EXECUTIVE SUMMARY

Introduction

The Trans-Texas Corridor (TTC) is a proposed multi-use, statewide network of transportation routes in Texas that would incorporate existing and new highways, railways and utility rights-of-way (ROW). This summary provides an overview of the process used to evaluate alternatives for the TTC corridor that will run from Oklahoma to Mexico and/or the Texas Gulf Coast Corridor (TTC-35). As envisioned, TTC-35 would include separate lanes for passenger vehicles and large trucks, freight railways, high-speed commuter railways, and a corridor for utilities including water lines, oil and natural gas pipelines, and transmission lines for electricity, broadband and other telecommunications services.

Plans call for TTC-35 to be completed in phases over the next 50 years with facilities prioritized according to Texas’ transportation needs. The Texas Department of Transportation (TxDOT) will oversee planning, construction and ongoing maintenance of TTC-35, although private vendors may be responsible for much of the daily operations.

This Draft Environmental Impact Statement (DEIS) has been prepared pursuant to the National Environmental Policy Act (NEPA), and in compliance with the NEPA regulations issued by the Council on Environmental Quality (CEQ) (40 CFR Part 1500-1508) and by the FHWA (23 CFR Part 771). The CEQ (40 CFR 1508.28) and FHWA regulations allow NEPA studies for large, complex projects to be carried out in a two-stage or tiered process. This tiered approach to transportation decision-making under NEPA involves the preparation of a first (Tier One) NEPA document that makes a decision at a broader level. As stated in 40 CFR1508.28 regarding tiering:

*Agencies are encouraged to tier their environmental impact statements to eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision at each level of environmental review.*

At the Tier One level, broad issues are addressed, while taking into account the full range of potential effects to both the human and natural environments. After the broad issues are assessed in Tier One, the focus would shift to Tier Two environmental studies (NEPA documents) and to issues associated with a more exact determination of effects and the avoidance and mitigation of adverse effects. The difference in focus is one of degree.

The information presented in this Executive Summary is discussed in more detail in the TTC-35 Tier One DEIS.

What is the decision to be made in the Tier One Environmental Impact Statement?

The purpose of the Tier One EIS is to select a preferred alternative for the proposed TTC-35 project at a corridor level of analysis. Alternatives analyzed in detail in this document include twelve corridor alternatives and a No Action Alternative. The level of detail in this DEIS reflects the broad nature of the decision to be made through the Tier One environmental process. Approval of this Tier One NEPA document would not establish a specific route for the proposed TTC-35 nor authorize any construction-related activities.
What is the Trans-Texas Corridor?
In June 2002, TxDOT introduced the TTC system concept and vision in the “Crossroads of the Americas: Trans Texas Corridor Plan” (the “Plan”). As described in the Plan, the TTC system is a proposed 4,000-mile network of transportation facilities within the State of Texas.

What is the TTC-35 project?
The TTC-35 project as currently envisioned would:

- be a transportation corridor extending from the Texas/Oklahoma state line (north of the Dallas-Fort Worth metropolitan area), through central Texas, and to the Texas/Mexico border and/or the Texas Gulf Coast;
- generally parallel existing Interstate Highway 35 (I-35) for much of its length, and possibly portions of I-37, and proposed I-69; and
- be up to 1,200 feet wide (at full build-out) with separate lanes for passenger vehicles (three in each direction) and trucks (two in each direction), six rail lines (separate lines in each direction for high-speed rail, commuter rail, and freight rail), and a 200-foot wide utility corridor.

Why is the TTC-35 project needed?
TTC-35 is needed in order to:

- accommodate projected population growth and subsequent traffic demand:
  - the population is projected to reach more than 19.5 million by the year 2030; and
  - growth of approximately 145 percent is expected to occur in the study area between 2000 and 2060.
- facilitate traffic congestion management:
  - current traffic volumes for most segments of I-35 exceed design capacity; and
  - demands being placed on the highways and railroads are far out-pacing new build plans.
- accommodate increasing freight volumes:
  - estimates conducted by the Statewide Analysis Model (SAM) indicate an expected increase of 132 percent in the number of freight vehicles on Texas roads by 2025;
  - estimates for 2060 indicate a nearly 403 percent increase over the 1998 levels in the number of freight vehicles on Texas roads daily; and
  - approximately 20 to 38 percent of the current traffic on I-35 is freight.

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2 TxDOT uses the SAM modeling for all of its statewide travel demand modeling. SAM is capable of providing estimates of vehicle movement, including those carrying freight and commodities, into and out of Texas, through Texas, and within regions of Texas.
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- **provide transportation modal options:**
  - increased population, increased freight traffic, increasingly inadequate highway capacity and accompanying congestion compound the need for additional modal options; and
  - provide additional passenger travel options including high-speed and commuter rail, in addition to improved modal options for freight including dedicated truck lanes and additional freight rail capacity.

- **improve safety:**
  - between 1993 and 2003, 2,895 people died in crashes on Texas interstates. Of those people, 691 people died in 611 crashes involving fatalities on I-35 alone;
  - 25 percent of fatal accidents on I-35 involve large trucks. The splitting of automobiles and trucks into separate roadways would eliminate auto/truck conflicts and reduce the number of accidents;
  - the inclusion of rail may reduce both the number of passenger vehicles and the number of trucks on Texas Interstates, reducing the number of accidents; and
  - create alternate routes for hazardous materials around heavily populated urban areas.

- **enhance economic vitality:**
  - approximately 75 percent of America’s commerce with Mexico travels through Texas. Increased access and mobility within the study area would improve the movement of people, goods, and services and potentially lead to new employment and business opportunities.

What is the purpose of the TTC-35 project?
The purpose of TTC-35 is: To improve the international, interstate, and intrastate movement of goods and people; address the anticipated transportation needs of Texas from the Texas/Oklahoma state line to the Texas/Mexico border and/or Texas Gulf Coast along the I-35 corridor for the next 20 to 50 years; and, sustain and enhance the economic vitality of the State of Texas.

These purposes would be met in such a way as to comply with authorizing legislation in an environmentally sensitive manner, and to comply with all applicable federal and state laws and regulations.

What would the TTC-35 project look like?
A generalized illustration of the TTC-35 concept is presented in Figure ES-1. The figure conceptually illustrates all of the transportation modal facilities occurring within a single 1,200-foot wide right-of-way as envisioned in the Plan. However, TTC-35 would not be constructed all at once. Instead, each modal facility (rail lines, truck lanes, and/or vehicle lanes) would be constructed based on meeting specific transportation needs.
What are the logical termini for TTC-35?
The Tier One DEIS considered logical termini\(^3\) and operating segments for TTC-35 as appropriate at a corridor level of analysis. As envisioned in the Plan, TTC-35 is a State of Texas initiative that extends from the Texas/Oklahoma state line, north of the Dallas-Fort Worth metropolitan area, through Central Texas, to the Texas/Mexico border and/or the Texas Gulf Coast. The Tier One DEIS evaluates corridor alternatives and not facility alignments. At the corridor level it is not possible to identify alignment-specific logical termini and connections to infrastructure because an alignment has not been proposed. In the absence of alignment-specific information, it is appropriate to identify corridor-level logical termini at the borders of the state. Alignment-specific logical termini would be identified during Tier Two processes should the project proceed. Therefore, for the purposes of the Tier One DEIS, potential connection zones (PCZs) were established at the northern termini in the vicinity of Gainesville and Sherman-Denison and at the southern termini at Laredo and the Rio Grande Valley. These PCZs, which are common to all RCAs approaching the northern and southern termini, were established to allow for the identification of the best connection to existing facilities should TTC-35 advance to Tier Two environmental processes.

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\(^3\) The FHWA Memorandum “The Development of Logical Project Termini” (USDOT-FHWA, 1993) defines logical termini as 1) rational endpoints for a transportation improvement, and 2) rational endpoints for a review of environmental impacts.
Should TTC-35 proceed to Tier Two environmental processes, the logical termini or operating segments of a TTC-35 facility alignment may extend beyond the borders of the state of Texas. At which point, additional coordination with the MPOs, local governments, Oklahoma, and Mexico may be necessary for the purposes of project development during Tier Two environmental processes. In addition, different TTC-35 transportation modal alternatives evaluated during the Tier Two environmental process may have different modal logical termini or operating segments at the northern and southern ends of the identified corridor depending on future transportation needs.

**What process is being used to study TTC-35?**

The TTC-35 environmental study process is being conducted in two distinct phases or “tiers” as presented in Table ES-1. Tier One of the environmental process evaluates 13 alternatives (a No Action Alternative and 12 Reasonable Corridor Alternatives [RCAs]). The 12 RCAs are four to 18 miles in width and between 486 and 521 miles long. If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative for TTC-35, the selected corridor would become the study area for Tier Two environmental processes. Subsequent Tier Two NEPA documents could be in the form of Categorical Exclusions (CE), Environmental Assessments (EA), and EISs. These Tier Two NEPA documents would address site-specific details of project impacts, costs, and mitigation for alternatives that could proceed to construction should they be approved.
### Table ES-1: TTC-35 Tiered Decision Matrix

<table>
<thead>
<tr>
<th>Tier One Decision (Analyzes TTC-35 as a whole)</th>
<th>Tier Two Decision (SIU-based)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection of a preferred alternative:</td>
<td>Selection of a preferred alternative:</td>
</tr>
<tr>
<td>• No Action Alternative</td>
<td>• No Action Alternative</td>
</tr>
<tr>
<td>or</td>
<td>or</td>
</tr>
<tr>
<td>• Corridor Alternative</td>
<td>• Route Location Alternative</td>
</tr>
</tbody>
</table>

If the preferred alternative is a corridor alternative, then the following decisions may also be made:

- Identification of preliminary Segments of Independent Utility (SIUs)
- Identification of corridor preservation priorities, if warranted
- Refinement of the transportation modal concept, if warranted

**Key Points:**
- Tier One *does not* authorize construction
- If the Preferred Alternative is a corridor alternative, the selected corridor becomes the “study area” for Tier Two

**Key Points:**
- If the No Action Alternative is not selected as the Preferred Alternative and a route location is selected, the project alignment approved in the Tier Two environmental document advances to *right-of-way acquisition, design, and construction.*

**Flowchart ES-1** presented below provides additional information regarding the Tier One and Tier Two environmental processes.
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Flowchart ES-1: TTC-35 Environmental Study Timeline

Additional Environmental Studies
If a preferred corridor is selected, it would serve as the study area for additional environmental studies. The purpose of the additional studies is to determine a final route for roads, rail and utilities within the preferred corridor. Separate environmental studies (to include public involvement) may be conducted for each individual section of road, rail and utilities. These studies would result in a final project route and would authorize construction.

Federal Approval (Record of Decision) Anticipated Summer 2007

Federal Approval (Record of Decision) Anticipated Summer 2007

PHWA decision

THIS DOES NOT AUTHORIZE CONSTRUCTION.

Record of Decision
- Selection of preferred corridor (+/-10 miles wide), or a No Action option
- If corridor is selected, corridor preservation priorities would be identified

Public Involvement continues through all phases of the environmental studies.
Federal Highway Administration
What is the scope of the Tier One EIS?
In 40 CFR 1508.25, the CEQ provides the definition of scope of environmental impact statements. CEQ requires that in determining the scope on an environmental impact statement, “agencies shall consider 3 types of actions, 3 types of alternatives, and 3 types of impacts.”

This DEIS considered the three types of actions defined by CEQ (40 CFR Section 1808.25) which are:

1. Connected Actions - actions that are closely related. Actions are connected if they: (i) Automatically trigger other actions which may require environmental impact statements. (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously. (iii) Are interdependent parts of a larger action and depend on the larger action for their justification.

The Tier One action is an independent action and does not depend on any larger action for its justification. Should TTC-35 advance beyond the Tier One EIS, any TTC-35 facility(ies) proposed during Tier Two environmental processes would generally rely on the TTC-35 Tier One need and purpose, but would have to demonstrate its own project specific need and purpose.

2. Cumulative Actions - action which when viewed with other proposed actions have cumulatively significant impacts.

This DEIS addresses other cumulative actions within the study area.

3. Similar Actions - actions which when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography.

It was concluded that there are no similar actions to the proposed action in either timing or geography.

This Tier One DEIS addresses the three types of alternatives defined by CEQ (40 CFR 1508.25), which are:

1. No Action Alternative;
2. Other reasonable courses of actions; and
3. Mitigation measures (not in the proposed action).
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This Tier One DEIS considers the three types of impacts defined by CEQ (40 CFR 1508.25), which are:\(^4\)

1. Direct - impacts caused by the action and occur at the same time and place;
2. Indirect - impacts caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects to air and water and other natural systems, including ecosystems; and
3. Cumulative – impacts which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

How was the Tier One study area defined?
As shown on Figure ES-2, the TTC-35 Tier One study area occupies all or portions of 77 Texas counties. This study area was delineated in part to avoid the hilly terrain and associated sensitive environmental areas (threatened and endangered species and their habitats, and sensitive Edwards Aquifer recharge and contributing zones) west of I-35. Delineation of the study area also included consideration of:

- other environmental issues (i.e., land use, cultural resources, natural regions, etc.);
- planning and engineering factors;
- transportation factors; and
- public and agency comments obtained during the scoping meetings held in the Spring of 2004.

The TTC-35 Tier One study area is located primarily parallel to and east of I-35. Potential TTC-35 endpoints (also referred to as “termini”) within the study area include the vicinities of Laredo, McAllen/Harlingen, and Corpus Christi to the south, and the vicinities of Gainesville, Denison, and Paris to the north.

\(^4\) The terms “effect” and “impact” are used synonymously in the CEQ regulations (40 CFR Section 1508.8).
Figure ES-2: Tier One Study Area
What alternatives were considered for TTC-35 in the Tier One DEIS?

Alternatives considered in the Tier One DEIS include: Transportation Systems Management (TSM), Travel Demand Management (TDM), upgrading existing facilities, the No Action Alternative, and corridor alternatives.

TSM, TDM, and upgrading of an existing facility are more appropriately considered as possible transportation solutions at an alignment-level decision. If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative for TTC-35, TSM and TDM strategies and upgrading of an existing facility would be evaluated for effectiveness during Tier Two environmental processes.

Corridor alternatives and the No Action Alternative are explained in more detail below.

How were project corridor alternatives developed?

Thirty-one Preliminary Corridor Alternative (PCA) segments were identified using a Geographic Information Systems (GIS) based route optimization tool. The 31 PCA segments could be variously combined to form 180 PCAs. During the identification of the PCAs, efforts were made to avoid large-scale environmental constraints. Large-scale environmental constraints were defined as being sufficient in size to influence the location of a corridor that would be 10 miles wide. Large-scale environmental constraints include, but are not limited to, existing and proposed reservoirs, urbanized areas, military bases, critical threatened and endangered species habitats, and parklands/historic properties.

Seven PCA segments, which combine to form 12 RCAs and the No Action Alternative, were carried forward for detailed study in the Tier One DEIS. These 12 RCAs were selected based on:

1. Comments received at the public and agency meetings held in the Fall of 2004 and Spring of 2005; and
2. An analysis of the PCAs based on environmental, planning and engineering, and transportation screening criteria.

The 12 RCAs evaluated are illustrated in Figures ES-3 and ES-4.

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5 Transportation System Management is defined in the DEIS as a set of transportation policies or strategies aimed at reducing traffic congestion and improving roadway mobility without major capital expenditures to increase physical roadway traffic capacity.

6 Travel Demand Management (TDM) is defined in the DEIS as strategies that are designed to reduce the number of vehicles on roadways, particularly during peak travel periods.

7 Upgrade of an existing facility is defined in the DEIS as a single facility or a contiguous set of existing north-south oriented facilities that could be reasonably upgraded to meet the complete TTC-35 vision expressed in the Plan.
Figure ES-3: Reasonable Corridor Alternatives 1 through 6
Figure ES-4: Reasonable Corridor Alternatives 7 through 12
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How is the No Action Alternative defined?
If the Tier One decision selects the No Action Alternative, no corridor selection would be made and the TTC-35 project as envisioned would not proceed.

The No Action Alternative assumes the construction of other roadway projects currently planned and programmed for funding within the study area. The No Action Alternative for railways equates to maintenance of existing facilities and operations, and modest expansions of capacity and commercial facilities.

Under the No Action Alternative and the RCAs, direct effects to the natural and human environment may occur as a result of the implementation of the other projects planned and programmed in the study area. Any direct and indirect effects of those projects would be evaluated under their own environmental studies along with the cumulative effects of other past, present, and reasonably foreseeable projects.

How were the project alternatives evaluated?
The Tier One DEIS evaluates each of the 13 alternatives (No Action Alternative and 12 RCAs) based on each alternative’s individual ability to meet the TTC-35 need and purpose and its potential to affect the environment.

Specifically, each alternative was assessed based on:

- environmental effects;
- planning and engineering analysis; and
- traffic analysis.

Analysis of Environmental Effects

How were environmental resources considered in the analysis of RCAs?
Environmental resources are quantified in the Tier One DEIS to disclose the amount of each resource within each RCA based on the best available data. A resource or combination of resources could possibly preclude the identification of an RCA as the Preferred Alternative, because, individually or collectively, they completely block the width of an RCA. Environmental resource data were not used as surrogates for estimating potential effects that may occur should a TTC-35 facility(ies) be constructed within each RCA. Such use of these data would be highly speculative in the absence of any TTC-35 facility(ies) alignments. If a corridor is selected as the Preferred Alternative in the Tier One decision, the potential for effects would be thoroughly assessed during Tier Two environmental processes for any proposed TTC-35 facility(ies).

As part of the process to determine whether a single resource or combination of resources completely blocked the width of an RCA a GIS spatial analysis was conducted. No blocked areas were found within any of the RCAs. Thus, based on this review, it appears there would be adequate room within each of the RCAs to develop a TTC-35 facility(ies) alignment during Tier Two environmental processes which would avoid and/or minimize effects to environmental resources.
All 13 alternatives (No Action Alternative and 12 RCAs) were evaluated for indirect and cumulative effects. Based on the evaluation of the potential indirect effects presented in this DEIS, no environmental factors were determined to preclude any of the RCAs from selection as the Preferred Alternative. Furthermore, based on the evaluation of the potential cumulative effects presented in this DEIS, the three environmental factors evaluated (wetlands, rural/agricultural land, and economic effects) were also not determined to preclude any of the RCAs from selection as the Preferred Alternative. Therefore, at the Tier One level of analysis, indirect and cumulative effects are not a differentiating factor in the identification of a preferred corridor alternative based on the analysis performed for the DEIS.

### What affect would the alternatives have on developed land?

Efforts were made during the delineation of the study area and the development of alternatives to avoid urban areas and military bases; as a result, less than 2 percent of each RCA is comprised of developed land (as defined by the 1992 National Land Cover Dataset [NLCD]). The potential effects to land use categories, aside from developed land, are discussed further in this Executive Summary as potential effects to other resources (i.e., water, wetlands, etc.). Land use data on developed land based on the best available data from the NLCD is provided in Charts ES-1 and ES-2 to disclose the amount of developed land within each RCA.

**Chart ES-1** shows the percentage of each RCA occupied by developed lands. The percentage of developed land within the RCAs ranges from 1.37 to 1.87 percent.

<table>
<thead>
<tr>
<th>RCA</th>
<th>Percentage of RCA Occupied by Developed Lands</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.8%</td>
</tr>
<tr>
<td>2</td>
<td>1.7%</td>
</tr>
<tr>
<td>3</td>
<td>1.4%</td>
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<tr>
<td>4</td>
<td>1.4%</td>
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<tr>
<td>5</td>
<td>1.7%</td>
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<tr>
<td>6</td>
<td>1.7%</td>
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<tr>
<td>7</td>
<td>1.4%</td>
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<tr>
<td>8</td>
<td>1.3%</td>
</tr>
<tr>
<td>9</td>
<td>1.8%</td>
</tr>
<tr>
<td>10</td>
<td>1.7%</td>
</tr>
<tr>
<td>11</td>
<td>1.5%</td>
</tr>
<tr>
<td>12</td>
<td>1.4%</td>
</tr>
</tbody>
</table>
Chart ES-2 shows a comparison of the total area of each RCA occupied by developed lands to the total area of each RCA in square-miles. The area occupied by developed lands within the RCAs ranges from 79.23 to 95.96 square-miles.

Chart ES-2: RCA Developed Lands Comparison

Land use was not used to identify a preferred alternative among the RCAs, because all land use categories reviewed for this analysis occur within each RCA. In the absence of a TTC-35 facility(ies) alignment, it is not possible to predict how much of each land use category would be affected by a future TTC-35 facility(ies) alignment.

The No Action Alternative is not anticipated to have additional direct effects to land use within the study area beyond those that may result from projects already planned and programmed. Effects of projects already planned and programmed would be evaluated under their own environmental studies.

**Would there be any affects to land value in general by any alternative?**

If the Tier One decision selects a corridor alternative as the Preferred Alternative, land value could be directly affected in some locations based on speculation of future placement of an actual TTC-35 facility(ies). Although no construction-related activities will be authorized as a result of the Tier One decision, land value within and adjacent to the corridor may be affected. Land value changes are difficult to predict as many variables, such as local zoning, local development patterns, and topography, can influence the value of land in a particular

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8 As defined by the 1992 National Land Cover Dataset (NLCD), developed lands are areas with 30 percent or greater constructed materials (e.g. asphalt, concrete, buildings, etc.) and include low-intensity residential, high-intensity residential, and commercial/industrial/transportation.
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If a corridor alternative is selected as the Preferred Alternative in the Tier One decision, direct effects could be limited to localized increases or decreases in land values.

**What affect would the alternatives have on neighborhood and community cohesion?**

Neighborhood and community cohesion was not used to identify a preferred alternative among the RCAs, because in the absence of a TTC-35 facility (ies) alignment, it would not be possible to determine how and which neighborhoods and communities would be affected by a TTC-35 facility(ies) alignment.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, neighborhood and community cohesion would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision. However, Tier Two environmental processes could identify potential TTC-35 facility(ies) alignments that may affect neighborhood and community cohesion.

The No Action Alternative would have no additional direct effects to neighborhood and community cohesion beyond those that may result from projects already planned and programmed in the Statewide Transportation Improvement Program (STIP) and Metropolitan Transportation Plans (MTPs). Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

**What affect would the alternatives have on population?**

Efforts were made during the delineation of the study area and the development of alternatives to avoid urbanized areas, because they have high concentrations of population.

Population data based on the best available data at the census tract level\(^9\) from the *Census 2000* is provided in **Charts ES-3 and ES-4** to disclose the total population and population density within each RCA.

**Chart ES-3** shows the total population for each RCA. The total population within the RCAs ranges from 816,741 to 980,667.

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\(^9\) Demographic information was calculated using all census tracts within or partially within an RCA.
Chart ES-3: RCA Total Population

Chart ES-4 shows the population density for each RCA. The population density within the RCAs ranges from 144 to 190 persons per square-mile.

Chart ES-4: Population Density (population/RCA total area)
Population data were not used to identify a preferred alternative among the RCAs, because, in the absence of a TTC-35 facility(ies) alignment, it is not possible to predict how much population within each RCA would be affected by a future TTC-35 facility(ies) alignment.

If the Tier One decision selects a corridor alternative for the Preferred Alternative, population size would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision. However, the selection of a corridor alternative as the Preferred Alternative could have an indirect effect on population dispersal patterns, because undeveloped areas could become developed in anticipation of a future TTC-35 facility(ies). Exactly how population dispersal patterns may change would likely differ somewhat among the RCAs, but the general effect of some population dispersing in response to the selection of a corridor would be similar.

The No Action Alternative is not anticipated to have additional direct effects to population growth patterns beyond those that may result from projects already planned and programmed. Effects of projects already planned and programmed would be evaluated under their own environmental studies.

**What affect would the alternatives have on environmental justice populations?**

Minority population and households below the poverty level (an indication of low-income) were used as indications for environmental justice populations. Minority population and poverty demographics based on the best available data at the census tract level from the Census 2000 is provided in Chart ES-5 to disclose the percent minority and the percent of households below the poverty level within each RCA. The percentage of the population of each RCA considered minority ranges from 43 to 49 percent of the RCA population and the percentage of the households below the poverty level within the RCAs ranges from 22 to 27.

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10 Demographic information was calculated using all census tracts within or partially within an RCA.
11 Minority population is as defined by the FHWA Order 6640.23. FHWA Order 6640.23 defines “low-income” as a person whose household income is at or below the Department of Health and Human Services (DHHS) poverty guidelines. Poverty data from the Census 2000 were collected at the state and county levels to determine the percent of families living below the poverty level in Texas and the study area counties. The Census Bureau follows the Office of Management and Budget (OMB), Statistical Policy Directive 14 in establishing poverty thresholds. According to the Census 2000, approximately 12 percent of Texas families live below the poverty level and approximately 11.5 percent of families in the study area counties overall had incomes below the poverty level.
12 The Texas State average for households below the poverty level is 15.4 percent and the State average for minority population is 48 percent.
Data pertaining to environmental justice populations were not used to identify a preferred alternative among the RCAs, because, in the absence of a TTC-35 facility(ies) alignment, it is not possible to predict, which, if any, environmental justice populations within each RCA would be affected by a future TTC-35 facility(ies) alignment. Furthermore, if a future TTC-35 facility(ies) alignment would potentially affect environmental justice populations, a tailored public involvement process with the potentially affected populations would be necessary to determine how any environmental justice population would be affected by a TTC-35 facility(ies) alignment.

If the Tier One decision selects a corridor alternative as the Preferred Alternative, environmental justice populations would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative is not anticipated to have additional direct effects to environmental justice populations beyond those that may result from projects already planned and programmed. Effects of projects already planned and programmed would be evaluated under their own environmental studies.

**What affect would the alternatives have on relocations?**

Relocations were not used to identify a preferred alternative among the RCAs because no relocations would occur as a result of the Tier One decision.
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If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, no construction-related activities will be authorized. TxDOT will not be allowed to make advanced acquisition of land because the Tier One EIS does not identify a specific alignment for TTC-35. TxDOT will only be allowed to purchase options on land upon completion of the Tier One environmental process. The purchase of options allows the State to pay a willing landowner now for the option to buy the land in the future. The option period is limited to a maximum of 5 years. The price of the land is negotiated at the time of the purchase of the property, and not at the time of the option. The State cannot use eminent domain to acquire options. If a specific route for a TTC-35 facility(ies) is identified during Tier Two environmental processes, the State will be allowed to purchase land and use eminent domain, if necessary.

The No Action Alternative would not result in any additional displacements of residences or businesses beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

**What affect would the alternatives have on economic characteristics?**
Economic characteristics were not used to identify a preferred alternative among the RCAs, because data to quantify the potential direct economic effects of a TTC-35 corridor are not available at this time.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, direct effects to the Texas economy would be limited to land value changes, which could occur within and near the Preferred Alternative, based on speculation of future placement of an actual TTC-35 facility(ies). Land value changes are difficult to predict, as many variables such as local zoning, local development patterns, and topography can influence the value of land in a particular region. If a corridor alternative is selected as the Preferred Alternative in the Tier One decision, direct effects could be limited to localized increases or decreases in land values.

The No Action Alternative would not have any additional direct effects to the Texas economy beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

**What affect would the alternatives have on utilities?**
In the absence of a TTC-35 facility(ies) alignment, the number and location of linear and power-generating utilities within a corridor would not preclude the consideration of any RCA as the Preferred Alternative.

The number of oil and natural gas wells is provided in Chart ES-6 to disclose the total number within each RCA based on the best available data from the RRC. The number of oil and natural gas wells within the RCAs ranges from 2,181 to 5,042. Oil wells tend to be more abundant in the southern portions of the RCAs compared to the central and northern portions.
In the northern portion of the RCAs, the number of natural gas wells is higher to the west of Dallas-Fort Worth than to the east.

Oil and natural gas wells were not used to identify a preferred alternative, because they are not a regulated resource and many oil and natural gas wells could likely be avoided at a Tier Two level of analysis.

If the Tier One decision selects a corridor alternative as the Preferred Alternative, utility infrastructure, including oil and natural gas wells, would not be affected, because no construction-related activities will be authorized at the Tier One level of analysis.

The No Action Alternative is not anticipated to have additional direct effects to oil and natural gas wells beyond those that may result from projects already planned and programmed. Effects of projects already planned and programmed would be evaluated under their own environmental studies.

**What affect would the alternatives have on air quality?**

The designated non-attainment counties and near non-attainment counties for the eight-hour ozone standard are listed in **Chart ES-7** to disclose the designated counties within each RCA based on the best available data from the United States Environmental Protection Agency (EPA) and the Texas Commission on Environmental Quality (TCEQ). Each RCA includes all or portions of six or seven counties that have been designated as non-attainment for the eight-hour ozone standard (as defined by the EPA). The RCAs that occur on the west side of Dallas-Fort Worth include six counties designated as non-attainment and those RCAs on the
east side of Dallas-Fort Worth include seven counties. All RCAs also pass through the Austin and San Antonio Early Action Compact (EAC) area.\(^{13}\)

Air quality was not used to identify a preferred alternative among the RCAs, because all of the RCAs pass through the Dallas-Fort Worth non-attainment area, and the Austin and the San Antonio\(^ {14}\) EACs.

If the Tier One decision selects a corridor alternative as the Preferred Alternative, air quality would not be directly affected, because no construction-related activities will be authorized.

The No Action Alternative is not anticipated to have additional direct effects to air quality beyond those that may result from projects already planned and programmed. Effects of projects already planned and programmed would be evaluated under their own environmental studies.

**What affect would the alternatives have on noise?**
Noise characteristics were not used to identify a preferred alternative among the RCAs because in the absence of a TTC-35 facility(ies) alignment, potential noise receptors (residences, businesses, etc.) cannot be determined and predicted.

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\(^{13}\) EACs are formed in order to defer non-attainment designation.

\(^{14}\) San Antonio has been designated as non-attainment with a deferred effective date of 2007.
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, noise and vibration levels would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative would have no additional direct effects to noise and vibration levels beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

What affect would the alternatives have on cultural resources?
During the development of alternatives, efforts were made to minimize the number of large National Register of Historic Places (NRHP) listed sites and districts within RCAs. Because of those avoidance efforts, each of the RCAs only has between five and seven large NRHP-listed sites or districts within them. The number of large NRHP-listed sites and districts, the area within each RCA, and the percent RCA area are provided in Charts ES-8, ES-9, and ES-10 to disclose the best available data for cultural resources within each RCA. Chart ES-8 lists the number of large NRHP-listed sites or districts within each RCA.

Chart ES-8: Number of Large NRHP-listed Sites or Districts

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**Chart ES-9** provides the total area of each RCA occupied by large NRHP-listed sites or districts. The total area occupied by large NRHP-listed sites or districts in the RCAs ranges from only 1.20 to 3.64 square-miles.

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\(^{15}\) Large NRHP-listed sites and districts are defined as 23 acres or larger in size. In accordance with the Federal NOI dated February 5, 2004, to minimize duplication of effort, the size standard of 23 acres was used in order to be consistent with data developed by the I-69/TTC study. The I-69/TTC study established the 23-acre size standard under the assumption that any resource comprising less than five percent of the corridor width of 4 miles would not affect corridor development.
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Chart ES-9: Area of RCA Occupied by Large NRHP-listed Sites or Districts vs. RCA Area

Chart ES-10: Percentage of RCA Occupied by Large NRHP-listed Sites or Districts of 23 Acres or Greater

Chart ES-10 provides the percentage of total area of each RCA that is occupied by large NRHP-listed sites or districts. Large NRHP-listed sites or districts comprise less than 0.1 percent of the total area of each RCA.

Chart ES-10: Percentage of RCA Occupied by Large NRHP-listed Sites or Districts
Large NRHP-listed sites and districts were not used to identify a preferred alternative among the RCAs, because none completely blocked any RCA and many cultural resource sites could likely be avoided at a Tier Two level of analysis.

If the Tier One decision selects a corridor alternative as the Preferred Alternative cultural resources (defined as large NRHP-listed sites and districts) would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative is not anticipated to have additional direct effects to cultural resources beyond those that may result from projects already planned and programmed. Effects of projects already planned and programmed would be evaluated under their own environmental studies.

**What affect would the alternatives have on parklands?**

The area covered by parklands (in square-miles) and the percent of the RCA occupied by parklands is presented in **Charts ES-11 and ES-12** to disclose the amount of parklands within each RCA based on the best available data from the National Park Service (NPS), United States Fish and Wildlife Service (USFWS), Texas Parks and Wildlife Department (TPWD), Texas General Land Office (GLO), Lower Colorado River Authority (LCRA), and Land and Water Resources Conservation Program (LWRCP).

**Chart ES-11** provides the percentage of each RCA occupied by parklands. The percentages of parklands within the RCAs range only from 0.11 to 0.29 percent of any RCA.

![Chart ES-11: Percentage of RCA Occupied by Parklands](image-url)
Chart ES-12 provides the amount of the RCA area in square-miles occupied by parklands. The number of square-miles of parklands within the RCAs ranges from 6.37 to 14.95 square-miles.

Chart ES-12: RCA Area Occupied by Parklands

Parklands were not used to identify a preferred alternative among the RCAs, because none completely blocked any RCA and many parklands could likely be avoided at a Tier Two level of analysis.

If the Tier One decision selects a corridor alternative as the Preferred Alternative, parklands would not be directly affected, because no construction-related activities will be authorized.

The No Action Alternative is not anticipated to have additional direct effects to parklands beyond those that may result from projects already planned and programmed. Effects of projects already planned and programmed would be evaluated under their own environmental studies.

What affect would the alternatives have on Section 4(f) properties?  
Efforts were made during the development of alternatives to avoid large NRHP-listed sites and districts, all of which are protected by Section 4(f). Two PCAs were removed from

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**Footnotes:**
16 Section 4(f), 49 U.S.C. 303, USDOT policy on lands, wildlife and waterfowl refuges, and historic sites as they apply to transportation projects, stipulates that the FHWA “may not approve the use of land [for a transportation program or project] from a significant publicly owned public park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless a determination is made that: (i) There is no feasible and prudent alternative to the use of land from the property; and (ii) The action includes all possible planning to minimize harm to the property resulting from such use.”
17 In accordance with the Federal NOI dated February 5, 2004, to minimize duplication of effort, the size standard of 23 acres was used in order to be consistent with data standards developed by the I-69/TTC study. The I-69/TTC study established the 23-acre size standard.
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further consideration, because of the presence of a large cultural resource district that would preclude the location of a potential Tier Two TTC-35 facility(ies) since it blocked the entire width of each PCA.

Section 4(f) lands were not used to identify a preferred alternative among the RCAs, because, in the absence of a TTC-35 facility(ies) alignment, potential effects to 4(f) lands cannot be predicted. Furthermore, many Section 4(f) lands could likely be avoided at a Tier Two level of analysis.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, Section 4(f) properties would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative would have no additional effects to Section 4(f) properties beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

What affect would the alternatives have on Section 6(f) properties? Section 6(f) lands were not used to identify a preferred alternative among the RCAs, because, in the absence of a TTC-35 facility(ies) alignment, potential impacts to 6(f) cannot be predicted. Furthermore, many potential Section 6(f) lands could likely be avoided at a Tier Two level of analysis.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, Section 6(f) lands would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative would have no additional effects to Section 6(f) lands beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

What affect would the alternatives have on prime farmland soils? The total area (in square-miles) of each RCA and the percentage of each RCA occupied by prime farmland soils is provided in Charts ES-13 and ES-14 to disclose the amount of prime farmland soils based on the best available data from the Natural Resource Conservation Service (NRCS) in each RCA.

under the assumption that any resource comprising less than five percent of the corridor width of 4 miles would not effect corridor development.

18 Section 6(f) of the Land and Water Conservation Fund Act (LWCA) of 1965 (16 USC 460l - 460l-11) applies to programs and policies of any agency. The purpose of this Act is to “assist in preserving, developing, and assuring accessibility to outdoor recreation resources and to strengthen the health and vitality of U.S. citizens by providing funds and authorizing federal assistance to states in planning, acquiring and developing land and water areas and facilities, and by providing funds for federal acquisition and development of lands and other areas.”
Chart ES-13 provides a comparison of the total area of prime farmland soils (as defined by the NRCS) in square-miles within an RCA to the total area of the RCA. The total square-miles of prime farmland soils within the RCAs range from 1,975 to 2,403 square-miles.

Chart ES-13: RCA Prime Farmland Soils Area vs. RCA Area

Chart ES-14 provides the percentage of each RCA comprised of prime farmland soils comprise. The percent of prime farmland soils within the RCAs ranges from 37 percent to 47 percent.
Prime farmland soils were not used to identify a preferred alternative, because, in the absence of a TTC-35 facility(ies) alignment, obtaining specific data for assessing potential effects on this resource is not possible.

If the Tier One decision selects a corridor alternative as the Preferred Alternative, prime farmland soils would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative is not anticipated to have additional direct effects to prime farmland soils beyond those that may result from projects already planned and programmed. Effects of projects already planned and programmed would be evaluated under their own environmental studies.

**What affect would the alternatives have on river basins?**
Major river basins were not used to identify a preferred alternative among the RCAs because they occur within each RCA.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, rivers would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative would have no additional direct effects to river basins beyond those that may result from projects already planned and programmed in the STIP and MTPs.
Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

**What affect would the alternatives have on impaired stream segments?**
The number of impaired stream segments (as defined by the TCEQ) within each RCA are provided in **Chart ES-15** based on the best available data from TCEQ. The number of impaired stream segments within the RCAs ranges from 18 to 22 stream segments. Overall, the RCAs that occur to the west of Dallas-Fort Worth have the least amount of surface water and the least number of impaired stream segments.

**Chart ES-15: Number of Impaired Stream Segments Within Each RCA**

Impaired stream segments were not used to identify a preferred alternative among the RCAs, because, in the absence of a TTC-35 facility(ies) alignment, it is not possible to estimate the effects to impaired stream segments.

If the Tier One decision selects a corridor alternative as the Preferred Alternative, impaired stream segments would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative is not anticipated to have additional direct effects to impaired stream segments beyond those that may result from projects already planned and programmed. Effects of projects already planned and programmed would be evaluated under their own environmental studies.
What affect would the alternatives have on existing reservoirs?

Efforts were made during the delineation of the study area and the development of alternatives to minimize the effects to existing and proposed reservoirs. As a result, existing reservoirs comprise less than 1 percent of the total area of each RCA and no proposed reservoirs occur within any of the RCAs.

The total area (in square-miles) of each RCA occupied by existing reservoirs is provided in Chart ES-16 to disclose the amount of existing reservoirs within each RCA based on the best available data from the Texas Water Development Board (TWDB). The amount of square-miles comprised of existing reservoirs within RCAs ranges from 9.86 to 32.10 square-miles.

Existing reservoirs were not used to identify a preferred alternative among the RCAs, because, in the absence of a TTC-35 facility(ies) alignment, it is not possible to estimate the effects to existing reservoirs.

If the Tier One decision selects a corridor alternative as the Preferred Alternative, existing reservoirs would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative is not anticipated to have additional direct effects to existing reservoirs beyond those that may result from projects already planned and programmed. Effects of projects already planned and programmed would be evaluated under their own environmental studies.
What affect would the alternatives have on groundwater resources/aquifers?
The number of major aquifers (as defined by the Texas Water Development Board [TWDB]) occurring beneath each RCA are listed in Charts ES-17 and ES-18. This information is provided to disclose the aquifers beneath each RCA based on the best available data from the TWDB.

Chart ES-17 shows the number of major aquifers (as defined by the TWDB) occurring beneath each RCA. Each RCA traverses two or three major aquifers.

Chart ES-17: Number of Major Aquifers Occurring Beneath Each RCA

Chart ES-18 shows the number of minor aquifers (as defined by the TWDB) occurring beneath each RCA. Each RCA traverses three to six minor aquifers. In general, the RCAs that occur on the west side of Dallas-Fort Worth had fewer minor aquifers than those that occur east of Dallas-Fort Worth.
Major and minor aquifers were not used to identify a preferred alternative among the RCAs, because they occur beneath each RCA and their occurrence would not preclude any RCA from selection as the Preferred Alternative.

If the Tier One decision selects a corridor alternative as the Preferred Alternative, major and minor aquifers would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative is not anticipated to have additional direct effects to major and minor aquifers beyond those that may result from projects already planned and programmed. Effects of projects already planned and programmed would be evaluated under their own environmental studies.

**What affect would the alternatives have on flood-prone areas?**

The percentage of each RCA occupied by flood-prone areas (defined as natural areas that have a 1 percent or greater probability of flooding but that do not necessarily correspond to legally defined floodplains) is provided in Chart ES-19 to disclose the amount of flood-prone area within each RCA based on the best available data from the Bureau of Economic Geology (BEG). The percent of flood-prone areas ranges from 5.77 to 16.45 percent of each RCA.
Flood-prone areas were not used to identify a preferred alternative among the RCAs, because, in the absence of a TTC-35 facility(ies) alignment, it is not possible to estimate the potential effects to flood-prone areas.

If the Tier One decision selects a corridor alternative as the Preferred Alternative, flood-prone areas would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative is not anticipated to have additional direct effects to flood-prone areas beyond those that may result from projects already planned and programmed. Effects of projects already planned and programmed would be evaluated under their own environmental studies.

**What affect would the alternatives have on wetlands?**

The amount of wetland area (in square-miles) (as designated in the 1992 NLCD) and the percentage of each RCA occupied by wetlands are provided in Charts ES-20 and ES-21 to disclose the amount of wetlands within each RCA based on the best available data from the NLCD.

Chart ES-20 provides data on the amount of square-miles of wetlands (as designated in the 1992 NLCD) within each RCA. Wetlands constitute between 6.53 and 42.85 square-miles of the RCAs.
Chart ES-20: Area of RCA Occupied by Wetlands vs. RCA Area

Chart ES-21 provides the percentage of each RCA occupied by wetlands. The amount of wetlands represents less than 1 percent of the total area of each RCA.

Chart ES-21: Percentage of RCA Occupied by Wetlands
Wetlands were not used to identify a preferred alternative among the RCAs, because, in the absence of a TTC-35 facility(ies) alignment, it is not possible to estimate the potential effects to wetlands.

If the Tier One decision selects a corridor alternative as the Preferred Alternative, wetlands would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative is not anticipated to have additional direct effects to wetlands beyond those that may result from projects already planned and programmed. Effects of projects already planned and programmed would be evaluated under their own environmental studies.

**What affect would the alternatives have on mineral resources?**

The total number of mining activities within each RCA is provided in Chart ES-22 to disclose the mining activities within each RCA based on the best available data from the Texas Railroad Commission (RRC).

**Chart ES- 22: Total Number of Mining Activities Within Each RCA**

Mining activities were not used to identify a preferred alternative among the RCAs, because they are not regulated and many could be avoided at a Tier Two level of analysis.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, mineral resources and mining activities would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.
The No Action Alternative is not anticipated to have additional direct effects to mineral resources beyond those that may result from projects already planned and programmed. Effects of projects already planned and programmed would be evaluated under their own environmental studies.

**What affect would the alternatives have on vegetative communities, wildlife species, and terrestrial and aquatic communities?**

Vegetative communities and wildlife species and associated habitat were not characterized within each RCA, because it was not practicable to conduct field surveys within each RCA at the Tier One level of analysis. As a result, vegetative communities and wildlife species and associated habitat were not used to identify a preferred alternative among the RCAs.

However, significant publicly owned or privately held terrestrial and aquatic habitat areas within the study area that are managed by private entities or governmental agencies as wildlife habitats and wildlife management areas (WMAs) were identified and the total area within each RCA that is occupied by a significant publicly owned or privately held terrestrial and aquatic habitat area is presented in Chart ES-23. This information is provided to disclose the amount of WMAs within each RCA based on the best available data from the GLO. The area of each RCA containing significant terrestrial and aquatic habitat area ranges from zero to 3.28 square-miles (less than 1 percent of each RCA in which they occur).

**Chart ES-23: Area of RCA Occupied by Significant Publicly Owned or Privately Held Terrestrial and Aquatic Habitats Areas vs. RCA Area**

The number of significant publicly owned and privately held terrestrial and aquatic habitats was not used to identify a preferred alternative among the RCAs, because, based on the best
available, only one WMA exists within the RCAs and could most likely be avoided during Tier Two environmental processes.

If the Tier One decision selects a corridor alternative as the Preferred Alternative, significant publicly owned or privately held terrestrial and aquatic habitat areas would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative is not anticipated to have additional direct effects to vegetative communities, wildlife species, and terrestrial and aquatic habitat areas beyond those that may result from projects already planned and programmed. Effects of projects already planned and programmed would be evaluated under their own environmental studies.

**What affect would the alternatives have on threatened, endangered, and candidate species?**

Federally and state-listed threatened, endangered, and candidate species occur throughout the study area. Efforts were made during the delineation of the study area to avoid and minimize effects to designated critical habitats and to avoid and minimize effects to the federally listed species west of I-35, because of the geographic extent of their potential occurrences.

