Texas A&M University Press. *Editor's Note: All freshwater fishes life history information in this table was sourced directly from the online version; citations are embedded in the online version at http://www.bio.txstate.edu/~tbonner/txfishes/*	Range in Texas, as known	
Anguilla rostrata	American eel			G4	S5	TBPR	ECPL	CHIH			WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	streams and reservoirs in drainages connected to marine environments	the mouth upstream to and including the Kiamichi River), Sabine Lake (including minor	N
Atractosteus spatula	alligator gar					TBPR	ECPL	CHIH			WGCP				GCPM-UP	GCPM-MID	GCPM-LWR	STPL	channel snag, pool-snag complex, pool-edge, and pool-vegetation habitat	(including minor coastal drainages west to Galveston Bay), Galveston Bay (including	N

Scientific Name	Common Name	Status		Abundance Ranking		TBPR	ECPL	CHIH - AZNM	HIPL	SWTB	WGCP	CRTB	CGPL	EDPT	GCPM Upper	GCPM Mid	GCPM lower	STPL	General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
		Federal	State	Global	State		Note: Other ecoregions are included in this ecoregion's list for cross-reference and coordination on conservation actions as needed														
Cycleptus elongatus	Blue sucker		T	G3G4	S3	TBPR	ECPL				WGCP	CRTB			GCPM-UP	GCPM-MID			large, deep rivers, and deeper zones of lakes	(including minor coastal drainages west to Galveston Bay), Galveston Bay (including	N
Etheostoma fonticola	Fountain darter	LE	E	G1	S1	TBPR													usually in dense beds of *Vallisneria, Elodia, Ludwigia* and other aquatic plants; substrate normally mucky	unit	Y
Macryhbopsis storeriana	Silver chub					TBPR	ECPL					CRTB	CGPL						common over silt or mud, turbid water with very soft sand/silt substrate	from other populations of this species, which range through the Mississippi River Basin	N
Micropterus treculii	Guadalupe bass			G3	S3	TBPR						CRTB		EDPT		GCPM-MID			small lentic environments; commonly taken in flowing water	portions of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also	Y
Notropis atrocaudalis	Blackspot shiner					TBPR	ECPL				WGCP				GCPM-UP	GCPM-MID	GCPM-LWR		backwater and swiftest currents	(including minor coastal drainages west to Galveston Bay), Galveston Bay (including	N
Notropis bairdi	Red River shiner					TBPR	ECPL				WGCP	CRTB	CGPL						streambeds with widely fluctuating flows subject to high summer temperatures, high rates of evaporation,	Red River, from the mouth upstream to and including the Kiamichi River	N
Notropis buccula	Small eye shiner	C		G2Q	S2	TBPR	ECPL												broad condition tolerances (turbidity, salinity, oxygen).	Brazos River; historically as far south as Hempstead (Waller County)	Y
Notropis chalybaeus	Ironcolor shiner					TBPR	ECPL				WGCP								Plain streams and rivers of low to moderate gradient; often at the upstream ends of pools, with a moderate	(including minor coastal drainages west to Galveston Bay), San Antonio Bay (including	N
Notropis oxyrhynchus	Sharpnose shiner	C		G3	S3	TBPR	ECPL			SWTB		CRTB	CGPL						Moderate current velocities and depths, sand bottom	captured into the Red River drainage; introduced in Colorado River drainage	Y
Notropis potteri	Chub shiner		T	G4	S3	TBPR	ECPL			SWTB	WGCP	CRTB	CGPL						turbid, flowing water with silt or sand substrate; tolerant of high salinities	Brazos River, Colorado River, San Jacinto River, Trinity Rivers, and Galveston Bay	N