The number of federally and state-listed threatened, endangered, and candidate species common to the RCAs are presented in Charts ES-24 and ES-25 to disclose the number of species potentially occurring within the counties traversed by each RCA based on the best available data from the USFWS and TPWD.

As shown in Chart ES-24, the number of federally listed threatened, endangered, and candidate species potentially occurring within the counties traversed by each RCA is between 12 and 14.
As shown in Chart ES-25, the number of state-listed threatened and endangered species potentially occurring within the counties traversed by the RCA is between 39 and 47.
The locations of federally and state-listed threatened, endangered, and candidate species were not identified within each RCA, because it was not practicable to conduct species-specific field surveys within each RCA at the Tier One level of analysis. Furthermore, in the absence of a TTC-35 facility it would not be possible to estimate the potential effects of a TTC-35 facility(ies) alignment on federally and state-listed threatened, endangered, and candidate species. As a result, the numbers of federally and state-listed threatened, endangered, and candidate species were not used to identify a preferred alternative among the RCAs.

If the Tier One decision selects a corridor alternative as the Preferred Alternative, the federally and state-listed threatened, endangered, and candidate species potentially occurring in the counties traversed by any RCA would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative is not anticipated to have additional direct effects to federally and state-listed threatened, endangered, and/or candidate species beyond those that may result from projects already planned and programmed. Effects of projects already planned and programmed would be evaluated under their own environmental studies.

**What affect would the alternatives have on designated critical habitat?**

No designated critical habitat exists within any of the RCAs. Therefore, designated critical habitat was not used to identify a preferred alternative among the RCAs.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, there would be no direct effects to designated critical habitat, because no areas identified as designated critical habitat are located within any of the RCAs.

The No Action Alternative would have no additional direct effects to areas identified as designated critical habitat beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

**What affect would the alternatives have on visual and aesthetic resources?**

Visual and aesthetic resources were not used to identify a preferred alternative among the RCAs, because, in the absence of a TTC-35 facility(ies) alignment, it is not possible to predict how visual and aesthetic resources within each RCA would be affected by a future TTC-35 facility(ies) alignment.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, visual resources would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative would have no additional direct effects to visual resources beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.
What affect would the alternatives have on hazardous materials and waste sites?
Numerous hazardous materials and waste sites occur within the study area. Many of these sites are small and ubiquitous across the study area. Therefore, only data for Superfund and landfill sites were obtained and used to compare the RCAs at the Tier One level of analysis.

The number of NPL, SPL and landfill sites is listed in Chart ES-26 to disclose the amount of hazardous waste sites within each RCA based on the best available data from the TCEQ and the EPA. The number of landfills within the RCAs ranges from 46 to 64.

There are no federally or state-listed Superfund sites within any RCAs.

Hazardous waste sites were not used to identify a preferred alternative among the RCAs, because, in the absence of a TTC-35 facility(ies) alignment, it is not possible to estimate the effects to hazardous waste sites within any RCA and many and could be avoided during Tier Two level of analysis.

If the Tier One decision selects a corridor alternative as the Preferred Alternative, landfills would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative is not anticipated to have additional direct effects to hazardous materials and waste sites beyond those that may result from projects already planned and programmed for the study area. Effects of projects already planned and programmed would be evaluated under their own environmental studies.
What affect would the alternatives have on energy resources?
The effects on the use of energy were not used to identify a preferred alternative among the RCAs, because, in the absence of a TTC-35 facility(ies) alignment, it is not possible to estimate the use of energy as a result of a TTC-35 facility(ies).

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, energy resources would not be directly affected, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative would have no additional direct effects to energy beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

What would be the construction effects of the TTC-35 Tier One decision?
Construction effects were not used to identify a preferred alternative among the RCAs, because there would be no construction-related activities that would be authorized as a result of the Tier One decision.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, no direct short-term or long-term construction effects would occur, because no construction-related activities will be authorized as a result of the Tier One decision.

The No Action Alternative would not result in additional construction-related effects beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

What are the indirect effects of a TTC-35 corridor?
Indirect effects are those “which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 CFR 1508.25).” Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects to air and water and other natural systems, including ecosystems.

An approach for assessing the indirect effects of TTC-35 at a Tier One level of analysis was developed based on 23 CFR 771, the FHWA Technical Advisory 6640.8A and The Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact Considerations in the NEPA Process Memorandum issued by FHWA on January 31, 2003. The steps used in the Tier One indirect effects assessment include:

19 The Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects (“NCHRP Report”) (NCHRP, 2002) was also referenced in developing this indirect effects assessment.
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• Scoping;
• Identification of the study area;
• Inventory of the study area;
• Identification of impact-causing activities of the selection of a corridor;
• Identification and analysis of indirect effects;
• Mitigation and enhancement strategies; and
• Proposed Tier Two indirect effects assessment method.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects of a TTC-35 corridor on environmental resources would include both the direct and indirect effects to those resources from any TTC-35 facility(ies) constructed within the identified corridor. For the sake of comparing potential indirect effects, the RCAs include the assumption that a TTC-35 facility(ies) would be constructed and operated if an RCA is selected as the Preferred Alternative. Thus, the indirect effects of each RCA would include the direct and indirect effects associated with the construction and operation of a TTC-35 facility(ies). Since these effects would not occur under the No Action Alternative, they provide a basis for comparing the No Action Alternative to the RCAs. Potential indirect effects of a TTC-35 corridor may include, but would not be limited to:

• changes in land use as some land is converted from non-developed to developed;
• decreased cohesion of some communities and opportunities for community cohesion in new residential areas;
• changes in patterns of human population dispersal;
• new employment opportunities and loss of some existing jobs;
• relocation of some businesses, residences, and utilities;
• changes in the development and location of some future utilities and transportation facilities;
• positive and negative effects to air quality and noise;
• effects to cultural resources and parklands;
• conversion of some prime farmland soils to developed land;
• degradation of some surface and subsurface waters;
• wildlife habitat fragmentation and habitat loss; and
• other effects directly and indirectly related to increased development.

In summary, all 13 alternatives (No Action Alternative and 12 RCAs) were evaluated for indirect effects. Based on the evaluation of the potential indirect effects presented in this DEIS, no environmental factors were determined to preclude any of the RCAs from selection as the Preferred Alternative. Therefore, at the Tier One level of analysis, indirect effects are not a differentiating factor in the identification of a preferred corridor alternative based on the analysis performed for the DEIS.

If the Tier One decision results in a corridor alternative as the Preferred Alternative and TTC-35 advances to Tier Two environmental process, the Tier Two NEPA documents would focus on an individual TTC-35 facility(ies). At that point, in the project development process, alignment-level preliminary design information for a proposed TTC-35 facility(ies) would be available to allow for a quantitative analysis to evaluate indirect effects of a TTC-
35 facility(ies). Although the exact process used to evaluate indirect effects of individual TTC-35 facilities would be determined during Tier Two environmental processes, the indirect effects assessment would follow a process as outlined in the TxDOT guidance on assessing indirect effects that is currently under development.

**What are the cumulative effects of a TTC-35 corridor?**

Cumulative effects are defined as “the impact on the environment that results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.25).” Cumulative impacts include the direct and indirect impacts of a project together with the reasonably foreseeable future actions of others.

The cumulative effects assessment presented in the DEIS is based on the 8-step approach described in the TxDOT Interim Guidance on Preparing Cumulative Impact Analyses (TxDOT, 2006). However, since the TxDOT 8-step approach does not address cumulative effects at a Tier One level of analysis, the approach was modified for a Tier One level of analysis. The specific steps used in the TTC-35 Tier One cumulative effects assessment include:

- Scoping to identify the significant cumulative effects issues associated with TTC-35;
- Define the geographic scope for the analysis;
- Define the time frame for the analysis;
- Identify other actions affecting the environmental resources of concern;
- Characterize the resources of concern and identify the cause-and-effect relationships between human activities and the resources;
- Determine the magnitude and significance of cumulative effects;
- Mitigation and enhancement strategies; and
- Proposed Tier Two cumulative effects assessment method.

During the agency scoping for cumulative effects, 20 state and federal agencies and 231 local and regional agencies were contacted. As a result of the agency coordination and public involvement process for TTC-35, three major resources were identified which require an evaluation of the cumulative effects of TTC-35 at a Tier One level of analysis. These three resources are wetlands, rural/agricultural land, and economic effects.

The cumulative effects analysis in this DEIS evaluates the past (defined as 1972 to 2001), present (defined as 2002 to 2005), and reasonably foreseeable future (defined as 2006 to 2030). The year 1972 was used as the past time frame, because 1972 is the first year land cover imagery data was available that covered the entire study area. The year 2030 was used for the reasonably foreseeable future, because FHWA regulations (23 CFR 450.322)

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20 The CEQ’s Considering Cumulative Effects Under the National Environmental Policy Act, Council on Environmental Quality, Office of the President (CEQ, 1997) and the CEQ memorandum regarding Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (CEQ, 2005) were also references in developing this cumulative effects assessment.

21 The land cover classifications used in this cumulative effects analysis were developed using Landsat imagery from 1972 and 2002.
require metropolitan transportation plans cover a 20-year planning horizon. Currently, the plans of the MPOs within the study area typically extend to the year 2030. Furthermore, the planning horizon for local land use plans is typically for a 20 to 30-year period. Beyond these dates, reliable data on the past, present and reasonably foreseeable future was not available for the entire study area and would be speculative and weaken the technical integrity of the cumulative effects analysis.

In summary, all 13 alternatives (No Action Alternative and 12 RCAs) were evaluated for cumulative effects. Based on the evaluation of the potential cumulative effects presented in this DEIS, the three environmental factors evaluated (wetlands, rural/agricultural land, and economic effects) were not determined to preclude any of the RCAs from selection as the Preferred Alternative. Therefore, at the Tier One level of analysis, cumulative effects are not a differentiating factor in the identification of a preferred corridor alternative based on the analysis performed for the DEIS.

If the Tier One decision results in a corridor alternative as the Preferred Alternative and TTC-35 advances to Tier Two environmental process, the Tier Two NEPA documents would focus on an individual TTC-35 facility(ies). At that point, in the project development process, alignment-level preliminary design information for a proposed TTC-35 facility(ies) would be available to allow a quantitative analysis to evaluate cumulative effects of a TTC-35 facility(ies). Although the exact process used to evaluate the cumulative effects of individual TTC-35 facilities would be determined during Tier Two environmental processes, the cumulative effects assessment would follow a process similar to that described in the TxDOT 8-step approach previously discussed. Furthermore, any cumulative effects analysis completed for a TTC-35 facility(ies) during Tier Two environmental processes would follow the TxDOT 8-step approach.

Planning and Engineering Analysis

Why is the consideration of slopes important for identifying a preferred alternative?
Slopes are important for identifying a preferred alternative, because alternatives with a higher percentage of slopes less than 3 percent provide more areas of flatter ground. Areas with flatter ground are more conducive to constructing a future TTC-35 facility(ies), particularly rail facilities, during the Tier Two environmental processes.

Which alternatives have the highest percentages of slopes less than one percent and less than three percent?
Chart ES-27 shows the percentage of slopes less than 1 percent and less than 3 percent in each RCA. The percentages of slopes less than 1 percent ranges from 21 to 27 percent and the percentages of slopes less than 3 percent ranges from 65 to 74 percent. These percentages are lower for RCAs 1 through 4, which pass to the west of Dallas-Fort Worth, than they are for RCAs 5 through 12, which pass to the east of Dallas-Fort Worth. Thus, RCAs 5 through 12, which travel on the east side of Dallas-Fort Worth, have the best slopes for future TTC-35 facilities.
Why is existing rail infrastructure an important factor for identifying a preferred alternative?
Rail infrastructure is an important factor for identifying a preferred alternative, because the ability for a TTC-35 facility(ies) to utilize existing rail infrastructure could reduce ROW and construction costs and help to minimize environmental effects of a future TTC-35 facility(ies) during Tier Two environmental processes.

Which RCAs provide the greatest potential for incorporating existing rail infrastructure into a future TTC-35 facility(ies)?
Chart ES-28 shows that RCAs 1 and 2 contain the greatest existing rail line length with 321 and 344 miles of rail line, respectively. However, RCAs 1 and 2 have steeper slopes that are less suitable for high-speed rail facilities. RCAs 9 and 10 also contain higher amounts of existing rail infrastructure (272 and 294 miles, respectively) and proportionally few steep slopes. The amount of rail infrastructure and few steep slopes present within RCAs 9 and 10 may provide greater potential for incorporating existing rail infrastructure into a future TTC-35 facility(ies) during Tier Two environmental processes.
Why is existing highway infrastructure an important factor for identifying a preferred alternative?
Existing highway infrastructure is an important factor for identifying a preferred alternative, because, the ability for a TTC-35 facility(ies) to utilize existing highway infrastructure could reduce ROW and construction costs and help to minimize environmental impacts of a future TTC-35 facility(ies) during Tier Two environmental processes.

Which RCAs provide the greatest potential for incorporating existing highway infrastructure into a future TTC-35 facility(ies)?
Chart ES-29 shows that RCAs 1, 5, and 9 each have greater miles of existing highway length within them than do other RCAs. The amount of existing highway infrastructure calculated within each RCA was based on the length of existing (or under construction) four-lane or greater divided highways traveling roughly parallel to the RCA centerline at the time the Tier One DEIS was prepared. The greater amount of existing highway infrastructure within RCAs 1, 5, and 9 may provide greater potential for incorporating existing infrastructure into a future TTC-35 facility(ies) during Tier Two environmental processes.
Traffic Analysis

What method was used to perform the traffic analysis?

Five transportation criteria that measure the performance of each RCA on fulfilling the TTC-35 need and purpose were used to evaluate the No Action Alternative and the 12 RCAs. Each of the five criteria was evaluated for both non-toll and toll scenarios. The five criteria were:

- **Average total vehicle flow on I-35** - This criterion was selected to provide an estimate of the average number of vehicles (trucks and autos combined) on each segment of I-35 during a 24-hour period;
- **Average total truck flow on I-35** - This criterion was calculated similarly as Criterion 1 except that Criterion 2 focuses solely on truck traffic;
- **Total vehicle hours of travel (VHT) on I-35** - This criterion was selected to provide an estimate of the number of hours of vehicle operation (vehicle hours) on I-35 during a 24-hour period;
- **Average maximum volume/capacity (V/C) ratio on I-35** - This criterion was selected to provide an estimate of the traffic volume on segments of I-35 in relationship to the traffic capacity of those segments over a 24-hour period; and
- **Combined travel-time between urban regions in the study area** - This criterion was selected to provide an estimate of connectivity among urban regions in the study area in terms of travel times among these regions.
Traffic modeling was performed for each criterion and a cumulative “performance” score was calculated based on the modeling results to provide a measure of performance for each RCA. For example, an RCA that received ranks of 6, 11, 12, 5, and 6 for the five criteria would receive a performance score of 40, as shown in the calculation below:

\[ 6 + 11 + 12 + 5 + 6 = 40 \]

The lower the performance score, the better the traffic conditions.

What were the results of the traffic analysis?

Chart ES-30 shows the transportation performance score calculated for each RCA for both the non-tolled and tolled scenarios.

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The traffic analysis demonstrated that:

- Both of the RCAs 5 and 7 performed substantially better at meeting the TTC-35 need and purpose than the 10 other RCAs under both the non-tolled and tolled scenarios; \(^22\)
- RCA 5 performed slightly better than RCA 7 under the non-tolled scenario (receiving scores of 10 and 11, respectively); and

---

\(^{22}\) RCAs 5 and 7 scored 40 and 47 percent better, respectively, than the next best scoring RCA for the tolled scenario, and they scored 44 and 39 percent better, respectively, than the next best scoring RCA for the non-tolled scenario.
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- RCA 7 performed slightly better than RCA 5 under the tolled scenario (receiving scores of 8 and 9, respectively).

Based on the traffic analysis performed for this DEIS, all of the RCAs show improvement in projected future conditions over the No Action Alternative.

**How was public involvement solicited?**
Public involvement was an extensive part of the development of this DEIS for TTC-35. The purpose of the public involvement was to ensure every reasonable opportunity was made available to interested citizens, civic groups, and public officials to participate in the TTC-35 environmental process. Communication tools utilized in this effort included a project website, a toll-free hotline, a comprehensive mailing list, and numerous public meetings.

A total of 117 public meetings were held to provide project updates and solicit input. Comments received from the public at these meetings and through the project office aided in the development of the TTC-35 project. The public meetings held during the development of the TTC-35 project were conducted in:

- April - June 2004 (26 public scoping meetings were held to introduce the project concept, initial study area, and gather comments);
- October - November 2004 (44 public meetings were held to provide project updates, introduce preliminary corridor alternatives, and to receive comment); and
- February - March 2005 (47 public meetings were held to present refined preliminary corridor alternatives and to once again solicit public input and comments).

A website (www.keeptexasmoving.org) was established to provide 24-hour internet access to project and meeting information. The website was updated throughout the TTC-35 environmental process.

A toll-free hotline (1-877-872-6789 [1-877-TRANSTX]) was established to receive public inquiries about TTC-35. Individuals who call the hotline between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday, speak to a public involvement team representative, if available, or leave a message. All calls are returned within 24 hours, or the following business day.

An extensive mailing list was developed using a variety of online resources and local directories. Updated regularly throughout the project development process, this list has been used to inform interested stakeholders of upcoming TTC-35 project events and key milestones. This list includes:

- local elected officials,
- state agencies,
- chambers of commerce,
- school districts,
- libraries,
What agencies were involved in the process and how was agency comment/input obtained?
Coordination meetings were held with federal and state resource and regulatory agencies to initiate early involvement and cooperation in the environmental study. At these meetings, TxDOT staff presented overviews of TTC-35; including a discussion of the TTC concept, the proposed TTC-35 preliminary study area, the goals and objectives of TTC-35, schedule, and status. Coordination meetings were held with:

- National Marine Fisheries Service (NMFS);
- Texas Commission on Environmental Quality (TCEQ);
- Texas General Land Office (GLO);
- Texas Parks and Wildlife Department (TPWD);
- U.S. Army Corps of Engineers (USACE);
- U.S.D.A. Natural Resource Conservation Service (NRCS);
- U.S. DOT-Surface Transportation Board (STB);
- U.S. Environmental Protection Agency (EPA); and
- U.S. Fish and Wildlife Service (USFWS).

Who were the cooperating agencies and how were they involved in the process?
A cooperating agency is an agency that has special jurisdiction or can offer special expertise in regards to issues to be addressed in the EIS. The cooperating agencies for the TTC-35 Tier One DEIS are the EPA, STB, and USACE. Coordination occurred with the cooperating agencies throughout the development of the Tier One DEIS. In addition, the cooperating agencies were provided an opportunity to comment on a preliminary copy of this DEIS prior to its approval.

In summary, what were the results of the alternatives evaluation and which alternative was identified as the Preferred Alternative?
The No Action Alternative would not meet the TTC-35 need and purpose. Planned capacity improvements that would occur under the No Action Alternative are not expected to substantially reduce congestion levels projected for the year 2025. Additional capacity needed beyond the planned improvements would likely prove to be cost-prohibitive in many cases, because of development constraints along existing facilities. For these reasons, the No Action Alternative is not recommended as the Preferred Alternative.

Many large-scale (defined as of sufficient size to substantially block a 10-mile wide corridor) environmental resources were avoided when the study area was delineated and when
alternatives were developed. The environmental resources within the RCAs are not distributed so that they completely block the width of any RCA. Thus, any one of the RCAs could be considered as the Preferred Alternative from an environmental perspective. As a result, there is potential for identifying future TTC-35 facility(ies) alignments within any of the RCAs that would avoid many of the environmental resources considered in this Tier One DEIS. For this reason, environmental resources were not used as a basis for identifying the Preferred Alternative. Efforts would be made during Tier Two environmental processes to avoid and/or minimize the effects of a TTC-35 facility(ies) on environmental resources. In addition, mitigation would be developed for any effects that could not be avoided or minimized.

Planning/engineering criteria varied among the RCAs, but alone did not provide a quantifiable basis for precluding an RCA from consideration.

Transportation criteria varied among these RCAs and did provide a quantifiable basis for precluding RCAs from consideration as the Preferred Alternative. As a result, transportation criteria were used as a primary basis for identifying the Preferred Alternative.

RCA 5 and RCA 7 performed substantially better than all other RCAs based on transportation criteria. RCAs 5 and 7 scored 40 and 47 percent better, respectively, than the next best scoring RCA for the tolled scenario, and they scored 44 and 39 percent better, respectively, than the next best scoring RCA for the non-tolled scenario respectively. RCA 5 and RCA 7 scored so similarly that the two RCAs were not distinguished from each other based solely on their ranking for the transportation criteria.

Since RCAs 5 and 7 scored similarly on the transportation criteria, public comments supporting the use of existing infrastructure for a future TTC-35 facility(ies) were used to identify the Preferred Alternative. RCA 5 contains much greater length of both existing highway (195 miles compared to 90 miles) and existing rail line (214 miles compared to 66 miles) than RCA 7. The greater presence of these existing facilities in RCA 5 means that there would be greater potential in RCA 5, compared to RCA 7, for utilizing existing facilities; therefore, there would be greater potential in RCA 5 to reduce costs and environmental effects.

In summary, RCA 5 was identified as the Preferred Alternative because:

- RCAs 5 and 7 scored 40 and 47 percent better, respectively, than the next best scoring RCA for the tolled scenario, and they scored 44 and 39 percent better, respectively, than the next best scoring RCA for the non-tolled scenario respectively, which means they were the two best RCAs at meeting the TTC-35 need and purpose; and
- RCA 5 contains more existing highway (195 miles compared to 90 miles) and rail line (214 miles compared to 66 miles) facilities than RCA 7, and thus provides more potential than RCA 7 for reducing costs and environmental effects.

RCA 5 is shown in Figure ES-5.
Figure ES-5: Recommended Preferred Alternative
How did public involvement influence the process?
Comments received from the public and resource and regulatory agencies during the scoping meetings (Spring 2004) and the public meetings (Fall 2004 and Spring 2005) were used to further refine the study area and select criteria for identifying PCAs and RCAs.

Based on comments received through the scoping process, the study area was further refined by:

- adding counties to the study area as requested through public comments;
- expanding the study area boundary in key locations to allow for connections to existing transportation facilities; and
- expanding the study area boundary in key locations to allow for consideration of utilizing existing infrastructure as elements of TTC-35.

Several PCAs centered on existing transportation facilities were identified based on comments received. Connectivity with existing infrastructure, wetlands, prime farmland soils, and cultural resource sites and districts were all used as criteria for identifying PCAs and RCAs in response to comments provided by the public and/or resource and regulatory agencies.

During the evaluation of the RCAs, RCAs 5 and 7 performed substantially better in the traffic analysis than did all other RCAs, but they performed similar to each other. Criteria based on public comments were used to help distinguish between RCAs 5 and 7. Specifically, public comments requesting consideration of utilizing existing highway and railroad infrastructure as elements of TTC-35 were used to identify RCA 5 as the Preferred Alternative over RCA 7, since RCA 5 had 105 more miles of existing highway and 148 more miles of existing railroad infrastructure within it than RCA 7.

What will happen next in the process?
The approved Tier One DEIS has been made available to the general public and provided to public agencies. In addition, a comment period of a minimum of 45 days is underway. During this period, TxDOT will hold public hearings throughout the TTC-35 study area. At these hearings, the Tier One DEIS will be presented and comments from the public will be received. TxDOT will also accept comments via mail and e-mail during the comment period. All comments received during the public hearing comment period will be reviewed and substantive comments will be considered during the preparation of the TTC-35 Tier One Final Environmental Impact Statement (FEIS). The Tier One FEIS will include a summary of and response to substantive comments received from agencies and the general public.

The current schedule anticipates the TTC-35 Tier One FEIS to be completed in 2007. When this occurs, a Notice of Availability (NOA) will be published in the Federal Register and the Tier One FEIS will be available to interested parties. The FHWA may publish a Record of Decision (ROD) at least 30 days after the Tier One FEIS NOA is published. FHWA can accept the No Action Alternative, one of the RCAs, or may seek
additional work. Subsequent Tier Two NEPA documents could be in the form of CEs, EAs, and EISs. These Tier Two NEPA documents would address site-specific details of project impacts, costs, and mitigation for alternatives that could proceed to construction should they be approved.
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**1.0 NEED AND PURPOSE**

The Texas Department of Transportation (TxDOT) and the Federal Highway Administration (FHWA) are proposing the Trans-Texas Corridor 35 (TTC-35), an element of the Trans-Texas Corridor (TTC) system. The FHWA is the lead federal agency for this Environmental Impact Statement (EIS). In addition, the Environmental Protection Agency (EPA), Surface Transportation Board (STB), and the United States Army Corps of Engineers (USACE) are cooperating agencies. Appendix A-1 contains copies of the letters, dated May 10, 2004, that FHWA sent to the cooperating agencies. Appendix A-1 also contains copies of the response letters FHWA received from the USACE, EPA, and STB, dated April 13, 2005, July 7, 2004, and July 16, 2004, respectively.

On February 5, 2004, the FHWA published a Notice of Intent (NOI) to prepare a Tier One EIS for the proposed TTC-35 in the Federal Register. On February 6, 2004, TxDOT published a NOI for TTC-35 in the Texas Register. Appendix A-2 contains copies of both NOIs.

TxDOT and FHWA are preparing this EIS using a tiered approach to *National Environmental Policy Act of 1969* (NEPA) decision-making. The Tier One EIS focuses on broad issues such as general location. Tier One will not authorize the construction of any portion of TTC-35. A more detailed discussion of the tiered approach is included in Section 1.5 - TTC-35 NEPA Approach of this Chapter. This Tier One Draft EIS (DEIS) examines the social, economic, and environmental effects associated with the alternatives considered. This document has been prepared pursuant to Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR], Chapter V, Part 1500-1508), NEPA, FHWA regulations (23 CFR Part 771), and TxDOT rules (43 Texas Administrative Code Chapter 2, Subchapter C).

Information is provided in this Chapter that answers the following questions:

- What is TTC-35?
- Why is TTC-35 needed?
- What is the purpose of TTC-35?
- What are the logical termini and operating segments?
- What approach was used to study TTC-35?
- What is the scope this EIS?
- What is the purpose of the Tier One EIS?
- What is the study area?

**1.1 NEED AND PURPOSE**

The TTC-35 Need and Purpose Statement Support Document ("Need and Purpose Statement Support Document") (July, 2005), included in Appendix A-3, provides
detailed data to support the need for TTC-35.\textsuperscript{23} In summary, the data presented in Appendix A-3 demonstrate that the projected passenger and freight increases will continue to place added demand on the existing roadway, rail, and utility infrastructure in the TTC-35 study area (“study area”). Planned capacity improvements for Interstate Highway 35 (I-35) as programmed in the Statewide Transportation Improvement Program (STIP) and Metropolitan Transportation Plans (MTP) would not substantially reduce congestion levels projected by 2025. Based on data provided in the Need and Purpose Statement Support Document (Appendix A-3), in summary, the TTC-35 facility is needed to accomplish the following:

- **Accommodate Projected Population Growth and Subsequent Traffic Demand:** The study area contains all or portions of 77 counties, many of which are the fastest growing counties in Texas and the United States (U.S.). The Texas Water Development Board (TWDB) projects the population within the study area to reach more than 19.5 million by the year 2030. Figure 1-1 depicts the 2000 population in the study area by county and the projected population by county for 2030. Furthermore, dynamic growth of approximately 145 percent is expected to occur in the study area from 2000 to 2060 with population projections of approximately 27.7 million for the year 2060. Population will place additional demands on the already constrained transportation infrastructure (highways, railways, and utilities).

- **Facilitate Congestion Management:** Figure 1-2 shows the 2003 average daily traffic (ADT) flow along I-35 and other major highways in the study area. Current traffic volumes for most segments of I-35 exceed design capacity, resulting in longer travel times and lower levels of service within the I-35 corridor. Although transportation improvements are programmed to be constructed within the I-35 corridor over the next 25 years, I-35 would still not meet the demands of projected population growth and subsequent traffic demand in the study area. Forecast volumes (years 2025 and 2060) along many sections of I-35 are expected to double that of capacity. Simply constructing urban bypasses would not satisfy the demand of the entire corridor. Essentially, the capacity required to meet future demand is equal to a second interstate-level facility. Freight projections for the highways and railways of the nation currently suggest that the infrastructure supporting these and the other modes will not grow as fast as freight demand over the next two decades and beyond. The demands being placed on the highways and railroads are far out-pacing new build plans.

- **Accommodate Increasing Freight Volumes:** Figure 1-3 shows the 1998 truck and rail freight traffic in Texas. The Statewide Analysis Model (SAM)\textsuperscript{24} estimates that the number of freight vehicles on the state’s roadways is expected to dramatically increase over the next 55 years (TxDOT, 2004a). Estimates

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\textsuperscript{23} This Need and Purpose Statement Support Document utilizes the best available data for each referenced data source; however, data were not readily available for the 50-year TTC-35 planning horizon for all resource categories. Thus, consistent projection years are not always presented. For instance, traffic and congestion is typically presented for a 20- to 25-year period. However, the population can be more easily projected to a longer period such as 50 years.

\textsuperscript{24} TxDOT uses the SAM model for all of its statewide travel demand modeling. SAM is capable of providing estimates of vehicle movement, including those carrying freight and commodities, into and out of Texas, through Texas, and within regions of Texas.
indicate an expected increase of 132 percent in the number of freight vehicles on Texas roads by 2025. Additionally, estimates for 2060 indicate a nearly 403 percent increase over the 1998 levels in the number of freight vehicles on Texas roads daily. Approximately 20 to 38 percent of the current traffic on I-35 is freight. The projected increase of freight movement in addition to the expected continual deterioration of the existing infrastructure would foster the need for multimodal transportation infrastructure, new intermodal connections, and accommodations for more frequent and higher freight tonnage.

- **Provide Transportation Modal Options:** Increased population, increased freight traffic, increasingly inadequate highway capacity, and accompanying congestion compound the need for additional modal options. TTC-35 would give additional passenger travel options including high-speed and commuter rail, in addition to improved modal options for freight including dedicated truck lanes and additional freight rail capacity.

- **Improve Safety:** Accident statistics nationwide indicate that motor vehicle crashes are the leading cause of death for persons between the ages of 3 and 34. In a 10-year period between 1993 and 2003, 2,895 people died in crashes on Texas interstate highways. Of those people, 691 people died in 611 crashes involving fatalities on I-35 alone. Additionally, 25 percent of fatal accidents on I-35 involve large trucks. The splitting of automobiles and trucks into separate roadways would eliminate many auto/truck conflicts and reduce the number of accidents. Furthermore, the inclusion of rail may reduce both the number of passenger vehicles and the number of trucks on Texas interstate highways, which would also reduce the number of accidents. TTC-35 would also create alternate routes for hazardous materials around heavily populated urban areas.

- **Enhance Economic Vitality:** The Texas economy is strong, thriving, and continues to diversify. From 1990 to 2000, Texas added 2.2 million jobs. Texas currently leads the nation in exports. Approximately 75 percent of America’s commerce with Mexico travels through Texas. The successful economic growth in Texas has placed strains on existing infrastructure. The infrastructure is aging and rapidly reaching or exceeding capacity in many areas throughout the state. As a result, transportation infrastructure in Texas requires major improvements and expansion to enable the continued growth and expansion of the state’s economy. Additionally, the economic vitality of the study area could be stimulated by the creation of new jobs and business opportunities resulting from the new employment, trade, and commercial travel TTC-35 would provide. Increased access and mobility within the study area would improve the movement of people, goods, and services, and potentially lead to new employment and business opportunities.
Based on meeting the above stated needs, the purpose of TTC-35 is:

To improve the international, interstate, and intrastate movement of goods and people; address the anticipated transportation needs of Texas from the Texas/Oklahoma state line to the Texas/Mexico border and/or Texas Gulf Coast along the Interstate 35 corridor for the next 20 to 50 years; and, sustain and enhance the economic vitality of the State of Texas.

These purposes will be met in such a way as to comply with Texas House of Representatives Bill (House Bill [HB]) 3588\(^{25}\) and HB 2702\(^{26}\) in an environmentally sensitive manner, and to comply with NEPA and all applicable federal and state laws and regulations.

### 1.2 PROJECT BACKGROUND

In June 2002, TxDOT published the “Crossroads of the Americas: Trans Texas Corridor Plan” (the “Plan”), which introduced the TTC concept and vision (TxDOT, 2002a). As envisioned in the Plan, the TTC system is a proposed 4,000-mile network of multimodal transportation facilities within the State of Texas.

The Plan identified the goals and conceptual elements of the TTC system and established the planning framework and parameters for subsequent project development activities. As identified in the Plan, the goals of the TTC include:

- provision of faster and safer transportation of people and freight;
- relief for congested roadways;
- reduction of transport of hazardous materials in populated areas;
- improvement of air quality by reducing emissions;
- provision of a safer, more reliable utility transmission system; and
- promotion of economic growth and development through the creation of new markets and new jobs.

Although the Texas Transportation Commission accepted the Plan in June 2002, it was conceptual in nature and served to provide only the initial framework for the overall TTC concept. Since the adoption of the Plan, the vision of TTC has evolved from its original goals and objectives. As a result, the TTC-35 project as presented in this Tier One DEIS has evolved.

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\(^{25}\) Texas House of Representatives Bill 3588 is the authorizing legislation granting TxDOT the authority to construct, acquire, finance, maintain, manage, operate, own, and control transportation facilities associated with the Trans-Texas Corridor. The bill was passed by the 78th Legislature in 2003.

\(^{26}\) Texas House of Representatives Bill 2702 is the authorizing legislation that provides clarity on TxDOT’s authority to construct, acquire, finance, maintain, manage, operate, own, and control transportation facilities associated with the Trans-Texas Corridor. The bill was passed by the 79th Texas Legislature in 2005.
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The Plan identified the following factors as key to the identification of the priority elements of the TTC:

- congestion relief for major metropolitan areas;
- safety benefit from routing hazardous material away from highly populated areas;
- generation of toll revenue; and
- economic development potential.

As conceptually described in the Plan, each TTC element would include separate lanes for passenger vehicles (three lanes in each direction) and trucks (two lanes in each direction), six rail lines (one line each in both directions for high-speed rail, commuter rail and freight rail), and a 200-foot wide utility zone. It is anticipated these facilities would be phased over time based on transportation demand. Figure 1-4 depicts a conceptualized TTC that would require approximately 1,200 feet of right-of-way (ROW) if all of the TTC facilities were located in a common corridor with additional ROW at interchanges and at other locations as dictated by roadway geometrics.

1.3 TTC-35 DESCRIPTION

The TTC-35 (the Oklahoma to Mexico/Gulf Coast element) is one of four high-priority TTC elements identified in the Plan. The TTC-35 would be approximately 560 miles long with the actual length dependent on the results of the Tier One decision and subsequent Tier Two environmental processes. As proposed, TTC-35 would be a multi-modal transportation corridor extending from the Texas/Oklahoma state line, north of the Dallas-Fort Worth metropolitan area, through Central Texas, to the Texas/Mexico border and/or the Texas Gulf Coast. It is anticipated that the proposed TTC-35 project would generally parallel existing I-35 for much of its length, and possibly portions of I-37, and proposed I-69.

Plans call for TTC-35 to be completed in phases over the next 50 years with alignments prioritized according to Texas’ transportation needs. The Texas Department of Transportation (TxDOT) will oversee planning, construction and ongoing maintenance, although private vendors may be responsible for much of the daily operations.

Since TTC-35 is still in the planning phase, commitments regarding sources of funding for the entire TTC-35 corridor, as envisioned in the Plan, have not been made. As a result, TTC-35 was evaluated in this Tier One DEIS to not preclude funding options that would be determined later in the project development process. As substantial portions of the highway element of the proposed TTC-35 are anticipated to be tolled, the corridor was evaluated as both a non-tolled and candidate toll facility. Toll feasibility studies would be completed for any TTC-35 highway facility programmed to use toll-funding sources prior to project construction when alignment-level information is available.
1.4 LOGICAL TERMINI AND OPERATING SEGMENTS

This Tier One DEIS considered logical termini\(^\text{27}\) and operating segments for TTC-35 as appropriate at a corridor level of analysis. As envisioned in the Plan, TTC-35 is a State of Texas initiative that extends from the Texas/Oklahoma state line, north of the Dallas-Fort Worth metropolitan area, through Central Texas, to the Texas/Mexico border and/or the Texas Gulf Coast. This Tier One DEIS evaluates corridor alternatives and not facility alignments. At the corridor level it is not possible to identify alignment-specific logical termini and connections to infrastructure because an alignment has not been proposed. In the absence of alignment-specific information, it is appropriate to identify corridor-level logical termini at the borders of the state. Alignment-specific logical termini would be identified during Tier Two processes should the project proceed. Therefore, for the purposes of this Tier One DEIS, potential connection zones (PCZs) were established at the northern termini in the vicinity of Gainesville and Sherman-Denison and at the southern termini at Laredo and the Rio Grande Valley. These PCZs, which are common to all RCAs approaching the northern and southern termini, were established to allow for the identification of the best connection to existing facilities should TTC-35 advance to Tier Two environmental processes.

Should TTC-35 proceed to Tier Two environmental processes, the logical termini or operating segments of a TTC-35 facility alignment may extend beyond the borders of the state of Texas. At which point, additional coordination with the MPOs, local governments, Oklahoma, and Mexico may be necessary for the purposes of project development during Tier Two environmental processes. In addition, different TTC-35 transportation modal alternatives evaluated during the Tier Two environmental process may have different modal logical termini or operating segments at the northern and southern ends of the identified corridor depending on future transportation needs.

1.5 TTC-35 NEPA APPROACH

Because of the early planning stage of the TTC-35 concept, the project-planning horizon (50 years), and the size of the project, TxDOT and FHWA have chosen to use a tiered approach to NEPA to make decisions regarding the development of TTC-35. This tiered approach to transportation decision-making under NEPA involves the preparation of a first (Tier One) NEPA document that makes a decision at a broad level. As stated in 40 CFR1508.28 regarding tiering:

*Agencies are encouraged to tier their environmental impact statements to eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision at each level of environmental review.* (§1508.28)

*Whenever a broad environmental impact statement has been prepared (such as a program or policy statement) and a subsequent statement or environmental assessment is then prepared on an action included within the entire program or policy (such as a site specific action) the subsequent statement or environmental*

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\(^{27}\) The FHWA Memorandum “The Development of Logical Project Termini” (USDOT-FHWA, 1993) defines logical termini as 1) rational endpoints for a transportation improvement, and 2) rational endpoints for a review of environmental impacts.
assessments need only summarize the issues discussed in the broader statement and incorporate discussions from the broader statement by reference and shall concentrate on the issues specific to the subsequent action. The subsequent document shall state where the earlier document is available. Tiering may also be appropriate for different stages of actions. (§1508.28)

1.6 SCOPE OF THIS TIER ONE ENVIRONMENTAL IMPACT STATEMENT

In 40 CFR 1508.25, the CEQ provides the definition of scope of environmental impact statements. CEQ requires that in determining the scope on an environmental impact statement, “agencies shall consider 3 types of actions, 3 types of alternatives, and 3 types of impacts.”

The three types of actions include:

1. Connected Actions - There are no connected actions as defined by 40 CFR Section 1508.25. A Tier One decision for TTC-35 would not automatically trigger other actions that would require evaluation in this Tier One EIS. Upon completion of the Tier One EIS, there is no obligation by TxDOT to consider proceeding with Tier Two environmental processes for TTC-35. The Tier One EIS is not connected to any other action, because the Tier One may conclude without any other actions being taken. However, should a decision be made for TTC-35 to proceed to a Tier Two environmental process, these Tier Two actions would be connected to each other by the Tier One EIS.

The Tier One action is an independent action and does not depend on any larger action for its justification. Should TTC-35 advance beyond the Tier One EIS, any TTC-35 facility(ies) proposed during Tier Two environmental processes would generally rely on the TTC-35 Tier One need and purpose, but would have to demonstrate its own project specific need and purpose.

2. Cumulative Actions - This DEIS defines cumulative actions within the study area and evaluates the potential for the proposed action to have cumulative effects in Chapter 5 – Indirect and Cumulative Effects Assessment.

3. Similar Actions - As disclosed in the TTC-35 NOI for the Tier One DEIS (Appendix A-2), TxDOT is also preparing a Tier One DEIS for I-69/Trans-Texas Corridor (I-69/TTC). I-69/TTC and TTC-35 are separate and distinct actions with each having logical termini and independent utility, as envisioned

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28 Connected Actions are defined by the CEQ (40 CFR Section 1508.25) as actions that are closely related. Actions are connected if they: (i) Automatically trigger other actions which may require environmental impact statements; (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously; (iii) Are interdependent parts of a larger action and depend on the larger action for their justification.

29 Cumulative Actions are defined by the CEQ (40 CFR 1508.25) as those actions which when viewed with other proposed actions have cumulatively significant impacts.

30 Similar Actions are defined by the CEQ (40 CFR 1508.25) as those actions which when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography.
in the Plan, however, the proposed projects share the need to terminate along the Texas-Mexico International border or Texas Gulf Coast. Both projects are evaluating RCAs that terminate at the PCZ in the vicinity of Laredo. However, the RCAs being evaluated for each project do not overlap. TTC-35 and I-69/TTC are not similar actions as defined by CEQ 40 CFR 1508.25, because they do not have similar project timing or geography. Nor are there any other similar actions to the proposed action in either timing or geography.

The three types of alternatives include (40 CFR 1508.25):

1. No Action Alternative;
2. Other reasonable courses of actions; and
3. Mitigation measures (not in the proposed action).

This Tier One DEIS evaluates a No Action Alternative and 12 Reasonable Corridor Alternatives. These 13 alternatives are described in Chapter 2 – Alternatives, and evaluated in Chapter 4 – Environmental Consequences, Chapter 5 – Indirect and Cumulative Effects Assessment, Chapter 6 - Transportation Planning and Engineering Analysis, and Chapter 7 – Identification of the Preferred Alternative. If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, no construction-related activities will be authorized as a result of the Tier One decision. Therefore, no mitigation is proposed in this document. However, Chapter 4 –Environmental Consequences discusses assessment methodologies and potential mitigation strategies that may be used if a Tier Two environmental process is undertaken for any proposed TTC-35 facility(ies).

The three types of impacts or effects that must be addressed and considered by federal agencies in satisfying the requirements of the NEPA process include:31

1. Direct, which are caused by the action and occur at the same time and place (40 CFR Section 1508.8);
2. Indirect, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects to air and water and other natural systems, including ecosystems (40 CFR Section 1508.8); and
3. Cumulative, which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time (40 CFR Section 1508.7).

31 The terms “effect” and “impact” are used synonymously in the CEQ regulations (40 CFR Section 1508.8).
This Tier One DEIS evaluates the direct effects of the No Action Alternative and the 12 Reasonable Corridor Alternatives in Chapter 4 – Environmental Consequences and the indirect and cumulative effects in Chapter 5 – Indirect and Cumulative Effects Assessment.

1.7 PURPOSE OF THIS TIER ONE ENVIRONMENTAL IMPACT STATEMENT

The purpose of this Tier One DEIS is to compare corridor alternatives and a No Action Alternative, and to identify a preferred alternative. The Preferred Alternative selected in the Tier One Record of Decision (ROD) would either be the No Action Alternative, or a corridor in which a TTC-35 facility(ies) as conceptually described in the Plan, would be evaluated in subsequent Tier Two environmental processes. If the Tier One decision results in the selection of a corridor alternative as a Preferred Alternative, the selected corridor would become the study area for subsequent Tier Two environmental processes.

Since the Tier One EIS would make a corridor-level rather than an alignment-level decision, no construction activities will be allowed to proceed as a result of the Tier One decision. Furthermore, if the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative for TTC-35 rather than the No Action Alternative, a second level of NEPA documents (Tier Two) would have to be prepared for facilities proposed within the TTC-35 corridor identified in the Tier One EIS. Subsequent Tier Two NEPA documents could be in the form of Categorical Exclusions, Environmental Assessments, and EISs. These Tier Two NEPA documents would address site-specific details of project impacts, costs, and mitigation for alternatives that could proceed to construction should they be approved. Table 1-1 includes the TTC-35 tiered decision matrix for Tier One and Tier Two environmental processes.