Notropis shumardi	Silverband shiner					TBPR	ECPL				WGCP				GCPM-UP	GCPM-MID	GCPM-LWR		channel with moderate to swift current velocities and moderate to deep depths; associated with turbid	(including minor coastal drainages west to Galveston Bay), Galveston Bay (including	N
Percina apristis	Guadalupe darter					TBPR	ECPL							EDPT		GCPM-MID			collections from the clearest waters tributary to the Guadalupe, namely spring heads and the main river	absent from the headwaters of the Blanco and the entirety of the San Antonio River	Y
Polyodon spathula	Paddlefish		T	G4	S3	TBPR	ECPL				WGCP	CRTB			GCPM-UP				sized rivers, sluggish pools, backwaters, bayous, and oxbows with abundant zooplankton; large reservoirs if	eastward; currently only Red River, from the mouth upstream to and including the	N
Satan eurystomus	Widemouth blindcat		T	G1	S1	TBPR													Karst: Subterranean waters	(Edwards Limestone, Lower Cretaceous) in the vicinity of San Antonio (Bexar County)	Y
Trogloglanis pattersoni	Toothless blindcat		T	G1	S1	TBPR													Karst: Subterranean waters	(Edwards Limestone, Lower Cretaceous) in the vicinity of San Antonio (Bexar County)	Y
INVERTEBRATES																			www.bugguide.net – good tool for identification and taxonomic information. www.texasento.net – compilation of information on insects in Texas www.odonatacentral.org – resource for identification and distribution of damselflies and dragonflies www.butterfliesandmoths.org – resource for identification and distribution of Lepidoptera www.texasmussels.wordpress.com – resource for information on freshwater mussels in Texas Howells, R. G., R. W. Neck and H. D. Murray. 1996. Freshwater Mussels of Texas. Texas Parks and Wildlife Press, Austin.		
Bombus pensylvanicus	American bumblebee			GU	SU*	TBPR	ECPL		HIPL		WGCP	CRTB	CGPL	EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Grassland, Savanna/Open Woodland	Terrestrial - Insect - Bee/Wasp/Ant	
Chimarra holzenthali	Holzenthal's Philopotamid caddisfly			G1G2	S1	TBPR	ECPL				WGCP								Riparian, Riverine	Aquatic - Insects - Caddisflies; added TBPR, ECPL	
Cotinis boylei	A scarab beetle			G2*	S2*	TBPR	ECPL								GCPM-UP	GCPM-MID	GCPM-LWR		Grassland, Shrubland, Woodland	Terrestrial - Insect - Beetles	
Nicrophorus americanus	American Burying Beetle	LE		G1	S1	TBPR													Grassland, Savanna/Open Woodland	Terrestrial - Insect - Beetles	
Potamilus amphichaenus	Texas heelsplitter		T	G1G2	S1	TBPR	ECPL				WGCP	CRTB							Riverine	Aquatic - Freshwater - Mollusks; new state rank and threatened state status	
Procambarus regalis	Regal burrowing crayfish			G2G3	S2?*	TBPR													Freshwater Wetland, Grassland	Aquatic - Crustaceans - Crayfish	
Procambarus steigmani	Parkhill prairie crayfish			G1G2	S1S2*	TBPR													Freshwater Wetland, Grassland	Aquatic - Crustaceans - Crayfish	
Pseudocentroptiloides morihari	A mayfly			G2G3	S2?*	TBPR													Riverine, Riparian	Aquatic - Insects - Mayflies	
Sphinx eremitoides	Sage sphinx			G1G2	S1?*	TBPR		CHIH						EDPT					Grassland	Terrestrial - Insect - Butterflies/Moths	
Susperatus tonkawa	A mayfly			G1	S1*	TBPR	ECPL												Riparian, Riverine	Aquatic - Insects - Mayflies	
PLANTS																			J.M. Poole, W.R. Carr, D.M. Price and J.R. Singhurst. 2007. Rare Plants of Texas. Texas A&M University Press, College Station. D.S. Correll and M.C Johnston. 1979. Manual of the Vascular Plants of Texas. The University of Texas at Dallas, Richardson. M.C. Johnston. 1990. The Vascular Plants of Texas: A List Up-dating the Manual of the Vascular Plants of Texas, 2nd Edition. Marshall C. Johnston, Austin. F.W. Gould. 1975. The Grasses of Texas. Texas A & M University Press, College Station. S.D. Jones, J.K. Wipff, and P.M. Montgomery. 1997. Vascular Plants of Texas: A Comprehensive Checklist including Synonymy; Bibliography, and Index. University of Texas Press, Austin. R.A. Vines. 2004. Trees, Shrubs and Woody Vines of the Southwest. Blackburn Press.		
Agalinis densiflora	Osage Plains false foxglove			G3	S2	TBPR						CRTB	CGPL	EDPT					Savanna/Open Woodland - Outcrops	Terrestrial	N
Astragalus reflexus	Texas milk vetch			G3	S3	TBPR					WGCP			EDPT				STPL	Savanna/Open Woodland	Terrestrial	Y
Calopogon oklahomensis	Oklahoma grass pink			G3	S1S2	TBPR	ECPL				WGCP				GCPM-UP				Savanna/Open Woodland; Grassland; Freshwater Wetland	Terrestrial	N
Carex edwardsiana	canyon sedge			G3G4S3S4	S3S4	TBPR						CRTB		EDPT					Woodland (slopes above Riparian)	Wetland	Y
Carex shinnersii	Shinner's sedge			G3?	S2	TBPR	ECPL					CRTB							Grassland	Wetland	N
Crataegus dallasiana	Dallas hawthorn			G3Q	S3	TBPR													Riparian (creeks in the Blackland Prairie)	Terrestrial	Y
Cuscuta exaltata	tree dodder			G3	S3	TBPR	ECPL					CRTB		EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Woodland	Terrestrial	N
Dalea hallii	Hall's prairie-clover			G3	S3	TBPR								EDPT					Savanna/Open Woodland; Grassland	Terrestrial	Y
Echinacea atrorubens	Topeka purple-coneflower			G3	S3	TBPR					WGCP	CRTB			GCPM-UP	GCPM-MID	GCPM-LWR		Savanna/Open Woodland	Terrestrial	N
Hexalectris nitida	Glass Mountains coral-root			G3	S3	TBPR		CHIH				CRTB		EDPT					Woodland	Terrestrial	N
Hexalectris warnockii	Warnock's coral-root			G2G3	S2	TBPR		CHIH						EDPT					Woodland	Terrestrial	N
Hymenoxys pygmea	Pygmy prairie dawn			G1	S1	?	?												Barren/Sparse Vegetation with Grassland matrix (saline prairie)	currently being described	Y
Liatris glandulosa	glandular gay-feather			G3	S3	TBPR						CRTB							Savanna/Open Woodland	Terrestrial	Y
Paronychia setacea	bristle nailwort			G3	S3	TBPR	ECPL				WGCP				GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Savanna/Open Woodland	Terrestrial	Y
Phlox oklahomensis	Oklahoma phlox			G3	SH	TBPR													Savanna/Open Woodland	Terrestrial	N
Physaria engelmannii	Engelmann's bladderpod			G3	S3	TBPR	ECPL					CRTB	CGPL	EDPT					Savanna/Open Woodland	Terrestrial	Y
Polygonella parksii	Parks' jointweed			G2	S2	TBPR	ECPL												Savanna/Open Woodland (sandhills); Grassland	Terrestrial	Y
Prunus texana	Texas peachbush			G3G4	S3S4	TBPR	ECPL							EDPT	GCPM-UP	GCPM-MID	GCPM-LWR	STPL	Savanna/Open Woodland; Grassland	Terrestrial	Y
Thalictrum texanum	Texas meadow-rue			G2	S2	TBPR	ECPL								GCPM-UP	GCPM-MID	GCPM-LWR		Savanna/Open Woodland; Riparian (bottomland forest)	Terrestrial	Y
Zizania texana	Texas wild rice	LE	E	G1	S1	TBPR								EDPT					Riverine (spring-fed, clear, thermally constant, moderate current, sand to gravel substrate)	Aquatic	Y

Species of Greatest Conservation Need List

2010 Census Urban Area Map

November 18, 2016

1:107,032

0 0.75 1.5 3 mi

0 1.5 3 6 km

2010 Census Urbanized Areas		2010 Census Urbanized Areas
2010 Census Urban Clusters		2010 Census Urban Clusters
States		States
Counties		Counties

Source: U.S. Census Bureau https://tigerweb.geo.census.gov/tigerweb/
Sources: Esri, USGS, NOAA

IH 635 from US 75 to IH 30
Dallas County, Texas
CSJs: 2374-01-137, 2374-01-180, 2374-01-183, 2374-02-053, & 2374-02-144

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