<table>
<thead>
<tr>
<th>Tier One Decision (Analyzes TTC-35 as a whole)</th>
<th>Tier Two Decision (SIU-based)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection of a preferred alternative:</td>
<td>Selection of a preferred alternative</td>
</tr>
<tr>
<td>• No Action Alternative</td>
<td>• No Action Alternative</td>
</tr>
<tr>
<td>or</td>
<td>or</td>
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<tr>
<td>• Corridor Alternative</td>
<td>• Route Location Alternative</td>
</tr>
</tbody>
</table>

If the preferred alternative is a corridor alternative, then the following decisions may also be made:

- Identification of preliminary Segments of Independent Utility (SIUs).
- Identification of corridor preservation priorities, if warranted.
- Refinement of the transportation modal concept, if warranted.
This Tier One DEIS addresses the following questions:

- Why is TTC-35 needed?
- What is the purpose of TTC-35?
- If a corridor is selected, what is the best corridor location for TTC-35 (the area that will serve as the general study area for the Tier Two environmental processes)?

If this Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the following questions may be addressed in the Tier One Final EIS (FEIS):

- Can preliminary Segments of Independent Utility (SIUs) for Tier Two environmental processes be identified? If so, where?
- Are there any locations within the Preferred Alternative identified for corridor preservation?
- Can the transportation modal concept be refined at the Tier One level of analysis?
- Are there general advanced mitigation strategies that may be employed?

1.8 STUDY AREA
In the early stages of the TTC-35 environmental process, a study area for this Tier One EIS was delineated. Initially, a 99-county study area was delineated for TTC-35 based on the Plan, which provided a general description for the conceptual location (parallel to I-35, I-37, and proposed I-69) of TTC-35 and its termini. The 99-county study area was evaluated based on the following three factors determined to be key to further development of TTC-35:

- federally protected species;
- the Edwards Aquifer; and
Based on these three factors and an origin-destination analysis, 21 of the 99 counties were removed from the study area, reducing it to 78 counties. The counties eliminated from the study area were predominantly west of I-35.

Environmental, planning/engineering, and transportation factors were examined to determine whether the 78-county study area could be further refined. A detailed explanation of the process used to examine these factors is provided in Appendix A-4, TTC-35 Study Area Identification Report (“Study Area Identification Report”) (April, 2004, as updated in August, 2004 and July, 2005).

Environmental factors evaluated at this stage included:

- air quality non-attainment areas (including near non-attainment areas as designated by Texas Commission on Environmental Quality (TCEQ);
- cultural resources;
- economic conditions;
- land use;
- landfills and superfund sites;
- natural regions;
- population;
- public lands;
- rivers and reservoirs;
- threatened and endangered species; and
- wetlands.

Planning and engineering factors evaluated included:

- ability to utilize existing I-35;
- consideration of utility infrastructure; and
- connections to airports and intermodal facilities.

The transportation factor evaluated included:

- travel-time sensitivity analysis.

Based on the evaluation of the environmental, planning/engineering, and transportation factors, eight counties were removed from the study area, reducing the study area from 78 to 70 counties. Six counties were removed based on a travel-time sensitivity analysis, which determined those counties were too far away from existing I-35 to provide a viable alternative based on travel-time for thru-traffic. Additionally, two counties were removed to avoid the urbanized areas, an objective articulated in the Plan.
During the Spring of 2004, a scoping process was initiated for the proposed TTC-35. The scoping process included a series of meetings with resource and regulatory agencies and 26 public meetings. During the scoping process, the 70-county study area was presented for review and comment. The comments received during the scoping process are summarized in the *TTC-35 Tier One EIS Scoping Report* (April, 2005) (TxDOT, 2005a).

Based on the comments received during the scoping process, the 70-county study area was evaluated and further refined. The majority of refinements were made in response to public comments requesting:

- consideration for using existing and planned highway and/or rail facilities;
- incorporation of Dallas and Tarrant counties into the study area; and
- placing TTC-35 in proximity to portions of existing I-35.

Additional refinements to the 70-county study area shown at the scoping meetings were made based on newly obtained information related to engineering, mobility, and/or connectivity issues. These refinements resulted in a study area for the Tier One EIS that includes all or parts of 77 counties. **Table 10** in the Study Area Identification Report ([Appendix A-4](#)) provides a summary of the revisions made to the 70-county study area based on agency and public scoping and new technical information. The TTC-35 study area as refined following the scoping process is shown on **Figure 1-5**. **Chapter 8** includes a summary of the Tier One scoping process.

**Table 1-2** summarizes the factors considered in developing the study area. A comprehensive discussion of the study area development method and how the public and agency input was incorporated into the process is provided in the Study Area Identification Report ([Appendix A-4](#)).

<table>
<thead>
<tr>
<th>Environmental Factors</th>
<th>Planning/Engineering Considerations</th>
<th>Transportation Analysis</th>
<th>Public and Agency Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federally Protected Species</td>
<td>Ability to Utilize Existing I-35</td>
<td>Origin-Destination Analysis</td>
<td>Based on comments received at the Spring 2004 Scoping Meetings, the study area boundaries were refined to incorporate additional existing and planned facilities, to incorporate Dallas and Tarrant counties, and to be closer to portions of I-35.</td>
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<tr>
<td>Edwards Aquifer</td>
<td>Consideration of Utility Infrastructure</td>
<td>Travel-Time Sensitivity Analysis</td>
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<tr>
<td>Topography</td>
<td>Connections to Airports and Intermodal Facilities</td>
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<td>Air Quality Non-Attainment Areas (including near non-attainment areas as designated by TCEQ)</td>
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<td>Cultural Resources</td>
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<td>Economic Conditions</td>
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<td>Land Use</td>
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<td>Landfills and Superfund Sites</td>
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<td>Wetlands</td>
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2.0 ALTERNATIVES

In accordance with NEPA, 23 CFR Part 771, the FHWA Technical Advisory 6640.8A, and 43 TAC Chapter 2, Subchapter C, various alternatives were considered for meeting the future transportation needs within the study area. During the development of the alternatives, efforts were made to minimize the potential for environmental impacts, while considering general conceptual design elements of potential future TTC-35 facilities. This Chapter discusses the process used to identify the alternatives including the Preliminary Corridor Alternatives (PCAs), the Reasonable Corridor Alternatives (RCAs), and the Preferred Alternative. In addition, it provides answers to the following questions:

- What alternatives were considered and how were they developed?
- What alternatives were eliminated from further consideration and why?
- What alternatives were advanced for study in the DEIS and why?
- What is the Recommended Preferred Alternative and why was it identified?

The decision considered in this document is the selection of either the No Action Alternative or the selection of a corridor in which a TTC-35 facility(ies) could be constructed if such a facility(ies) receives environmental approval through Tier Two environmental processes. If the Tier One decision results in a corridor alternative (which would be from 4 to 18 miles wide) as the Preferred Alternative, the selected corridor would become the study area for subsequent Tier Two environmental processes of potential alignments for a TTC-35 facility(ies). No construction-related activities will be authorized as a result of the Tier One decision.

2.1 PRELIMINARY ALTERNATIVES

Preliminary alternatives considered include: Transportation Systems Management, Travel Demand Management, upgrading existing facilities, the No Action Alternative, and PCAs. Each of these is described below.

Transportation Systems Management

Transportation Systems Management (TSM) refers to a set of transportation policies or strategies aimed at reducing traffic congestion and improving roadway mobility without major capital expenditures to increase physical roadway traffic capacity. TSM strategies are aimed at making adjustments to the existing roadway transportation system to increase traffic flow, and include the optimization of traffic signal timing, improvements in intersection geometry, the designation of High Occupancy Vehicles (HOV) lanes, and Intelligent Transportation Systems (ITS). TSM programs and policies are strongly encouraged by TxDOT and a variety of TSM measures are included in the transportation plans of the Metropolitan Planning Organizations (MPOs) within the study area.

Railroad operators try to accomplish the same goals as those managing roadway improvements, but use different terms, such as improved blocking strategies designed to decrease car handlings (switching), and use of industrial engineering techniques to reduce
cost or increase speed in maintenance and servicing activities through better information, techniques and strategies. A relatively recent approach to line capacity in the industry has been directional running, using two different rail lines that connect the same points and running trains predominately one way on one line and the opposite on the other line.

Based on the anticipated population growth and traffic projections, as discussed in the Need and Purpose Statement Support Document (Appendix A-3), and since TTC-35 has a 50-year planning horizon, TSM strategies alone would not meet the predicted transportation needs of the study area. Traffic projections indicate the need for additional physical capacity for efficient movement of goods and people within the study area. The decision being evaluated in this Tier One DEIS is a corridor-level decision and not an alignment-level decision. TSM is more appropriately considered as a transportation solution at an alignment-level decision. If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative for TTC-35, TSM strategies would be evaluated for effectiveness during Tier Two environmental processes when project-specific details regarding alignment, geometry, and traffic volumes of a potential TTC-35 facility(ies) are known. Any TSM strategy identified would be developed in conjunction with local transportation plans during Tier Two environmental processes.

**Travel Demand Management**

Travel Demand Management (TDM) strategies are designed to reduce the number of vehicles on roadways, particularly during peak travel periods. TDM utilizes programs and policies aimed at increasing the number of occupants per vehicle, encouraging motorists to avoid driving during morning, noon and evening “rush hours”, and using alternative modes of transportation. Examples of TDM strategies include parking preferences and price breaks for van pools or car pools, creation of HOV lanes for use by buses, car pools and van pools, “flextime” in the workplace to encourage travel outside the most congested times, improved transit service, and pedestrian and bicycle facilities. This approach involves the integration of transportation planning with broader urban design and lane use initiatives, such as higher densities, mixed land use, and increased use of telecommunications. TDM strategies are strongly encouraged by TxDOT. In addition, a variety of TDM strategies are included in the MPOs’ plans within the study area.

TDM strategies in freight railroad operation have, until recently (within the last two to three years), not existed. Railroads have generally sought any freight traffic that would make a positive contribution to operating income. In addition to distance, railroads price their services based on the value of the commodity, the volume of the commodity, and their ability to move the commodity effectively. Recently, the major railroads have found that they have more potential freight opportunities than physical capacity, and have been making pricing changes to eliminate freight traffic that makes the least contribution to revenue and encourage more of the higher valued movements.

Based on the anticipated population growth and traffic projections, as discussed in the Need and Purpose Statement Support Document (Appendix A-3), and since TTC-35 has
a 50-year planning horizon, TDM strategies alone would not meet the predicted transportation needs of the study area. As with TSM, future traffic projections indicate the need for additional capacity for efficient movement of goods and people within the study area. The decision being evaluated in this Tier One DEIS is a corridor-level decision and not an alignment-level decision. TDM is more appropriately considered as a transportation solution at an alignment-level decision. If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative for TTC-35, TDM strategies would be evaluated for effectiveness in conjunction with local transportation plans during Tier Two environmental processes.

**Upgrade of an Existing Facility**

Under this alternative, an existing transportation facility or contiguous set of existing transportation facilities within the study area would be upgraded to meet the TTC-35 need and purpose. Between Laredo, Texas and the Texas/Oklahoma state line, I-35 meanders within and adjacent to the TTC-35 study area. Although portions of I-35 may provide opportunities for a TTC-35 corridor, environmental and development constraints adjacent to the I-35 ROW would prohibit the expansion of I-35 to a 1,200-foot ROW for much of its length, particularly in the area between Dallas and San Antonio. Other facilities within the study area may provide opportunities for expansion beyond the existing ROW limits, but no single facility would accommodate the entire length of TTC-35 envisioned in the Plan. In addition, within the study area no contiguous set of existing north-south oriented facilities exist that could be reasonably upgraded to meet the complete TTC-35 vision expressed in the Plan.

Railroads typically make most facility improvements within their existing ROW. Railroad companies primarily build new lines to serve new markets. When existing lines have serious deficiencies (curves, grades, flooding, etc.), geographically minor line changes are made to correct or ameliorate the deficiencies. Most railroad lines in 2005 within the study area are on the general alignment chosen at the time of construction. To the extent possible, curves and grades have been reduced without requiring relocation of adjacent structures. This has had two results:

- incremental improvements have been achieved over time; and
- the ultimate efficiency of the rail corridor is generally subject to the same constraint that the initial corridor had with respect to curvature, profile, and expandability.

Although upgrading an existing railroad or highway facility to accommodate the entire TTC-35 was dropped from further consideration, opportunities to utilize existing facilities for portions of TTC-35 were considered during the development of PCAs.

The decision being evaluated in this Tier One DEIS is a corridor-level decision and not an alignment-level decision. The upgrading of an existing facility is more appropriately considered as a transportation solution at an alignment-level decision. If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative for
TTC-35 the upgrading of existing facility(ies) within the Tier Two study area would be evaluated during Tier Two environmental processes.

No Action Alternative
If the Tier One decision selects the No Action Alternative, no corridor would be selected and the TTC-35 project, as envisioned, would not proceed.

The No Action Alternative assumes the construction of other roadway projects within the study area currently planned and programmed in the STIP and MPO Metropolitan Transportation Plans.

The No Action Alternative for railways equates to maintenance of the status quo, which means the primary focus would be on maintenance of existing facilities and operations, and modest expansions of capacity and commercial facilities.

The No Action Alternative was carried forward and evaluated in this DEIS.

Preliminary Corridor Alternatives (PCAs)
Preliminary corridor alternatives were created as the first step in the development of alternatives that would identify corridors connecting at least one northern terminus to at least one southern terminus. In developing the PCAs, efforts were made to avoid large-scale environmental constraints (e.g. designated critical habitat for threatened and endangered species, existing and proposed reservoirs, urbanized areas, military bases, large parks and wildlife refuges, etc.) that would potentially influence the location of a 10-mile wide corridor. Four primary steps were used to initially develop the PCAs. These steps included the identification of:

1. Large-scale avoidance areas;
2. Northern and southern termini;
3. Potential corridors based on slope/distance trends utilizing a Geographic Information System (GIS)-based route optimization tool; and
4. Potential corridors utilizing existing major transportation highway and rail infrastructure.

The TTC-35 Corridor Alternatives Development Technical Report (“Alternatives Technical Report”) (October, 2005) provides a detailed discussion on how the PCAs were developed. A copy of the Alternatives Technical Report is included in Appendix B-1.

Public and agency meetings were held in the Fall of 2004 to solicit input on the PCAs. The comments received at the Fall 2004 public meetings are summarized in the TTC-35 Tier One EIS Fall 2004 Public Meeting Report document (May, 2005) (TxDOT, 2005b). The PCAs presented at the public meetings in the Fall of 2004 are shown on Figure 2-1.
Comments received during the Fall 2004 public and agency meetings were reviewed, the input received was considered, and the PCAs were further refined. Three steps were used in refining the PCAs. These steps included:

1. Narrowing the PCAs (the strongest trend lines between two points) to 10 miles wide based on trend-line concentrations;\(^{32}\)
2. Modifying the existing infrastructure corridors by buffering to 4-mile wide corridors;\(^{33}\) and,
3. Identifying modal transition zones (MTZs) and potential connection zones (PCZs) (definitions of these are provided below).

As previously mentioned, the Alternatives Technical Report (Appendix B-1) provides a detailed discussion on how the PCAs were developed.

Modal Transition Zones are defined as zones within which the various transportation modes (auto, truck, rail, and utilities) would be routed to best serve their respective destinations. Furthermore, within these zones, locally developed transportation facilities could be incorporated into a TTC-35 facility(ies). Potential connections to facilities within the MTZs would be studied during the Tier Two environmental processes in cooperation with local elected officials and planning organizations.

Potential Connection Zones are defined as areas at the Laredo and the Rio Grande Valley southern termini, which are common to all PCAs approaching these termini.\(^{34}\) PCZs were established during the project development process to allow for the identification of the best connection to existing or future border facilities should TTC-35 advance to Tier Two environmental processes. At the corridor level it is not possible to identify alignment-specific logical termini and connections to infrastructure because an alignment has not been proposed. In the absence of alignment-specific information, it is appropriate to identify corridor-level logical termini at the borders of the state. Therefore, these PCZs, along with the PCZs identified during RCA development (at the northern end of the study are near Gainesville and Sherman-Denison) were utilized as logical termini for the project.\(^{35}\)

MTZs and PCZs were identified as zones for future analyses during Tier Two environmental processes. At the Tier One stage, sufficient data are not available to designate precise connections through MTZs and PCZs.

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\(^{32}\) A trend line is a path that follows the least slope and distance between the origin and destination points (Texas/Oklahoma state line to Texas/Mexico border or Texas Gulf Coast). Trend line concentrations occur where clusters or groupings of trend lines exist.

\(^{33}\) In areas where trend-line generated corridors overlapped with existing infrastructure corridors, the corridor was considered an existing infrastructure corridor and was narrowed to 4 miles in width.

\(^{34}\) Note: As part of the process of determining RCAs for detailed study in the DEIS and in response to comments, PCZs were added at the northern termini in the vicinity of Gainesville and Sherman-Denison. This is discussed under Section 2.2 – Alternatives for Further Study.

\(^{35}\) The FHWA Memorandum “The Development of Logical Project Termini” (USDOT-FHWA, 1993) defines logical termini as 1) rational endpoints for a transportation improvement, and 2) rational endpoints for a review of environmental impacts.
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The PCA development process led to the identification of 31 PCA segments within three regions (North, Central, and South) of the study area. The PCA segments are shown on Figure 2-2.

The 31 PCA segments were presented to the public and agencies during meetings held in Spring 2005. The comments received at the public meetings are summarized in the TTC-35 Tier One EIS Spring 2005 Public Meeting Report document (July, 2005) (TxDOT, 2005c).

The 31 PCA segments could be combined to create 180 full-length corridors connecting the Texas/Oklahoma state line to the Texas/Mexico border and/or the Texas Gulf Coast. The PCA segments were evaluated based on environmental, planning/engineering, and transportation screening criteria. The environmental screening criteria included the Texas Ecological Assessment Protocol composite (TEAPc) data\textsuperscript{36}, wetlands data, prime farmland soils data, and information on cultural resource districts (Osowski, et.al., 2005).\textsuperscript{37} The engineering screening criteria included connectivity with existing highways and railroads, slope, and distance. The transportation screening criteria were a measurement of each PCA segment’s ability to meet the TTC-35 need and purpose. The transportation screening criteria included system demand, I-35 demand, and I-35 demand/vehicle miles traveled (VMT) based on travel demand modeling using the SAM. A detailed discussion of each of these criteria and the analysis of each PCA segment is included in the Alternatives Technical Report (Appendix B-1).

The following paragraphs contain descriptions of each PCA segment along with a discussion of why or why they were not advanced for detailed study in the DEIS. The locations and places named in the descriptions are located within the State of Texas.

Northern Region
The PCA segments that begin with the letter “N” are located in the northern region of the study area. Northern segments that terminate at I-35 are labeled “N1”, segments that terminate at United States Highway (US) 75 are labeled as “N2”, and segments terminating at US 271 are labeled as “N3”.

**N1A** has a length of approximately 189 miles. It begins on the Texas/Oklahoma state line at I-35 and proceeds south as a 4-mile wide corridor centered on I-35 through Gainesville to just north of Denton. At Denton it becomes a 10-mile wide corridor proceeding southwest until crossing US 287, turning southward across US 180 between Mineral Wells and Weatherford. From that point, it heads generally south across I-20. At Granbury it heads southeast ending at US 84 approximately 15 miles west of Waco near the western edge of the study area boundary. N1A was not carried forward since it was less effective at meeting the TTC-35 need and purpose than other PCA segments in

\textsuperscript{36} TEAPc scores are based in part on ecological diversity, rarity, and sustainability. The TEAPc scale is a graduated scale where “Top 1%” identifies those areas that are among the top 1% ecological important areas with an ecoregion, and the “51 to 100%” category includes the least ecological important areas with the ecoregion.

\textsuperscript{37} 23 acres was used for reporting cultural resource sites/districts in order to maintain consistency with the I-69/TTC project environmental process as a critical area for reporting cultural resources sites.
the northern region, because it scored lower on the transportation screening criteria. Furthermore, it scored lower for three of the planning/engineering screening criteria (slope, length, and connectivity with highways) than did other northern PCA segments.

**N1B** has a length of approximately 174 miles. It follows the same path as N1A from the Texas/Oklahoma state line to a point near Springtown. It continues as a 10-mile wide corridor southwest of US 287 heading south across I-20. It then merges back with N1A on the same path near Meridian near State Highway (SH) 22 until ending at a point on US 84 approximately 15 miles west of Waco near the western edge of the study area boundary. N1B was carried forward since it was more effective at meeting the TTC-35 need and purpose than other PCA segments in the northern region, because it scored higher on the transportation screening criteria. In addition, it scored slightly better on the planning/engineering screening criteria, with the exception of connectivity with rail (which scored in the mid-range), than the other northern PCA segments, and it did not have any environmental screening criteria that would preclude its use in an RCA. Furthermore, because of its proximity to the west side of Fort Worth, it would provide the opportunity to consider a corridor west of the Dallas-Fort Worth (DFW) metropolitan area.

**N1C** has a length of approximately 178 miles. It follows the same path as N1B from the Texas/Oklahoma state line until approximately Cleburne. It continues as a 10-mile wide corridor at US 67 where it curves southeasterly between Lake Whitney and Aquilla Lake. It then merges back with N1B on the same path, west of Lake Waco, ending at a point on US 84 approximately 15 miles west of Waco near the western edge of the study area boundary. N1C did not have any environmental and/or planning/engineering screening criteria that would preclude its use in an RCA. However, N1C was not carried forward since it was less effective at meeting the TTC-35 need and purpose than other PCA segments in the northern region, because it scored lower on the transportation screening criteria.

**N1D** has a length of approximately 176 miles. It begins on the Texas/Oklahoma state line at I-35 and proceeds southeast as a 10-mile wide corridor until reaching the intersection of US 380 and SH 78 west of Greenville. It then curves southwest across I-30, I-20, and I-45, continuing south and east of I-35 until ending at US 84 northeast of Waco. N1D was carried forward since it was more effective at meeting the TTC-35 need and purpose than other PCA segments in the northern region, because it scored higher on the transportation screening criteria. In addition, the PCA did not have environmental or planning/engineering screening criteria that would preclude its use in an RCA. Furthermore, its proximity to the east side of Dallas would provide the opportunity to consider a corridor east of the DFW metropolitan area that terminates at N1.

**N2A** has a length of approximately 200 miles. It begins on the Texas/Oklahoma state line at US 75 and proceeds southwest as a 10-mile wide corridor until near Denton. It then follows the same path as N1C to a point on US 84 about 15 miles west of Waco near the western boundary of the study area. N2A did not have any environmental and/or
planning/engineering screening criteria that would preclude its use in an RCA. However, N2A was not carried forward since it was less effective at meeting the TTC-35 need and purpose than other PCA segments in the northern region, because it scored lower on the transportation screening criteria.

N2B has a length of approximately 180 miles. It begins on the Texas/Oklahoma state line at US 75 and proceeds southward as a 4-mile wide corridor centered on US 75 until a point slightly north of McKinney. It then follows the same path as N1D until reaching I-35 East (E) south of Waxahachie. At this point, it becomes a 4-mile wide corridor centered on I-35E and then I-35 and heads south until reaching US 84 northeast of Waco. N2B was not carried forward since it was less effective at meeting the TTC-35 need and purpose than other PCA segments in the northern region, because it scored lower on the transportation screening criteria.

N2C has a length of approximately 162 miles. It begins on the Texas/Oklahoma state line at US 75 and proceeds south as a 10-mile wide corridor until a point northeast of McKinney where it follows the same path as N1D until ending at US 84 northeast of Waco. N2C was carried forward since it was more effective at meeting the TTC-35 need and purpose than other PCA segments in the northern region, because it scored higher on the transportation screening criteria. In addition, it would provide the opportunity to consider an RCA east of the DFW metropolitan area that terminates at N2.

N3A has a length of approximately 183 miles. It begins on the Texas/Oklahoma state line at US 271 and proceeds southwest as a 10-mile wide corridor until crossing I-30 east of Rockwall. It then follows a parallel and partially overlapping path as N1D until north of Navarro Mills Lake where it merges with N1D, N2C, and N2B until ending at US 84 just northeast of Waco. N3A was not carried forward since it was less effective at meeting the TTC-35 need and purpose than other PCA segments in the northern region, because it scored lower on the transportation screening criteria.

N3B has a length of approximately 174 miles. It begins on the Texas/Oklahoma state line at US 271 and proceeds southwest as a 4-mile wide corridor centered on US 271 until reaching the vicinity of Commerce where it widens to a 10-mile wide corridor and follows the same path as N3A until reaching Corsicana. From that point it narrows to a 4-mile wide corridor centered on I-45 and SH 14, until reaching just west of the Richland-Chambers Reservoir where it stays centered on SH 14 and the Union Pacific Railroad line to Mexia and ends at US 84. N3B was not carried forward since it was less effective at meeting the TTC-35 need and purpose than other PCA segments in the northern region, because it scored lower on the transportation screening criteria.

Central Region
The PCA segments that begin with the letter “C” are located in the central region of the study area.

CA has a length of approximately 166 miles. It begins as a 10-mile wide corridor at US 84 just northeast of Waco, and runs approximately parallel to, and slightly east of I-35. It
ends at I-10 east of San Antonio on the west side of Seguin. It follows the planned path for SH 130 except where SH 130 connects to I-10. CA was carried forward since it was more effective at meeting the TTC-35 need and purpose than other PCA segments in the central region, because it scored higher on the transportation screening criteria. It does not contain any environmental or planning/engineering criteria that would preclude its use as a corridor. Furthermore, it provides the opportunity to consider a corridor that lies in proximity to I-35 and to cities adjacent to I-35 between US 84 and I-10.

**CB** has a length of approximately 174 miles. It begins as a 10-mile wide corridor at US 84 just northeast of Waco following the same path as CA until south of Temple. It continues in a slight southwestern curve, passing east of Taylor, until merging with CA near US 290 east of Austin. From that point, it follows the path of CA; however, it separates from CA just prior to ending at I-10 north of Seguin. CB was carried forward since it was more effective at meeting the TTC-35 need and purpose than other PCA segments in the central region, because it scored higher on the transportation screening criteria. It does not include any other environmental or planning/engineering screening criteria that would preclude its use as an RCA. Furthermore, it provides the opportunity to consider a corridor that is further away from I-35 in the central region as compared to the other PCA segments in the central region that were carried forward.

**CC** has a length of approximately 134 miles. It begins as a 10-mile wide corridor at a point on US 84 approximately 15 miles west of Waco near the western boundary of the study area. It proceeds southeasterly and merges with CA on the east side of I-35 just north of Temple and follows the path of CA until reaching US 183 near Lockhart where it becomes a 4-mile wide corridor centered on US 183 southward until ending at I-10 near Luling. Only the portion of CC from US 84 to north of Temple was carried forward since it was required to provide a connection to N1B (the combined PCA is herein referred to as N1B/CC), which would allow the opportunity to consider an alternative that lies west of the DFW metropolitan area. In addition, CC scored well for meeting the TTC-35 need and purpose by scoring high for two of three transportation-screening criteria.

**CD** has a length of approximately 153 miles. It begins as a 10-mile wide corridor at US 84 just northeast of Waco until near SH 7 west of Marlin and proceeds south to cross US 190 west of Cameron and US 79 west of Rockdale. From there, it proceeds south across US 290 west of Giddings and continues east of Bastrop State Park, taking a sharp turn southwest to end at I-10 in Luling. CD was not carried forward since it was less effective at meeting the TTC-35 need and purpose than other PCA segments in the central region, because it scored lower on the transportation screening criteria.

**CE** has a length of approximately 152 miles. It begins as a 10-mile wide corridor at US 84 just northeast of Waco and becomes a 4-mile wide corridor approximately 7 miles southeast of Waco at SH 6. It continues southeast as a 4-mile wide corridor centered on SH 6 until Marlin where it becomes centered on the Union Pacific Railroad, west of Bryan-College Station. It then continues in a southwest direction until ending at I-10 in Flatonia. CE did not have any environmental and/or planning/engineering screening.
criteria that would preclude its use in a RCA. However, CE was not carried forward since it was less effective at meeting the TTC-35 need and purpose than other PCA segments in the central region, because it scored lower on the transportation screening criteria.

**CF** has a length of approximately 150 miles. It begins as a 4-mile wide corridor at Mexia and US 84 and proceeds south along SH 14 until reaching Hearne where it follows the same path as CE ending at I-10 in Flatonia. CF was not carried forward since it was less effective at meeting the TTC-35 need and purpose than other PCA segments in the central region, because it scored lower on the transportation screening criteria.

**Southern Region**

PCA segments that begin with the letter “S” are located in the southern region of the study area. PCA segments beginning with “S1” would connect with existing and/or future facilities in Laredo in order to reach the Texas/Mexico border. PCA segments beginning with “S2” would connect with existing and/or future facilities in the Rio Grande Valley in order to reach the Texas/Mexico border. PCA segments beginning with “S3” would connect with existing and/or future facilities in the vicinity of Corpus Christi in order to reach the Texas Gulf Coast.

**S1A** has a length of approximately 154 miles. It begins as a 10-mile wide corridor at I-10 east of San Antonio on the west side of Seguin, and curves to the southwest along Loop 1604. At US 181, it becomes a 4-mile wide corridor and heads west until intersecting I-35 just north of Lytle and centers on I-35 ending at the Texas/Mexico border near Laredo. S1A was carried forward since it was more effective at meeting the TTC-35 need and purpose than other PCA segments in the southern region, because it scored higher on the transportation screening criteria. Furthermore, it provides the opportunity to consider an RCA that incorporates portions of existing I-35 between San Antonio and Laredo.

**S1B** has a length of approximately 148 miles. It begins as a 10-mile wide corridor at I-10 in Seguin and curves southwest, crossing US 181 on the west side of Floresville. It crosses I-37 approximately 5 miles southeast of Pleasanton and continues southwest ending at the Texas/Mexico border near Laredo. S1B was carried forward since it was more effective at meeting the TTC-35 need and purpose than other PCA segments in the southern region, because it scored higher on the transportation screening criteria. In addition, it does not have any environmental or planning/engineering screening criteria that would preclude its use as a corridor. Furthermore, it provides the opportunity to consider a corridor terminating in Laredo that would not run directly adjacent to I-35.

**S1C** has a length of approximately 163 miles. It begins as a 10-mile wide corridor at I-10 near Luling and heads southwest where it merges with S1B at US 181 west of Floresville and follows the same path as S1B ending at the Texas/Mexico border near Laredo. S1C

PCA Segments S1A, S1B, S1C, S1D, S1E, and S1F connect with the PCZ in Laredo, Texas. The PCZ was established to allow for the identification of the best connection to existing or future border facilities as TTC-35 facilities are developed during Tier Two environmental processes.
did not have any environmental and/or planning/engineering screening criteria that would preclude its use in a RCA. However, S1C was not carried forward, since not only is S1C almost entirely on the same path as S1B, it also provides little usefulness since the southern portion of CC and all of CD, which S1C would serve to connect, did not merit being carried forward in the analysis.

**S1D** has a length of approximately 106 miles. It begins as a 4-mile wide corridor at the Texas Gulf Coast near Corpus Christi and heads west along SH 44 to Alice. It widens to a 10-mile wide corridor and continues southwest ending at the Texas/Mexico border near Laredo. S1D was not carried forward, because it would not contribute to meeting the TTC-35 need and purpose on its own merit since it runs east-west, between Laredo and Alice and would only function within a corridor if it connected to another PCA segment in the southern region.

**S1E** has a length of approximately 177 miles. It begins as a 4-mile wide corridor at I-10 near Luling and proceeds south centered on SH 80 until reaching Nixon. It then widens to a 10-mile wide corridor and heads southwest to George West. It continues southwest through Freer centered on US 59 and ends at the Texas/Mexico border near Laredo. S1E did not have any environmental and/or planning/engineering screening criteria that would preclude its use in a RCA. However, S1E was not carried forward since it was less effective at meeting the TTC-35 need and purpose than other PCA segments in the southern region, because it scored lower on the transportation screening criteria.

**S1F** has a length of approximately 110 miles. It begins as a 4-mile wide corridor at the Texas Gulf Coast near Corpus Christi following the same path as S1D to Alice. It then separates from S1D and heads west until approximately 20 miles east of Freer where it merges with S1E and follows its path until ending at the Texas/Mexico border near Laredo. S1F was not carried forward, because it would not contribute to meeting the TTC-35 need and purpose on its own merit since it runs east-west between Laredo and Corpus Christi and would only function within a corridor if it connected to another PCA segment in the southern region.

**S2A** has a length of approximately 229 miles. It begins as a 10-mile wide corridor at I-10 in Seguin and narrows to a 4-mile wide corridor following the path of S1A southwest along Loop 1604. At the intersection of US 281, I-37, and Loop 1604, it separates from S1A and heads south as a 10-mile wide corridor centered on US 281 and I-37. It then narrows to a 4-mile wide corridor as US 281 and I-37 merge southeast of Pleasanton. From that point, S2A remains centered on US 281 as it splits from I-37 north of Three Rivers and proceeds southward to George West where it narrows to include only the existing ROW width of US 281 southward until reaching the Texas/Mexico border in the

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39 PCA Segments S1D, S1F, S3A, S3B, S3C and S3D connect with the MTZ at Corpus Christi. Within the MTZ, the various modes (auto, truck, rail, and utilities) would be routed to best serve their respective destinations and locally developed transportation facilities will be incorporated. Connection details would be studied during the Tier Two environmental processes in cooperation with local elected officials and planning organizations.

40 Although PCA segments centered on existing transportation facilities are typically 4 miles wide, that portion of PCA segment S1E that is centered on US 59 is 10 miles wide. This was done to maintain consistency with the I-69/TTC project which is also studying this portion of US 59 as a potential corridor connection to Laredo.
S2A was not carried forward since it was less effective at meeting the TTC-35 need and purpose than other PCA segments in the southern region, because it scored lower on the transportation screening criteria.

**S2B** has a length of approximately 227 miles. It begins as a 10-mile wide corridor at I-10 near Seguin and curves southwest across US 181 on the west side of Floresville. It then follows the same path as S1B until reaching southeast of Pleasanton at which point it breaks off to follow the path of S2A as a 4-mile wide corridor until near George West. At George West, it widens to a 10-mile wide corridor and then widens further to 15 miles for a distance of approximately 25 miles. It narrows gradually to an average width of approximately 7 miles as it precedes south ending at the Texas/Mexico border in the Rio Grande Valley. S2B did not have any environmental and/or planning/engineering criteria that would preclude its use in a corridor. However, S2B was not carried forward since it was less effective at meeting the TTC-35 need and purpose than other PCA segments in the southern region, because it scored lower on the transportation screening criteria.

**S2C** has a length of approximately 226 miles. It begins as a 10-mile wide corridor at I-10 east of Luling and curves southwest until reaching George West where it joins S2B following its path ending at the Texas/Mexico border in the Rio Grande Valley. S2C did not have any environmental and/or planning/engineering screening criteria that would preclude its use in a corridor. However, S2C was not carried forward since it was less effective at meeting the TTC-35 need and purpose than other PCA segments in the southern region, because it scored lower on the transportation screening criteria.

**S2D** has a length of approximately 236 miles. It begins as a 4-mile wide corridor at I-10 near Luling and then widens to a 10-mile wide corridor at Nixon. It then follows the path of S1E to Kenedy. At that point, it becomes a 4-mile wide corridor centered on US 181 and proceeds southeast to SH 359 south of Beeville. It then follows SH 359 southwest to Alice and turns south where it follows the path of S2A until ending at the Texas/Mexico border in the Rio Grande Valley. S2D did not have any environmental and/or planning/engineering screening criteria that would preclude its use in a corridor. However, S2D was not carried forward since it was less effective at meeting the TTC-35 need and purpose than other PCA segments in the southern region, because it scored lower on the transportation screening criteria.

**S2E** has a length of approximately 237 miles. It begins as 10-mile wide corridor at I-10 east of Luling and follows the path of S2C separating slightly north of Kenedy. It then heads south becoming a 4-mile wide corridor centered on I-37 near Mathis. It continues heading southeast to Calallen where it becomes a 10-mile wide corridor centered on US 77 heading slightly southwest to near Kingsville. In Kingsville, it narrows to include only the ROW width of US 77 until it reaches a point north of Raymondville and ends at the Texas/Mexico border in the Rio Grande Valley. S2E was not carried forward since it

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41 PCA Segments S2A, S2B, S1C, S1D, S1E and S1F connect with the PCZ in the Rio Grande Valley. The PCZ was established to allow for the identification of the best connection to existing or future border facilities as TTC-35 facilities are developed during Tier Two environmental processes.
was less effective at meeting the TTC-35 need and purpose than other PCA segments in the southern region, because it scored lower in the transportation screening criteria.

S2F has a length of approximately 267 miles. It begins at I-10 near Luling as a 4-mile wide corridor centered on US 183 and continues southeast to Cuero where it heads southwest centered on SH 72 to Kenedy. It is then centered on US 181 running southeast to Sinton where it turns southwest centered on US 77 to Calallen. It then follows the same path as S2E until ending at the Texas/Mexico border in the Rio Grande Valley. S2F was not carried forward, because it was completely blocked by the Cuero Archaeological District.

S3A has a length of approximately 157 miles. It begins as a 10-mile wide corridor at I-10 in Seguin following the same path as S2A until east of Choke Canyon Reservoir. It then continues southeast as a 4-mile wide corridor until ending at the Texas Gulf Coast in the vicinity of Corpus Christi. S3A was not carried forward since it was less effective at meeting the TTC-35 need and purpose than other PCA segments in the southern region, because it scored lower in the transportation screening criteria.

S3B has a length of approximately 139 miles. It begins as a 10-mile wide corridor at I-10 in Seguin and proceeds southwest along Loop 1604. It then narrows to a 4-mile wide corridor centered on US 181 southeast of Calaveras Lake until ending at the Texas Gulf Coast in the vicinity of Corpus Christi. S3B did not have any environmental and/or planning/engineering screening criteria that would preclude its use in a RCA. However, S3B was not carried forward since it was less effective at meeting the TTC-35 need and purpose than other PCA segments in the southern region, because it scored lower on the transportation screening criteria.

S3C has a length of approximately 133 miles. It begins as a 4-mile wide corridor at I-10 in Seguin and proceeds along SH 123 south to Karnes City where it follows the path of S3B until ending at the Texas Gulf Coast in the vicinity of Corpus Christi. S3C did not have any environmental and/or planning/engineering that would preclude its use in a RCA. However, S3C was not carried forward since it was less effective at meeting the TTC-35 need and purpose than other PCA segments in the southern region, because it scored lower on the transportation screening criteria.

S3D has a length of approximately 160 miles. It begins as a 4-mile wide corridor at I-10 in Flatonia where it is centered on the Union Pacific Railroad southwest along the eastern edge of the study area. It continues southwest as a 4-mile wide corridor centered on SH 72 until Kenedy where it follows the path of S3B until it ends at the Texas Gulf Coast in the vicinity of Corpus Christi. S3D was not carried forward, because the corridor segment is completely blocked by the Cuero Archaeological District.

2.2 ALTERNATIVES CONSIDERED FOR FURTHER STUDY

As described in the previous section, seven of the 31 PCA segments (N1B/CC, N1D, N2C, CA, CB, S1A, and S1B) were carried forward. These seven PCA segments were
combined in various configurations to form 12 RCAs that were advanced for further study in this Tier One DEIS. In addition to these 12 corridor alternatives, the No Action Alternative was advanced for further study. Each RCA has a minimum width of 4 miles or 10 miles. Minimum widths of 4 miles occur where RCAs are centered on existing infrastructure and minimum widths of 10 miles occur where RCAs are centered on trend lines used to create PCAs. Common to all RCAs is an 18-mile-wide area east of San Antonio where individual RCAs overlap. A description of each RCA is provided below and all of the RCAs are presented on Figure 2-3.

As part of the process of determining RCAs for detailed study in the DEIS and in response to comments, PCZs were added at the northern termini in the vicinity of Gainesville and Sherman-Denison. These PCZs, which are common to all RCAs approaching these termini, were established to allow for the identification of the best connection to existing facilities should TTC-35 advance to Tier Two environmental processes.

**RCA 1 (PCA Segments N1B/CC–CA–S1A)**
RCA 1 has a centerline length of approximately 506 miles and an area of approximately 4,983 square miles. The northern terminus is located at the Texas/Oklahoma state line in the vicinity of Gainesville. The corridor proceeds south as a 4-mile wide corridor centered on I-35 to just north of Denton. Then, it becomes a 10-mile wide corridor proceeding southwest crossing US 287, curving south across I-20, and continues south across US 84 to I-35 north of Temple. At that point, it generally parallels existing I-35 to the east and crosses I-10 at Seguin. RCA 1 continues south until it reaches US 181 southeast of San Antonio. At US 181, it becomes a 4-mile wide corridor heading west along Loop 1604 until reaching I-35 north of Lytle. It then follows I-35 south to the Texas/Mexico border near Laredo. The general location of RCA 1 is shown in Figure 2-4.

**RCA 2 (PCA Segments N1B/CC–CB–S1A)**
RCA 2 has a centerline length of approximately 506 miles and an area of approximately 5,009 square miles. The northern terminus is at the Texas/Oklahoma state line in the vicinity of Gainesville. The corridor follows the path of RCA 1 to a point just east of Temple. At that point, it heads south and passes east of Taylor. RCA 2 crosses US 290 northwest of Bastrop then continues southeast where it joins back with RCA 1 near SH 71 southeast of Austin. RCA 2 then follows the path of RCA 1 until ending at the Texas/Mexico border near Laredo. The general location of RCA 2 is shown in Figure 2-5.

**RCA 3 (PCA Segments N1B/CC–CA–S1B)**
RCA 3 has a centerline length of approximately 486 miles and an area of approximately 5,571 square miles. The northern terminus is at the Texas/Oklahoma state line in the vicinity of Gainesville. The corridor follows the path of RCA 1 until reaching US 181

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42 RCA 1 includes SH 130 (under construction) for approximately 90 miles from just south of Georgetown to I-10 north of Seguin.
43 RCA 2 includes SH 130 (under construction) for approximately 40 miles from SH 71 southeast of Austin to I-10 north of Seguin.
southeast of San Antonio. At this point, RCA 3 continues southwest as a 10-mile wide corridor crossing I-37, SH 72, and SH 44 until ending at the Texas/Mexico border near Laredo. The general location of RCA 3 is shown in Figure 2-6.

**RCA 4 (PCA Segments NIB/CC–CB–S1B)**

RCA 4 has a centerline length of approximately 486 miles and an area of approximately 5,597 square miles. The northern terminus is at the Texas/Oklahoma state line in the vicinity of Gainesville. The corridor follows the path of RCA 2 until reaching US 181 southeast of San Antonio. At this point, RCA 4 follows the path of RCA 3 until ending at the Texas/Mexico border near Laredo. The general location of RCA 4 is shown in Figure 2-7.

**RCA 5 (PCA Segments N1D–CA–S1A)**

RCA 5 has a centerline length of approximately 521 miles and an area of approximately 5,307 square miles. The northern terminus is at the Texas/Oklahoma state line in the vicinity of Gainesville. The corridor heads southeast across US 75 to US 380 where it curves southwest across I-30, I-20, and I-45 and continues southwest to near Temple. At this point, RCA 5 follows the path of RCA 1 to the southern terminus at the Texas/Mexico border near Laredo. The general location of RCA 5 is shown in Figure 2-8.

**RCA 6 (PCA Segments N1D–CB–S1A)**

RCA 6 has a centerline length of approximately 521 miles and an area of approximately 5,333 square miles. The northern terminus is at the Texas/Oklahoma state line in the vicinity of Gainesville. The corridor follows the path of RCA 5 until near Temple. At this point, RCA 6 follows the path of RCA 2 to the Texas/Mexico border near Laredo. The general location of RCA 6 is shown in Figure 2-9.

**RCA 7 (PCA Segments N1D–CA–S1B)**

RCA 7 has a centerline length of approximately 502 miles and an area of approximately 5,895 square miles. The northern terminus is at the Texas/Oklahoma state line in the vicinity of Gainesville. The corridor follows the path of RCA 5 until it reaches US 181 southeast of San Antonio. At this point, RCA 7 follows the path of RCA 3 to the southern terminus at the Texas/Mexico border near Laredo. The general location of RCA 7 is shown in Figure 2-10.

**RCA 8 (PCA Segments N1D–CB–S1B)**

RCA 8 has a centerline length of approximately 501 miles and an area of approximately 5,921 square mile. The northern terminus is at the Texas/Oklahoma state line in the vicinity of Gainesville. The corridor follows the path of RCA 5 to near Temple at which point it follows RCA 2 to US 181 southeast of San Antonio. RCA 8 then follows the path of RCA 3 to the southern terminus at the Texas/Mexico border near Laredo. The general location of RCA 8 is shown in Figure 2-11.
RCA 9 (PCA Segments N2C–CA–S1A)
RCA 9 has a centerline length of approximately 508 miles and an area of approximately 5,141 square miles. The northern terminus is at the Texas/Oklahoma state line in the vicinity of Sherman-Denison. The corridor heads south to US 380 at which point it follows the path of RCA 5 to near Temple. RCA 9 then follows RCA 1 to the southern terminus at the Texas/Mexico border near Laredo. The general location of RCA 9 is shown in Figure 2-12.

RCA 10 (PCA Segments N2C-CB–S1A)
RCA 10 has a centerline length of approximately 507 miles and an area of approximately 5,167 square miles. The northern terminus is at the Texas/Oklahoma state line in the vicinity of Sherman-Denison. The corridor follows the path of RCA 9 until near Temple. RCA 10 then follows RCA 2 to the southern terminus at the Texas/Mexico border near Laredo. The general location of RCA 10 is shown in Figure 2-13.

RCA 11 (PCA Segments N2C–CA–SIB)
RCA 11 has a centerline length of approximately 488 miles and an area of approximately 5,730 square miles. The northern terminus is at the Texas/Oklahoma state line in the vicinity of Sherman-Denison. The corridor follows the path of RCA 9 until US 181 southeast of San Antonio. At this point, RCA 11 follows the path of RCA 3 to the southern terminus at the Texas/Mexico border near Laredo. The general location of RCA 11 is shown in Figure 2-14.

RCA 12 (PCA Segments N2C–CB–S1B)
RCA 12 has a centerline length of approximately 488 miles and an area of approximately 5,756 square miles. The northern terminus is at the Texas/Oklahoma state line in the vicinity of Sherman-Denison. The corridor follows the path of RCA 9 until near Temple at which point it follows the path of RCA 2 until US 181 southeast of San Antonio. RCA 12 then follows the path of RCA 3 to the southern terminus at the Texas/Mexico border near Laredo. The general location of RCA 12 is shown in Figure 2-15.

2.3 IDENTIFICATION OF THE PREFERRED ALTERNATIVE
The No Action Alternative would not meet the TTC-35 need and purpose. Planned capacity improvements that would occur under the No Action Alternative are not expected to substantially reduce congestion levels projected for the year 2025. Additional capacity needed beyond the planned improvements would likely prove to be cost-prohibitive in many cases because of development constraints along existing facilities. For these reasons, the No Action Alternative is not recommended as the Preferred Alternative.

Many large-scale (defined as of sufficient size to substantially block a 10-mile wide corridor) environmental resources were avoided when the study area was delineated and when alternatives were developed. The environmental resources within the RCAs are not distributed so that they completely block the width of any RCA. Thus, any one of the RCAs could be considered as the Preferred Alternative from an environmental
perspective. As a result, there is potential for identifying future TTC-35 facility(ies) alignments within any of the RCAs that would avoid many of the environmental resources considered in this Tier One DEIS. All 13 alternatives (No Action Alternative and 12 RCAs) were evaluated for indirect and cumulative effects. Based on the evaluation of the potential indirect and cumulative effects presented in this DEIS, no environmental factors were determined to preclude any of the RCAs from selection as the Preferred Alternative. Therefore, at the Tier One level of analysis, indirect and cumulative effects are not a differentiating factor in the identification of a preferred corridor alternative based on the analysis performed for the DEIS.

For this reason, environmental resources were not used as a basis for identifying the Preferred Alternative. Efforts would be made during Tier Two environmental processes to avoid and/or minimize the effects of a TTC-35 facility(ies) on environmental resources. In addition, mitigation would be developed for any effects that could not be avoided or minimized.

Planning/engineering criteria varied among the RCAs but these also did not on their own merit provide a quantifiable basis for precluding an RCA from consideration.

Transportation criteria varied among these RCAs and did, their own merit, provide a quantifiable basis for precluding RCAs from consideration as the Preferred Alternative. As a result, transportation criteria were used as a basis for identifying the Preferred Alternative.

Based on the transportation criteria, RCA 5 and RCA 7 ranked substantially higher than all other RCAs. RCA 5 and RCA 7 scored so similarly the two RCAs were not distinguished from each other based solely on their ranking on the transportation criteria.

Planning/engineering criteria were mostly similar for RCA 5 and RCA 7 except that RCA 5 contains much greater length of both existing highway (195 miles compared to 90 miles) and existing rail line (214 miles compared to 66 miles). The greater presence of these existing facilities in RCA 5 means that there would be greater potential in RCA 5, compared to RCA 7, for utilizing existing facilities; therefore, there would be greater potential in RCA 5 to reduce costs and environmental effects.

RCA 5 was identified as the Preferred Alternative because:

- RCAs 5 and 7 scored 40 and 47 percent better, respectively, than the next best scoring RCA for the tolled scenario, and they scored 44 and 39 percent better, respectively, than the next best scoring RCA for the non-tolled scenario, respectively; and thus, were the two best RCAs at meeting the TTC-35 need and purpose; and
- RCA 5 contains much more existing highway (195 miles compared to 90 miles) and rail line (214 miles compared to 66 miles) facilities than RCA 7,
and thus provides more potential than RCA 7 for reducing costs and environmental effects.

A comparison of the alternatives is provided in Chapter 4 – Environmental Consequences, Chapter 5 – Indirect and Cumulative Effects Assessment, Chapter 6 – Transportation Planning and Engineering Analysis, and Chapter 7 – Identification of the Preferred Alternative.
Chapter 3
Affected Environment
TTC-35 Tier One Draft EIS

3.0 AFFECTED ENVIRONMENT

This Chapter discusses the existing human and natural environment of the study area. The information presented utilizes the best available data and mapping information at the time the document was prepared. Based on the size of the study area and since the Tier One EIS makes a corridor-level, not an alignment-level decision, detailed field investigations to characterize existing conditions or resources at precise locations within the study area would not be feasible. Therefore, data and information on the existing resources found in the study area are discussed in broad, general terms based on the best available data and mapping resources from resource and regulatory agencies at the time this Tier One EIS was prepared. In most cases, data provided in this Chapter and the corresponding Appendix C are presented at the county level because it serves as a manageable basis for reporting data based on the size of the study area. Whenever data other than the county-level data were used to describe a specific issue or resource, an explanation is provided for why that level of data was used. Appendix C-1 contains the fact sheets for each county in the study area.

This Chapter provides answers to questions such as:

- What types of land cover are found in the study area counties?
- What are the population characteristics within the study area counties?
- What are the employment characteristics of the study area counties?
- What is the racial and ethnic make-up of the study area counties?
- What percent of the population within the study area counties live below the poverty level?
- What is the air quality status within the study area counties?
- What are the FHWA Noise Abatement Criteria?
- What National Historic Landmarks are located in the study area counties?
- How many acres of parklands are located in the study area counties?
- How many acres of prime farmland soils are located in each county in the study area?
- What river basins are located in the study area counties?
- Where are the flood-prone areas within the study area counties?
- Where are the general locations of wetland areas in the study area counties?
- What are the physiographic regions within the study area counties?
- What are the major geologic unit descriptions in the study area counties?
- What known mines are located in the study area counties?
- What types of vegetation are found in the study area counties?
- What types of wildlife and aquatic species may occur in the study area counties?
- What threatened and endangered species are listed for the counties in the study area?
- What kinds of hazardous waste sites are found in the study area counties?
3.1 LAND USE

Counties within or partially within the study area contain approximately 73,700 square-miles. The study area itself covers approximately 52,500 square-miles, or approximately 20 percent of the total area of Texas. The National Land Cover Dataset (NLCD) 1992 Classification System was used to make a general assessment of land use in the study area (U.S. Geologic Service [USGS], 1992). The NLCD Program was developed through a partnership of the USGS, EPA, U.S. Forest Service (USFS), and the National Oceanic and Atmospheric Administration (NOAA). Land cover data were derived using images from Landsat’s Thematic Mapper (TM) sensors to categorize land covers. The classification system is divided into nine categories and 21 sub-categories. Appendix C-2 provides the 1992 NLCD nine category definitions and the land cover types, square miles, acres, and percentage of total land cover in each county in the study area.

Table 3-1 lists land cover by category type for the area occupied by all counties within or partially within the study area.

<table>
<thead>
<tr>
<th>Study Area Category</th>
<th>Area in Square-miles</th>
<th>Percent of Study Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>1,796</td>
<td>2.4</td>
</tr>
<tr>
<td>Developed</td>
<td>2,281</td>
<td>3.1</td>
</tr>
<tr>
<td>Barren</td>
<td>525</td>
<td>0.7</td>
</tr>
<tr>
<td>Forested Upland</td>
<td>14,114</td>
<td>19.1</td>
</tr>
<tr>
<td>Shrubland</td>
<td>16,430</td>
<td>22.3</td>
</tr>
<tr>
<td>Non-Natural Woody</td>
<td>20</td>
<td>0.03</td>
</tr>
<tr>
<td>Herbaceous Upland</td>
<td>10,530</td>
<td>14.3</td>
</tr>
<tr>
<td>Planted/Cultivated</td>
<td>26,673</td>
<td>36.1</td>
</tr>
<tr>
<td>Wetlands</td>
<td>1,370</td>
<td>1.9</td>
</tr>
</tbody>
</table>


The two most common land covers in the study area are agricultural, which consists of the NLCD planted/cultivated and non-natural woody categories, and rangeland, which consists of the NLCD forested upland, shrubland, herbaceous upland categories. Although developed land exists within each county in the study area, no county exhibits more than 47 percent urbanized (or developed) land.

Figures 3-1 through 3-4 illustrate the types of land cover and their distribution within the study area counties.
3.2 DEMOGRAPHIC, SOCIAL, AND ENVIRONMENTAL CHARACTERISTICS

Demographic, social, and economic characteristics of the study area were collected at the county level based on the most recently available data from the U.S. Census Bureau (1999a) for the Census 2000, Texas Department of Economic Development, the U. S. Department of Agriculture (USDA) (1997) for the 1997 Census of Agriculture, and the Texas Almanac (2001 and 2003).

Population

Population data reported in this section are from the Census 2000. The study area counties had a combined population in 2000 of over 11.3 million people, which accounted for over 54 percent of the total population of Texas (approximately 20.8 million). The population was not evenly distributed throughout the study area counties, since approximately 52 percent of the total population in the study area counties resided in the four most populous counties (Dallas, Tarrant, Bexar, and Travis). Eighteen of the study area counties each had a population of greater than 100,000 people, accounting for approximately 84 percent of the total population within the study area counties. Conversely, 51 of the study area counties each had a population of less than 50,000 people, accounting for only approximately 10 percent of the total population within the study area counties.
Table 3-2 shows the population of the counties in the study area.

Table 3-2: Study Area Population by County

<table>
<thead>
<tr>
<th>County</th>
<th>Population</th>
<th>County</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson</td>
<td>55,109</td>
<td>Jim Wells</td>
<td>39,326</td>
</tr>
<tr>
<td>Atascosa</td>
<td>38,628</td>
<td>Johnson</td>
<td>126,811</td>
</tr>
<tr>
<td>Bastrop</td>
<td>57,733</td>
<td>Karnes</td>
<td>15,446</td>
</tr>
<tr>
<td>Bee</td>
<td>32,359</td>
<td>Kaufman</td>
<td>71,313</td>
</tr>
<tr>
<td>Bell</td>
<td>237,974</td>
<td>Kenedy</td>
<td>414</td>
</tr>
<tr>
<td>Bexar</td>
<td>1,392,931</td>
<td>Kleberg</td>
<td>31,549</td>
</tr>
<tr>
<td>Bosque</td>
<td>17,204</td>
<td>Lamar</td>
<td>48,499</td>
</tr>
<tr>
<td>Brazos</td>
<td>152,415</td>
<td>La Salle</td>
<td>5,866</td>
</tr>
<tr>
<td>Brooks</td>
<td>7,976</td>
<td>Lavaca</td>
<td>19,210</td>
</tr>
<tr>
<td>Burleson</td>
<td>16,470</td>
<td>Lee</td>
<td>15,657</td>
</tr>
<tr>
<td>Caldwell</td>
<td>32,194</td>
<td>Leon</td>
<td>15,335</td>
</tr>
<tr>
<td>Cameron</td>
<td>335,227</td>
<td>Limestone</td>
<td>22,051</td>
</tr>
<tr>
<td>Collin</td>
<td>491,675</td>
<td>Live Oak</td>
<td>12,309</td>
</tr>
<tr>
<td>Cooke</td>
<td>36,363</td>
<td>McLennan</td>
<td>213,517</td>
</tr>
<tr>
<td>Dallas</td>
<td>2,218,899</td>
<td>McMullen</td>
<td>851</td>
</tr>
<tr>
<td>Delta</td>
<td>5,327</td>
<td>Medina</td>
<td>39,304</td>
</tr>
<tr>
<td>Denton</td>
<td>432,976</td>
<td>Milam</td>
<td>24,238</td>
</tr>
<tr>
<td>DeWitt</td>
<td>20,013</td>
<td>Montague</td>
<td>19,117</td>
</tr>
<tr>
<td>Dimmit</td>
<td>10,248</td>
<td>Navarro</td>
<td>45,124</td>
</tr>
<tr>
<td>Duval</td>
<td>13,120</td>
<td>Nueces</td>
<td>313,645</td>
</tr>
<tr>
<td>Ellis</td>
<td>111,360</td>
<td>Palo Pinto</td>
<td>27,026</td>
</tr>
<tr>
<td>Erath</td>
<td>33,001</td>
<td>Parker</td>
<td>88,495</td>
</tr>
<tr>
<td>Falls</td>
<td>18,576</td>
<td>Rains</td>
<td>9,139</td>
</tr>
<tr>
<td>Fannin</td>
<td>31,242</td>
<td>Robertson</td>
<td>16,000</td>
</tr>
<tr>
<td>Fayette</td>
<td>21,804</td>
<td>Rockwall</td>
<td>43,080</td>
</tr>
<tr>
<td>Freestone</td>
<td>17,867</td>
<td>San Patricio</td>
<td>67,138</td>
</tr>
<tr>
<td>Frio</td>
<td>16,252</td>
<td>Smith</td>
<td>174,706</td>
</tr>
<tr>
<td>Goliad</td>
<td>6,928</td>
<td>Somervell</td>
<td>6,809</td>
</tr>
<tr>
<td>Gonzales</td>
<td>18,628</td>
<td>Tarrant</td>
<td>1,446,219</td>
</tr>
<tr>
<td>Grayson</td>
<td>110,595</td>
<td>Travis</td>
<td>812,280</td>
</tr>
<tr>
<td>Guadalupe</td>
<td>89,023</td>
<td>Van Zandt</td>
<td>48,140</td>
</tr>
<tr>
<td>Henderson</td>
<td>73,277</td>
<td>Webb</td>
<td>193,117</td>
</tr>
<tr>
<td>Hidalgo</td>
<td>569,463</td>
<td>Willacy</td>
<td>20,082</td>
</tr>
<tr>
<td>Hill</td>
<td>32,321</td>
<td>Williamson</td>
<td>249,967</td>
</tr>
<tr>
<td>Hood</td>
<td>41,100</td>
<td>Wilson</td>
<td>32,408</td>
</tr>
<tr>
<td>Hopkins</td>
<td>31,960</td>
<td>Wise</td>
<td>48,793</td>
</tr>
<tr>
<td>Hunt</td>
<td>76,596</td>
<td>Wood</td>
<td>36,752</td>
</tr>
<tr>
<td>Jack</td>
<td>8,763</td>
<td>Zapata</td>
<td>12,182</td>
</tr>
<tr>
<td>Jim Hogg</td>
<td>5,281</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 1999a. (Census 2000).

Table 3-3 provides a summary of population, gender and age data for the state of Texas and study area counties. General age and gender population statistics in 2000 for the combined study area counties were similar to those for the state. Appendices C-3 and C-4 contain detailed age and gender statistics for Texas and the study area counties. The population within the study area counties was slightly younger than the state population (median age 32.0 years versus 32.3 years) and a slightly lower percentage of residents...
were 65 years old or older. Figure 3-5 shows the percent of the population 65 years and older. The percentages of males (49.6 percent), females (50.4 percent), and residents of 18 years of age or older (71.8 percent) within the study area counties were the same as the percentages (49.6, 50.4, and 71.8, respectively) for the state.

### Table 3-3: Age and Gender General Population Statistics for the State of Texas and Study Area Counties

<table>
<thead>
<tr>
<th></th>
<th>Population</th>
<th>Percent Male</th>
<th>Percent Female</th>
<th>Median Age</th>
<th>Percent (\geq 18) yrs. old</th>
<th>Percent (\geq 65) yrs. old</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texas</td>
<td>20,851,820</td>
<td>49.6</td>
<td>50.4</td>
<td>32.3</td>
<td>71.8</td>
<td>9.9</td>
</tr>
<tr>
<td>Study Area Counties</td>
<td>11,330,793</td>
<td>49.6</td>
<td>50.4</td>
<td>32.0</td>
<td>71.8</td>
<td>9.5</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 1999a. (Census 2000).

Table 3-4 shows the lowest, highest, and average total population, gender and age data for the counties within the study area. The counties within the study area have substantial variation in age and gender population statistics. For example, Dallas County, the most populous county in the study area, had a population of over 2.2 million in the year 2000, while Kenedy County was the least populous with 414 residents. The percentage of males per county ranged from 46.2 to 59.7 and the percentage of females ranged from 40.3 to 53.8. The median age per county ranged from 23.6 years to 43.1 years.

### Table 3-4: Population, Age and Gender General Population Statistics for the Study Area Counties

<table>
<thead>
<tr>
<th></th>
<th>County Population</th>
<th>Percent (\text{male})</th>
<th>Percent (\text{female})</th>
<th>Median Age</th>
<th>Percent (\geq 18) yrs. old</th>
<th>Percent (\geq 65) yrs. old</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowest</td>
<td>414</td>
<td>46.2</td>
<td>40.3</td>
<td>23.6</td>
<td>63.8</td>
<td>5.0</td>
</tr>
<tr>
<td>Highest</td>
<td>2,218,899</td>
<td>59.7</td>
<td>53.8</td>
<td>43.1</td>
<td>78.5</td>
<td>22.0</td>
</tr>
<tr>
<td>Average</td>
<td>147,153</td>
<td>50.0</td>
<td>50.0</td>
<td>35.2</td>
<td>72.6</td>
<td>13.4</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 1999a. (Census 2000).

### Environmental Justice

Executive Order (EO) 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) (February 11, 1994) requires each Federal agency to implement its programs, policies, and activities that affect human health or the environment so as to identify and avoid, to the greatest extent allowed by law, “disproportionately high and adverse” effects on minority and low-income populations (U.S. Executive Office of the President, 1994). The three fundamental environmental justice principles established by EO 12898 are (Report Number CDOT-DTD-R-2002-7, 2002) (Van Orden and Grauberger, 2002):

- avoid, minimize, or mitigate disproportionately high and adverse human health or environmental effects, including social and economic effects, on minority populations and low-income populations;
ensure the full and fair participation by all potentially affected communities in the transportation decision-making process; and,
prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority populations and low-income populations.

The FHWA and the Federal Transit Administration (FTA) have had a long-standing policy to actively ensure nondiscrimination under Title VI of the 1964 Civil Rights Act. The Civil Rights Restoration Act of 1987 clarified the intent of Title VI to include all programs and activities of Federal-aid recipients, sub-recipients, and contractors whether or not these programs and activities are federally funded. Furthermore, NEPA stresses the importance of providing for “all Americans safe, healthful, productive, and aesthetically pleasing surroundings” and provides a requirement for using a “systematic, interdisciplinary approach” to aid in considering environmental and community factors in decision-making.

In April 1997, the United States Department of Transportation (USDOT) issued DOT Order 5610.2, Environmental Justice to Address Environmental Justice in Minority Populations and Low-Income Populations, which summarizes and expands upon the requirements of EO 12898 (USDOT, 1997). In December 1998, the FHWA issued DOT Order 6640.23, FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which requires the FHWA to implement the principles of USDOT Order 5610.2 and EO 12898 by incorporating environmental justice principles in all FHWA programs, policies, and activities (USDOT-FHWA, 1998).

A disproportionate environmental impact occurs when the risk or rate for a minority population or low-income population from exposure to an environmental hazard significantly exceeds the risk or rate to the general population and, where available, to another appropriate comparison group.

Low-Income Populations
FHWA Order 6640.23 defines “low-income” as a person whose household income is at or below the Department of Health and Human Services (DHHS) poverty guidelines (USDOT-FHWA, 1998). Poverty data from the Census 2000 were collected at the state and county levels to determine the percent of families living below the poverty level in Texas and the study area counties. The Census Bureau follows the Office of Management and Budget (OMB), Statistical Policy Directive 14 in establishing poverty thresholds (USOMB, 1978).

The most recently available poverty guidelines published by DHHS were for 2005. Based on the DHHS 2005 Poverty Guidelines, the weighted average income for a four-person family is $19,350 (DHHS, 2005). However, in 1999, which is the year the Census 2000 count was conducted, the DHHS Poverty Guideline for a family of four was $16,700 (DHHS, 1999). According to the Census 2000, approximately 12 percent of Texas families live below the poverty level and approximately 11.5 percent of families in the study area counties overall had incomes below the poverty level.
The percentage of families below the poverty level varied substantially among study area counties. Thirteen counties (Brooks, Cameron, Dimmit, Duval, Frio, Hidalgo, Jim Hogg, Jim Wells, Kleberg, La Salle, Webb, Willacy, and Zapata) have more than 20 percent of families with incomes below the poverty level. Twenty-five counties reported less than 10 percent of families with incomes below the poverty level. Figure 3-6 shows the percent of the families below the poverty level for each county in the study area. In addition, Appendix C-5 provides a table of the percent of families living below the poverty level for each county in the study area.

Minority Populations
FHWA Order 6640.23 defines “minority” as a person who is:

- Black (having origins in any of the black racial groups of Africa);
- Hispanic (of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);
- Asian American (having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands), or;
- American Indian and Alaska Native (having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).

Data from the Census 2000 were collected to determine the percentage of minority population within the State of Texas and the study area counties. According to the Census 2000, the population of both the State of Texas and the study area counties was approximately 48 percent minority. Figure 3-7 shows the percent of minorities for each county in the study area. With the exception of Dallas County, the counties with the largest percentage minority population tend to be in the southern portion of the study area. Appendix C-6 includes the racial demographics and minority percentages for each county in the study area.

Economy
Employment
According to the Census 2000, the State of Texas had a civilian labor force of over 9.8 million people; approximately 47 percent of the state population. Of this total labor force, approximately 56 percent (over 5.4 million) resided in the study area counties. The civilian labor force within the study area counties was approximately 48 percent of the combined population of these counties. Table 3-5 shows the employment status of the civilian labor force in the State of Texas and study area counties. The percentages of employed and unemployed labor force were similar for the study area counties (94.3 and 5.7 percent, respectively) compared to the state overall (93.9 and 6.1 percent, respectively). Appendix C-7 includes employment status for each county in the study area.
Among the study area counties, there was much variation in the percentages of employed and unemployed labor force. The percentage of employed labor force ranged from approximately 85.8 to 98.3 and the percentage of unemployed labor force ranged from approximately 1.7 to 14.2. In general, the percentage of unemployed labor force was greater in the southern portion of the study area. In fact, seven of the nine counties with more than 9 percent of the civilian labor force unemployed are located adjacent to or very near the Texas/Mexico border.

**Table 3-6** shows the employment by industry for the State of Texas and the study area counties. The percentages of employment by industry in 2000 were similar for the study area counties compared to the state (U.S. Census Bureau, 1999a). For most industry groups, the difference between statewide employment and employment for residents of the study area counties was less than 1 percent. The only difference of more than 1 percentage was for the “agriculture, forestry, fishing and hunting, and mining” industry group in which case the percent of the employed civilian labor force was lower for the study area counties (approximately 1.6 percent) than the state (approximately 2.7 percent).
Table 3-6: Employment by Industry for the State of Texas and for the Combined Study Area Counties

<table>
<thead>
<tr>
<th>Industry Group</th>
<th>Percentage of Employed Civilian Labor Force per Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>State of Texas</td>
</tr>
<tr>
<td>Arts, entertainment, recreation, accommodation and food services</td>
<td>7.3</td>
</tr>
<tr>
<td>Other services (except public administration)</td>
<td>5.2</td>
</tr>
<tr>
<td>Public administration</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 1999a. (Census 2000).

According to the data presented in Table 3-6, the “education, health and social services” industry group employed the largest percentage of civilian labor force in the study area counties. The “agriculture, forestry, fishing and hunting, and mining” industry group employed the lowest percentage of the labor force in the study area counties. Appendix C-8 includes labor by category for each county in the study area.

Income

Income and poverty levels are measures of a person’s ability to provide for themselves and their families, to support neighborhood and community businesses, and to amass assets for the future. *Census 2000* reported that the Texas statewide median family income was approximately $45,861. The average median family income for the study area counties was approximately $40,850.

Median family income varied substantially among the study area counties. For example, 12 counties (Brooks, Cameron, Dimmit, Duval, Frio, Hidalgo, Jim Hogg, Kenedy, La Salle, Webb, Willacy, and Zapata) reported median family incomes of less than $30,000. Ten counties (Collin, Denton, Ellis, Hood, Kaufman, Parker, Rockwall, Tarrant, Travis, and Williamson) reported median family incomes of greater than $50,000. The median family income data for each county are provided in Appendix C-9.

Economic Profile

Texas accounted for approximately 7.4 percent of both national employment and Gross Domestic Product (GDP) and approximately 7.7 percent of the population in 2003. Similar to the national economy, Texas has experienced substantial growth in service industry employment combined with a substantial decline in manufacturing employment. In Texas, service industry employment (e.g. professional, technical, & business services, food, entertainment, health care, education, waste management, and arts) has grown from 20 percent to 30 percent of total employment from 1980 to 2001. During this period, manufacturing employment has declined from 14 percent to 9 percent. Prior to 1980, the oil industry greatly dominated the Texas economy. However, beginning in the early 1980s, the oil and gas industry steadily decreased its role in the Texas economy. In fact, oil and gas extraction now accounts for less than 7 percent of the Texas gross state product (GSP). Presently, services are an important segment of the Texas economy and manufacturing has become more highly technical. As a result, in the industry shift, the
Texas economy is less volatile and employment tends to be more closely mirroring the U.S. employment rate.

The study area was broken into 11 regions for discussion purposes in this Tier One EIS. In addition to the 11 regions used, a twelfth region encompassing the Texas counties outside of the study area is included in the economic profiles discussion. Figure 3-8 illustrates these economic regions.

Region 1: Laredo
The Laredo region includes Webb and Dimmit counties in south Texas. The education, health, and social services industry sector (23.2 percent of the employed labor force) and retail trade sector (13.9 percent) are the largest employers in the region. Due to the Laredo region’s location near the Texas/Mexico border, the transportation, warehousing, and utilities industry sector —particularly related to the movement of freight to distribution centers in San Antonio and Dallas —has become an important component of the local economy. This sector itself comprises 13.7 percent of employment in the region, and this is the only region where this sector employs greater than 7.1 percent of the employed labor force.

Region 2: Brownsville/McAllen
The Brownsville/McAllen region encompasses Cameron and Hidalgo counties at the southern tip of the study area. Like the Laredo Region, it is located on the Texas/Mexico border where cross border traffic plays an important role in the role in the regional economy. The education, health, and social services sector and the retail trade sector are the largest industry groups in this region, accounting for 26.5 percent and 13.1 percent of employed labor force, respectively.

Region 3: Corpus Christi
The Corpus Christi region includes Nueces and San Patricio counties on the Texas Gulf Coast. The education, health, and social services sector and the retail trade sector are the largest industry groups in this region, accounting for 22.6 percent and 12.0 percent of employed labor force, respectively. Motor vehicle and air transportation are important in facilitating mobility to the region’s workforce as well as providing access to other markets.

Region 4: San Antonio
The San Antonio region includes all of Bexar County. The education, health, and social services sector (21.4 percent) and retail trade sector (12.6 percent) are the largest industry sectors in terms of percent of employed labor force. The San Antonio region has been bolstered by the development of the Kelly USA intermodal (road, rail, air) facility that provides connections to major U.S., Canadian, and Mexican cities. Manufacturing employment and earnings are expected to increase with the development of a Toyota plant in proximity to the Kelly USA intermodal facility.
Region 5: Austin
The Austin region includes Travis and Williamson counties and is the fastest growing region in the study area. The education, health, and social services sector and the professional services sector are the large industry groups in this region, accounting for 17.1 percent and 12.9 percent of employed labor force, respectively. Manufacturing, including high-tech, accounts about 14.4 percent of regional employment. In the Austin region, motor vehicle and air transportation are critical to the movement of freight goods, mobility, and regional economic growth.

Region 6: Dallas–Fort Worth
The Dallas–Fort Worth region includes Collin, Dallas, Denton, Rockwall, and Tarrant counties. The education, health, and social services sector (15.4 percent), manufacturing sector (12.7 percent), professional services sector (12.1 percent), and retail trade sector (12.1 percent) are the largest industry sectors in terms of percent of employed labor force. With a diverse economic base, the DFW region is served by an extensive roadway network, commuter rail (DART), freight motor vehicle transportation, and air freight, and passenger services (DFW Airport, Love Field, Alliance Intermodal) that supports the regional manufacturing base, financial services industry, and retail trade.

Region 7: West of Dallas–Fort Worth
The West of Dallas–Fort Worth region, which includes 12 counties (Bosque, Cooke, Erath, Hill, Hood, Jack, Johnson, Montague, Palo Pinto, Parker, Somervell, and Wise) west of the DFW region is located in the northwest corner of the study area. The education, health, and social services sector (18.5 percent), manufacturing sector (15.4 percent), and retail trade sector (13.0 percent) are the largest industry sectors in terms of percent of employed labor force.

Region 8: East of Dallas–Fort Worth
The East of Dallas–Fort Worth region encompasses 15 counties (Anderson, Delta, Ellis, Fannin, Grayson, Henderson, Hopkins, Hunt, Kaufman, Lamar, Navarro, Rains, Smith, Van Zandt, and Wood) in the northeast corner of the study area. The education, health, and social services sector (20.1 percent), manufacturing sector (15.6 percent), and retail trade sector (13.2 percent) are the largest industry sectors in terms of percent of employed labor force.

Region 9: Central TTC
The Central TTC region includes 20 counties (Bastrop, Bee, Brazos Burleson, Caldwell, DeWitt Falls, Fayette, Freestone, Goliad, Gonzales, Guadalupe, Karnes, Lavaca, Lee, Leon, Limestone, Milam, Robertson, and Wilson) in Central Texas. Major industries in the region include education, health, and social services (24.1 percent of employed labor force), retail trade (11.3 percent), and manufacturing (11.0 percent). Due to the diversity of industry groups represented in this sector, road, air, and rail modalities are extremely important to the regional economy. Rail and motor freight transportation play a further role in supporting the region’s farming and manufacturing sectors.
Region 10: South TTC
The South TTC region consists of 14 counties (Atascosa, Brooks, Duval, Frio, Jim Hogg, Jim Wells, Kenedy, Kleberg, LaSalle, Live Oak, McMullen, Medina, Willacy, and Zapata). Major industries in the region include education, health, and social services (23.9 percent of employed labor force), retail trade (11.1 percent), and agriculture, forestry, fishing and hunting, and mining (10.8 percent). This is the only region of those studied where the agricultural and related industries sector employs over 5.3 percent of the employed labor force. Motor vehicle transportation, rail, and air cargo facilities are critical in facilitating access to markets.

Region 11: Waco
The Waco region includes Bell and McLennan counties. Employment and earnings in the region are driven by the proximity to the U.S. Army facility at Fort Hood. As a result, federal military employment is a major economic component in this region. Nevertheless, the education, health, and social services sector (25.3 percent of employed labor force) and retail trade sector (12.6 percent of total employment) were the largest industry groups in the region in 2000. Motor vehicle travel efficiency supports the mobility of local commuting traffic associated with the service industry and access to markets for the retail industry. Access to passenger air transportation is also important in supporting business travel for the services sector.

Region 12: Rest of Texas
This region encompasses areas outside the study area, including the Houston metropolitan area, Abilene, Amarillo, El Paso, Lubbock, and the Midland-Odessa area. This region has a total population of roughly 9.5 million inhabitants and has strong education, health, and social service (20.0 percent of employed labor force), manufacturing (11.8 percent) and retail trade (11.7 percent) sectors. State/local government and manufacturing are also key economic sectors in this region.

Table 3-7 summarizes the population and employment growth data for each region discussed above from 1990 to 2000.

<table>
<thead>
<tr>
<th>Region</th>
<th>Counties</th>
<th>Population (thousands)</th>
<th>Employed Labor Force (thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1990</td>
<td>2000</td>
</tr>
<tr>
<td>1</td>
<td>Laredo</td>
<td>Webb, Dimmit</td>
<td>144</td>
</tr>
<tr>
<td>2</td>
<td>Brownsville-McAllen</td>
<td>Cameron, Hidalgo</td>
<td>643</td>
</tr>
<tr>
<td>3</td>
<td>Corpus Christi</td>
<td>Nueces, San Patricio</td>
<td>350</td>
</tr>
<tr>
<td>4</td>
<td>San Antonio</td>
<td>Bexar</td>
<td>1,185</td>
</tr>
<tr>
<td>5</td>
<td>Austin</td>
<td>Travis, Williamson</td>
<td>716</td>
</tr>
<tr>
<td>6</td>
<td>Dallas-Fort Worth</td>
<td>Collin, Dallas, Denton, Rockwell, Tarrant</td>
<td>3,586</td>
</tr>
<tr>
<td>7</td>
<td>West of</td>
<td>Bosque, Cooke,</td>
<td>381</td>
</tr>
</tbody>
</table>
### Table 3-7: General Demographics of the Regions Under Study, 1990-2000

<table>
<thead>
<tr>
<th>Region</th>
<th>Counties</th>
<th>Population (thousands)</th>
<th>Employed Labor Force (thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1990</td>
<td>2000</td>
</tr>
<tr>
<td>#</td>
<td>Name</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Dallas-Fort Worth</td>
<td>Erath, Hill, Hood,</td>
<td>771</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jack, Johnson, Montague, Palo Pinto, Parker, Somervell, Wise</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Central TTC</td>
<td>Bastrop, Bee, Brazos, Burleson, Caldwell, DeWitt Falls, Fayette, Freestone, Goliad, Gonzales, Guadalupe, Karnes, Lavaca, Lee, Leon, Limestone, Milam, Robertson, Wilson</td>
<td>208</td>
</tr>
<tr>
<td>11</td>
<td>South TTC</td>
<td>Atascosa, Brooks, Duval, Frio, Jim Hogg, Jim Wells, Kenedy, Kleberg, La Salle, Live Oak, McMullen, Medina, Willacy, Zapata</td>
<td>8,096</td>
</tr>
<tr>
<td>12</td>
<td>Rest of Texas</td>
<td>All remaining Texas counties</td>
<td>8,096</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Texas</td>
<td>16,986</td>
</tr>
</tbody>
</table>

Sources: Population data are from U.S. Census Bureau, 1989 and 1999a. (Census 1990 and Census 2000).
Employment data are from the U.S. Department of Labor, 2006

**Appendix C-10** includes a detailed table that identifies the major employers, the primary components of the economy, primary agricultural activities, and recreational activities in each of the study area counties.

### 3.3 UTILITIES

By definition, utilities are commodities or services provided for public use. The study area counties contain numerous utilities ranging from large interstate pipelines and power transmission lines to municipal utilities such as storm water collection, water treatment...
and supply, and sanitary sewer collection and treatment facilities. Only large-scale utilities were evaluated within the study area counties at this Tier One level of analysis. Large-scale was defined as of sufficient size to influence the location of a corridor that was 10 miles wide. The utilities studied include: power generating stations, nuclear power plants, electrical power transmission lines, water storage and transmission pipelines, and petroleum and natural gas storage and transmission pipelines that are located within and traverse the study area counties. Oil and natural gas wells also are included as utilities and data collected include the number of wells per county and the density of wells in square-miles per county.

Based on the TTC-35 concept as envisioned, a 200-foot wide utility ROW would be included in the overall transportation corridor to accommodate utility location. Electronic data for petroleum and natural gas pipeline and wells were available and obtained through interagency coordination with the Texas Railroad Commission (RRC) in 2004 and 2005. No official coordination has been conducted with private power and energy stakeholders or other state and federal regulators, such as the Public Utilities Commission of Texas (PUCT), Electric Reliability Council of Texas (ERCOT), the Lower Colorado River Authority (LCRA), U.S. Nuclear Regulatory Commission (NRC) and the Texas Water Development Board (TWDB), by the project team regarding data for power generating stations, nuclear power plants, electrical power transmission lines, and water storage and transmission pipelines. Therefore, best available public data and general information for these larger utility types were gathered from the PUCT, ERCOT, LCRA, NRC, and TWDB websites (PUCT, 2005; LCRA, 2005; ERCOT, 2005; NRC, 2005; and TWDB, 2001 and 2004). These utilities would be further investigated during Tier Two environmental processes. While the general information obtained from the websites included location information for some utilities, these location data were not available digitally and thus could not be verified as accurate. Data for telecommunication and fiber optic cable lines were unavailable at the time this Tier One EIS was developed. Further studies would be conducted during Tier Two environmental processes to gather information on utilities.

**Electrical Power Generation, Transmission, and Distribution**

The transmission of electrical power throughout Texas is overseen by ERCOT, which is one of 10 regional Reliability Councils in the North American Electric Reliability Council (NERC) Organization responsible for security monitoring and ensuring reliability of the electric system. ERCOT is an area located totally within the State of Texas that contains about 85 percent of Texas' electrical load. ERCOT, along with, Southwest Power Pool (SPP), and Southeastern Electric Reliability (SERC), two other NERC councils, are the Texas electric reliability councils that cover the study area counties. ERCOT covers 76 of the study area counties; only Wood County falls within the SPP Reliability Council boundary. **Figure 3-9** depicts the Reliability Council Boundaries within the study area counties as reported by ERCOT and PUCT (2005). At the time of the development of this Tier One EIS, electrical power data from ERCOT and SPP were not available. This information would be investigated during Tier Two environmental processes.
Power Generating Stations
According to the PUCT, of the 74 new electric generation facilities completed since 1995 in Texas, 28 facilities occur within the study area counties (PUCT, 2005). Based on PUCT data, one generating facility in Jack County is currently under construction; three facilities have been announced with expected construction dates to start in 2005 and 2006 in Bexar, Hunt, and McLennan counties; 10 generating facilities in Anderson, Bell, Dallas/Tarrant, Duval, Ellis, Hidalgo, Parker, Travis, and Wise counties have been either delayed or cancelled; nine generating facilities in Bexar, Collin, Dallas, Fannin, Nueces, and Tarrant counties have been mothballed, or temporarily shut down, since 2002; and three generating units in Dallas, Travis, and Tarrant counties have been retired since 2002. A detailed list of the facilities and their status is included in Appendix C-11.

In addition, the Lower Colorado River Authority (LCRA) has three power generating facilities within the study area counties (LCRA, 2005). The Fayette Power Project is located in Fayette County seven miles east of La Grange, Texas. However, the facility does not occur within the study area boundary. The Sam Gideon Power Plant and the Lost Pines 1 Power Project both are located in Bastrop County five miles east of Bastrop and are within the study area.

Nuclear Power Plants
According to the NRC, there are two nuclear power plants in Texas, but only one is located within the study area counties (NRC, 2005). The Comanche Peak Pressurized Water Reactor (or steam electric power station) is a two-unit nuclear-fueled powered plant with an operating capacity of 2,300 megawatts. The plant, operated by TXU Generating Company, is located approximately four miles northwest of Glen Rose, Texas, in Somervell County. Fuel for the Comanche Peak plant is uranium dioxide. The nearby Squaw Creek Reservoir provides cooling water for the power plant and covers 3,275 surface acres with an average depth of 46 feet.

Hydroelectric Power
Hydroelectric power is produced as a by-product of other river operations activities. There are six hydroelectric dams in Texas regulated by the LCRA and only two, the Mansfield Dam and Tom Miller Dam, occur within the study area counties (LCRA, 2005). However, while these hydroelectric dams occur within a study area county, they are not located within the study area boundary.

Electrical Power Transmission and Distribution Lines
Electrical power transmission lines form an interconnected group of lines and associated equipment for the movement or transfer of electric energy from generation power plants to distribution substations. Throughout the study area counties there are numerous 69, 138, and 345-kilovolt (kV) transmission lines and smaller distribution lines. Considering the size of the study area and the abundance of transmission and distribution lines that criss-cross the study area counties, it would not be feasible to conduct a detailed listing of all electrical power transmission and distribution lines at this Tier One EIS level. Further information gathering and coordination with the Reliability Councils and federal and state regulatory agencies would be conducted during Tier Two environmental processes.
Water Transmission and Distribution Pipelines

TWDB is charged with developing a state water plan to ensure that "sufficient water will be available at a reasonable cost to further the economic development of the entire state (TWDB, 2001).” First developed in 1967, this plan, called “Water for Texas”, is updated every two years and estimates the supply and demands for water for the next generation, and projects future facility needs. In order to meet these needs, the TWDB also administers state and federal funds to build water supply and wastewater treatment facilities.

The Water for Texas – 2002 plan identified water supply issues and needs for Texas to the year 2050. Planners estimate that 14.9 million acre-feet/year of groundwater and 14.9 million acre-feet/year of surface water is currently available. However, 6.1 million acre-feet/year of the State’s groundwater and 6.3 million acre-feet/year of the State’s surface water is currently inaccessible because of the lack of infrastructure to connect or treat the water. While the TTC-35 utility corridor would not solve all of the infrastructure needs for Texas’ water supply, it could provide a location for transmission lines to convey water from the source to the demand areas. The Water for Texas – 2002 plan also identified 53 major conveyances necessary in order to deliver water supplies to areas of need. These major conveyances are depicted in the TTC-35 Need and Purpose Statement Support Document (July, 2005). At present, there are no data for existing water transmission across the study area counties. Further data collection of existing water transmission lines and other water utilities would be conducted during Tier Two processes along with coordination with state regulatory agencies.

In addition, the state’s population continues to increase and the demand for water continues to increase. Texas is one of three states leading the nation in seawater desalination technological advancements (TWDB, 2004). These advances have made desalination a more viable option for providing high-quality drinking water that can meet the federal and state drinking water quality standards. This has lead to several research and feasibility projects regarding the desalination of seawater along the Texas Gulf Coast region (TWDB, 2004). Data collection on desalination would be conducted during Tier Two environmental processes, if appropriate.

Oil and Natural Gas

Pipelines

Texas is ranked second in the U.S. in oil and natural gas production. As the RRC regulates the oil and gas industry and pipeline safety in Texas, data were gathered from the RRC for the 77 counties within the study area (RRC, 2004a and 2005).

Throughout the study area there are a multitude of transmission and distribution pipelines associated with oil, natural gas, and other refined and hazardous liquid products. These pipelines include product lines, natural gas lines, natural gas liquids, liquid petroleum gas, carbon dioxide lines, crude oil lines, anhydrous ammonia lines, hydrogen gas lines, and highly volatile liquid lines. Figures 3-10 through 3-13 depict the oil, natural gas, and other refined product pipelines that occur within the study area counties. Many of these
pipelines are not solely contained within a study area county, but traverse several counties as they cross the state. Additional data on oil and gas pipelines would be collected during Tier Two environmental processes.

In addition, LCRA has an underground natural gas storage reservoir facility, known as the Hilbig Gas Storage Facility, near Rockne in Bastrop County (LCRA, 2005). This facility, an ancient volcano that has been sealed by layers of shale over time, provides LCRA’s gas-fired power plants with additional natural gas supply.

**Wells**

Oil and natural gas wells are distributed throughout the study area counties. Some of the wells may be distributed in well-known locations of oil and/or gas fields in large enough concentrations or densities that may impede the location of a potential TTC-35 corridor alternative. Figures 3-14 through 3-17 depict the density of oil and natural gas wells in each of the study area counties. Additional data on oil and gas wells would need to be collected during Tier Two environmental processes.

### 3.4 EXISTING TRANSPORTATION SYSTEM

**Roadway System**

Texas’ primary passenger and freight mode of transportation is the roadway network. TxDOT operates an overall road network of 301,141 miles. Four percent of the total road network is comprised of interstate highways (3,233 centerline miles). Approximately 22 percent of Texas’ total VMT (49 billion VMT) in 2000 was on interstate highways with approximately two-thirds of this traffic occurring on urban interstate highways and one-third on rural interstate highways.

Interstate 35, which includes approximately 550 centerline miles and constitutes 17 percent of the total interstate centerline miles in the State of Texas, provides north-south mobility spanning from the Oklahoma border to the Texas/Mexico border and through I-37 to the Texas Gulf Coast. The original purpose of portions of I-35 was to serve as an intercity expressway, not an interstate highway. Portions of I-35 date back to construction in the 1950’s, and, as a result, do not meet current design and safety standards for interstate highways. There are other north-south roadways located within the study area; however, none provides a long distance controlled access route similar to I-35. Roadways such as US 75, US 77, US 281, and SH 6 provide alternatives to travel on I-35, but none are designed for high-speed, high-volume, and long distance traffic.

Table 3-8 provides an inventory of the existing facilities by functional class within the study area and their corresponding centerline and lane miles. Roadways within the study area are illustrated in Figure 3-18 through 3-21.

<table>
<thead>
<tr>
<th>Facility</th>
<th>Centerline Miles</th>
<th>Lane Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate Highways</td>
<td>553</td>
<td>2,605</td>
</tr>
<tr>
<td>US Highways</td>
<td>2,255</td>
<td>9,086</td>
</tr>
</tbody>
</table>
Table 3-8: Study Area Roadway Facilities by Functional Class

<table>
<thead>
<tr>
<th>Facility</th>
<th>Centerline Miles</th>
<th>Lane Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Highways</td>
<td>2,943</td>
<td>9,065</td>
</tr>
<tr>
<td>Farm-to-Market &amp; Ranch-to Market Roads</td>
<td>8,718</td>
<td>19,275</td>
</tr>
</tbody>
</table>

Source: TxDOT, 2004a. Statewide Analysis Model.

Improvements to Existing Roadway Network
There are planned improvements for several existing sections of I-35 to be completed over the next 20 years. However, even with these improvements, anticipated travel needs within the I-35 corridor through 2025 would exceed this additional capacity. I-35 travels through the heart of the urban areas of Dallas, Fort Worth, Waco, Austin, San Antonio, Laredo, and several other small cities. Expansion beyond the existing facility and planned improvements would be difficult in many urbanized and highly populated areas of these cities due to ROW and construction costs.

Projects Under Construction or in Transportation Improvement Plans
Several major construction projects are currently underway or are funded in the STIP (TxDOT, 2005d). In Laredo, construction would expand I-35 from four to six lanes from Loop 20 to the Uniroyal (milepost marker #13) interchange. It would also include the construction of three new overpasses over I-35 and reconstruction of two one-way frontage roads between said project limits.

Based on construction limits, when current construction projects in New Braunfels and San Marcos are complete, I-35 from the Williamson-Bell County line to Spur 422 in San Antonio would have at least three lanes in each direction, with more in the urban areas.

The primary construction activity in the Austin area affecting I-35 is the construction of SH 130 from Georgetown to US 183 south of Austin. It is anticipated that SH 130 will eventually connect to I-10 in Seguin. Construction on the segments from Georgetown to US 183 began in 2003 and is expected to be completed in 2007. State Highway 130 will provide an additional north-south roadway in the Austin area and should provide some relief to congestion on I-35.

The Waco District of TxDOT has 29 projects in the 2004-2006 STIP on I-35. When these projects are complete, I-35 will have at least six lanes from Hillsboro, south to the Bell/Williamson County line. Segments of I-35 in the Waco and Temple urban areas will consist of eight lanes.

Freight Railroads
The majority of railroad lines in Texas are privately owned, operated, and funded. This has historically limited the State’s involvement in railroad planning, construction, and funding. The role of the State has been limited to safety oversight (i.e., bridge, track, and signal safety standards) and regulation (i.e., authority to ensure compliance with safety standards for highway/rail crossings). The impact that railroads have on people and movement of goods is critical, drawing the attention of government and business to the

3-18
relationship between private sector operations and public welfare. This attention has generated interest in the “partnering” of public and private sectors. The Texas Rail System Plan (TSRP) describes the current Texas rail system and identifies some methods the State can take to increase its involvement in nurturing this important transportation resource (TxDOT, 2005e). For years, railroad companies have struggled to earn the cost of capital for the myriad of improvements in infrastructure and equipment they need. This need for capital has driven some of their larger customers to invest in railroad equipment, for example, electric generating companies buying fleets of coal cars and chemical companies owning fleets of tank cars. Two of the three Class I freight railroads have executed agreements with the State indicating their recognition of the importance of new sources of capital.

Three Class I freight railroads operate within the study area, Union Pacific Railroad (UPRR), Burlington Northern-Santa Fe Railroad Company (BNSF) and Kansas City Southern (KCS). These three Class I railroads account for over 90 percent of the freight tonnage hauled within Texas. The locations of rail lines are shown in Figures 3-22 through 3-25.

### Passenger Rail
Amtrak operates passenger trains in the study area between Gainesville, Texas, and San Antonio, Texas. The Texas Eagle operates between Chicago, Illinois, and San Antonio, Texas, entering through Texarkana, Texas. At San Antonio, Texas, the Texas Eagle connects to the Sunset Limited, Amtrak’s transcontinental train, which operates between Los Angeles, California, and Orlando, Florida. The Heartland Flyer operates between Oklahoma City, Oklahoma, and Fort Worth, Texas, where it connects with the Texas Eagle.

#### 3.5 AIR QUALITY
The EPA and the TCEQ, [formerly the Texas Natural Resource Conservation Commission, TNRCC], are responsible for the protection of air quality in Texas. Under the authority of the Clean Air Act (CAA), as amended, primary and secondary National Ambient Air Quality Standards (NAAQS) were established for six criteria pollutants (EPA, 2004a). These pollutants include: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), ozone (O₃), and particulate matter of 10 microns or less in size (PM-10 and PM-2.5). Primary standards refer to air quality levels required to protect health, including the health of "sensitive" populations such as asthmatics, children, and the elderly, within an adequate margin of safety. Secondary standards refer to air quality levels required to safeguard public welfare, including visibility, comfort, animals, and property from the deleterious effects of poor air quality. The primary and secondary NAAQS are shown in Table 3-9.

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44 Class I railroads are defined as those with operating revenues in excess of $277.7 million.
Table 3-9: National Ambient Air Quality Standards (NAAQS)

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Averaging Time</th>
<th>NAAQS</th>
<th>Standard Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfur Dioxide (SO₂)</td>
<td>Annual Arithmetic Mean</td>
<td>0.03 ppm</td>
<td>Primary</td>
</tr>
<tr>
<td></td>
<td>Twenty-four Hour*</td>
<td>0.14 ppm</td>
<td>Primary</td>
</tr>
<tr>
<td></td>
<td>Three Hour*</td>
<td>0.50 ppm</td>
<td>Secondary</td>
</tr>
<tr>
<td>Particulates (PM-10)</td>
<td>Annual Arithmetic Mean</td>
<td>50 μg/m³</td>
<td>Primary and Secondary</td>
</tr>
<tr>
<td></td>
<td>Twenty-four Hour**</td>
<td>150 μg/m³</td>
<td>Primary and Secondary</td>
</tr>
<tr>
<td>Particulates (PM-2.5)</td>
<td>Annual Arithmetic Mean</td>
<td>5 μg/m³</td>
<td>Primary and Secondary</td>
</tr>
<tr>
<td></td>
<td>Twenty-four Hour**</td>
<td>65 μg/m³</td>
<td>Primary and Secondary</td>
</tr>
<tr>
<td>Carbon Monoxide (CO)</td>
<td>One Hour*</td>
<td>35 ppm</td>
<td>Primary</td>
</tr>
<tr>
<td></td>
<td>Eight Hour*</td>
<td>9 ppm</td>
<td>Primary</td>
</tr>
<tr>
<td>Ozone (O₃)</td>
<td>Eight Hour***</td>
<td>0.08 ppm</td>
<td>Primary and Secondary</td>
</tr>
<tr>
<td>Nitrogen Dioxide (NO₂)</td>
<td>Annual Arithmetic Mean</td>
<td>0.053 ppm</td>
<td>Primary and Secondary</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>Three Month Arithmetic Mean</td>
<td>1.5 μg/m³</td>
<td>Primary and Secondary</td>
</tr>
</tbody>
</table>

Source: EPA, 2004a (Website: http://www.epa.gov/air/criteria.html).

*Not to be exceeded more than once a year.
**Estimated number of days with exceedences, not to be more than once per year.
***Three-year average of annual fourth-highest daily maximum.
ppm – Parts of pollutant per million parts of air (by volume at 25°C Celsius [C]).
μg/m³ - Micrograms of pollutant per cubic meter of air.

In accordance with the CAA, an area that has not achieved compliance with the NAAQS primary standard based on air quality monitoring data is designated by EPA as a “non-attainment area”. In addition, the TCEQ has designated “near non-attainment areas” for planning purposes. Areas designated as near non-attainment are areas close to falling into non-compliance with the NAAQS. The near non-attainment area counties either have an ozone monitor or are part of a metropolitan statistical area (MSA) that has an ozone monitor. Presently, it is uncertain which near non-attainment counties, if any, EPA would designate as non-attainment in the future.

The study area does not contain counties that have been designated non-attainment for CO, PM-10, or PM-2.5. The DFW metropolitan area (Collin, Dallas, Denton, Tarrant, Ellis, Johnson, Kaufman, Parker, and Rockwall counties) is in non-attainment for the eight-hour ozone air quality standard. Three counties in the San Antonio area, Bexar, Comal, and Guadalupe, have also been designated as non-attainment for the eight-hour ozone standard. Both Bexar County and Guadalupe County are part of an Early Action Compact (EAC) for the San Antonio area, which defers designation until December 31, 2007. Transportation and general conformity regulations do not apply to San Antonio while the deferral is in effect. Comal County is not within the TTC-35 study area.

The TCEQ has identified nine additional study area counties as near non-attainment for the eight-hour standard for ozone. These counties include: Williamson, Travis, Caldwell, Bastrop, Wilson, San Patricio, Nueces, Victoria, and Smith. Williamson, Travis, Caldwell, and Bastrop counties are located within the Austin EAC, and have developed a
plan outlining potential emission reduction measures to be implemented. Wilson County is also located in the EAC in the San Antonio area. San Patricio and Nueces counties are in the Corpus Christi near non-attainment area. Victoria is in the Victoria near non-attainment area. Smith County is located in the North East Texas EAC.

The CAA requires transportation conformity in non-attainment areas. Conformity requires that a non-attainment area demonstrate that the MTP and TIP conform to the State Implementation Plan (SIP) (TCEQ, 2005a). Currently, the DFW and San Antonio metropolitan areas are the only areas designated non-attainment or deferred non-attainment in the study area. As a result, both of these areas will be required to demonstrate conformity of their MTP and TIP with the SIP.

In addition to the criteria, air pollutants for which there are NAAQS, EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries). Urban air toxics, also known as hazardous air pollutants, are those pollutants that cause or may cause cancer or other serious health effects or adverse environmental and ecological effects. Most air toxics originate from man-made sources, but some are also released from natural sources. The EPA has not yet determined how best to evaluate the impact of future transportation facilities on the ambient concentrations of urban air toxics. The Clean Air Act identified 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list of toxics and identified a group of 21 as mobile source air toxics (MSATs), which are set forth in an EPA final rule, Control of Emissions of Hazardous Air Pollutants from Mobile Sources (66 FR 17235).

There are no standards for mobile source air toxics (MSATs) or no tools to determine the significance of localized concentrations or of increases or decreases in emissions. The MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline. Of the 21 MSATs listed, the EPA identified a list that it now labels as the six priority MSATs. These are benzene, formaldehyde, acetaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, and 1, 3-butadiene and are considered the priority transportation toxics.

The EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources (66 FR 17229) (March 29, 2001) under the authority in Section 202 of the Clean Air Act. In this rule, EPA examined the impacts of existing and newly promulgated mobile source control programs; including the reformulated gasoline (RFG) program, the national low emission vehicle (NLEV) standards, the Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and the proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, FHWA projects that even with a 64 percent
increase in VMT, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57 percent to 65 percent, and will reduce on-highway diesel PM emissions by 87 percent. As a result, EPA concluded that no further motor vehicle emissions standards or fuel standards were necessary to further control MSATs. The EPA is preparing another rule under authority of CAA Section 202(l) that will address these issues and could make adjustments to the full 21 and the primary six MSATs.

The FHWA *Interim Guidance on Air Toxic Analysis in NEPA Documents* (February 3, 2006) provides guidance on when and how to analyze MSATs in the NEPA process for highways. However, this guidance is not complete and will evolve as MSAT science progresses.

### 3.6 NOISE

**Highway**

TxDOT has developed *Guidelines for Analysis and Abatement of Highway Traffic Noise* (TxDOT, 1996) for use on highway projects. The guidelines were developed in accordance with 23 CFR 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (USDOT, 1982) and the *FHWA Policy and Guidance for Highway Traffic Noise Analysis and Abatement* (June, 1995) (USDOT-FHWA, 1995). The FHWA published Noise Abatement Criteria (NAC) for different land uses close to highways that are presented in **Table 3-10**.

<table>
<thead>
<tr>
<th>Activity Category</th>
<th>dBA Leq</th>
<th>Description of Land Use Activity Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>57 (exterior)</td>
<td>Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose</td>
</tr>
<tr>
<td>B</td>
<td>67 (exterior)</td>
<td>Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals</td>
</tr>
<tr>
<td>C</td>
<td>72 (exterior)</td>
<td>Developed lands, properties, or activities not included in categories A or B above</td>
</tr>
<tr>
<td>D</td>
<td>---</td>
<td>Undeveloped lands</td>
</tr>
<tr>
<td>E</td>
<td>52 (interior)</td>
<td>Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums</td>
</tr>
</tbody>
</table>


Sound from highway traffic is generated primarily from a vehicle’s tires, engine, and exhaust. It is commonly measured in decibels and expressed as “dB.” Sound occurs over a wide range of frequencies. However, not all frequencies are detectable to the human ear; therefore, an adjustment is made to the high and low frequencies to approximate the way an average person hears traffic sounds. This adjustment is called A-weighting and is
expressed as dBA. Since traffic sound levels are never constant because of the changing number, type, and speed of vehicles, a single value is used to represent the average or equivalent sound level and is expressed as “Leq.” Table 3-11 provides a list of common sound/noise levels.
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Table 3-11: Common Sound/Noise Levels

<table>
<thead>
<tr>
<th>Outdoor</th>
<th>dBA</th>
<th>Indoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jet flyover at 300 meters</td>
<td>110</td>
<td>Rock band at 5 meters</td>
</tr>
<tr>
<td>Pneumatic hammer</td>
<td>100</td>
<td>Subway train</td>
</tr>
<tr>
<td>Gas lawn mower at 1 meter</td>
<td>90</td>
<td>Food blender at 1 meter</td>
</tr>
<tr>
<td>Downtown (large city)</td>
<td>80</td>
<td>Garbage disposal at 1 meter</td>
</tr>
<tr>
<td>Lawn mower at 30 meters</td>
<td>70</td>
<td>Shouting at 1 meter</td>
</tr>
<tr>
<td>Commercial area</td>
<td>60</td>
<td>Vacuum cleaner at 3 meters</td>
</tr>
<tr>
<td>Air conditioning unit</td>
<td></td>
<td>Normal speech at 1 meter</td>
</tr>
<tr>
<td>Babbling brook</td>
<td></td>
<td>Clothes dryer at 1 meter</td>
</tr>
<tr>
<td>Quiet urban (daytime)</td>
<td>50</td>
<td>Large business office</td>
</tr>
<tr>
<td>Quiet urban (nighttime)</td>
<td>40</td>
<td>Dishwasher (next room)</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>Library</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>Threshold of hearing</td>
</tr>
</tbody>
</table>


Under 23 CFR 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise, analysis of project area noise levels in areas on new location include a comparison of the existing noise levels to those predicted to occur at some point in the future as a result of the implementation of the proposed project (USDOT, 1982). To accomplish this, locations within a project study area that are most sensitive to noise are identified and a representative sample of those locations is chosen for noise comparison.

Noise monitoring is normally conducted to determine existing noise levels. Field measurements of noise levels were not conducted for this Tier One DEIS because this document evaluates a transportation corridor and does not evaluate possible alignment locations.
Field noise measurements for any highway studied during a Tier Two environmental process would be obtained following guidance listed in TxDOT’s *Guidelines for Analysis and Abatement of Highway Traffic Noise* (1996).

**Railroads**

Freight and passenger trains generally travel through and near populated areas making evaluating noise and vibration a key part of the environmental impact assessment process. Experience has shown that noise and vibration are perceived as a major concern of surrounding communities. Existing noise levels in the study area are attributable to intercity passenger and freight rail traffic. The primary source of vibration in the study area is attributable to the interaction of train wheels on the tracks. No monitoring of ambient noise levels was conducted for this analysis.

The Federal Railroad Administration (FRA) and the STB have regulations covering the preparation of environmental documentation. FRA has regulations limiting the total sound that can be emitted by most conventional moving railroad equipment used for typical freight and passenger trains. Both agencies consider certain land uses to be noise and vibration “sensitive”. Land uses within this category include residences, schools, churches, libraries, hospitals, hotels/motels, and parks. FRA has developed a guidance manual, *High-speed Ground Transportation Noise and Vibration Impact Assessment* (USDOT-FRA, 1998) which includes criteria for noise and vibration impact evaluation. These noise criteria are based on a comparison of the new rail systems activity with the outdoor ambient noise from other sources in the community. They incorporate both absolute thresholds, which consider activity interference caused by the rail system alone and relative limits, which consider annoyance due to the change in noise environment caused by the train.

The noise impact criteria and descriptors for human annoyance depend on land use (designated Category 1, Category 2, and Category 3). Category 1 includes tracts of land where quiet is an essential element of their intended purpose, such as outdoor concert pavilions or National Landmarks where outdoor interpretation routinely takes place. Category 2 includes residences and buildings where people sleep. Category 3 includes institutional land uses with daytime and evening use, such as schools, places of worship and libraries.

The major sources of existing train noise in the study area are:

- locomotive engines;
- interaction between the train wheels and the track rails; and
- locomotive horns that are sounded at highway/rail at-grade crossings.

The major source of existing ground-borne vibration is the rolling interaction of the rail vehicle wheels on the rails. Secondary noises along the corridor include motor vehicle traffic on nearby roadways, aircraft in some areas, and general community activities.
In addition to the rail noise, rail operations have the potential to cause vibration impacts. Ground-borne vibration is a small but rapid fluctuating motion transmitted through the ground. Ground-borne vibration diminishes (or “attenuates”) over distance. Some soil types transmit vibration quite efficiently; others do not. The response of humans, building, and sensitive equipment to vibration is described in terms of root-mean square (RMS) velocity level in decibel units (VdB). The average person can just barely perceive vibration velocity levels below 70 VdB. Common sources of ground-borne vibration are heavy trucks, rough roads, trains and earth-moving equipment. Several factors influence the rail related vibration level at a particular location, including:

- rail operations, including train length and speed;
- track design and condition;
- geologic conditions; and
- affected building characteristics.

Unlike noise criteria, vibration impact criteria are based on the typical maximum vibration level from repeated events such as the passbys of a train.

Field measurements were not collected during this Tier One EIS. Noise and vibration measurements would be collected during field investigations at representative locations during Tier Two environmental processes. These measurements would help define the existing noise and vibration environments. Further noise and vibration analyses would be conducted in a manner consistent with federal guidance. The major steps of the noise and vibration analysis include:

- inventory noise and vibration sensitive land-uses;
- determine existing noise and vibration levels;
- estimate future levels of noise and vibration;
- compare findings with federal standards and make a determination of impact;
- consider need for, reasonableness, and feasibility of mitigation; and
- recommend mitigation, if warranted.

Information regarding train speed, train volume, time of operation, and distance from the track would be used to estimate noise and vibration levels during Tier Two environmental processes.

3.7 CULTURAL RESOURCES

NEPA requires consideration of important historic, cultural, and natural aspects of our national heritage. NEPA regulations direct agencies to consider the effect of their projects on districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places (NRHP), and significant scientific, cultural, or historical resources (40 CFR 1508.27(8)). Collectively, these resources are referred to as “cultural resources”. The regulatory framework provided below applies to all cultural resource types.
Section 106 of the *National Historic Preservation Act* (NHPA) of 1966, as amended, also encourages coordination with the NEPA process (36 CFR 800.2(a)(4)). This requires federal agencies to “take into account” the effect that an undertaking would have on “historic properties”. The NHPA provides a definition of historic properties that includes prehistoric and historical sites, buildings, structures, districts, and objects included in or eligible for inclusion in the NRHP. Historic properties also include the artifacts, records, and remains that relate to the historic properties. In accordance with the Advisory Council on Historic Preservation (ACHP) regulations pertaining to the protection of historic properties (36 CFR 800.4), federal agencies are required to identify, assess, and mitigate the effects that the undertaking would have on such properties. These steps shall be completed under the terms of the Programmatic Agreement for NHPA compliance between the FHWA, Texas Historical Commission (THC) (the State Historic Preservation Officer [SHPO]), ACHP, and TxDOT. Coordination with federally recognized tribes has been initiated. Chapter 8, Section 8.3 – Additional Coordination provides a summary of this coordination.

This project also falls under the purview of the Texas Antiquities Code (TAC) because it will be owned by the state. As the project may involve purchase of ROW by the State, or lands belonging to local municipalities and counties, impacts to cultural resources would also be subject to the provisions of the Programmatic Agreement (PA) between the FHWA, THC, and TxDOT (TxDOT, 2005f). The TAC allows for all such properties to be considered State Archaeological Landmarks (SAL), and requires that each be examined in terms of possible “significance”. Significance standards for the code are outlined under Chapter 26 of the THC Rules of Practice, under the Procedures for the TAC, and closely follow those of the U.S. Secretary of the Interior’s Standards and Guidelines.

Historic and archeological resources determined eligible for listing in the NRHP by the THC which would be directly affected by a FHWA-funded project are subject to evaluation under Section 4(f) of the *Department of Transportation Act of 1966* (23 CFR 771.135). Section 4(f) requires that the agency specifically address why alternatives to avoid a NRHP property are not feasible and prudent and that the proposed action includes all possible planning to minimize harm to the property resulting from such use. The “use” or “taking” of historic property would be approved only when there is no feasible and prudent alternative to such a use or taking. A comprehensive list of all applicable state and federal laws concerning cultural resources is included in Appendix C-12.

**Prehistoric Overview**

The study area counties are located within two major archaeological planning regions in Texas, the Central and Southern Planning Region and the Eastern Planning Region, as defined by the THC (Mercado-Allinger et al., 1996). Prehistoric occupations in these areas of Texas are generally divided into three time periods: Paleoindian, Archaic, and Late Prehistoric. Sites dating to the Paleoindian Period (ca 11,500 – 8,000 Before Present [B.P.]) are represented by both surficial and deeply buried sites, rock shelters, and locations containing only isolated artifacts. These sites usually contain stone tools...
and blades; which are often fluted. Two projectile point styles, Clovis and Folsom, are associated with this time period, and dart points of various styles are associated with the end of the time period and the transition to the Archaic. Sites associated with the Archaic (8,000 B.P. – 1,250 B.P.) typically indicate a shift toward a more generalized hunting and gathering society. Artifact assemblages associated with the Archaic vary through time from small diverse tool assemblages indicative of a mobile and low-density population, to increasingly large sites located more densely on the landscape (Story, 1985 and Story et al., 1990). Burned rock middens are commonly associated with this time period, and seem to indicate a decrease in the importance of hunting, as indicated by the low ratios of projectile points to other tool assemblages (Prewitt, 1981). The use of burned rock middens carries over into the Late Prehistoric (Goode, 1991). The Late Prehistoric time period (1,250 B.P. – 260 B.P.) is associated with the appearance of the bow and arrow, and ceramics. Pottery traditions and point styles vary across the study area during this time. Population densities in this time period seem to be reduced from Archaic populations (Prewitt, 1983).

Historic Overview

The most rapid changes in the cultural history of Texas came in the historic era (ca 1700 to 1900). The era has been divided into three periods: the Spanish/Mexican period, the early Anglo-European settlement period, and the Development and Industrialization period (Fox, 1989). In the beginning of the late seventeenth and early eighteenth centuries, contact between Europeans and native populations became more common. Spanish missionaries were responsible for most available information on the native populations of Texas. Historically, many tribes traversed the study area, including the Caddo, Comanche, Kiowa, Tawakoni, Waco, Kichai, Tonkawa, Apache, and the Wichita. The introduction of the horse radically altered the interaction of nomadic tribes with native populations, and eventually, northern tribes pushed into Texas displacing resident Indian groups; in some cases, intermarrying with them (Hester et al., 1989).

The Spanish/Mexican period (ca 1716 to 1821) included the establishment of Spanish missions, presidios, and civil settlements in Texas (Fox, 1989). The Anglo-European settlement period (ca 1822 to 1845) began shortly after Mexico won its independence from Spain, and began to recruit American settlement in the southeast and coastal areas of Texas. This period is significant to Texas history and includes the initial settlements and the Texas War for Independence. The final historic period is the Development and Industrialization period (ca 1845 to the present), in which frontier forts and towns were established, Texas was annexed by the U.S., and the Civil War was fought. Additionally, in the later part of this period, farmers began to increase cattle production and railroads were built across Texas, inducing much more rapid growth in towns along the railroad (Fox, 1989).

Archeological and Historic Site Locations Within the Study Area Counties

This overview includes a very broad preliminary assessment of the cultural resources within the study area counties and is not intended to be comprehensive. Specifically, it includes an examination of available resources at the THC, Texas State Archives, and
limited area repositories. Cultural resources evaluated at this time include historic structures, districts, and archaeological sites, all of which are either listed as National Historic Landmarks (NHL), or are listed on the NRHP. The assumption regarding cultural resources in this Tier One EIS is that most cultural resources could be avoided within a four to 10-mile wide corridor and would be studied during Tier Two environmental processes.

Previous work within the study area counties identified trends in cultural resource site locations. The major clusters of sites usually occur because of intensive archaeological investigations in areas that are more heavily developed and thus more thoroughly studied. The number of known sites is much higher in the more urbanized counties. This does not necessarily indicate that these areas were also more densely populated in historic and prehistoric times, but is more of an indicator of how well the areas have been studied.

Based on the archaeological site data at THC, there are more than 8,000 known prehistoric and historic period archaeological sites within the study area counties. The highest site densities are where prehistoric culture groups selected temporary or permanent habitation areas along major rivers, mainstream drainages and principle tributaries. These site densities are notable in north, central, and south Texas where reservoirs are now located. Although temporary and seasonal occupation sites, as well as lithic procurement sites occur within these same types of locations, these habitation sites typically occur at a more remote distance from a permanent water source. The latter types of sites also occur in upland locations. However, historic period archaeological sites and structures are located more evenly across the landscape. Historic inhabitants routinely selected higher ground to establish their home settlements and these inhabitants augmented their settlement distance from water resources by digging wells or constructing cisterns.

Archeological and historic site types vary and this variation can be relative to the ecology of the area. The study area crosses eight natural regions, which are further discussed in detail in Section 3.12 – Terrestrial and Aquatic Communities (Bezanson, 2001 and NHPRP, 1978) of this Chapter. General archaeological site associations for each natural region are listed in Table 3-12. The information provided is not intended to be a complete list of the types of archaeological sites, but is intended as a general guideline.

<table>
<thead>
<tr>
<th>Natural Region</th>
<th>Archeological Site Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piney Woods</td>
<td>Sawmills, Caddo occupation sites and cemeteries, Paleoindian and Archaic lithic scatters, archeaic and late Prehistoric cemeteries and occupation sites, historic Indian occupation sites, historic farmsteads, historic downtown districts</td>
</tr>
<tr>
<td>Rolling Plains</td>
<td>Paleoindian to Late Prehistoric lithic scatters and open campsites, middens, rock shelters, burned rock middens, lithic procurement sites, Archaic to historic occupation sites or villages (Wichita, Comanche, Kiowa), cemeteries, historic farmsteads and ranch sites, historic frontier forts and outposts, historic downtown districts</td>
</tr>
<tr>
<td>Oak Woods and Prairies</td>
<td>Sawmills, Paleoindian to Late Prehistoric lithic scatters and open campsites, rock shelters, lithic procurement sites, Archaic to historic Indian occupation sites or villages (Wichita, Comanche, Kiowa),</td>
</tr>
</tbody>
</table>
**Table 3-12: Archeological and Historic Site Types by Natural Region**

<table>
<thead>
<tr>
<th>Natural Region</th>
<th>Archeological Site Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackland Prairies</td>
<td>Paleoindian to Late Prehistoric lithic scatters and open campsites, rock shelters, burned rock middens, lithic procurement sites, Archaic to historic Indian occupation sites, historic farmsteads, ranch sites, and historic downtown districts</td>
</tr>
<tr>
<td>Edwards Plateau</td>
<td>Paleoindian to Late Prehistoric lithic scatters and open campsites, rock shelters, burned rock middens, lithic procurement sites, Archaic to historic Indian occupation sites, historic farmsteads, Spanish mission and ranch sites, and historic downtown districts</td>
</tr>
<tr>
<td>Gulf Coast Prairies and Marshes</td>
<td>Paleoindian to Late Prehistoric lithic scatters and open campsites, Archaic to historic Indian occupation sites, shell middens, prehistoric and historic cemeteries, historic farmsteads, historic ranches (Spanish, Mexican, Texas Republic and early statehood), shipwrecks, and historic downtown districts</td>
</tr>
<tr>
<td>Coastal Sand Plain</td>
<td>Paleoindian to Late Prehistoric lithic scatters and open campsites, shell middens, Archaic to historic Indian occupation sites, prehistoric and historic cemeteries, historic farmsteads, historic ranches (Spanish, Mexican, Texas Republic and early statehood), shipwrecks, and historic downtown districts</td>
</tr>
<tr>
<td>South Texas Brush Country</td>
<td>Paleoindian to Late Prehistoric lithic scatters and open campsites, Archaic to historic Indian occupation sites, rock shelters, lithic procurement sites, prehistoric and historic cemeteries, historic farmsteads, historic ranches (Spanish, Mexican, Texas Republic and early statehood), frontier forts, and historic downtown districts</td>
</tr>
</tbody>
</table>


**National Register of Historic Places**

A list of National Register properties as of February 2005 was compiled for all of the counties located within the study area. The historical resources inventory identified those resources already known to have historical value by examining existing documentation of historical resources (historic-era buildings, sites, structures, and objects) in the study area, but did not include fieldwork or communication with local historical entities, such as county historical commissions. Documentary resources included NRHP listings. Locations for National Register sites were those provided in the THC Atlas.

All NRHP sites (1,431) for all study area counties are included in the inventory along with brief descriptions for each. It should be noted that the number of NRHP listings does not only reflect the historical significance of a county, but also the energy and determination of county residents to present candidates to the THC. Many sites and districts were listed more than 20 years ago and have not been field verified for present-day existence and integrity. **Table 3-13** provides a list of the number of NRHP-listed sites in each county.
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Table 3-13: Number of National Register of Historic Places-listed Sites by County

<table>
<thead>
<tr>
<th>County</th>
<th>Number of Sites</th>
<th>County</th>
<th>Number of Sites</th>
<th>County</th>
<th>Number of Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson</td>
<td>25</td>
<td>Frio</td>
<td>1</td>
<td>McLennan</td>
<td>17</td>
</tr>
<tr>
<td>Atascosa</td>
<td>3</td>
<td>Goliad</td>
<td>11</td>
<td>McMullen</td>
<td>1</td>
</tr>
<tr>
<td>Bastrop</td>
<td>98</td>
<td>Gonzales</td>
<td>9</td>
<td>Medina</td>
<td>7</td>
</tr>
<tr>
<td>Bee</td>
<td>11</td>
<td>Grayson</td>
<td>8</td>
<td>Milam</td>
<td>3</td>
</tr>
<tr>
<td>Bell</td>
<td>66</td>
<td>Guadalupe</td>
<td>12</td>
<td>Montague</td>
<td>1</td>
</tr>
<tr>
<td>Bexar</td>
<td>114</td>
<td>Henderson</td>
<td>1</td>
<td>Navarro</td>
<td>5</td>
</tr>
<tr>
<td>Bosque</td>
<td>39</td>
<td>Hidalgo</td>
<td>16</td>
<td>Nueces</td>
<td>13</td>
</tr>
<tr>
<td>Brazos</td>
<td>45</td>
<td>Hill</td>
<td>22</td>
<td>Palo Pinto</td>
<td>6</td>
</tr>
<tr>
<td>Brooks</td>
<td>0</td>
<td>Hood</td>
<td>2</td>
<td>Parker</td>
<td>3</td>
</tr>
<tr>
<td>Burleson</td>
<td>2</td>
<td>Hopkins</td>
<td>1</td>
<td>Rains</td>
<td>4</td>
</tr>
<tr>
<td>Caldwell</td>
<td>5</td>
<td>Hunt</td>
<td>7</td>
<td>Robertson</td>
<td>4</td>
</tr>
<tr>
<td>Cameron</td>
<td>22</td>
<td>Jack</td>
<td>1</td>
<td>Rockwall</td>
<td>1</td>
</tr>
<tr>
<td>Collin</td>
<td>60</td>
<td>Jim Hogg</td>
<td>0</td>
<td>San Patricio</td>
<td>2</td>
</tr>
<tr>
<td>Cooke</td>
<td>7</td>
<td>Jim Wells</td>
<td>1</td>
<td>Smith</td>
<td>25</td>
</tr>
<tr>
<td>Dallas</td>
<td>105</td>
<td>Johnson</td>
<td>5</td>
<td>Somervell</td>
<td>2</td>
</tr>
<tr>
<td>Delta</td>
<td>0</td>
<td>Karnes</td>
<td>1</td>
<td>Tarrant</td>
<td>76</td>
</tr>
<tr>
<td>Denton</td>
<td>13</td>
<td>Kaufman</td>
<td>7</td>
<td>Travis</td>
<td>158</td>
</tr>
<tr>
<td>DeWitt</td>
<td>59</td>
<td>Kenedy</td>
<td>0</td>
<td>Van Zandt</td>
<td>0</td>
</tr>
<tr>
<td>Dimmit</td>
<td>3</td>
<td>Kleberg</td>
<td>4</td>
<td>Webb</td>
<td>8</td>
</tr>
<tr>
<td>Duval</td>
<td>0</td>
<td>Lamar</td>
<td>40</td>
<td>Willacy</td>
<td>2</td>
</tr>
<tr>
<td>Ellis</td>
<td>120</td>
<td>La Salle</td>
<td>0</td>
<td>Williamson</td>
<td>70</td>
</tr>
<tr>
<td>Erath</td>
<td>5</td>
<td>Lavaea</td>
<td>7</td>
<td>Wilson</td>
<td>3</td>
</tr>
<tr>
<td>Falls</td>
<td>2</td>
<td>Lee</td>
<td>3</td>
<td>Wise</td>
<td>5</td>
</tr>
<tr>
<td>Fannin</td>
<td>7</td>
<td>Leon</td>
<td>1</td>
<td>Wood</td>
<td>8</td>
</tr>
<tr>
<td>Fayette</td>
<td>17</td>
<td>Limestone</td>
<td>4</td>
<td>Zapata</td>
<td>6</td>
</tr>
<tr>
<td>Freestone</td>
<td>1</td>
<td>Live Oak</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Table 3-14 lists the number of large NRHP-listed sites and districts by county within the study area. TxDOT archaeologists obtained the data regarding these resources from the THC. The assumption has been made that resources less than 23 acres in size can be avoided within a 4- to 10-mile wide corridor. Figure 3-26 illustrates the location and size of these NRHP resources (excluding archeological site locations). Appendix C-13 contains a more detailed description of the resources by county.

Table 3-14: Large National Register of Historic Places-listed Sites and Districts by County

<table>
<thead>
<tr>
<th>County</th>
<th>Number of Sites</th>
<th>County</th>
<th>Number of Sites</th>
<th>County</th>
<th>Number of Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson</td>
<td>0</td>
<td>Frio</td>
<td>0</td>
<td>McLennan</td>
<td>1</td>
</tr>
<tr>
<td>Atascosa</td>
<td>1</td>
<td>Goliad</td>
<td>3</td>
<td>McMullen</td>
<td>0</td>
</tr>
<tr>
<td>Bastrop</td>
<td>3</td>
<td>Gonzales</td>
<td>1</td>
<td>Medina</td>
<td>3</td>
</tr>
<tr>
<td>Bee</td>
<td>0</td>
<td>Grayson</td>
<td>1</td>
<td>Milam</td>
<td>0</td>
</tr>
<tr>
<td>Bell</td>
<td>1</td>
<td>Guadalupe</td>
<td>2</td>
<td>Montague</td>
<td>0</td>
</tr>
<tr>
<td>Bexar</td>
<td>24</td>
<td>Henderson</td>
<td>0</td>
<td>Navarro</td>
<td>2</td>
</tr>
</tbody>
</table>

45 Large sites and districts are defined as 23 acres or larger in size. In accordance with the Federal NOI dated February 5, 2004, to minimize duplication of effort, the size standard of 23 acres was used in order to be consistent with data standards developed by the I-69/TTC study. The I-69/TTC study established the 23-acre size standard under the assumption that any resource comprising less than five percent of the corridor width of 4 miles would not affect corridor development.
Table 3-14: Large National Register of Historic Places-listed Sites and Districts by County

<table>
<thead>
<tr>
<th>County</th>
<th>Number of Sites</th>
<th>County</th>
<th>Number of Sites</th>
<th>County</th>
<th>Number of Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bosque</td>
<td>2</td>
<td>Hidalgo</td>
<td>3</td>
<td>Nueces</td>
<td>0</td>
</tr>
<tr>
<td>Brazos</td>
<td>1</td>
<td>Hill</td>
<td>2</td>
<td>Palo Pinto</td>
<td>0</td>
</tr>
<tr>
<td>Brooks</td>
<td>0</td>
<td>Hood</td>
<td>1</td>
<td>Parker</td>
<td>1</td>
</tr>
<tr>
<td>Burleson</td>
<td>0</td>
<td>Hopkins</td>
<td>0</td>
<td>Rains</td>
<td>0</td>
</tr>
<tr>
<td>Caldwell</td>
<td>0</td>
<td>Hunt</td>
<td>0</td>
<td>Robertson</td>
<td>1</td>
</tr>
<tr>
<td>Cameron</td>
<td>5</td>
<td>Jack</td>
<td>0</td>
<td>Rockwall</td>
<td>0</td>
</tr>
<tr>
<td>Collin</td>
<td>3</td>
<td>Jim Hogg</td>
<td>0</td>
<td>San Patricio</td>
<td>1</td>
</tr>
<tr>
<td>Cooke</td>
<td>0</td>
<td>Jim Wells</td>
<td>0</td>
<td>Smith</td>
<td>1</td>
</tr>
<tr>
<td>Dallas</td>
<td>18</td>
<td>Johnson</td>
<td>0</td>
<td>Somervell</td>
<td>0</td>
</tr>
<tr>
<td>Delta</td>
<td>0</td>
<td>Karnes</td>
<td>1</td>
<td>Tarrant</td>
<td>8</td>
</tr>
<tr>
<td>Denton</td>
<td>0</td>
<td>Kaufman</td>
<td>1</td>
<td>Travis</td>
<td>13</td>
</tr>
<tr>
<td>DeWitt</td>
<td>2</td>
<td>Kenedy</td>
<td>1</td>
<td>Van Zandt</td>
<td>0</td>
</tr>
<tr>
<td>Dimmit</td>
<td>0</td>
<td>Kleberg</td>
<td>1</td>
<td>Webb</td>
<td>3</td>
</tr>
<tr>
<td>Duval</td>
<td>0</td>
<td>Lamar</td>
<td>8</td>
<td>Willacy</td>
<td>1</td>
</tr>
<tr>
<td>Ellis</td>
<td>2</td>
<td>La Salle</td>
<td>0</td>
<td>Williamson</td>
<td>1</td>
</tr>
<tr>
<td>Erath</td>
<td>1</td>
<td>Lavaca</td>
<td>0</td>
<td>Wilson</td>
<td>1</td>
</tr>
<tr>
<td>Falls</td>
<td>1</td>
<td>Lee</td>
<td>0</td>
<td>Wise</td>
<td>0</td>
</tr>
<tr>
<td>Fannin</td>
<td>1</td>
<td>Leon</td>
<td>0</td>
<td>Wood</td>
<td>0</td>
</tr>
<tr>
<td>Fayette</td>
<td>2</td>
<td>Limestone</td>
<td>3</td>
<td>Zapata</td>
<td>1</td>
</tr>
<tr>
<td>Freestone</td>
<td>0</td>
<td>Live Oak</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


National Historic Landmarks

The list of NHLs in the study area counties was compiled by project archeologists using the best available data obtained from the National Park Service (NPS) (2005). Landmarks that are located within the study area counties are listed in Table 3-15.

Table 3-15: National Historic Landmarks Within Study Area Counties

<table>
<thead>
<tr>
<th>Landmark Name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bastrop State Park</td>
<td>Bastrop</td>
</tr>
<tr>
<td>Alamo</td>
<td>Bexar San Antonio</td>
</tr>
<tr>
<td>Espada Aqueduct</td>
<td>Bexar San Antonio</td>
</tr>
<tr>
<td>Fort Sam Houston</td>
<td>Bexar San Antonio</td>
</tr>
<tr>
<td>Hangar 9, Brooks Air Force Base</td>
<td>Bexar San Antonio</td>
</tr>
<tr>
<td>Majestic Theatre</td>
<td>Bexar San Antonio</td>
</tr>
<tr>
<td>Mission Concepcion</td>
<td>Bexar San Antonio</td>
</tr>
<tr>
<td>Randolph Field Historic District</td>
<td>Bexar San Antonio</td>
</tr>
<tr>
<td>Spanish Governor’s Palace</td>
<td>Bexar San Antonio</td>
</tr>
<tr>
<td>Fort Brown</td>
<td>Cameron Brownsville</td>
</tr>
<tr>
<td>Palmito Ranch Battlefield</td>
<td>Cameron Brownsville</td>
</tr>
<tr>
<td>Palo Alto Battlefield</td>
<td>Cameron Brownsville</td>
</tr>
<tr>
<td>Resaca de la Palma Battlefield</td>
<td>Cameron Brownsville</td>
</tr>
<tr>
<td>USS Cabot (Naval Ship)</td>
<td>Cameron Port Isabel</td>
</tr>
<tr>
<td>Dealy Plaza Historic District</td>
<td>Dallas Dallas</td>
</tr>
<tr>
<td>Fair Park Texas Centennial Buildings</td>
<td>Dallas Dallas</td>
</tr>
<tr>
<td>Highland Park Shopping Village</td>
<td>Dallas Highland Park</td>
</tr>
<tr>
<td>Sam Rayburn House</td>
<td>Fannin Bonham</td>
</tr>
</tbody>
</table>
Table 3-15: National Historic Landmarks Within Study Area Counties

<table>
<thead>
<tr>
<th>Landmark Name</th>
<th>County</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presidio Nuestra Senora de Loreto de la Bahia</td>
<td>Goliad</td>
<td>Goliad</td>
</tr>
<tr>
<td>Fort Richardson</td>
<td>Jack</td>
<td>Jacksboro</td>
</tr>
<tr>
<td>King Ranch</td>
<td>Kenedy, Kleberg, Nueces, Willacy</td>
<td>Near Kingsville</td>
</tr>
<tr>
<td>Porter Farm</td>
<td>Kaufman</td>
<td>Near Terrell</td>
</tr>
<tr>
<td>USS Lexington (Naval Ship)</td>
<td>Nueces</td>
<td>Corpus Christi</td>
</tr>
<tr>
<td>Governor’s Mansion</td>
<td>Travis</td>
<td>Austin</td>
</tr>
<tr>
<td>Texas State Capitol</td>
<td>Travis</td>
<td>Austin</td>
</tr>
<tr>
<td>Trevino-Uribe Rancho</td>
<td>Zapata</td>
<td>San Ygnacio</td>
</tr>
</tbody>
</table>


American Heritage Rivers

EO 13061 established the American Heritage Rivers initiative (U.S. Executive Office of the President, 1997a). The American Heritage Rivers initiative has three objectives: natural resource and environmental protection; economic revitalization; and historic and cultural preservation. The EO states that agencies to the extent permitted by law and consistent with their missions and resources, shall coordinate federal plans, functions, programs, and resources to preserve, protect, and restore rivers and their associated resources important to our history, culture, and natural heritage. Additionally, agencies shall commit to a policy under which they will seek to ensure that their actions have a positive effect on the natural, historic, economic, and cultural resources of American Heritage River communities. The policy requires agencies to consult with American Heritage River communities early in the planning stages of federal actions, take into account the communities’ goals and objectives and ensure that actions are compatible with the overall character of the communities. Agencies shall seek to ensure that their help for one community does not adversely affect neighboring communities. Additionally, agencies are encouraged to develop formal and informal partnerships to assist communities. Local federal facilities, to the extent permitted by law and consistent with the agencies’ missions and resources, should provide public access, physical space, technical assistance, and other support for American Heritage River communities. The Rio Grande River in Texas has been designated as an American Heritage River.

3.8 PARKLANDS

Based on a review of available GIS public digital data sources from the Texas Parks and Wildlife Department (TPWD)-Land and Water Resources Conservation Program (LWCRP) (2002), NPS (2001), Texas General Land Office (GLO) (2001, 1995, and No date), and LCRA (2002), parklands covering a total of 481,121 acres accounting for approximately 1.4 percent of the area of the study area counties were identified. These sources of information were the best available data to identify parklands for this Tier One EIS. No electronic data were found for Jim Hogg County. Table 3-16 summarizes the acreages for federal, state, county, city parks, and parks with unknown owners located within the study area counties. Figures 3-27 to 3-30 show the study area counties and the identified parklands.
A concentration of parkland is located along the coastal counties and along the Rio Grande in far south Texas. Cameron County contains the largest total acreage attributed to parks with 119,902 acres.

The NPS and the USFS own more than 138,000 acres of parklands, which occupy portions of nine counties within the study area. The USFS owns the 19,501-acre Lyndon B. Johnson Grassland (Wise County) and the 18,690-acre Caddo National Grassland (Fannin County). The NPS owns the 96,060-acre Padre Island National Seashore (Kenedy, Kleberg, and Willacy counties), 3,423-acre Palo Alto Battlefield (Cameron County), and the 847-acre San Antonio Missions National Historic Park (Bexar and Wilson counties). Although the Padre Island National Seashore encompasses parts of counties within the study area along the Gulf of Mexico, it is located outside of the study area boundary. **Appendix C-14** provides data for federally owned parklands within the study area counties.

The National Wildlife Refuges (NWR) owned and operated by the USFWS occurring within the study area counties are discussed in **Section 3.12 - Terrestrial and Aquatic Communities** of this Chapter.

The TPWD owns and operates state parks, wildlife management areas (WMA), and state historic sites throughout the study area. TPWD-owned parks and public facilities comprise more than 140,000 acres in 43 study area counties. Other state entities own land to a lesser extent. **Appendix C-15** provides data on state-owned parklands with the study area counties.

**Appendices C-16 through C-18** provide information on county, LCRA, and city-owned parks.

Unnamed parks are those that were included in the database but had no name or specific ownership information. **Appendix C-19** provides information on parks with an unknown owner in the study area counties.

### 3.9 PRIME FARMLAND SOILS

Soils that are best suited for the production of food, feed, forage, fiber, and oilseed crops are defined by the United States Department of Agriculture (USDA) as prime farmland soils. These soils produce the highest yields with a minimal expenditure of energy and
economic resources; therefore, farming prime farmland soils could result in the least damage to environmental resources than the farming of other soil types. Prime farmland soils may currently be used as cropland, pasture, or woodland, or for other purposes.

The Farmland Protection Policy Act (FPPA of 1981, P.L. 97-98 and amendments, 9 U.S.C 4201(b) authorizes the USDA’s Natural Resources Conservation Service (NRCS) to develop criteria for identifying the effects of federal programs on the conversion of farmland to non-agricultural uses. Projects considered exempt under the FPPA include those that require no additional ROW or require ROW that is developed, urbanized, or zoned for urban use. The NRCS defines urban lands as areas with a density of 30 or more structures within a 40-acre area or areas within a municipality. Thus, use of the prime farmland soils for highway projects would not be considered as farmland conversion in areas committed to residential and commercial development.

Data from the NRCS and other sources were obtained to determine the amount of prime farmland soils in the study area counties. Within the study area counties, a total of 15,499,774 acres of prime farmland soils occur. However, six of the counties have prime farmland soils surveys that have not been mapped, or have acreages of the prime farmland soils that have not been calculated. Data for the six counties (Duval, Goliad, Kenedy, Kleberg, McMullen, and Zapata) in which prime farmland soils occur, but have not been mapped or acres calculated were obtained from the NRCS Electronic Field Office website (2004a), which was the best available data.

Figure 3-31 depicts the total prime farmland soils found within the study area counties and Table 3-17 shows the total acres of prime farmland soils occurring in the study area by county.
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Affected Environment
TTC-35 Tier One Draft EIS

Table 3-17: Total Acres of Prime Farmland Soils Occurring Within the Study Area by County

<table>
<thead>
<tr>
<th>County</th>
<th>Total Acres of Prime Farmland Soils</th>
<th>County</th>
<th>Total Acres of Prime Farmland Soils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimmitt</td>
<td>769,796</td>
<td>Navarro</td>
<td>199,776</td>
</tr>
<tr>
<td>Duval¹</td>
<td>Not mapped</td>
<td>Nueces</td>
<td>380,103</td>
</tr>
<tr>
<td>Ellis</td>
<td>272,685</td>
<td>Palo Pinto</td>
<td>180,147</td>
</tr>
<tr>
<td>Erath</td>
<td>227,655</td>
<td>Parker</td>
<td>145,609</td>
</tr>
<tr>
<td>Falls</td>
<td>207,988</td>
<td>Rains²</td>
<td>25,119</td>
</tr>
<tr>
<td>Fannin</td>
<td>259,770</td>
<td>Robertson</td>
<td>162,623</td>
</tr>
<tr>
<td>Fayette</td>
<td>216,772</td>
<td>Rockwall²</td>
<td>56,684</td>
</tr>
<tr>
<td>Freestone</td>
<td>62,113</td>
<td>San Patricio</td>
<td>275,216</td>
</tr>
<tr>
<td>Frio</td>
<td>452,350</td>
<td>Smith</td>
<td>109,465</td>
</tr>
<tr>
<td>Goliad¹</td>
<td>Not mapped</td>
<td>Somerville²</td>
<td>43,339</td>
</tr>
<tr>
<td>Gonzales</td>
<td>238,150</td>
<td>Tarrant</td>
<td>173,054</td>
</tr>
<tr>
<td>Grayson</td>
<td>187,338</td>
<td>Travis</td>
<td>142,898</td>
</tr>
<tr>
<td>Guadalupe</td>
<td>209,924</td>
<td>Van Zandt</td>
<td>94,531</td>
</tr>
<tr>
<td>Henderson</td>
<td>82,330</td>
<td>Webb</td>
<td>227,414</td>
</tr>
<tr>
<td>Hidalgo</td>
<td>607,710</td>
<td>Willacy</td>
<td>238,578</td>
</tr>
<tr>
<td>Hill</td>
<td>312,099</td>
<td>Williamson</td>
<td>333,039</td>
</tr>
<tr>
<td>Hood²</td>
<td>101,630</td>
<td>Wilson</td>
<td>286,352</td>
</tr>
<tr>
<td>Hopkins²</td>
<td>76,692</td>
<td>Wise</td>
<td>190,741</td>
</tr>
<tr>
<td>Hunt</td>
<td>156,017</td>
<td>Wood</td>
<td>101,424</td>
</tr>
<tr>
<td>Jack</td>
<td>221,307</td>
<td>Zapata¹</td>
<td>Not mapped</td>
</tr>
<tr>
<td>Jim Hogg</td>
<td>60,301</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


¹ Prime farmland soils occur within the county; however, NRCS has not yet mapped or calculated the total acreage.
² Soils information for counties is provided in the same soil survey. These soil surveys include: Hood and Somerville counties; Hopkins and Rains counties; Kaufman and Rockwall counties; and Kenedy and Kleberg counties.

Appendix C-20 provides detailed prime farmland soils information for each study area county in which prime farmland soils occur.

3.10 WATER RESOURCES

Water resources within the study area are subject to a number of state and federal regulations including the Coastal Barrier Resources Act, Texas Coastal Management Program, Rivers and Harbors Act of 1899, Clean Water Act (CWA) (including Section 404 Regulatory Program), Section 401 and 303(d) list of the CWA, Texas Pollutant Discharge Elimination System (TPDES), and EO 11990 on Protection of Wetlands (U.S. Executive Office of the President, 1997b).

The following sections provide information on the major river basins, surface water features, groundwater including minor and major aquifers, and a regional overview of potential wetlands within the study area counties.

River Basins

Portions of 16 of the 23 defined river and coastal basins in Texas occur within the study area counties, of which 13 are river basins and three are coastal basins. All river basin and water quality information presented in this section was obtained from the Texas Water Quality Inventory, 2000 (TNRCC, 2002), which is the most recent Section 303(d)
list with a completed review by EPA available when this Tier One EIS was developed. Section 303(d) of the CWA requires each state to develop a list of water bodies that do not meet water quality standards and to submit an updated list to the EPA every two years. The TCEQ is responsible for maintaining this list for the State of Texas. The study area counties encompass several listed 303(d) waters. If TxDOT proposes to construct TTC-35 facilities within 5 miles of an impaired segment, it would be required to coordinate with TCEQ. An impaired segment is defined by TCEQ as a water body that does not meet the standards set for its use, or is expected not to meet its use in the future. **Table 3-18** presents information on the river and coastal basins within the study area counties.
<table>
<thead>
<tr>
<th>River Basin</th>
<th>Area of Basin within Texas (square-mile)</th>
<th>Area of Basin Within the Study Area Counties (square-mile)</th>
<th>Percentage of Study Area Drained by Basin</th>
<th>No. of Stream Segments within Study Area</th>
<th>Associated Reservoir(s) within the Study Area</th>
<th>Section 303 (d) Impaired Stream Segments</th>
<th>Study Area County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red River</td>
<td>24,463</td>
<td>2,571</td>
<td>3.48</td>
<td>10</td>
<td>4</td>
<td>3</td>
<td>Cooke, Denton, Fannin, Lamar, Montague</td>
</tr>
<tr>
<td>Sulphur River</td>
<td>3,558</td>
<td>1,680</td>
<td>2.28</td>
<td>7</td>
<td>2</td>
<td>4</td>
<td>Delta, Fannin, Hopkins, Hunt, Lamar</td>
</tr>
<tr>
<td>Cypress Creek</td>
<td>2,812</td>
<td>82</td>
<td>&lt;1.00</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>Hopkins, Wood</td>
</tr>
<tr>
<td>Sabine River</td>
<td>7,426</td>
<td>2,724</td>
<td>3.69</td>
<td>10</td>
<td>2</td>
<td>6</td>
<td>Collins, Hopkins, Hunt, Kaufman, Rains, Rockwall, Smith, Van Zandt, Wood</td>
</tr>
<tr>
<td>Neches River</td>
<td>10,011</td>
<td>1,596</td>
<td>2.16</td>
<td>8</td>
<td>2</td>
<td>6</td>
<td>Anderson, Henderson, Smith, Van Zandt</td>
</tr>
<tr>
<td>Trinity River</td>
<td>17,969 (upper end)</td>
<td>13,739</td>
<td>18.61</td>
<td>38</td>
<td>24</td>
<td>19</td>
<td>Anderson, Collin, Cooke, Dallas, Denton, Ellis, Fannin, Freestone, Grayson,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Henderson, Hill, Hood, Hunt, Jack, Johnson, Kaufman, Leon, Limestone, Montague,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Navarro, Parker, Rockwall, Tarrant, Van Zandt, Wise</td>
</tr>
<tr>
<td>Brazos River</td>
<td>43,000</td>
<td>14,361</td>
<td>19.46</td>
<td>48</td>
<td>17</td>
<td>18</td>
<td>Bastrop, Bell, Bosque, Brazos, Burleson, Erath, Falls, Fayette, Freestone,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hill, Hood, Jack, Johnson, Lee, Leon, Limestone, McLennan, Milam, Palo Pinto,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Parker, Robertson, Somervell, Travis, Williamson</td>
</tr>
<tr>
<td>Colorado River</td>
<td>39,900</td>
<td>2,672</td>
<td>3.62</td>
<td>15</td>
<td>2</td>
<td>13</td>
<td>Bastrop, Caldwell, Fayette, Lee, Travis, Williamson</td>
</tr>
<tr>
<td>Lavaca River</td>
<td>2,309</td>
<td>1,293</td>
<td>1.75</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>DeWitt, Fayette, Gonzales, Lavaca</td>
</tr>
<tr>
<td>Lavaca-Guadalupe Coastal Basin</td>
<td>998</td>
<td>16</td>
<td>&lt;1.00</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>DeWitt, Lavaca</td>
</tr>
<tr>
<td>Guadalupe River</td>
<td>6,070</td>
<td>3,188</td>
<td>4.32</td>
<td>9</td>
<td>0</td>
<td>3</td>
<td>Bastrop, Caldwell, DeWitt, Fayette, Goliad, Gonzales, Guadalupe, Karnes, Lavaca,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Travis, Wilson</td>
</tr>
<tr>
<td>San Antonio River</td>
<td>4,180</td>
<td>3,288</td>
<td>4.46</td>
<td>12</td>
<td>2</td>
<td>7</td>
<td>Atascosa, Bexar, DeWitt, Goliad, Guadalupe, Karnes, Medina, Wilson</td>
</tr>
</tbody>
</table>
### Table 3-18: River and Coastal Basins Within the Study Area Counties

<table>
<thead>
<tr>
<th>River Basin</th>
<th>Area of Basin within Texas (square-mile)</th>
<th>Area of Basin Within the Study Area Counties (square-mile)</th>
<th>Percentage of Study Area Drained by Basin</th>
<th>No. of Stream Segments within Study Area</th>
<th>Associated Reservoir(s) within the Study Area</th>
<th>Section 303 (d) Impaired Stream Segments</th>
<th>Study Area County</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Antonio-Nueces Coastal Basin</td>
<td>2,652</td>
<td>1,691</td>
<td>2.29</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>Bee, Goliad, Karnes, Live Oak, Nueces, San Patricio</td>
</tr>
<tr>
<td>Rio Grande</td>
<td>48,259</td>
<td>3,342</td>
<td>4.53</td>
<td>9</td>
<td>1</td>
<td>8</td>
<td>Cameron, Dimmit, Hidalgo, Jim Hogg, Webb, Zapata</td>
</tr>
<tr>
<td>Total Area Within Study Area Counties</td>
<td>240,999</td>
<td>73,734</td>
<td>100.00</td>
<td>190</td>
<td>61</td>
<td>98</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3-32 shows the study area counties in relation to the boundaries of the major rivers and coastal basins. A more detailed description of each river basin is included in Appendix C-21.

Wild and Scenic Rivers
The Provisions of the Wild and Scenic Rivers Act of 1968 (16 U.S.C. 1271, as amended; Public Law 90-542) states that Federal agencies must consider impacts to wild and scenic rivers:

> In all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic and recreational river areas, and all river basin and project plan reports submitted to the Congress shall consider and discuss any such potentials. The Secretary of the Interior and the Secretary of Agriculture shall make specific studies and investigations to determine which additional wild, scenic and recreational river areas within the United States shall be evaluated in planning reports by all Federal agencies as potential alternative uses of the water and related land resources involved.

There are no designated or potentially designated Wild and Scenic Rivers located within the study area counties.

Groundwater Resources
Several Federal laws help protect groundwater quality. Section 1424(e) of The Safe Drinking Water Act (SDWA) of 1974 and amendments passed in 1986, included the establishment of the Sole Source Aquifer Demonstration Program. To fulfill requirements of the SDWA as directed by the EPA, TWDB provides protection of public water supply systems through the Groundwater Resources Division. Groundwater resources were identified from the best available data obtained from the TWDB. The TWDB defines major aquifers as those that supply large quantities of water in large areas of the State. Minor aquifers are defined by TWDB as those that supply large quantities of water in small areas or relatively small quantities in large areas (TWDB, 1995). The EPA has designated two segments of the Edwards Aquifer (San Antonio and Barton Springs segment) as the only sole source aquifer (SSA) in Texas. The EPA defines a SSA as the "sole or principal source" of drinking water for a given service area; that is, an aquifer which is needed to supply 50 percent or more of the drinking water for an area and, for which there are no reasonably available alternative sources should the aquifer become contaminated.

Groundwater resources within study area counties are listed as major and minor aquifers in Table 3-19, and Figures 3-33 and 3-34 depict the major and minor aquifers in the study area counties.
Table 3-19: Major and Minor Aquifers Within the Study Area Counties

<table>
<thead>
<tr>
<th>Aquifers</th>
<th>Associated Counties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrizo-Wilcox</td>
<td>Atascosa, Bell, Bexar, Guadalupe, Medina, Travis, and Williamson</td>
</tr>
<tr>
<td>Minor Aquifers</td>
<td></td>
</tr>
<tr>
<td>Blossom</td>
<td>Lamar</td>
</tr>
<tr>
<td>Brazos River Alluvium</td>
<td>Bosque, Brazos, Burleson, Falls, Hill, McLennan, Milam, Robertson</td>
</tr>
<tr>
<td>Hickory</td>
<td>Travis, Williamson</td>
</tr>
<tr>
<td>Nacatoch</td>
<td>Delta, Ellis, Henderson, Hopkins, Hunt, Kaufman, Lamar, Navarro, Rains, Rockwall</td>
</tr>
<tr>
<td>Queen City</td>
<td>Anderson, Atascosa, Bastrop, Bexar, Brazos, Burleson, Caldwell, Fayette, Freestone, Frio, Gonzales, Guadalupe, Henderson, La Salle, Lee, Leon, McMullen, Milam, Robertson, Smith, Van Zandt, Wilson, Wood</td>
</tr>
<tr>
<td>Sparta</td>
<td>Anderson, Atascosa, Bastrop, Brazos, Burleson, Fayette, Frio, Gonzales, La Salle, Lee, Leon, McMullen, Robertson, Wilson</td>
</tr>
<tr>
<td>Woodbine</td>
<td>Collin, Cooke, Dallas, Denton, Ellis, Fannin, Grayson, Hill, Hunt, Johnson, Kaufman, Lamar, McLennan, Navarro, Rockwall, Tarrant</td>
</tr>
<tr>
<td>Yegua-Jackson</td>
<td>Atascosa, Bastrop, Brazos, Burleson, Duval, Fayette, Frio, Gonzales, Jim Hogg, Karnes, La Salle, Lavaca, Lee, Leon, Live Oak, McMullen, Webb, Wilson, Zapata</td>
</tr>
</tbody>
</table>


General geologic and water quality information for the four major and eight minor aquifers within the study area counties is presented in Appendix C-22 (TWDB, 1995).

**Floodplains**

EO 11988 on Floodplain Management requires federal agencies to take actions to reduce the risk of flood loss; to minimize the impact of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial values served by floodplains (U.S. Executive Office of the President, 1997c). Federal agencies participating in or permitting the construction of any future project are subject to this EO.

A 100-year flood is a flood elevation that has a one percent chance of being equaled or exceeded each year. A 100-year floodplain is that floodplain that is at or below the 100-year flood elevation. While these floodplains are typically associated with a stream, coastline, or other body of water, areas such as level, poorly drained terrain can also contain floodplains. Modifications to a floodplain that may increase floods are regulated and may be prohibited. The Federal Emergency Management Agency (FEMA) defines...
and maps 100-year floodplains throughout the U.S. and administers the National Flood Insurance Program (NFIP). The NFIP provides insurance protection to property owners in flood-prone areas and, by not providing insurance in 100-year floodplains, limits development of these features and reduces future flood losses. Participants in the NFIP include local governments such as cities and counties that must adopt and enforce minimum floodplain management ordinances so that their residents may obtain flood insurance.

Concerns with development in a floodplain include placement of structures of a size that would displace flood waters, thus raising the flood elevation; situating facilities that could pose environmental hazards during flood events; or siting (or otherwise encouraging) residential development that could place humans and property in danger during flood conditions. Floodplains provide good locations for other types of development, such as recreational facilities, provided that the facilities do not diminish possible floodplain values such as wetlands, water absorption capacity of the soils, or increase flood elevations.

In 1999, the Bureau of Economic Geology (BEG) developed the Land Resources of Texas (LRT) data map in order to provide natural resource information to aid in regional planning in rapidly developing areas of Texas (BEG, 1977). The BEG identified 70 land resource units within eight land resource categories, including the flood-prone areas unit. The LRT data map was used as the best source available to identify potential floodplains within the study area because of the size of the study area.

The flood-prone areas are “natural floodplains that have a statistical probability of flooding on the order of 1 percent or more, but that they do not necessarily correspond to floodplains that are legally defined by the Federal Insurance Administration” (Kier et al., 1977). The mapped data for flood-prone areas were digitized from 1:500,000 scale maps and are used in this document for gross regional comparisons of areas with a high probability for flooding. Additionally, the LRT maps do not provide flood-prone area data for tidal areas along the coast.

Flood-prone areas within the study area counties are generally associated with major rivers and stream systems and total approximately 7,773 square miles within the study area counties. **Table 3-20** quantifies the amount of flood-prone areas by river basin within the study area counties and **Figures 3-35 through 3-38** depict flood-prone areas within the study area counties.

<table>
<thead>
<tr>
<th>Table 3-20: Flood-prone Areas by River Basin Within the Study Area Counties</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>River Basin</strong></td>
</tr>
<tr>
<td>Red River</td>
</tr>
<tr>
<td>Sulphur River</td>
</tr>
<tr>
<td>Cypress Creek</td>
</tr>
<tr>
<td>Neches River</td>
</tr>
</tbody>
</table>
Table 3-20: Flood-prone Areas by River Basin Within the Study Area Counties

<table>
<thead>
<tr>
<th>River Basin</th>
<th>Flood-prone Areas (square-mile)</th>
<th>Percent Flood-prone Area Per Study Area River Basin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sabine River</td>
<td>343</td>
<td>12.59</td>
</tr>
<tr>
<td>Trinity River</td>
<td>1,659.05</td>
<td>12.08</td>
</tr>
<tr>
<td>Brazos River</td>
<td>1,498.23</td>
<td>10.43</td>
</tr>
<tr>
<td>Colorado River</td>
<td>178.75</td>
<td>6.69</td>
</tr>
<tr>
<td>Lavaca River</td>
<td>78.63</td>
<td>6.08</td>
</tr>
<tr>
<td>Lavaca-Guadalupe Coastal Basin</td>
<td>0.91</td>
<td>5.8</td>
</tr>
<tr>
<td>Guadalupe River</td>
<td>324.17</td>
<td>10.17</td>
</tr>
<tr>
<td>San Antonio River</td>
<td>248</td>
<td>7.54</td>
</tr>
<tr>
<td>San Antonio-Nueces Coastal Basin</td>
<td>93.79</td>
<td>5.55</td>
</tr>
<tr>
<td>Nueces River</td>
<td>1,867.57</td>
<td>17.11</td>
</tr>
<tr>
<td>Nueces-Rio Grande Coastal Basin</td>
<td>298.18</td>
<td>2.82</td>
</tr>
<tr>
<td>Rio Grande</td>
<td>458.32</td>
<td>13.71</td>
</tr>
</tbody>
</table>

Source: Kier et al., 1977.

The Trinity River Corridor Development Certificate Zone (Trinity River CDC Zone) is delineated similarly to the 100-year floodplain along portions of the Trinity River, including the Elm and West Forks, in Dallas, Denton, and Tarrant counties. The Trinity River CDC Zone within Tarrant County is located within the study area. Development is allowed within the Trinity River CDC Zone, but the development must not raise flood water levels, reduce flood storage capacity, or increase erosive water velocities.

**Wetlands and Other Waters of the U.S**

Section 404 of the CWA requires regulation of discharges into “waters of the U.S.”. The EPA is the principal administrative agency of the CWA; however, the USACE has the responsibility for implementation, permitting, and enforcement of the provisions of the Act. The USACE regulatory program is defined in CFR 320-330.

Water bodies, including lakes, rivers, and streams, are subject to jurisdictional consideration under the Section 404 program. Wetlands are also identified as “waters of the U.S.” and are therefore subject to jurisdiction. Wetlands are defined in 33 CFR 328.3 as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.” Any action that proposes to discharge fill into those areas falls under the jurisdiction of the USACE under Section 404 of the CWA (33 U.S.C. 1344).

Wetlands are defined according to the following three criteria: 1) the presence of hydrophytic vegetation; 2) wetland hydrology; and 3) hydric soil characteristics. The importance of a wetland to an ecosystem is evident in the function and values the wetland provides, such as flood storage capacity, aquatic nutrient and chemical recycling, and providing high quality aquatic and wildlife habitat.
For this Tier One DEIS, the locations within the study area of potential wooded and emergent wetlands were based on the 1992 NLCD (USGS, 1992). These data were the best available data that covered the entire study area. General descriptions of typical wooded and emergent wetlands are addressed by major river basin within the study area counties. It is important to note that wetlands identified by the NLCD are not necessarily jurisdictional wetlands as defined by Section 404 of the CWA.

The NLCD follows Cowardin et al. (1979) in defining wetlands as areas where the soil or substrate is periodically saturated with or covered with water. The NLCD further divides wetland areas into woody wetlands and emergent herbaceous wetlands. Woody wetlands are areas where forest or shrubland vegetation accounts for 25 to 100 percent of the cover and the soil or substrate is periodically saturated with or covered with water. Emergent herbaceous wetlands are areas where perennial herbaceous vegetation accounts for 75 to 100 percent of the cover and the soil or substrate is periodically saturated with or covered with water. No field surveys were conducted for this Tier One DEIS. Actual wetland delineations would be conducted during Tier Two environmental processes.

**Woody Wetlands**

Woody wetlands include bottomlands dominated by forest or woods, shrub-dominated bottomlands, and swamps associated with major river and stream systems. Within the study area counties, there are approximately 336,766 acres (526 square miles) of woody wetlands. Plant species composition of these wetland areas vary along gradients of north to south and west to east. From the Colorado River basin northward, woody wetlands are dominated by such trees as pecan (*Carya illinoiensis*), sugar hackberry (*Celtis laevigata*), cedar elm (*Ulmus crassifolia*), green ash (*Fraxinus pennsylvanica*), black willow (*Salix nigra*), American elm (*Ulmus americana*), and eastern cottonwood (*Populus deltoides*). Woody wetlands in the eastern extremes of the northern portion of the study area exhibit trees with affiliations to the southeast U.S. such as water oak (*Quercus nigra*), willow oak (*Quercus phellos*), sweetgum (*Liquidambar styraciflua*), and blackgum (*Nyssa sylvatica*). From the Guadalupe River basin southward, woody wetlands are dominated by such trees as pecan, sugar hackberry, cedar elm, black willow, and Berlandier ash (*Fraxinus berlandieri*). Table 3-21 provides acreages of woody wetlands by river basin within the study area counties.

**Emergent Herbaceous Wetlands**

Emergent herbaceous wetlands are defined by the NLCD as areas where perennial herbaceous vegetation accounts for 75 to 100 percent of the cover and the soil or substrate is periodically saturated with or covered with water. There are approximately 539,004 acres (842 square miles) of emergent wetlands within the study area counties. The majority of these wetlands include freshwater marshes associated with major reservoirs, rivers and streams, large seasonal drainages in wet meadows, pastures, and along minor drainages, and brackish and saltwater marshes in coastal areas. Inland emergent herbaceous wetlands are typically dominated by dense growths of cattails (*Typha* spp.), grasses, rushes, arrowheads (*Sagittaria* spp.), pickerelweed (*Pontederia cordata*), and sedges. Brackish and saltwater marshes in coastal areas are typically...
dominated by salt-loving grasses (especially cordgrasses \([Spartina\ spp.]\) and seashore saltgrass \([Distichlis\ spicata]\)) and sedges such as flatsedges \([Cyperus\ spp.]\), spikesedges \([Eleocharis\ spp.]\), beak-sedges \([Rhynchospora\ spp.]\), and bulrushes \([Schoenoplectus\ [=Scirpus]\ spp.]\). \textbf{Table 3-21} provides acreages of emergent herbaceous wetlands by river basin within in the study area counties.

### Table 3-21: NLCD Wetland Classification of Woody and Emergent Herbaceous Wetlands by River Basin

<table>
<thead>
<tr>
<th>River Basin</th>
<th>Woody Wetland</th>
<th>Emergent Herbaceous Wetland</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area (acres)</td>
<td>Area (square-miles)</td>
</tr>
<tr>
<td>Red River</td>
<td>24,348.68</td>
<td>38.04</td>
</tr>
<tr>
<td>Sulphur River</td>
<td>7.78</td>
<td>0.01</td>
</tr>
<tr>
<td>Cypress Creek</td>
<td>39.14</td>
<td>0.06</td>
</tr>
<tr>
<td>Sabine River</td>
<td>546.20</td>
<td>0.85</td>
</tr>
<tr>
<td>Neches River</td>
<td>1,343.93</td>
<td>2.10</td>
</tr>
<tr>
<td>Trinity River</td>
<td>0.22</td>
<td>0.00</td>
</tr>
<tr>
<td>Brazos River</td>
<td>38,859.72</td>
<td>60.72</td>
</tr>
<tr>
<td>Colorado River</td>
<td>14,276.19</td>
<td>22.31</td>
</tr>
<tr>
<td>Lavaca</td>
<td>6,076.94</td>
<td>9.50</td>
</tr>
<tr>
<td>Lavaca-Guadalupe Coastal Basin</td>
<td>22,685.17</td>
<td>35.45</td>
</tr>
<tr>
<td>Guadalupe River</td>
<td>582.01</td>
<td>0.91</td>
</tr>
<tr>
<td>San Antonio River</td>
<td>75,627.82</td>
<td>118.17</td>
</tr>
<tr>
<td>San Antonio-Nueces Coastal Basin</td>
<td>2,662.73</td>
<td>4.16</td>
</tr>
<tr>
<td>Nueces River</td>
<td>1,449.79</td>
<td>2.27</td>
</tr>
<tr>
<td>Nueces-Rio Grande Coastal Basin</td>
<td>32,074.23</td>
<td>50.12</td>
</tr>
<tr>
<td>Rio Grande</td>
<td>116,185.08</td>
<td>181.54</td>
</tr>
</tbody>
</table>


### Wetlands Reserve Program (WRP)

The Wetlands Reserve Program (WRP) was mandated by the \textit{Food Security Act of 1985} (Section 1237), as amended by the \textit{Food, Agriculture, Conservation and Trade Act of 1990}, and the \textit{Federal Agriculture Improvement and Reform Act of 1996}, to assist owners in restoring and protecting wetlands (NRCS, 2005). WRP is reauthorized in the \textit{Farm Security and Rural Investment Act of 2002} (Farm Bill) and is a Commodity Credit Corporation (CCC) program administered by NRCS. This program offers landowners the opportunity to protect, restore, and enhance wetlands that occur on their property. The goal of the WRP is “to achieve the greatest wetland functions and values, along with optimum wildlife habitat, on every acre enrolled in the program” (NRCS, 2005).
There are 94 WRP sites enrolled in the State of Texas, of which 42 WRP sites occur within 14 TTC-35 study area counties and cover approximately 37,898 acres. The study area counties in which these WRP sites occur include Cameron, Delta, Ellis, Fannin, Freestone, Hill, Hopkins, Kaufman, Lamar, Milam, Navarro, Robertson, Van Zandt, and Wood. However, there are only 39 WRP sites that occur within the study area boundary. These sites are located in 12 counties (Cameron, Delta, Ellis, Fannin, Hill, Hopkins, Kaufman, Lamar, Milam, Navarro, Robertson, and Van Zandt) accounting for approximately 36,184 acres. Generalized locations of these sites are depicted on Figures 3-35 through 3-38.

The Coastal Barrier Resources Act

The Coastal Barrier Resources Act of 1990 (CBRA) was passed in part to minimize damage to fish, wildlife, and other natural resources associated with coastal barriers of the Atlantic and Gulf coasts and along the shores of the Great Lakes. Undeveloped coastal barriers are defined in the Act as depositional geologic features that are subject to wave, tidal, and wind energies and that protect landward aquatic habitats from direct wave attack, and include all aquatic habitats associated with these features. Additionally, these features and habitats must contain few manmade structures, and the geomorphic and ecological processes must not be significantly impeded by human activities and manmade structures. The CBRA restricts certain federal expenditures that may encourage or facilitate development at coastal barriers. According to the USFWS, four counties within the study area contain coastal barrier resources: Nueces, Kleberg, Willacy, and Cameron. However, the identified coastal barrier resources are located outside the study area boundaries within those counties.

Coastal Zone Management

The Coastal Zone Management Program (CZMP) is authorized by the Coastal Zone Management Act of 1972 and administered at the federal level by the Coastal Programs Division within the National Oceanic and Atmospheric Administration's Office (NOAA) of Ocean and Coastal Resource Management. The Coastal Zone Management Act ensures that Federal actions that are reasonably likely to affect any land or water use or natural resource of the coastal zone will be consistent with the enforceable policies of a coastal state's or territory's federally approved coastal zone management program. On January 10, 1997, the State of Texas received federal approval of the Coastal Management Program (CMP) (62 Federal Register pp. 1439-1440) administered by the GLO. Under federal law, federal agency activities and actions affecting the Texas coastal zone must be consistent with the CMP goals and policies identified in 31 TAC Chapter 501. As required by federal law, the public is given an opportunity to comment on the consistency of proposed activities in the coastal zone undertaken or authorized by federal agencies. Six study area counties contain areas included within the Texas CMP: Cameron, Willacy, Kenedy, Kleberg, Nueces, and San Patricio. If necessary, consistency review by the CMP would be requested during Tier Two environmental processes.
3.11 PHYSIOGRAPHY AND TOPOGRAPHY

Physiographic Regions
Texas is divided into six physiographic provinces (landscapes). Each landscape “reflects a unified geological history of depositional and erosional processes” and has discernible characteristics pertaining to geologic structure, rock and soil types, vegetation, climate, and elevations and landforms that contrast significantly with adjacent landscapes (University of Texas, 2005). The physiography of the study area counties, from south to north, is as described by the BEG Physiographic Map, which is the most recent information available (BEG, 1996). Figure 3-39 depicts the physiographic regions occurring within the study area counties. From southernmost Texas to near San Antonio, the study area counties are situated entirely within the Gulf Coastal Plains province, encompassing the Coastal Prairie subprovince on the east and the Interior Coastal Plains subprovince on the west. The Coastal Prairie is nearly flat, with elevations generally varying by only several feet per mile. The Interior Coastal Plains region is generally low in relief, and consists of parallel ridges and valleys associated with southeasterly flowing major rivers occurring from Louisiana to Mexico.

Table 3-22 provides additional information for each physiographic region within the study area counties.
<table>
<thead>
<tr>
<th>Province</th>
<th>Associated Counties</th>
<th>Maximum Elevation</th>
<th>Minimum Elevation</th>
<th>Topography</th>
<th>Geologic Structure</th>
<th>Bedrock Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gulf Coast Plains</td>
<td>Bee, Brooks, Cameron, Goliad, Hidalgo, Jim Wells, Kenedy, Kleberg, Nueces, San Patricio, Willacy</td>
<td>300</td>
<td>0</td>
<td>Nearly flat prairie, &lt;1ft/mi to gulf</td>
<td>Nearly flat strata</td>
<td>Deltaic sands and muds</td>
</tr>
<tr>
<td>Interior Coastal Prairies</td>
<td>Bastrop, Bexar, Bell, Caldwell, Collin, Dallas, Delta, Denton, Ellis, Falls, Fannin, Freestone, Henderson, Hill, Hopkins, Hunt, Grayson, Guadalupe, Kaufman, Lamar, Limestone, Medina, McLennen, Milam, Navarro, Rains, Robertson, Rockwall, Travis, Van Zandt, Williamson</td>
<td>1,000</td>
<td>450</td>
<td>Low rolling terrain</td>
<td>Beds tilted south and east</td>
<td>Chalks and marls</td>
</tr>
<tr>
<td>Blackland Prairies</td>
<td>Bosque, Cooke, Denton, Erath, Hill, Hood, Grayson, Johnson, Parker, McLennan, Somervell, Tarrant, Wise</td>
<td>1,250</td>
<td>450</td>
<td>Low stairstep hills west; plains east</td>
<td>Strata dip east</td>
<td>Calcareous east; sandy west</td>
</tr>
<tr>
<td>Grand Prairie</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edwards Plateau</td>
<td>Bell, Bexar, Bosque, Medina, McLennan, Travis, Williamson</td>
<td>3,000</td>
<td>450</td>
<td>Flat upper surface with box canyons</td>
<td>Beds dip south; normal faulted</td>
<td>Limestones and dolomites</td>
</tr>
<tr>
<td>Principal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Texas Uplift</td>
<td>Travis</td>
<td>2,000</td>
<td>800</td>
<td>Knobby plain; surrounded by questas</td>
<td>Centripetal dips, strongly faulted</td>
<td>Granites; metamorphics; sediments</td>
</tr>
<tr>
<td>North-Central Plains</td>
<td>Cooke, Erath, Hood, Jack, Montague, Palo Pinto, Parker</td>
<td>3,000</td>
<td>900</td>
<td>Low north-south ridges (questas)</td>
<td>West dip; minor faults</td>
<td>Limestones; sandstones; shales</td>
</tr>
</tbody>
</table>

Source: BEG, 1996. Physiographic Map of Texas.
Elevations
The elevations in the study area counties range from sea level to 1,750-ft above sea level; increasing generally from southeast to northwest. Sea level elevation is found in counties at the southeast boundary of the study area, along the Gulf Coast from Cameron County at the southern tip of Texas to San Patricio County located 130 miles to the north. The highest point is in Erath County, located west of Fort Worth along the northwest border of the study area.

As shown in Figure 3-40, many of the study area counties have slopes greater than 1 percent although scattered areas east of I-35 have slopes of less than 1 percent. Large contiguous areas of 1 percent or less slope are found only in counties located in the southeast portion of the study area. As seen in Figure 3-40, slopes greater than 5 percent are prevalent throughout counties in the west-central section of the study area, and are common north to the Red River, such as in Palo Pinto County west of Fort Worth. By contrast, in areas east of I-35, slopes greater than 5 percent are infrequent.

Geology
The geologic information associated with the study area was digitized from the BEG Geology of Texas Map dated 1992, as this was the best data available (BEG, 1992). The major structural geological element occurring in the study area counties is the Ouachita Fold Belt, a buried mountain range extending from the Big Bend of southwest Texas to southeast Oklahoma (USACE, 2002). It underlies the central portion of the study area counties from south of San Antonio to Waco, and the east-central portion from Waco to the Texas/Oklahoma state line. Other major structural elements include several major fault zones and basins. The fault zones are associated with the Ouachita Fold Belt and include the Balcones, Luling, and Mexia fault zones. The Gulf Coast Basin occurs east of the Fold Belt and underlies the southern portion of the study area counties. In the northern portion of the study area counties, the East Texas Embayment and Fort Worth Basin flank the Ouachita Fold Belt on the east and west, respectively.

Except for the west-central section of the study area counties, the geology is primarily sedimentary, resulting from massive deltaic deposition of outwash materials from the western U.S. at the time of the Rocky Mountain uplift. This process formed a large, very deep wedge of sediment that thickens toward the Gulf Coast. Sediment layers that sharply differ in their respective characteristics have been uniquely designated as named geologic formations, or units. Geologic units in the study area counties generally dip gently toward the Gulf of Mexico, surfacing (outcropping) in bands that generally parallel the coast. Formation outcrops are typified by unique soil characteristics.

Geologic Units
The major geologic units or groups of the study area counties are shown on Figure 3-41 and descriptions are found in Table 3-23.
<table>
<thead>
<tr>
<th>Geologic Unit</th>
<th>Map Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alluvium</td>
<td>Qal</td>
<td>Floodplain deposits; undivided or divided into areas that are dominantly mud, silt, sand, or gravel.</td>
</tr>
<tr>
<td>Quaternary Undivided</td>
<td>Qu</td>
<td>Surficial deposits of chert; well-rounded pebbles and cobbles</td>
</tr>
<tr>
<td>Lissie</td>
<td>Ql</td>
<td>Sand, silt, clay, and gravel over flood basin mud and meanderbelt sand; up to 200 ft thick.</td>
</tr>
<tr>
<td>Willis</td>
<td>POW</td>
<td>Gravel, sand, and silt; some petrified wood; sand fine to very coarse, noncalcareous, overlayed by silty clay; 100+ ft thick.</td>
</tr>
<tr>
<td>Goliad</td>
<td>Mog</td>
<td>Sand, silts, clay, glauconite, volcanic ash; alluvial sediments along streams and coastal areas.</td>
</tr>
<tr>
<td>Fleming &amp; Oakville</td>
<td>Mol</td>
<td>Clay and sandstone; local quartz and chert gravel; fossil wood common; typically 300-1,450 ft thick.</td>
</tr>
<tr>
<td>Catahoula unit &amp;</td>
<td>Oc, Ej</td>
<td>Bentonitic, noncalcareous clay and sand; typically 350+ft thick</td>
</tr>
<tr>
<td>Jackson Group - Caddell, Manning, Wellborn, Whitsett units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Claiborne Group - Carrizo Sand, Queen City, Sparta, Cook Mtn., Weches, Reklaw, &amp; Yegua units</td>
<td>Ec1 (Yegua Ec2)</td>
<td>Sandstone, sand, greensand, siltstone, and clay; clay is lignitic, sandy, bentonitic, marly, silty; some fossil wood; sand fine grained quartz, locally carbonaceous; 30-1,000+ ft thick</td>
</tr>
</tbody>
</table>
| Wilcox & Midway groups            | EPA        | Wilcox - mostly mudstone with sandstone, lignite, ironstone, concretions; lignite mostly near middle of formation; seams 1-20 ft thick; abundant plant fossils; 1,000-1,500 ft thick.  
Midway - clays, silty, sandy; topographically featureless; 150-ft thick |
| Navarro & Taylor groups           | Ku2        | Marls, chalk, sand, sandstone, limestone, clay and coal                     |
| Eagle Ford Austin, Woodbine, U. Washita groups | Kul       | Limestones, chalk, marls, sandstones, shales                               |
| Fredericksburg & L. Washita groups | Kl2       | Clays, marls, limestones, sandstones, subsurface shales                     |
| Trinity group                     | Kl1        | Limestones, sandstones, subsurface shales                                  |
| Virgilian series                  | IpV        | Limestones, sandstones, shales                                             |
| Missourian series                 | IpM        | Shales, sandstones                                                         |
| Des Moinesian series              | IpD        | Limestones, shales                                                         |
| Wolfcampian series                | Pw         | Limestones, shales                                                         |

Mineral Resources
Surface Mines
Data regarding surface mining within the study area counties were obtained from RRC as this agency maintains the most current information available.

Outcrops of the Wilcox group, the Yegua unit of the Claiborne group, and Jackson group contain lignite coal\(^{46}\) (BEG, 1965). This resource is heavily utilized by surface mining and is regulated by the RRC. Lignite coal production in Texas now exceeds 50 million short tons\(^{47}\) annually (Handbook of Texas Online, 2001). Bituminous coal\(^{48}\) occurs primarily in counties of north central Texas. Although once mined extensively, a decline in demand during the late 1980s resulted in the closing of the North Texas bituminous coal mines. Prior to the advent of surface mining techniques, coal was shaft-mined, though on a much smaller scale than current surface mining. Active lignite surface mines located in the study area counties are listed in Table 3-24.

<table>
<thead>
<tr>
<th>Mine</th>
<th>County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rachal</td>
<td>Webb</td>
</tr>
<tr>
<td>Trevino</td>
<td>Webb</td>
</tr>
<tr>
<td>Palafox</td>
<td>Webb</td>
</tr>
<tr>
<td>San Miguel</td>
<td>Atascosa, McMullen</td>
</tr>
<tr>
<td>Powell Bend</td>
<td>Bastrop</td>
</tr>
<tr>
<td>Three Oaks</td>
<td>Milam, Lee, Bastrop</td>
</tr>
<tr>
<td>Sandow</td>
<td>Milam, Lee, Williamson</td>
</tr>
<tr>
<td>Calvert</td>
<td>Robertson</td>
</tr>
<tr>
<td>Twin Oak</td>
<td>Robertson</td>
</tr>
<tr>
<td>Jewett</td>
<td>Leon, Limestone, Freestone</td>
</tr>
<tr>
<td>Big Brown</td>
<td>Freestone</td>
</tr>
<tr>
<td>Monticello (Thermo)</td>
<td>Hopkins</td>
</tr>
</tbody>
</table>


Other Mining Activities
As shown in Figure 3-42, several other types of mining activities occur within the study area counties aside from the surface lignite mines and the coal and uranium reclamation mine sites previously discussed. Other mining activities within the study area counties include aluminum, barite, bentonite, cement, chromium, dimension stone, fullers earth, industrial sand and gravel, kaolin, lime, perlite, salt, sulfur, titanium pigment, and zeolite. These other mining activities and the study area counties they are located in are presented in Appendix C-23.

\(^{46}\) As defined by the Energy Information Administration (EIA), lignite coal is the lowest rank of coal, often referred to as brown coal, used almost exclusively as fuel for steam-electric power generation.

\(^{47}\) As defined by the Energy Information Administration (EIA), short ton is a unit of weight equal to 2,000 pounds.

\(^{48}\) As defined by the Energy Information Administration (EIA), bituminous coal is a dense coal, usually black, sometimes dark brown, often with well-defined bands of bright and dull material, used primarily as fuel in steam-electric power generation, with substantial quantities also used for heat and power applications in manufacturing and to make coke. Bituminous coal is the most abundant coal in active U.S. mining regions.
The USGS maintains information on the various minerals mined across the U.S., including annual statistics and common uses. The following describes the uses of some of the minerals mined within the study area counties. Natural zeolites are used for pet litter, animal feed supplement, fertilizer carrier, oil absorbent, odor control, aquaculture, horticultural applications, desiccants, gas absorbents, catalysts, and water purification for decreasing heavy metals from wastewaters. Aluminum is used in transportation (automobiles, airplanes, trucks, railcars, marine vessels, etc.), packaging (cans, foil, etc.), construction (windows, doors, siding, etc), consumer durables (appliances, cooking utensils, etc.), electrical transmission lines, machinery, and in numerous other applications. Three types of clays are mined within the study area counties: bentonite, kaolin, and fuller's earth. The major domestic markets for these clays are as follows: iron ore pelletizing for bentonite; absorbents for fuller's earth; and paper and refractory markets for kaolin. Generally, the end product of sulfur mining is sulfuric acid, and consumption of sulfuric acid has been regarded as one of the best indexes of a nation's industrial development (USGS, 2005). The U.S. produces more sulfuric acid every year than any other chemical.

Mine Reclamation
The Texas Abandoned Mine Land (AML) Program had reclaimed 2,160 acres of abandoned surface mined land and closed 400 abandoned underground mine openings in thirteen Texas counties as of January 1, 2001. The AML Program certified completion of all available coal surface mine reclamation in 1992 (RRC, 2002). **Table 3-25** details acreages and other information related to seven reclaimed coal-mining operations within the study area counties.

<table>
<thead>
<tr>
<th>Reclamation Project</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lumsden</td>
<td>Hopkins County</td>
<td>Reclaimed 2.8-acre coal pit and 17 acres of spoil. Completed 1980.</td>
</tr>
<tr>
<td>Wallace</td>
<td>Hopkins County</td>
<td>Reclaimed 2.6-acre coal pit and 12 acres of spoil. Completed 1980.</td>
</tr>
<tr>
<td>Parker</td>
<td>One mile east of Mineral Wells, Parker County</td>
<td>Reclaimed one coal mine shaft and eight acres of gob (materials separated and wasted from the coal during cleaning or other processing of coal). Completed 1989.</td>
</tr>
<tr>
<td>Bastrop</td>
<td>Seven miles north of Bastrop, Bastrop County</td>
<td>Reclaimed one coal mine shaft opening. Completed 1996</td>
</tr>
<tr>
<td>Alcoa</td>
<td>Seven miles south of Rockdale, Milam County</td>
<td>Reclaimed surface lignite mine. The project encompassed approximately 1,100 acres. Completed 1994.</td>
</tr>
<tr>
<td>Malakoff</td>
<td>One mile east of Malakoff, Henderson County</td>
<td>Five coal mine shafts backfilled and entrances sealed. Completed 1995.</td>
</tr>
<tr>
<td>Somerset</td>
<td>15 miles west of Somerset, Bexar County</td>
<td>Reclaimed collapsed coal mine shaft which caused subsidence of a county road. Local mine shafts were excavated and backfilled with compacted clay. Completed 1994.</td>
</tr>
</tbody>
</table>

Uranium and its associated trace elements and radionuclides are found in south Texas outcrops of the Jackson Group and overlying Frio clays or Catahoula formation (Cherepon, 2000). Surface mining of this resource occurred from the 1960s through the early 1980s at over 60 locations in what is known as the Karnes Uranium District located primarily in Karnes and Live Oak counties (Beaman and McGee, 2002). Reclamation of uranium mining initiated after 1975 has been under the regulatory authority of the RRC (Beaman and McGee, 2002). Twenty-three uranium pits were mined and abandoned prior to 1975 (RRC, 2002). Under the AML program, the RRC is currently reclaiming these pre-regulation uranium mines with funding from the Federal government (Beaman and McGee, 2002). Table 3-26 details acreages and other information related to reclaimed uranium mining operations in Texas.

| Table 3-26: Uranium Surface Mine Reclamation Within the Study Area Counties |
|-----------------------------|-----------------------------|--------------------------------------------------|
| Reclamation Project         | Location                    | Description                                      |
| E. Brysch                  | East of Falls City,         | Reclaimed ten acre abandoned pit and eight       |
| Manka                      | South of Falls City,        | Reclaimed 14 acre abandoned pit and 33 acres      |
| Smith                      | Karnes County               | Reclaimed 26 acre abandoned pit and 47 acres      |
| Searcy                     | Southwest of Falls City,    | Reclaimed seven acre abandoned pit and 39        |
|                            | Karnes County               | acres of spoil. Completed 1990.                  |
| Butler-Weddington Chain    | Karnes and Atascosa counties| Chain of five abandoned pits covering an area     |
|                            |                             | four miles long and 1.5 miles wide. Pits ten to   |
|                            |                             | 41 acres and spoil piles 50 to 145 acres.        |
|                            |                             | Reclamation complete at two sites and almost      |
|                            |                             | complete at three sites.                         |


3.12 TERRESTRIAL AND AQUATIC COMMUNITIES

Vegetation

Environmental factors (climate, geology, soils, and hydrology) that contribute in the shaping of vegetation communities vary substantially over the study area counties. Portions of the study area have counties adjacent to the Texas Gulf Coast, which strongly influences vegetation communities locally and for some distance inland. In addition, vegetation throughout much of the study area counties has been influenced by human-related activities such as urbanization, agriculture, and development of infrastructure.

Native vegetation communities within the study area counties can be characterized broadly as woodlands and forest in the northwest, northeast, east, and the central region; plains to the northwest; prairie in the north and extending south through the central region; semi-arid to arid brushlands to the south; and coastal plains and prairies to the south and southeast. On a smaller scale, these broadly defined vegetation communities are not finely delineated, but typically transition and blend from one community to another.
The Natural Heritage Policy Research Project (NHPRP, 1978) identified 11 natural regions within Texas. These natural regions were delineated based in part on physiographic and/or biologic characteristics. Study area counties occupy portions of eight natural regions and these are listed in Table 3-27 and shown in Figure 3-43.

<table>
<thead>
<tr>
<th>Natural Regions*</th>
<th>Counties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piney Woods</td>
<td>Anderson, Henderson, Smith, Van Zandt, Wood</td>
</tr>
<tr>
<td>Oak Woods and Prairies</td>
<td>Anderson, Bastrop, Bexar, Bosque, Brazos, Burleson, Caldwell, Cooke,</td>
</tr>
<tr>
<td></td>
<td>Denton, Erath, Falls, Fannin, Fayette, Freestone, Gonzales, Grayson,</td>
</tr>
<tr>
<td></td>
<td>Guadalupe, Henderson, Hill, Hood, Hopkins, Jack, Johnson, Lamar, Lee,</td>
</tr>
<tr>
<td></td>
<td>Leon, Limestone, Milam, Montague, Navarro, Palo Pinto, Parker, Rains,</td>
</tr>
<tr>
<td></td>
<td>Robertson, Smith, Somervell, Tarrant, Van Zandt, Wilson, Wise, Wood</td>
</tr>
<tr>
<td>Blackland Prairies</td>
<td>Bastrop, Bell, Bexar, Bosque, Brazos, Burleson, Caldwell, Collin, Dallas,</td>
</tr>
<tr>
<td></td>
<td>Delta, Denton, DeWitt, Ellis, Erath, Falls, Fannin, Fayette, Freestone,</td>
</tr>
<tr>
<td></td>
<td>Gonzales, Grayson, Guadalupe, Henderson, Hill, Hood, Hopkins, Hunt,</td>
</tr>
<tr>
<td></td>
<td>Johnson, Kaufman, Lamar, Lavaca, Lee, Leon, Limestone, McLennan, Medina,</td>
</tr>
<tr>
<td></td>
<td>Milam, Navarro, Parker, Rains, Robertson, Rockwall, Tarrant, Travis, Van</td>
</tr>
<tr>
<td></td>
<td>Zandt, Williamson, Wilson, Wise</td>
</tr>
<tr>
<td>Gulf Coast Prairies and</td>
<td>Brooks, DeWitt, Duval, Goliad, Jim Wells, Kenedy, Kleberg, Lavaca,</td>
</tr>
<tr>
<td>Marshes</td>
<td>Nueces, San Patricio, Willacy</td>
</tr>
<tr>
<td>Coastal Sand Plain</td>
<td>Brooks, Duval, Hidalgo, Jim Hogg, Jim Wells, Kenedy, Kleberg, Willacy</td>
</tr>
<tr>
<td>South Texas Brush Country</td>
<td>Atascosa, Bee, Bexar, Brooks, Cameron, DeWitt, Dimmit, Duval, Frio,</td>
</tr>
<tr>
<td></td>
<td>Goliad, Gonzales, Hidalgo, Jim Hogg, Jim Wells, Karnes, La Salle, Live</td>
</tr>
<tr>
<td></td>
<td>Oak, McMullen, Medina, San Patricio, Webb, Willacy, Wilson, Zapata</td>
</tr>
<tr>
<td>Edwards Plateau</td>
<td>Bell, Bexar, Guadalupe, Medina, Travis, Williamson</td>
</tr>
<tr>
<td>Rolling Plains</td>
<td>Erath, Jack, Montague, Palo Pinto, Wise</td>
</tr>
</tbody>
</table>

Source: (NHPRP, 1978).

*Distribution of study area counties among the natural regions of Texas. Counties can be occupied by more than one natural region.

Field surveys of vegetation were not conducted for this Tier One EIS; therefore, the listing of typical vegetative species found in each natural region is as described in the Checklist of the Vascular Plants of Texas (SMTH, 2001). In addition, general vegetation characteristics for these eight regions are described below. The information on general vegetative characteristics is from the NHPRP (1978) and Bezanson (2001). The information below is not intended to provide a definitive list of all plant communities and species occurring within the study area counties, but is meant only to provide a general synopsis of native communities and species. Though these discussions focus on native vegetation it should be understood that non-native vegetation, including agriculture crops and pasture grasses, is prevalent throughout much of the study area counties and has displaced native species in many areas.

The Piney Woods natural region extends from the Texas/Louisiana border eastward through portions of the Trinity River Basin, and from near the Texas/Oklahoma/Arkansas borders south to near the Gulf Coast. This natural region has gently rolling to hilly topography and supports native pine (Pinus sp.) - hardwood communities interspersed with farm and pasture land. Two sub-regions are recognized and only one of these, the Mixed Pine-Hardwood Forest sub-region, occurs in the study area. This sub-region
occupies portions of Anderson, Henderson, Smith, Van Zandt, and Wood counties along the northeastern edge of the study area. The current structure and composition of many pine-hardwood stands has been influenced by logging activities, but native species and communities are still present in the sub-region. Native upland tree species of the Mixed Pine-Hardwood Forest include loblolly pine (*Pinus taeda*), shortleaf pine (*Pinus echinata*), blackjack oak (*Quercus marilandica*), and post oak (*Quercus stellata*); hardwood species in lowlands include sweetgum, magnolia (*Magnolia* sp.), tupelo (*Nyssa* sp.), elm (*Ulmus* sp.), and ash (*Fraxinus* sp.). Common understory woody species include redbud (*Cercis canadensis*), dogwood (*Cornus* sp.), and blackhaw (*Viburnum* sp.); understory shrub and vine species include southern wax-myrtle (*Myrica cerifera*), American beautyberry (*Callicarpa americana*), grapes (*Vitis* sp.), blueberries (*Vaccinium* sp.), hawthorn (*Crataegus* sp.), greenbriar (*Smilax* sp.), rattan-vine (*Berchemia scandens*), trumpet honeysuckle (*Lonicera sempervirens*), dewberries (*Rubus* sp.), yellow jessamine (*Gelsemium sempervirens*), and poison ivy (*Rhus toxicodendron*). Grass species native to this sub-region include blackseed needlegrass (*Piptochaetium avenaceum*), Virginia wildrye (*Elymus virginicus*), Canada wildrye (*Elymus canadensis*), purpletop (*Tridens flavus*), broadleaf woodoats (*Chasmanthium latifolium*), narrowleaf woodoats (*Chasmanthium sessiliflorum*), eastern little bluestem (*Schizachyrium scoparium* var. *divergens*), giant cane (*Arundinaria gigantea*), carpetgrass (*Axonopus* sp.), and brownseed paspalum (*Paspalum plicatulum*).

The Oak Woods and Prairies natural region extends in three narrow bands from the Texas/Oklahoma state line south and southwest into Texas. The eastern-most band extends as far south as Bexar County and the smaller western bands extend into counties south of the Dallas/Fort Worth area. This natural region occupies portions of 41 study area counties. The Oak Woods and Prairies region has gently rolling topography and supports oak-hickory forests interlaced with tall-grass prairie. Three sub-regions are recognized and each occurs in the study area. The Oak Woodlands sub-region forms the largest and eastern-most band of this region. Large portions of this sub-region have been converted to cultivated pasture but a variety of native vegetation communities remain including upland forests, floodplain forests, herbaceous seeps and bogs, and other communities. Tree species of the Oak Woodlands sub-region include post oak, blackjack oak, black hickory (*Carya texana*), eastern red cedar (*Juniperus virginiana*), sugar hackberry, elm, pecan, and isolated pockets of loblolly pine; understory species include yaupon (*Ilex vomitoria*), American beautyberry, farkleberry (*Vaccinium arbores*, and wax myrtle. Vine species native to the Oak Woodlands sub-region include grapes, greenbriar, Virginia creeper (*Parthenocissus quinquefolia*), rattan-vine, and poison ivy. Grass and forb species native to this sub-region include little bluestem (*Schizachyrium scoparium*), three-awns (*Aristida purpurea*), purpletop, Texas grama (*Bouteloua rigidiseta*), foxglove (*Penstemon cobaea*), coneflowers (*Rudbeckia* sp.), and Parks nailwort (*Paronychia virginica*). Plant communities in the Western Cross Timbers sub-region include upland woodlands, mesic forests, and floodplain woodlands. Tree species in this sub-region include post oak, blackjack oak, cedar elm, sugar hackberry, eastern red cedar, mesquite (*Prosopis sp.*), Ashe juniper (*Juniperus ashei*), shin oak (*Quercus sinuata*), and Texas ash (*Fraxinus texensis*); shrub species include sumac (*Rhus* sp.),
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elbow bush (*Forestiera pubescens*), redbud, and American beautyberry; grass species include sideoats grama (*Bouteloua curtipendula*), Texas grama, little bluestem, purpletop, buffalo grass (*Buchloe dactyloides*), and Texas wintergrass (*Stipa leucotricha*). The remaining sub-region within the Oak Woods and Prairies is the Eastern Cross Timbers. This sub-region lies between the Oak Woodlands and Western Cross Timbers and is a mixture of these sub-regions.

The Blackland Prairies natural region runs from near the Texas/Oklahoma state line south and southwest into central and south-central Texas. This region intermixes with the Oak Woods and Prairies natural region at its northwest and southeast boundaries, and borders the Balcones Fault lies along its southwestern boundary. The Blackland Prairie has gently rolling to near level topography and occupies portions of 47 study area counties. Two sub-regions are identified – the Grand Prairie sub-region in the northwest portion of the study area and the larger Blackland Prairie sub-region extending from the north into the south-central portion of the study area. Tall-grasses dominate in the latter while the former supports mainly mid-height grasses. Native grasses found within the Blackland Prairie include little bluestem, Indiangrass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardii*), tall dropseed (*Sporobolus asper*), switchgrass (*Panicum virgatum*), sideoats grama, rosettegrass (*Dichanthelium* sp.), Canada wildrye, longspike tridens (*Tridens strictus*), and Silveanus dropseed (*Sporobolus silveanus*). Forb species native to the Blackland Prairie include Maximilian sunflower (*Helianthus maximiliani*), heath aster (*Aster ericoides*), coneflowers, goldenrods (*Solidago* sp.), woolly croton (*Croton capitatus*), Indian blanket (*Gaillardia pulchella*), black-eyed Susan (*Rudbeckia hirta*), camphor weed (*Heterotheca latifolia*), phloxes (*Phlox* spp.), and gayfeathers (*Liatris* spp.). Some woodlands and forest communities are present in the Blackland Prairie, primarily in the northern part of the region. Tree species native to this sub-region include post oak, water oak, Shumard oak (*Quercus shumardii*), bur oak (*Quercus macrocarpa*), elms, pecan, ash, and eastern red cedar.

Relatively few areas of native grasslands remain in the Blackland Prairies natural region. Bezanson (2000) reports that more than 98 percent of the native grasslands of the Blackland Prairie have been converted to cropland or seeded with non-native pasture grasses such as bermudagrass (*Cynodon* sp.), King Ranch bluestem (*Bothriochloa ischaemum*), and Johnsongrass (*Sorghum halepense*).

The Gulf Coast Prairies and Marshes natural region lies along the Texas Gulf Coast from the Texas/Louisiana border to Mexico. In the middle of the Texas coast, this region extends inland for 90 miles or more and to the south tends to be less extensive. This natural region has been substantially transformed by agriculture and infrastructure development. Bezanson reports that at least 35 percent of the coastal marsh acreage existing in 1950 has been displaced by urban and industrial development, and the displacement of prairies has been even more extensive (Bezanson, 2001). Three Gulf Coast Prairies and Marshes sub-regions are recognized: Dunes and Barrier Islands, Estuarine Zone, and Upland Prairies and Woods. Only the Upland Prairies and Woods sub-region occurs in the study area counties, occupying portions of 11 counties in the
southeast to extreme southern part of the study area. Plant communities native to this sub-region include upland grasslands, woodlands, and savannas, floodplain forests, and coastal xeric brushlands. Native tree species found here include live oak *(Quercus virginiana)*, sugar hackberry, water oak, and pecan; shrub and brush species include yaupon, wax myrtle, colima *(Zanthoxyhum fagara)*, Texas persimmon *(Diospyros texana)*, granjeno *(Celtis pallida)*, mesquite and prickly pear *(Opuntia spp)*. Much of the native grasslands and prairies have been converted to agricultural lands and now support invasive species including huisache *(Acacia smallii)*, mesquite, eastern baccharis *(Baccharis halimifolia)*, smutgrass *(Sporobolus sp.*), and carpetgrass; native grasses and forbs present in some areas include brownseed paspalum, little bluestem, Indiangrass, Texas wintergrass, silver bluestem *(Bothriochloa laguroides)*, tall dropseed, plains bristlegrass *(Setaria leucopila)*, gayfeathers, coneflowers, and asters.

The Coastal Sand Plain natural region forms an irregular-shaped patch near the southern tip of the study area. This natural region lies very near the southern Gulf Coast and at its maximum extent reaches about 80 miles west and inland. Portions of eight study area counties are within the Coastal Sand Plain. Compared to most of the other natural regions in Texas, the Coastal Sand Plain is relatively small and it has not been divided into sub-regions. The dominant vegetation community here is upland grassland. Native grass species present in this natural region include little bluestem, gulfdune paspalum *(Paspalum monostachyum)*, Pan American balsamcyle *(Elyonurus tripsacoides)*, tanglehead *(Heteropogon contortus)*, sand dropseed *(Sporobolus cryptandrus)*, thin paspalum *(Paspalum setaceum)*, and fringed signalgrass *(Brachiaria ciliatissima)*. Forb species native to this region include woolly croton, Texas croton *(Croton texennsis)*, partridge-pea *(Chamaecrista fasciculata)*, Drummond phlox *(Phlox drummondii)*, bush-sunflower *(Simsia calva)*, and lazy-daisies *(Aphanostephus skirrhobasis)*. Live oak mottes are present in grasslands and on dunes along with other woody species including mesquite, Texas persimmon, colima, and granjeno.

The South Texas Brush Country natural region occupies all or portions of 24 counties in the southern end of the study area. This region abuts the Coastal Sand Plain and the Gulf Coast Prairies and Marshes regions to the east and the Blackland Prairie, Oak Woods and Prairies, and Edwards Plateau (see below) to the north. The southern and western boundaries for this natural region are formed by the Rio Grande. Topography here is near level to rolling and the elevation ranges from sea level to about 1,000 feet. Three sub-regions are recognized: the Subtropical Zone sub-region lies at the southern tip of the state, the Brush Country sub-region occupies most of the region, and the Bordas Escarpment sub-region forms a very narrow north-south oriented band near the center of the region. Brushlands, grasslands, savannas, woodlands, and forests are all present in the South Texas Brush Country and each can be further categorized into more specific sub-units. A great variety of native brush species occur here including mesquite, granjeno, Texas prickly pear *(Opuntia lindheimeri)*, whitebrush *(Aloysia gratissima)*, brasili *(Condalia hookeri)*, cenizo *(Leucophyllum frutescens)*, Texas ebony *(Pithecellobium ebano)*, Texas palmetto *(Sabal mexicana)*, guajillo *(Acacia berlandieri)*, and blackbrush *(Acacia rigidula)*; native grasses and forbs include cane bluestem
Bothriochloa barbinodis), tanglehead, trichloris (Trichloris sp.), bristlegrasses (Setaria sp.), lovegrasses (Eragrostis sp.), windmillgrasses (Chloris sp.), crotons, low menodora (Menodora heterophylla), bush-sunflower, and lazy-daisy. Native tree species present in some upland and floodplain areas include live oak, post oak, sugar hackberry, elms, pecan, and Berlandier ash (Fraxinus berlandieriana).

The Edwards Plateau natural region lies mostly in central and west-central Texas. The southern and eastern boundary of this region runs along the Balcones Fault and meets the South Texas Brush Country region to the south and the Blackland Prairie to the east. The Edwards Plateau region also shares boundaries with the Rolling Plain (see below) and Oak Woods and Prairies to the north and reaches south to the Rio Grande and west to the Pecos River. The Edwards Plateau encroaches into only six counties (Bell, Bexar, Guadalupe, Medina, Travis, and Williamson) near the center of the study area. Elevations in this region range from less than 100 to 3,000 feet and deep canyons have formed along many streams and rivers. Three sub-regions are described – Balcones Canyonlands, Live Oak-Mesquite Savannah, Lampasas Cut Plain – and each occur in the central study area. Upland and canyon forests, savannahs, grasslands, and riparian woodlands are all present in the Edwards Plateau natural region. Tree species present in the Edwards Plateau natural region include Ashe juniper, live oak, Texas oak (Quercus buckleyi), cedar elm, Lacey oak (Quercus glaucoides), shin oak, netleaf hackberry (Celtis reticulata), and pecan. Shrub species occurring in this region include Texas persimmon, agarito (Berberis trifoliata), deciduous holly (Ilex decidua), escarpment black cherry (Prunus serotina), prickly pear, mesquite, and buttonbush (Cephalanthus occidentalis). A variety of native grasses, forbs, and wildflowers are present within the Edwards Plateau. A few examples are gramas (Bouteloua spp.), bluestems, seep muhly (Muhlenbergia reverchonii), Texas wintergrass, Indiangrass, purple threeawn (Aristida purpurea), switchgrass, rough zexmenia (Zexmenia hispida), least-daisy (Chaetopappa asteroides), blackfoot daisy (Melampodium leucanthum), white milkwort (Polygala alba), and Texas bluebonnet (Lupinus texensis).

The Rolling Plains natural region occupies a large portion of north-central Texas and reaches into the Panhandle region of Texas. This natural region has gently rolling to moderately rough topography, and intermittent stream valleys dissect the plains in some areas. The Rolling Plains meet the Edwards Plateau to the south and the Oak Woods and Prairies to the east. Overgrazing has greatly impacted portions of the Rolling Plains and likely encouraged the spread of invasive species (e.g., mesquite and prickly pear). Three sub-regions are identified, but only one, the Mesquite Plains, occurs in the study area counties. This sub-region encroaches into five counties (Erath, Jack, Montague, Palo Pinto, and Wise) in the northwest portion of the study area. This sub-region is dominated by mesquite-shortgrass and mid-grass savannah. Mesquite is the most common tree species and oak, juniper, acacia (Acacia sp.), lotebush (Ziziphus obtusifolia), prickly pear, and mimosa (Mimosa sp.) are common brush species. Grass species native to the Mesquite Plains include gramas, buffalograss, tridens (Tridens sp.), bluestems, Texas wintergrass, purple threeawn, red lovegrass (Eragrostis secundiflora var. oxylepis), and tobosagrass (Hilaria mutica).
Wildlife and Aquatic Species

Many terrestrial and aquatic habitats within the study area counties have been altered from native conditions. In addition, past and current landscape disturbances influence the range, distribution, and abundance of wildlife and fishes. Some species have responded to disturbances by expanding their range, while others have experienced a reduction in range. Also, non-native species have become established throughout much of the state and native species have been introduced into habitats outside of their native range.

Ranges of individual species within the study area counties could be described generally as wide, regional, or local. Wide-ranging species are defined here as those species potentially occurring in each major region (north, central, and south) of the study area counties. Regional species are those potentially occurring in a substantial portion of the study area counties. Local species are those with very limited ranges within the study area counties and which would be expected to occur at only a few sites or within relatively small areas. Despite the potential for occurrence over relatively large areas, wide-ranging and regional species would not be expected to occur in all available habitats within their range; local occurrence of wide-ranging and regional species is dependent in part on site-specific conditions.

Wide-ranging and regional fish, amphibian, reptile, and mammal species potentially occurring in study area counties are discussed below. In addition, species listed as threatened or endangered are discussed in the Threatened and Endangered Species section that follows this section. The following discussions are not intended to provide a definitive list of species potentially occurring in the study area counties but are intended to provide only a general overview. No field surveys were conducted for this Tier One EIS. It is important to note that species occurring or potentially occurring within one or more of the study area counties would not necessarily be expected to occur or potentially occur within the study area itself. The distribution of species is based in part on the location of suitable habitats and such habitats may not be uniformly distributed throughout a county or counties.

Fish, Amphibians, and Reptiles

Hubbs et al. (1991) identifies 247 fish species known to inhabit Texas freshwater habitats. Approximately two-thirds (169) of these species are exclusive or nearly exclusive to freshwater habitats and the remaining species are estuarine or marine species sometimes found in lower salinity habitats. Approximately seven percent (18 of 247) of the species occurring in Texas freshwaters are considered non-native to the State. Many of the fish species occurring in Texas occupy at least one of the river or coastal basins draining the study area counties.

Information on the potential occurrence of fish species within the study area counties was compiled from Hubbs et al. (1991), the Texas Freshwater Fishes Index, and a specimen database maintained by the Texas Natural History Collection of the Texas Memorial Museum (TMM) of the University of Texas (TMM 1998 and 2003). Information on the potential occurrence of amphibian and reptile species within the study area counties was
compiled from the TMM (2000) and from a specimen database maintained by the Texas Natural History Collection of the TMM of the University of Texas (TMM, 2003). **Appendix C-24** includes tables with fish, amphibian, and reptile species potentially occurring within the study area counties.

**Birds**
Shackelford et al. (No date) estimates that 54 percent of the 615 bird species documented in Texas are Nearctic-Neotropical migratory bird species. The in-state abundance and range of these species commonly vary by seasons depending in part on the life history of individual species and the availability of quality habitat. The study area counties lay within the central migratory flyway followed by many Nearctic-Neotropical migratory species each year. The study area counties also support a wide variety of habitats that could provide layover, foraging, nesting, and/or wintering habitat for migratory birds. Many of these species potentially occur within the study area counties during at least one season, though some would be considered only rare or infrequent migrants.

Information on the potential occurrence of bird species within the study area counties was compiled from the North-Central Texas Birds checklist (No date), the Hagerman NWR in Grayson County checklist (USFWS, No date-a), the birds of San Antonio, Bexar County checklist (SAAS, 1997), the Camp Swift in Bastrop County checklist (U.S. Department of Defense [DOD], No date), the Laguna Atascosa NWR in Cameron and Willacy counties checklist, and the Santa Ana NWR in Hidalgo County checklist (USFWS, 1987 and 1995). No field surveys were conducted for this Tier One EIS. Species listed here are considered abundant or common during at least one season (spring, summer, fall, winter). **Appendix C-24** contains a table with bird species potentially occurring within the study area counties.

**Mammals**
Davis and Schmidly (1994) report that 141 mammal species are native to Texas and 12 non-native species occur or potentially occur in the State. Ninety-two of these species occur typically in the Trans-Pecos region that is outside of the study area boundary; these species are relatively rare outside of the Trans-Pecos region. However, some of these species and many of the remaining species could potentially occur at least rarely in one or more of the study area counties. Information on the potential occurrence of mammal species within study area counties was compiled from Davis and Schmidly (1994). **Appendix C-24** lists mammal species potentially occurring within the study area counties.

**Threatened and Endangered Species**
Some plant and animal species are listed under federal and/or state laws and regulations created to protect species threatened with extinction. Species listed as federally threatened, endangered, or proposed for such listing are protected under the *Endangered Species Act of 1973, as amended* (ESA); specific habitats (“critical habitat”) for threatened and endangered species may also be designated for protection under the ESA. Specific ESA definitions for endangered species, threatened species, critical habitat, and related terms are provided in **Appendix C-25**.
Section 7 of the ESA requires that Federal agencies insure that agency actions (actions authorized, funded, or carried out by a Federal agency) are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat. Federal agencies are also required to consult with the USFWS or the National Marine Fisheries Service (NMFS) when an agency action is likely to jeopardize the continued existence of a proposed species or result in the destruction or adverse modification of habitat proposed for designation as critical habitat.

Plant and animal species may also be listed as endangered or threatened under laws and regulations established by the State of Texas. Threatened and endangered wildlife species are listed and protected by the State as described in Chapters 67 and 68 of the Parks and Wildlife Code, and in Title 31, Part 2, Chapter 65 of the TAC; threatened and endangered plant species are listed and protected as described in Chapter 88 of the Parks and Wildlife Code, and in Title 31, Part 2, Chapter 69 of the TAC. The State of Texas definitions of threatened and endangered species are presented in Appendix C-25. In general, the State of Texas regulations prohibit the take, possession, transportation, or sale of state-designated threatened or endangered wildlife species without a permit, and prohibit the commerce in threatened and endangered plants and the collection of such plants from public land without a permit. Enforcement of the State of Texas regulations pertaining to threatened and endangered species is conducted by the TPWD.

Wildlife and plant species not protected by federal and/or state laws and regulations pertaining to endangered and threatened species may receive protection under other laws and regulations. The Migratory Bird Treaty Act of 1918, as amended, extends federal protection to migratory bird species; among other activities, non-regulated “take” of migratory birds is prohibited under this Act in a manner similar to the ESA prohibition of “take” of threatened and endangered species. Bald eagles receive protection from take under the ESA and under the Bald Eagle Protection Act of 1940, as amended. The “take” of some game and non-game species is addressed in state regulations.

Information on the potential occurrence of threatened, endangered, proposed, and candidate species within the study area counties was compiled from the USFWS (2003a), Natural Diversity Database (NDD, [formerly Texas Biological and Conservation Data System TXBCD]) (TPWD, 2005), and NOAA (1999). A total of 123 species listed as threatened or endangered by the USFWS and/or the TPWD are considered by those agencies as occurring in, potentially occurring in, or potentially impacted by activities occurring in at least one of the counties contained within the study area. Critical habitat has been designated within the study area counties for nine of these listed species. Additionally, nine species identified as candidates for listing by the USFWS, but not listed by the TPWD, are considered by the USFWS as occurring or potentially occurring in the study area counties.

Table 3-28 provides a list of threatened, endangered, and candidate species potentially occurring in the study area counties, and brief species accounts for each are provided in Appendix C-26. It is important to note that species occurring or potentially occurring
within one or more of the study area counties would not necessarily be expected to occur or potentially occur within the study area itself. The distribution of species is based in part on the location of suitable habitats and such habitats may not be uniformly distributed throughout a county or counties.
### Table 3-28: Listed Threatened, Endangered, and Candidate Species Potentially Occurring Within the Study Area Counties

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Status</th>
<th>Counties</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PLANTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>slender rush-pea</td>
<td>Hoffmannseggia tenella</td>
<td>E</td>
<td>Kleberg, Nueces</td>
<td>Grasslands on heavy clay soils of the coastal plain.</td>
</tr>
<tr>
<td>Walker’s manioc</td>
<td>Manihot walkerae</td>
<td>E</td>
<td>Duval, Hidalgo</td>
<td>Periphery of native brush in sandy loam; also on caliche cuestas.</td>
</tr>
<tr>
<td>south Texas ambrosia</td>
<td>Ambrosia cheiranthifolia</td>
<td>E</td>
<td>Cameron, Jim Wells, Kleberg, Nueces</td>
<td>Open prairies and various shrublands on deep clay soils.</td>
</tr>
<tr>
<td>Texas prairie dawn-flower</td>
<td>Hymenoxys texana</td>
<td>E</td>
<td>La Salle</td>
<td>Poorly drained depressions or base of mima mounds in open grasslands or almost barren areas on slightly saline soils.</td>
</tr>
<tr>
<td>ashy dogweed</td>
<td>Thymophylla tephroleuca</td>
<td>E</td>
<td>Webb, Zapata</td>
<td>Grassland or blackbrush or cenizo shrublands on fine sandy loam soils.</td>
</tr>
<tr>
<td>Texas ayenia</td>
<td>Ayenia limitaris</td>
<td>E</td>
<td>Cameron, Hidalgo, Willacy</td>
<td>Woodlands on alluvial deposits on floodplains and terraces along the Rio Grande.</td>
</tr>
<tr>
<td>Johnston’s frankenia</td>
<td>Frankenia johnstonii</td>
<td>E³</td>
<td>Webb, Zapata</td>
<td>Shrublands on flats on saline sandy to clayey soils and on rocky gypseous slopes</td>
</tr>
<tr>
<td>Zapata bladderpod</td>
<td>Lesquerella thamnophila</td>
<td>E w/CH</td>
<td>Zapata</td>
<td>Blackbrush and/or cenizo shrublands on gravelly to sandy loams derived from Eocene formations.</td>
</tr>
<tr>
<td>large-fruited sand-verbena</td>
<td>Abronia macrocarpa</td>
<td>E</td>
<td>Freestone, Leon, Robertson</td>
<td>Deep, somewhat excessively drained sandy soils in openings in post oak woodlands, sometimes in active sand blowouts.</td>
</tr>
<tr>
<td>star cactus</td>
<td>Astrophytum asterias</td>
<td>E</td>
<td>Cameron, Hidalgo, Jim Hogg, Zapata</td>
<td>Gravelly saline clays or loams over the Catahoula and Frio formations, on gentle slopes and flats in grasslands or shrublands.</td>
</tr>
<tr>
<td>black lace cactus</td>
<td>Echinocereus reichenbachi var. albertii</td>
<td>E</td>
<td>Duval, Jim Wells, Kleberg</td>
<td>Grasslands, thorn shrublands, mesquite woodlands on sandy, possibly somewhat saline soils on coastal prairie; possibly more frequent in natural open areas sparsely covered with low brush; sometimes at the ecotone between this upland type and lower areas dominated by halophytic grasses and forbs.</td>
</tr>
<tr>
<td>bushy whitlow-wort</td>
<td>Paronychia congesta</td>
<td>C</td>
<td>Jim Hogg</td>
<td>Full sun in openings in blackbrush shrublands in shallow soils on xeric caliche or calcareous outcrops on the Bordas Escarpment.</td>
</tr>
<tr>
<td>Navasota ladies’-tresses</td>
<td>Spiranes parksii</td>
<td>E</td>
<td>Bastrop, Brazos, Burleson, Fayette, Freestone, Leon, Milam, Robertson</td>
<td>Margins of and openings within post oak woodlands in sandy loams along intermittent tributaries of rivers.</td>
</tr>
<tr>
<td>geocarpon (tinytim)</td>
<td>Geocarpon minimum</td>
<td>T</td>
<td>Anderson</td>
<td>Saline prairies; edge of sparsely vegetated areas known as “slick spots” with very high sodium content.</td>
</tr>
</tbody>
</table>
Table 3-28: Listed Threatened, Endangered, and Candidate Species Potentially Occurring Within the Study Area Counties

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Status</th>
<th>Counties</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOLLUSKES</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Texas hornshell</td>
<td>Poponaias popeii</td>
<td>C</td>
<td>Cameron, Hidalgo, Webb, Zapata</td>
<td>Rio Grande drainage from the Pecos River to the Falcon Breaks.</td>
</tr>
<tr>
<td>Ouachita rock-pocketbook mussel</td>
<td>Arkansia wheeleri</td>
<td>E</td>
<td>Lamar</td>
<td>Muddy or silty substrates of medium-sized rivers, in backwater or slackwater areas adjacent to the main channel; also reported from cobble-gravel bottoms in pools of small, slow-flowing rivers.</td>
</tr>
<tr>
<td>ARTHROPODS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American burying beetle</td>
<td>Nicrophorus americanus</td>
<td>E</td>
<td>Fannin, Lamar</td>
<td>Varies widely from oak-hickory and coniferous forest ridge tops or hillsides to riparian corridors and valley floors and pastures; extremely xeric, saturated, or loose sandy sites unsuitable.</td>
</tr>
<tr>
<td>Tooth Cave pseudoscorpion</td>
<td>Tartarocragris texana</td>
<td>E</td>
<td>Travis</td>
<td>Associated with karst terrain of the Edwards Limestone geologic formation which includes subterranean voids (fissures, fractures, cracks, caves) that provide relatively stable temperature, high humidity, and suitable shelter and foraging substrates, and with surface communities that provide both nutrient inputs and buffering from adverse condition.</td>
</tr>
<tr>
<td>Government Canyon Bat Cave spider</td>
<td>Neoleptoneta microps</td>
<td>E</td>
<td>Bexar</td>
<td>Associated with karst terrain of the Edwards Limestone geologic formation which includes subterranean voids (fissures, fractures, cracks, caves) that provide relatively stable temperature, high humidity, and suitable shelter and foraging substrates, and with surface communities that provide both nutrient inputs and buffering from adverse condition.</td>
</tr>
<tr>
<td>Tooth Cave spider</td>
<td>Neoleptoneta myopica</td>
<td>E</td>
<td>Bexar, Travis</td>
<td>Associated with karst terrain of the Edwards Limestone geologic formation which includes subterranean voids (fissures, fractures, cracks, caves) that provide relatively stable temperature, high humidity, and suitable shelter and foraging substrates, and with surface communities that provide both nutrient inputs and buffering from adverse condition.</td>
</tr>
<tr>
<td>Robber Baron Cave meshweaver</td>
<td>Cicurina baronia</td>
<td>E</td>
<td>Bexar</td>
<td>Associated with karst terrain of the Edwards Limestone geologic formation which includes subterranean voids</td>
</tr>
<tr>
<td>Common Name</td>
<td>Scientific Name</td>
<td>Status</td>
<td>Counties</td>
<td>Habitat</td>
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<tr>
<td>--------------------------------</td>
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</tr>
<tr>
<td>Madla Cave spider</td>
<td>Cicurina madla</td>
<td>E</td>
<td>Bexar</td>
<td>(fissures, fractures, cracks, caves) that provide relatively stable temperature, high humidity, and suitable shelter and foraging substrates, and with surface communities that provide both nutrient inputs and buffering from adverse condition.</td>
</tr>
<tr>
<td>Braken Bat Cave meshweaver</td>
<td>Cicurina venii</td>
<td>E</td>
<td>Bexar</td>
<td>Associated with karst terrain of the Edwards Limestone geologic formation which includes subterranean voids (fissures, fractures, cracks, caves) that provide relatively stable temperature, high humidity, and suitable shelter and foraging substrates, and with surface communities that provide both nutrient inputs and buffering from adverse condition.</td>
</tr>
<tr>
<td>Government Canyon Bat Cave meshweaver</td>
<td>Cicroina vespera</td>
<td>E</td>
<td>Bexar</td>
<td>Associated with karst terrain of the Edwards Limestone geologic formation which includes subterranean voids (fissures, fractures, cracks, caves) that provide relatively stable temperature, high humidity, and suitable shelter and foraging substrates, and with surface communities that provide both nutrient inputs and buffering from adverse condition.</td>
</tr>
<tr>
<td>Warton Cave meshweaver</td>
<td>Cicurina wartonii</td>
<td>C</td>
<td>Travis</td>
<td>Associated with karst terrain of the Edwards Limestone geologic formation which includes subterranean voids (fissures, fractures, cracks, caves) that provide relatively stable temperature, high humidity, and suitable shelter and foraging substrates, and with surface communities that provide both nutrient inputs and buffering from adverse condition.</td>
</tr>
<tr>
<td>Cokendolpher Cave harvestman</td>
<td>Texella cokendolpheri</td>
<td>E</td>
<td>Bexar</td>
<td>Associated with karst terrain of the Edwards Limestone geologic formation which includes subterranean voids (fissures, fractures, cracks, caves) that provide relatively stable temperature, high humidity, and suitable shelter and foraging substrates, and with surface communities that provide both nutrient inputs and buffering from adverse condition.</td>
</tr>
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<td>Common Name</td>
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<td>Counties</td>
<td>Habitat</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Federal</td>
<td>State</td>
</tr>
<tr>
<td>Bee Creek Cave harvestman</td>
<td><em>Texella reddelli</em></td>
<td>E</td>
<td>Travis</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Associated with karst terrain of the Edwards Limestone geologic formation which includes subterranean voids (fissures, fractures, cracks, caves) that provide relatively stable temperature, high humidity, and suitable shelter and foraging substrates, and with surface communities that provide both nutrient inputs and buffering from adverse condition.</td>
</tr>
<tr>
<td>Bone Cave harvestman</td>
<td><em>Texella reyesi</em></td>
<td>E</td>
<td>Travis, Williamson</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Associated with karst terrain of the Edwards Limestone geologic formation which includes subterranean voids (fissures, fractures, cracks, caves) that provide relatively stable temperature, high humidity, and suitable shelter and foraging substrates, and with surface communities that provide both nutrient inputs and buffering from adverse condition.</td>
</tr>
<tr>
<td>Unnamed ground beetle</td>
<td><em>Rhadine exilis</em></td>
<td>E</td>
<td>Bexar</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Associated with karst terrain of the Edwards Limestone geologic formation which includes subterranean voids (fissures, fractures, cracks, caves) that provide relatively stable temperature, high humidity, and suitable shelter and foraging substrates, and with surface communities that provide both nutrient inputs and buffering from adverse condition.</td>
</tr>
<tr>
<td>Unnamed ground beetle</td>
<td><em>Rhadine infernalis</em></td>
<td>E</td>
<td>Bexar</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Associated with karst terrain of the Edwards Limestone geologic formation which includes subterranean voids (fissures, fractures, cracks, caves) that provide relatively stable temperature, high humidity, and suitable shelter and foraging substrates, and with surface communities that provide both nutrient inputs and buffering from adverse condition.</td>
</tr>
<tr>
<td>Tooth Cave ground beetle</td>
<td><em>Rhadine persephone</em></td>
<td>E</td>
<td>Travis, Williamson</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Associated with karst terrain of the Edwards Limestone geologic formation which includes subterranean voids (fissures, fractures, cracks, caves) that provide relatively stable temperature, high humidity, and suitable shelter and foraging substrates, and with surface communities that provide both nutrient inputs and buffering from adverse condition.</td>
</tr>
</tbody>
</table>
## Table 3-28: Listed Threatened, Endangered, and Candidate Species Potentially Occurring Within the Study Area Counties

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Status</th>
<th>Counties</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffin Cave mold beetle</td>
<td><em>Batrisodes texanus</em></td>
<td>E</td>
<td>Williamson</td>
<td>Associated with karst terrain of the Edwards Limestone geologic formation which includes subterranean voids (fissures, fractures, cracks, caves) that provide relatively stable temperature, high humidity, and suitable shelter and foraging substrates, and with surface communities that provide both nutrient inputs and buffering from adverse condition.</td>
</tr>
<tr>
<td>Helotes mold beetle</td>
<td><em>Batrisodes venyivi</em></td>
<td>E</td>
<td>Bexar</td>
<td>Associated with karst terrain of the Edwards Limestone geologic formation which includes subterranean voids (fissures, fractures, cracks, caves) that provide relatively stable temperature, high humidity, and suitable shelter and foraging substrates, and with surface communities that provide both nutrient inputs and buffering from adverse condition.</td>
</tr>
<tr>
<td>Kretschmarr Cave mold beetle</td>
<td><em>Texamaurops reddelli</em></td>
<td>E</td>
<td>Travis</td>
<td>Associated with karst terrain of the Edwards Limestone geologic formation which includes subterranean voids (fissures, fractures, cracks, caves) that provide relatively stable temperature, high humidity, and suitable shelter and foraging substrates, and with surface communities that provide both nutrient inputs and buffering from adverse condition.</td>
</tr>
<tr>
<td><strong>FISHES</strong></td>
<td><strong>Scaphirhynchus platorynchus</strong></td>
<td>T</td>
<td>Fannin, Grayson, Lamar, Montague</td>
<td>Open, flowing channels with bottoms of sand or gravel.</td>
</tr>
<tr>
<td>shovelnose sturgeon</td>
<td><em>Scaphirhynchus platorynchus</em></td>
<td>T</td>
<td>Fannin, Grayson, Lamar, Montague</td>
<td>Open, flowing channels with bottoms of sand or gravel.</td>
</tr>
<tr>
<td>paddlefish</td>
<td><em>Polyodon spathula</em></td>
<td>T</td>
<td>Anderson, Delta, Fannin, Freestone, Grayson, Henderson, Hopkins, Lamar, Leon, Navarro, Rains, Smith, Van Zandt, Wood</td>
<td>Prefers large, free-flowing rivers, but will frequent impoundments with access to spawning sites.</td>
</tr>
<tr>
<td>Rio Grande silvery minnow</td>
<td><em>Hybognathus amarus</em></td>
<td>E</td>
<td>Cameron, Hidalgo, Webb, Zapata</td>
<td>Historically Rio Grande and Pecos River systems and canals; pools and backwaters of medium to large streams</td>
</tr>
<tr>
<td>Common Name</td>
<td>Scientific Name</td>
<td>Status</td>
<td>Counties</td>
<td>Habitat</td>
</tr>
<tr>
<td>-----------------------------</td>
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<td>--------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>(extirpated)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>smalleye shiner</td>
<td>Notropis buccula</td>
<td>C</td>
<td>Bell, Bosque, Brazos, Burleson, Erath, Falls, Hill, Hood, Limestone, McLenann, Palo Pinto, Somervell, Travis</td>
<td>Medium to large prairie streams with sandy substrate and turbid to clear warm water; Brazos River system and its tributaries.</td>
</tr>
<tr>
<td>sharpnose shiner</td>
<td>Notropis oxyrhynchus</td>
<td>C</td>
<td>Bosque, Brazos, Burleson, Erath, Hill, Hood, Milam, Palo Pinto, Robertson, Somervell</td>
<td>Brazos River drainage; large turbid river, with bottom a combination of sand, gravel, and clay-mud.</td>
</tr>
<tr>
<td>bluntnose shiner</td>
<td>Notropis simus</td>
<td>T</td>
<td>Webb</td>
<td>Main river channels, often below obstructions over substrate of sand, gravel, and silt.</td>
</tr>
<tr>
<td>blue sucker</td>
<td>Cycleptus elongatus</td>
<td>T</td>
<td>Bastrop, Brazos, Burleson, Caldwell, Fannin, Gonzales, Grayson, Lamar, Milam, Robertson, Webb</td>
<td>Channels and flowing pools with a moderate current; bottom type usually consists of exposed bedrock, perhaps in combination with hard clay, sand, and gravel.</td>
</tr>
<tr>
<td>creek chubsucker</td>
<td>Erimyzon oblongus</td>
<td>T</td>
<td>Delta, Fannin, Grayson, Hopkins, Lamar, Rains, Smith, Van Zandt, Wood</td>
<td>Small rivers and creeks of various types; seldom in impoundments; prefers headwaters, but seldom occurs in springs; young typically in headwater rivulets or marshes.</td>
</tr>
<tr>
<td>widemouth blindcat</td>
<td>Satan eurystomus</td>
<td>T</td>
<td>Bexar</td>
<td>San Antonio Pool of the Edwards Aquifer.</td>
</tr>
<tr>
<td>toothless blindcat</td>
<td>Trogloglanis patterson</td>
<td>T</td>
<td>Bexar</td>
<td>San Antonio Pool of the Edwards Aquifer.</td>
</tr>
<tr>
<td>Conchos pupfish</td>
<td>Cyprinodon eximius</td>
<td>T</td>
<td>Webb</td>
<td>Conchos River drainage of northern Mexico and in Rio Grande River tributaries in Texas; sloughs, backwaters, and stream margins.</td>
</tr>
<tr>
<td>opossum pipefish</td>
<td>Microphis brachyurus</td>
<td>C</td>
<td>Cameron, Kenedy, Kleberg, Nueces, San Patricio, Willacy</td>
<td>Fresh or low salinity waters.</td>
</tr>
<tr>
<td>blackside darter</td>
<td>Percina maculata</td>
<td>T</td>
<td>Delta, Fannin, Hopkins, Hunt, Lamar, Van Zandt</td>
<td>Clear, gravelly streams; prefers pools with some current, or even quiet pools, to swift riffles.</td>
</tr>
<tr>
<td>Rio Grande darter</td>
<td>Etheostoma grahami</td>
<td>T</td>
<td>Webb</td>
<td>Gravel and rubble riffles of creeks and small rivers.</td>
</tr>
<tr>
<td>river goby</td>
<td>Awaous banana</td>
<td>T</td>
<td>Cameron, Hidalgo</td>
<td>Clear water with slow to moderate current, sandy or hard bottom, and little or no vegetation; also enters brackish and ocean waters.</td>
</tr>
<tr>
<td>blackfin goby</td>
<td>Gobionellus atripinnis</td>
<td>T</td>
<td>Cameron</td>
<td>Brackish and freshwater coastal streams.</td>
</tr>
<tr>
<td>AMPHIBIANS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>south Texas siren - large form</td>
<td>Siren sp.</td>
<td>T</td>
<td>Brooks, Cameron, Dimmit, Duval, Hidalgo, Jim Hogg, Jim Wells, Karnes, Kenedy, Kleberg, La Salle, Live Oak,</td>
<td>Wet or sometimes wet areas, such as arroyos, canals, ditches, or even shallow depressions.</td>
</tr>
</tbody>
</table>
### Table 3-28: Listed Threatened, Endangered, and Candidate Species Potentially Occurring Within the Study Area Counties

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Status 2</th>
<th>Counties</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Habitat</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>black-spotted newt</td>
<td><em>Notophthalmus meridionalis</em></td>
<td>T</td>
<td>McMullen, Nueces, San Patricio, Webb, Willacy, Zapata</td>
<td>Wet or sometimes wet areas, such as arroyos, canals, ditches, or even shallow depressions.</td>
</tr>
<tr>
<td>Austin blind salamander</td>
<td><em>Eurycea waterlooensis</em></td>
<td>C</td>
<td>Travis</td>
<td>Spring openings or in caves known from only the vicinity of Barton Springs in Travis County.</td>
</tr>
<tr>
<td>Barton Springs salamander</td>
<td><em>Eurycea sosorum</em></td>
<td>E</td>
<td>E</td>
<td>Known from only the vicinity of Barton Springs in Travis County.</td>
</tr>
<tr>
<td>Georgetown salamander</td>
<td><em>Eurycea naufragia</em></td>
<td>C</td>
<td>Travis</td>
<td>Known from only six springs or aquifer-dependent sites in Williamson County.</td>
</tr>
<tr>
<td>Comal blind salamander</td>
<td><em>Eurycea tridentifera</em></td>
<td>T</td>
<td>Bexar</td>
<td>Found in springs and waters of caves in Bexar County.</td>
</tr>
<tr>
<td>Cascades Caverns salamander</td>
<td><em>Eurycea latitans</em> complex</td>
<td>T</td>
<td>Bexar</td>
<td>Found in springs and waters of caves in Bexar County.</td>
</tr>
<tr>
<td>Salado salamander</td>
<td><em>Eurycea chisholmensis</em></td>
<td>C</td>
<td>Bell</td>
<td>Surface springs and subterranean waters of the Salado Springs system along Salado Creek.</td>
</tr>
<tr>
<td>Mexican burrowing toad</td>
<td><em>Rhinophrynus dorsalis</em></td>
<td>T</td>
<td>Zapata</td>
<td>Roadside ditches, temporary ponds, arroyos, or wherever loose friable soils are present in which to burrow.</td>
</tr>
<tr>
<td>white-lipped frog</td>
<td><em>Leptodactylus labialis</em></td>
<td>T</td>
<td>Cameron, Hidalgo, Zapata</td>
<td>Grasslands, cultivated fields, roadside ditches, and a wide variety of other habitats.</td>
</tr>
<tr>
<td>Houston toad</td>
<td><em>Bufo houstonensis</em></td>
<td>E/CH</td>
<td>Bastrop, Brazos, Burleson, Freestone, Lavaca, Lee, Leon, Milam, Robertson</td>
<td>Species sandy substrate, water in pools, ephemeral pools, stock tanks; associated with soils of the Carrizo, Goliad, Queen City, Recklaw, Sparta, Willis, and Weches geologic formations.</td>
</tr>
<tr>
<td>Mexican treefrog</td>
<td><em>Smilisca baudinii</em></td>
<td>T</td>
<td>Cameron, Hidalgo, Zapata</td>
<td>Subtropical region of extreme southern Texas.</td>
</tr>
<tr>
<td>sheep frog</td>
<td><em>Hypopachus variolosus</em></td>
<td>T</td>
<td>Bee, Brooks, Cameron, Duval, Goliad, Hidalgo, Jim Hogg, Jim Wells, Karnes, Kenedy, Kleberg, La Salle, Live Oak, McMullen, Nueces, San Patricio, Willacy, Zapata</td>
<td>Predominantly grassland and savanna; moist sites in arid areas.</td>
</tr>
<tr>
<td>REPTILES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>alligator snapping</td>
<td><em>Macrochelys temminckii</em></td>
<td>T</td>
<td>Anderson, Brazos, Cooke, Delta,</td>
<td>Deep water of rivers, canals, lakes, and oxbows; also</td>
</tr>
</tbody>
</table>
### Table 3-28: Listed Threatened, Endangered, and Candidate Species Potentially Occurring Within the Study Area Counties

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Status</th>
<th>Counties</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>turtle</td>
<td></td>
<td></td>
<td>Fannin, Grayson, Henderson, Hopkins, Lamar, Rains, Smith, Van Zandt, Wood</td>
<td>swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation.</td>
</tr>
<tr>
<td>Cagle’s map turtle</td>
<td><em>Graptemys caglei</em></td>
<td>C T</td>
<td>Bexar, DeWitt, Gonzales, Guadalupe, Lavaca</td>
<td>Guadalupe River System; short stretches of shallow water with swift to moderate flow and gravel or cobble bottom, connected by deeper pools with a slower flow rate and a silt or mud bottom; gravel bar riffles and transition areas between riffles and pools.</td>
</tr>
<tr>
<td>Texas tortoise</td>
<td><em>Gopherus berlandieri</em></td>
<td>T</td>
<td>Atascosa, Bee, Bexar, Brooks, Cameron, DeWitt, Dimmit, Duval, Frio, Goliad, Guadalupe, Hidalgo, Jim Hogg, Jim Wells, Karnes, Kenedy, Kleberg, La Salle, Lavaca, Live Oak, McMullen, Medina, Nueces, San Patricio, Webb, Willacy, Wilson, Zapata</td>
<td>Open brush with a grass understory is preferred; open grass and bare ground are avoided; when inactive occupies shallow depressions at base of bush or cactus, sometimes in underground burrows or under objects.</td>
</tr>
<tr>
<td>loggerhead sea turtle</td>
<td><em>Caretta caretta</em></td>
<td>T T</td>
<td>Cameron, Kenedy, Kleberg, Nueces, San Patricio, Willacy</td>
<td>Gulf and bay system.</td>
</tr>
<tr>
<td>green sea turtle</td>
<td><em>Chelonia mydas</em></td>
<td>T T</td>
<td>Cameron, Kenedy, Kleberg, Nueces, San Patricio, Willacy</td>
<td>Gulf and bay system.</td>
</tr>
<tr>
<td>hawksbill sea turtle</td>
<td><em>Eretmochelys imbricata</em></td>
<td>E E</td>
<td>Cameron, Kenedy, Kleberg, Nueces, San Patricio, Willacy</td>
<td>Gulf and bay system.</td>
</tr>
<tr>
<td>Kemp’s Ridley sea turtle</td>
<td><em>Lepidochelys kempii</em></td>
<td>E E</td>
<td>Cameron, Kenedy, Kleberg, Nueces, San Patricio, Willacy</td>
<td>Gulf and bay system.</td>
</tr>
<tr>
<td>leatherback sea turtle</td>
<td><em>Dermochelys coriacea</em></td>
<td>E E</td>
<td>Cameron, Kenedy, Kleberg, Nueces, San Patricio, Willacy</td>
<td>Gulf and bay system.</td>
</tr>
<tr>
<td>reticulated collared lizard</td>
<td><em>Crotaphytus reticulatus</em></td>
<td>T</td>
<td>Brooks, Dimmit, Duval, Frio, Hidalgo, Jim Hogg, Jim Wells, La Salle, Live Oak, McMullen, Webb, Zapata</td>
<td>Requires open brush-grasslands; thorn-scrub vegetation, usually on well-drained rolling terrain of shallow gravel, caliche, or sandy soils; often on scattered flat rocks below escarpments or isolated rock outcrops among scattered clumps of prickly pear and mesquite.</td>
</tr>
<tr>
<td>Texas horned lizard</td>
<td><em>Phrynosoma cornutum</em></td>
<td>T</td>
<td>All counties</td>
<td>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.</td>
</tr>
<tr>
<td>northern scarlet</td>
<td><em>Cemothera coccinea</em></td>
<td>T</td>
<td>Henderson, Rains, Smith, Van Zandt, Wood</td>
<td>Mixed hardwood scrub on sandy soils.</td>
</tr>
<tr>
<td>Common Name</td>
<td>Scientific Name</td>
<td>Status</td>
<td>Counties</td>
<td>Habitat</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------</td>
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<td>----------</td>
<td>---------</td>
</tr>
<tr>
<td>snake</td>
<td><strong>copei</strong></td>
<td></td>
<td></td>
<td>Wood</td>
</tr>
<tr>
<td>Texas scarlet snake</td>
<td>Cemophora coccinea <strong>lineri</strong></td>
<td>T</td>
<td>Brooks, Jim Hogg, Kenedy, Nueces, San Patricio</td>
<td>Mixed hardwood scrub on sandy soils.</td>
</tr>
<tr>
<td>black-striped snake</td>
<td>Coniophanes imperialis</td>
<td>T</td>
<td>Cameron, Hidalgo, Kenedy, Willacy</td>
<td>Extreme south Texas; semi-arid coastal plain, warm, moist micro-habitats and sandy soils.</td>
</tr>
<tr>
<td>indigo snake</td>
<td><strong>Drymarchon corais</strong></td>
<td>T</td>
<td>Atascosa, Bee, Bexar, Brooks, Cameron, Dimmit, Duval, Frio, Hidalgo, Jim Hogg, Jim Wells, Karnes, Kenedy, Kleberg, La Salle, Live Oak, McMullen, Medina, Nueces, San Patricio, Webb, Willacy, Zapata</td>
<td>Thornbrush-chaparral woodlands of south Texas, in particular dense riparian corridors; can do well in suburban and irrigated croplands if not molested or indirectly poisoned; requires moist microhabitats, such as rodent burrows, for shelter.</td>
</tr>
<tr>
<td>speckled racer</td>
<td>Drymobius margaritiferus</td>
<td>T</td>
<td>Cameron, Hidalgo</td>
<td>Extreme south Texas; dense thickets near water, Texas palm groves, riparian woodlands.</td>
</tr>
<tr>
<td>Brazos water snake</td>
<td>Nerodia harteri</td>
<td>T</td>
<td>Bosque, Erath, Hood, Johnson, Palo Pinto, Parker, Somervell</td>
<td>Upper Brazos River drainage; in shallow water with rocky bottom and on rocky portions of banks.</td>
</tr>
<tr>
<td>northern cat-eyed snake</td>
<td>Leptodeira septentrionalis septentrionalis</td>
<td>T</td>
<td>Brooks, Cameron, Hidalgo, Jim Hogg, Kenedy, Kleberg, Willacy</td>
<td>Gulf Coastal Plain south of the Nueces River; thorn brush woodland; dense thickets bordering ponds and streams.</td>
</tr>
</tbody>
</table>

**BIRDS**

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Status</th>
<th>Counties</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>brown pelican</td>
<td>Pelecanus occidentalis</td>
<td>E E</td>
<td>Cameron, Kenedy, Kleberg, Nueces,</td>
<td>Largely coastal and near shore areas.</td>
</tr>
<tr>
<td>Common Name</td>
<td>Scientific Name</td>
<td>Status</td>
<td>Counties</td>
<td>Habitat</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------</td>
<td>--------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>reddish egret</td>
<td><em>Egretta rufescens</em></td>
<td>T</td>
<td>Cameron, Hidalgo, Kenedy, Kleberg, Nueces, San Patricio, Willacy</td>
<td>Brackish marshes and shallow salt ponds and tidal flats; nests on ground or in trees or bushes, on dry coastal islands in brushy thickets of yucca and prickly pear.</td>
</tr>
<tr>
<td>wood stork</td>
<td><em>Mycteria americana</em></td>
<td>T</td>
<td>Anderson, Bastrop, Bee, Bexar, Brazos, Brooks, Burleson, Caldwell, Cameron, Collin, Cooke, Dallas, Delta, Denton, DeWitt, Ellis, Fannin, Fayette, Freestone, Gonzales, Grayson, Guadalupe, Henderson, Hidalgo, Hopkins, Hunt, Jim Hogg, Jim Wells, Karnes, Kaufman, Kenedy, Kleberg, Lamar, Lavaca, Lee, Leon, Live Oak, Milam, Navarro, Nueces, Rains, Robertson, Rockwall, San Patricio, Smith, Van Zandt, Webb, Willacy, Wilson, Wood, Zapata</td>
<td>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.</td>
</tr>
<tr>
<td>bald eagle</td>
<td><em>Haliaeetus leucocephalus</em></td>
<td>T³ T</td>
<td>All counties [Anderson, Bastrop, Bell, Brazos, Bosque, Burleson, Caldwell, Cameron, Collin, Cooke, Dallas, Delta, Denton, DeWitt, Ellis, Erath, Falls, Fannin, Fayette, Freestone, Goliad, Gonzales, Grayson, Henderson, Hill, Hood, Hopkins, Hunt, Jack, Johnson, Kaufman, Kleberg, Lamar, Leon, Limestone, McLennan, Milam, Montague, Navarro, Palo Pinto, Parker, Rains, Robertson, Rockwall, Smith,</td>
<td>Found primarily near coasts, rivers, and large lakes; nests in tall trees or on cliffs near water.</td>
</tr>
</tbody>
</table>
### Table 3-28: Listed Threatened, Endangered, and Candidate Species Potentially Occurring Within the Study Area Counties

<table>
<thead>
<tr>
<th>Common Name</th>
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<th>Status</th>
<th>Counties</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>gray hawk</td>
<td>Asturina nitidus</td>
<td>T</td>
<td>Somervell, Tarrant, Travis, Van Zandt, Williamson, Wood</td>
<td>Mature woodlands of river valleys and nearby semiarid mesquite and scrub grasslands.</td>
</tr>
<tr>
<td>common black hawk</td>
<td>Buteogallus anthracinus</td>
<td>T</td>
<td>Cameron, Hidalgo, Webb, Willacy, Zapata</td>
<td>Cottonwood-lined rivers and streams; willow tree groves on the lower Rio Grande floodplain.</td>
</tr>
<tr>
<td>zone-tailed hawk</td>
<td>Buteo albonotatus</td>
<td>T</td>
<td>Bexar, Cameron, Frio, Hidalgo, Jim Hogg, Kleberg, Medina, Milam</td>
<td>Arid open country, including open deciduous or pine-oak woodland, mesa or mountain country, often near watercourses, and wooded canyons and tree-lined rivers along middle-slopes of desert mountains.</td>
</tr>
<tr>
<td>white-tailed hawk</td>
<td>Buteo albicaudatus</td>
<td>T</td>
<td>Bee, Brooks, Cameron, DeWitt, Duval, Goliad, Hidalgo, Jim Hogg, Jim Wells, Kenedy, Kleberg, La Salle, Lavaca, Live Oak, McMullen, Nueces, San Patricio, Webb, Willacy, Zapata</td>
<td>Near coast, it is found on prairies, cordgrass flats, and scrub-live oak; further inland on prairies, mesquite and oak savannas, and mixed savanna-chaparral.</td>
</tr>
<tr>
<td>northern aplomado falcon</td>
<td>Falco femoralis septentrionalis</td>
<td>E</td>
<td>Brooks, Cameron, Duval, Hidalgo, Jim Hogg, Jim Wells, Kenedy, Kleberg, Live Oak, McMullen, Willacy</td>
<td>Open country, especially savanna and open woodland, and sometimes in very barren areas; grassy plains and valleys with scattered mesquite, yucca, and cactus.</td>
</tr>
<tr>
<td>Arctic peregrine falcon</td>
<td>Falco peregrinus tundrius</td>
<td>T</td>
<td>All counties</td>
<td>Potential migrant.</td>
</tr>
<tr>
<td>Attwater’s greater prairie chicken</td>
<td>Tympanuchus cupido attwateri</td>
<td>E</td>
<td>DeWitt, Goliad, Lavaca</td>
<td>Open prairies of mostly thick grass one to three feet tall; from near sea level to 200 feet along coastal plain on upper</td>
</tr>
</tbody>
</table>
### Table 3-28: Listed Threatened, Endangered, and Candidate Species Potentially Occurring Within the Study Area Counties

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Status</th>
<th>Counties</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>piping plover</td>
<td><em>Charadrius melodus</em></td>
<td>T w/CH</td>
<td>All counties [Cameron, Dallas, Delta, Denton, Grayson, Kenedy, Kleberg, Nueces, San Patricio, Tarrant, Willacy]^a</td>
<td>Wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats.</td>
</tr>
<tr>
<td>interior least tern</td>
<td><em>Sterna antillarum athalassos</em></td>
<td>E</td>
<td>All counties [Bell, Bosque, Burleson, Collin, Cooke, Dallas, Delta, Denton, DeWitt, Dimmit, Duval, Ellis, Erath, Falls, Fannin, Fayette, Freestone, Goliad, Grayson, Guadalupe, Henderson, Hidalgo, Hill, Hood, Hopkins, Hunt, Jack, Jim Hogg, Jim Wells, Johnson, Karnes, Kaufman, Kenedy, Kleberg, La Salle, Lamar, Lee, Leon, Limestone, Live Oak, McLennan, McMullen, Milam, Montague, Navarro, Palo Pinto, Parker, Rains, Robertson, Rockwall, San Patricio, Somervell, Tarrant, Webb, Willacy, Wise, Wood, Zapata]^a</td>
<td>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); this subspecies is listed only when inland more than 50 miles from a coastline.</td>
</tr>
</tbody>
</table>
### Table 3-28: Listed Threatened, Endangered, and Candidate Species Potentially Occurring Within the Study Area Counties

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Status</th>
<th>Counties</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>sooty tern</td>
<td>Sterna fuscata</td>
<td>T</td>
<td>Cameron, Kenedy, Kleberg, Nueces, San Patricio, Willacy</td>
<td>Does dive, but snatches small fish and squid with bill as it flies or hovers over water.</td>
</tr>
<tr>
<td>cactus ferruginous pygmy-owl</td>
<td>Glaucidium brasilianum cactorum</td>
<td>T</td>
<td>Brooks, Cameron, Hidalgo, Jim Hogg, Kenedy, La Salle, Webb, Willacy, Zapata</td>
<td>Riparian trees, brush, palm, and mesquite thickets; during day also roosts in small caves and recesses on slopes of low hills.</td>
</tr>
<tr>
<td>rose-throated becard</td>
<td>Pachyramphus aglaiae</td>
<td>T</td>
<td>Cameron, Hidalgo, Zapata</td>
<td>Riparian trees, woodlands, open forest, scrub, and mangroves.</td>
</tr>
<tr>
<td>northern beardless-tyrannulet</td>
<td>Camptostoma imberbe</td>
<td>T</td>
<td>Cameron, Hidalgo, Kenedy, Willacy, Zapata</td>
<td>Mesquite woodlands; near Rio Grande frequents cottonwood, willow, elm, and great leatree.</td>
</tr>
<tr>
<td>black-capped vireo</td>
<td>Vireo atricapillus</td>
<td>E</td>
<td>Bell, Bexar, Bosque, Cooke, Dallas, Denton, Erath, Grayson, Hill, Hood, Jack, Johnson, McLennan, Medina, Montague, Palo Pinto, Parker, Somervell, Travis, Williamson, Wise</td>
<td>Oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open.</td>
</tr>
<tr>
<td>tropical parula</td>
<td>Parula pitiayumi</td>
<td>T</td>
<td>Cameron, Hidalgo, Kenedy, Willacy, Zapata</td>
<td>Dense or open woods, undergrowth, brush, and trees along edges of rivers and resacas.</td>
</tr>
<tr>
<td>golden-cheeked warbler</td>
<td>Dendroica chrysoparia</td>
<td>E</td>
<td>Bell, Bexar, Bosque, Dallas, Erath, Hill, Hood, Johnson, McLennan, Medina, Palo Pinto, Parker, Somervell, Travis, Williamson</td>
<td>Juniper-oak woodlands; dependent on Ashe juniper.</td>
</tr>
<tr>
<td>Bachman’s sparrow</td>
<td>Aimophila aestivalis</td>
<td>T</td>
<td>Anderson, Delta, Henderson, Hopkins, Freestone, Lamar, Leon, Montague, Rains, Smith, Van Zandt, Wood</td>
<td>Open pine woods with scattered bushes or understory, brushy or overgrown hillsides, overgrown fields with thickets and brambles, grassy orchards.</td>
</tr>
<tr>
<td>Texas Botteri’s sparrow</td>
<td>Aimophila botterii texana</td>
<td>T</td>
<td>Bee, Cameron, Duval, Jim Wells, Kenedy, Kleberg, Nueces, Willacy</td>
<td>Coastal lowlands &amp; prairies; brush or open grassy land.</td>
</tr>
<tr>
<td>MAMMALS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>southern yellow bat</td>
<td>Lasiurus ega</td>
<td>T</td>
<td>Brooks, Cameron, Hidalgo, Kenedy, Kleberg, Nueces, San Patricio, Willacy</td>
<td>Associated with trees, such as palm trees.</td>
</tr>
<tr>
<td>Rafinesque’s big-eared bat</td>
<td>Corynorhinus rafinesqui</td>
<td></td>
<td>Brazos, Freestone, Leon</td>
<td>Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures.</td>
</tr>
<tr>
<td>black-tailed prairie dog</td>
<td>Cynomys ludovicianus</td>
<td>C</td>
<td>Bexar, Cooke, Denton, Erath, Hood, Jack, Johnson, Montague, Palo Pinto, Parker, Somervell, Wise</td>
<td>Dry, flat, short grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle.</td>
</tr>
<tr>
<td>Texas kangaroo rat</td>
<td>Dipodomys elator</td>
<td>T</td>
<td>Cooke, Jack, Montague, Wise</td>
<td>Mesquite not required, but mostly in association with scattered mesquite shrubs and sparse, short grasses in areas</td>
</tr>
</tbody>
</table>
### Table 3-28: Listed Threatened, Endangered, and Candidate Species Potentially Occurring Within the Study Area Counties

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Status</th>
<th>Counties</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coues’ rice rat</td>
<td><em>Oryzomys couesi</em></td>
<td>T</td>
<td>Cameron, Hidalgo, Kenedy, Willacy</td>
<td>Cattail-bulrush marsh with shallower zone of aquatic grasses near the shoreline; shade trees around the shoreline.</td>
</tr>
<tr>
<td>gray wolf (extirpated)</td>
<td><em>Canis lupus</em></td>
<td>E</td>
<td>Dimmit, Erath, Hood, Jack, La Salle, Montague, Palo Pinto, Parker, Somervell, Webb, Wise</td>
<td>Western two-thirds of the state in forests, brushlands, or grasslands.</td>
</tr>
<tr>
<td>red wolf (extirpated)</td>
<td><em>Canis rufus</em></td>
<td>E</td>
<td>Burleson, Cooke, DeWitt, Duval, Erath, Fannin, Fayette, Goliad, Grayson, Guadalupe, Hood, Jack, Jim Wells, Karnes, Lamar, Lee, Live Oak, McMullen, Milam, Montague, Palo Pinto, Parker, Rains, Robertson, San Patricio, Somervell, Van Zandt, Wise</td>
<td>Eastern half of Texas in brushy and forested areas, as well as coastal prairies.</td>
</tr>
<tr>
<td>black bear</td>
<td><em>Ursus americanus</em></td>
<td>T</td>
<td>Anderson, Atascosa, Bexar, Brazos, Burleson, Delta, Dimmit, Duval, Fannin, Frio, Hood, Hopkins, Jim Hogg, Kenedy, Lamar, La Salle, Lavaca, Leon, McMullen, Medina, Smith, Webb, Wise, Zapata</td>
<td>Bottomland hardwoods and large tracts of undeveloped forested areas; also desert lowlands and high elevation forests and woodlands; dens in tree hollows, rock piles, cliff overhangs, caves, or under brush piles.</td>
</tr>
<tr>
<td>Louisiana black bear</td>
<td><em>Ursus americanus luteolus</em></td>
<td>T</td>
<td>Anderson, Brazos, Burleson, Delta, Fannin, Hopkins, Lamar, Lavaca, Leon, Smith</td>
<td>Bottomland hardwoods and large tracts of inaccessible forested areas.</td>
</tr>
<tr>
<td>black-footed ferret (extirpated)</td>
<td><em>Mustela nigripes</em></td>
<td>E</td>
<td>Cooke</td>
<td>Potential inhabitants of any prairie dog towns in the general area.</td>
</tr>
<tr>
<td>ocelot</td>
<td><em>Leopardus pardalis</em></td>
<td>E</td>
<td>Atascosa, Bee, Brooks, Cameron, Dimmit, Duval, Frio, Goliad, Hidalgo, Jim Hogg, Jim Wells, Karnes, Kenedy, Kleberg, La Salle, Live Oak, McMullen, Nueces, San Patricio, Webb, Willacy, Wilson, Zapata</td>
<td>Dense chaparral thickets; mesquite-thorn scrub and live oak mottes; avoids open areas.</td>
</tr>
</tbody>
</table>
### Table 3-28: Listed Threatened, Endangered, and Candidate Species Potentially Occurring Within the Study Area Counties

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Status</th>
<th>Counties</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>gulf Coast</td>
<td><em>Herpailurus yagouaroundi cacomitli</em></td>
<td>E</td>
<td>Atascosa, Bee, Brooks, Cameron, Dimmit, Duval, Frio, Goliad, Hidalgo, Jim Hogg, Jim Wells, Karnes, Kenedy, Kleberg, La Salle, Live Oak, McMullen, Nueces, San Patricio, Webb, Willacy, Wilson, Zapata</td>
<td>Thick brushlands especially, near water.</td>
</tr>
<tr>
<td>jaguarundi (extirpated)</td>
<td><em>Panthera onca</em></td>
<td>E</td>
<td>Brooks, Cameron, Hidalgo, Jim Hogg, Kenedy, Kleberg, Willacy</td>
<td>Dense chaparral.</td>
</tr>
<tr>
<td>West Indian</td>
<td><em>Trichechus manatus</em></td>
<td>E</td>
<td>Cameron, Kenedy, Nueces, San Patricio, Willacy</td>
<td>Gulf and bay system.</td>
</tr>
</tbody>
</table>

1 Plant and animal species listed as threatened or endangered, or considered candidates for such listing, by the U.S. Fish and Wildlife Service (USFWS) and Texas Parks and Wildlife Department (TPWD), and considered by those agencies as occurring in, potentially occurring in, or potentially impacted by activities in study-area counties. Information on the occurrence of listed species was compiled from USFWS (2003a, 2005), the Natural Diversity Database (NDD) [formerly Texas Biological and Conservation Data System, TXBCD] (TPWD, 2005a), and the National Oceanic and Atmospheric Administration (NOAA 1999).

2 Status Codes:
- E = Endangered; a species in danger of extinction throughout all or a significant portion of its range.
- T = Threatened; a species which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
- C = Candidate; a species for which the USFWS has on file enough substantial information to warrant listing as threatened or endangered.
- w/CH = Critical Habitat for this species has been designated by the USFWS in at least one of the study-area counties.

3 Johnston’s frankenia and bald eagle have been proposed by USFWS for federal delisting (USFWS 2003b, USFWS 1999).

4 The USFWS considers bald eagle, piping plover, whooping crane, and least tern as potentially occurring as migrants in all Texas counties; counties listed in brackets are those specifically identified in USFWS (2003a and 2005) and/or TPWD (2005a).
Twenty-two species listed as threatened or endangered by the USFWS and/or the TPWD, or considered candidates for such listing, are known to occur in study area counties but were removed from consideration in this document based on review of their known ranges. These species are: Tooth Cave pseudoscorpion (*Tartarocreagris texana*), Government Canyon Bat Cave spider (*Neoleptoneta microps*), Tooth Cave spider (*Neoleptoneta myopica*), Robber Baron Cave meshweaver (*Cicurina baronia*), Madla Cave spider (*Cicurina madla*), Braken Bat Cave meshweaver (*Cicurina venii*), Government Canyon Bat Cave meshweaver (*Cicurina vespera*), Warton cave meshweaver (*Cicurina wartoni*), Cokendolpher cave harvestman (*Texella cokendolpheri*), Bee Creek Cave harvestman (*Texella reddelli*), Bone Cave harvestman (*Texella reyesi*), two unnamed ground beetles (*Rhadine exilis* and *Rhadine infernalis*), Tooth Cave ground beetle (*Rhadine persephone*), Coffin Cave mold beetle (*Batrisodes texanus*), Helotes mold beetle (*Batrisodes venyivi*), Kretschmarr Cave mold beetle (*Texamaurops reddelli*), Austin blind salamander (*Eurycea waterlooensis*), Comal blind salamander (*Eurycea tridentifera*), Barton Springs salamander (*Eurycea sosorum*), Cascades Caverns salamander (*Eurycea latitans complex*) and Georgetown salamander (*Eurycea naufragia*). These species and their habitats are dependent on the Edwards Aquifer and/or Edwards limestone formation in central Texas. The ranges of these species are relatively localized and well defined. Though these species and their habitats occur in study area counties (Bexar, Travis, and Williamson counties), they occur outside of the study area boundary and are not further discussed in this document. No other threatened or endangered species occurring in other regions of the study area are known to have such localized and well-defined ranges. The species listed here are the only threatened or endangered species known to occur in the study area counties but not included for further discussion in this document.

**Significant Terrestrial and Aquatic Habitats**

Certain lands within the study area counties are considered by state, federal, and/or private entities as constituting significant habitats worthy of protection. Many of these lands are incorporated into preserves, parks, and refuges created with the intent of protecting fragile, unique, or vanishing habitats, or protecting habitats upon which endangered or threatened species depend. Privately and publicly held significant habitats and designated critical habitat occurring within the study area counties are listed in Table 3-29.

Certain lands within the study area counties are designated by the USFWS as “critical habitat” and are protected under the ESA. The USFWS owns and operates six wildlife refuges comprising over 178,000 acres, which occupy portions of eight study area counties. The largest of these is the approximately 77,000-acre Lower Rio Grande NWR in Cameron, Hidalgo, and Willacy counties. The NPS owns and operates approximately 130,000 acres associated with the Padre Island National Seashore in Kenedy, Kleberg, and Willacy counties. However, while this habitat does occur in counties within the study area, it does not occur within the study area boundary. The USFWS owns and operates approximately 20,250 acres of the Lyndon B. Johnson Grassland in Wise County and approximately 17,785 acres of the Caddo National Grassland in Fannin...
County. The Nature Conservancy (TNC) owns and operates nine of these habitats within or partially within the study area equaling approximately 32,284 acres; the largest of which is the Padre Island Preserve at approximately 24,532 acres in Willacy County (TNC, 2004).

It is important to note that although the lands discussed in Table 3-29 occur in study area counties, they do not necessarily occur within the study area boundary. State Parks (SP) and WMAs managed by TPWD and other parklands are listed in Appendix C-15.
Table 3-29: Privately and Publicly Held Significant Habitats Within the Study Area Counties

<table>
<thead>
<tr>
<th>Significant Habitat</th>
<th>County</th>
<th>Acres</th>
<th>Private/Public (owner/manager)</th>
<th>Reason for Establishment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balcones Canyonlands NWR</td>
<td>Travis, Williamson</td>
<td>20,000</td>
<td>Public (USFWS)</td>
<td>This refuge was established to serve primarily as habitat for endangered golden-cheeked warblers and black-capped vireos. Plans call for the final refuge configuration to include over 40,000 acres.</td>
</tr>
<tr>
<td>Barton Creek Habitat Preserve</td>
<td>Travis (southwest)</td>
<td>4,084</td>
<td>Private (TNC)</td>
<td>This preserve includes habitat for endangered golden-cheeked warbler and areas that will be restored as habitat for warblers and for endangered black-capped vireos. This preserve also helps to protect the quality of water recharging the Edwards Aquifer and potentially flowing through habitat of the endangered Barton Springs salamander.</td>
</tr>
<tr>
<td>Caddo National Grassland</td>
<td>Fannin</td>
<td>17,785</td>
<td>Public (USFS)</td>
<td>This grassland includes open grassland and post oak and blackjack oak savannahs that provide habitat for a variety of wildlife species.</td>
</tr>
<tr>
<td>Chihuahua Woods Preserve</td>
<td>Hidalgo</td>
<td>349</td>
<td>Private (TNC)</td>
<td>This preserve protects a relic Tamaulipan thornscrub community and provides protection for a number of rare species including the State-listed Texas tortoise.</td>
</tr>
<tr>
<td>Clymer Meadow Preserve</td>
<td>Hunt</td>
<td>1,068</td>
<td>Private (TNC)</td>
<td>This preserve is one of the largest and most diverse remnants of the Blackland Prairie and it supports imperiled grassland communities and many plant and bird species.</td>
</tr>
<tr>
<td>Francine Cohn Preserve</td>
<td>Willacy</td>
<td>300</td>
<td>Private (TNC)</td>
<td>This preserve provides foraging habitat for many bird species including species nesting on the nearby Shamrock Island Preserve (see below).</td>
</tr>
<tr>
<td>Hagerman NWR</td>
<td>Grayson</td>
<td>~11,000</td>
<td>Public (USFWS)</td>
<td>Located on the Big Mineral Arm of Lake Texoma, this refuge provides important foraging, rookery and buffer habitat for migrating, wintering, and summering bird species.</td>
</tr>
<tr>
<td>Laguna Atascosa NWR</td>
<td>Cameron, Willacy</td>
<td>&gt;65,000</td>
<td>Public (USFWS)</td>
<td>This refuge includes a wide range of coastal plains habitats that support resident and migratory species including listed species.</td>
</tr>
<tr>
<td>Laguna Madre</td>
<td>Cameron, Kenedy,</td>
<td>389,760</td>
<td>Public, Private (GLO, TPWD, US</td>
<td>Ownership of this shallow-water habitat, located between the Texas mainland and Padre Island, is divided among private and public entities. This area provides very important foraging, rookery, and nursery habitat for many bird species.</td>
</tr>
<tr>
<td></td>
<td>Kleberg, Nueces,</td>
<td></td>
<td>government, Audubon Society,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Willacy</td>
<td></td>
<td>King Ranch, et. al.)</td>
<td></td>
</tr>
<tr>
<td>Lennox Foundation Southmost Preserve</td>
<td>Cameron</td>
<td>1,034</td>
<td>Private (TNC)</td>
<td>This preserve contains one of only two stands of native sabal palm trees (Sabal minor) remaining in the U.S. and supports native wildlife including some listed species.</td>
</tr>
<tr>
<td>Lost Pines</td>
<td>Bastrop</td>
<td>98,000</td>
<td>Private with some public (Bastrop State Park (TPWD))</td>
<td>This area is generally defined as being located north of the Colorado River and south of US 290 (USFWS, 2003g). The Lost Pines are isolated from similar woodlands in eastern Texas and are a unique habitat in central Texas as it supports populations of endangered Houston toads, and a large portion of the Lost Pines has been designated as critical habitat for this species.</td>
</tr>
<tr>
<td>Lower Rio Grande Valley NWR</td>
<td>Cameron, Hidalgo,</td>
<td>77,000</td>
<td>Public (USFWS)</td>
<td>This refuge, comprised of over 110 individual tracts, serves to protect much of the remnant Lower Rio Grande Valley riparian forest and adjacent xeric ecotone. The refuge also provides habitat for many resident and migratory species including listed species. A portion of this refuge also occurs in Starr County, which is not within the study area.</td>
</tr>
<tr>
<td>Significant Habitat</td>
<td>County</td>
<td>Acres</td>
<td>Private/Public (owner/manager)</td>
<td>Reason for Establishment</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------</td>
<td>--------</td>
<td>-------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Little Sandy NWR</td>
<td>Wood</td>
<td>3,802</td>
<td>Public (USFWS)</td>
<td>This refuge contains the only remaining virgin bottomland hardwood areas in Texas and is provides wildlife habitat and rookery habitat for birds.</td>
</tr>
<tr>
<td>Lyndon B. Johnson Grassland</td>
<td>Wise</td>
<td>20,250</td>
<td>Public (USFS)</td>
<td>The grassland is managed by the USFS and comprises numerous unconnected parcels with a total combined area in excess of 20,250 acres; providing habitat for a wide variety of wildlife and bird species.</td>
</tr>
<tr>
<td>Mesquite Brushland Preserve</td>
<td>Duval</td>
<td>683</td>
<td>Private (TNC)</td>
<td>This preserve contains one of the few remaining undisturbed areas of Tamaulipan thornscrub habitat and supports several endemic and listed plant species and threatened Texas tortoises.</td>
</tr>
<tr>
<td>Ruth P.M. Lehmann Preserve</td>
<td>Travis</td>
<td>160</td>
<td>Private (TNC)</td>
<td>This preserve contains high-quality Hill Country habitat for endangered golden-cheeked warblers.</td>
</tr>
<tr>
<td>Santa Ana NWR</td>
<td>Hidalgo</td>
<td>2,080</td>
<td>Public (USFWS)</td>
<td>Located along the Rio Grande, this refuge contains remnant subtropical Rio Grande delta riparian forest and provides habitat for many wildlife and bird species including listed species.</td>
</tr>
<tr>
<td>Shamrock Island Preserve</td>
<td>Nueces</td>
<td>74</td>
<td>Private (TNC)</td>
<td>This preserve is an important nesting location for many bird species including the State-listed species reddish egret and white-faced ibis, and provides forage and shelter habitat for many other migratory species.</td>
</tr>
<tr>
<td>South Bay Coastal Preserve</td>
<td>Nueces</td>
<td>3,500</td>
<td>Public (TPWD)</td>
<td>This preserve is managed by TPWD and includes extensive algal flats and emergent and submersed vegetation that provide important habitat for birds, fishes, and finfish.</td>
</tr>
<tr>
<td>Padre Island National Seashore</td>
<td>Kenedy, Kleberg, Willacy</td>
<td>130,000</td>
<td>Public (NPS)</td>
<td>This seashore is managed by the NPS and is the longest remaining stretch of undeveloped barrier island in the world; which provides breeding and foraging habitat for many wildlife and bird species including threatened and endangered species. While this habitat does occur in three study area counties, the habitat does not occur within the boundary of the study area.</td>
</tr>
<tr>
<td>Padre Island Preserve</td>
<td>Willacy</td>
<td>24,532</td>
<td>Private (TNC)</td>
<td>This preserve contains nesting habitat for sea turtles and habitat for protected shore and sea birds and for many other species.</td>
</tr>
</tbody>
</table>

Source: TNC, 2004; USFWS, No date-b and No date-c; TPWD, 2005b and c and 2004; USFS, 2004; NPS, 2004a, b, and c.
Chapter 3
Affected Environment
TTC-35 Tier One Draft EIS

Essential Fish Habitat

Essential Fish Habitat (EFH) is defined in the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended 1996, as “...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” EFH designations occur only in aquatic areas necessary to support federally managed marine and anadromous fish.

According to the Gulf of Mexico Fishery Management Council (GMFMC) (1998), Texas’ Gulf of Mexico shoreline is the most ecologically diverse region within the State. Texas has approximately 367 total miles of the Gulf of Mexico shoreline and contains 2,125 miles of bay-estuary-lagoon shoreline supporting more than 611,760 acres of fresh, brackish, salt marshes (GMFMC, 1998).

In February 1999, NOAA and NFMS released the Essential Fish Habitat: New Marine Fish Habitat Conservation Mandate for Federal Agencies (revised April, 2000), which provides an overview of the EFH provisions of the MSFCMA and implementing rules (NOAA-NMFS, 1999). In the document, NMFS designated EFH associated with the Gulf of Mexico as areas associated with both estuarine and marine areas. Estuarine areas include: estuarine emergent wetlands; mangrove wetlands; submerged aquatic vegetation; algal flats; mud, sand, shell, and rock substrates; and estuarine water column. Marine areas include: water column; vegetated bottoms; non-vegetated bottoms; live bottoms; coral reefs; artificial reefs; geologic features; continental shelf features; West Florida Shelf; Mississippi/Alabama Shelf; and the Louisiana/Texas Shelf.

Based on GIS data, there are approximately 971 total miles of shoreline associated with the study area counties of Cameron, Kenedy, Kleberg, Nueces, San Patricio, and Willacy. While there is shoreline habitat occurring within the study area counties; shoreline habitats are not included within the study area boundary except for those associated with Nueces and San Patricio counties near Corpus Christi. These shorelines provide essential habitats for federally managed fish species and therefore potentially may be designated as EFH.

The Upper Laguna Madre, including Baffin Bay, covers approximately 101,305 acres of surface area and is separated from the Gulf of Mexico by Padre Island, the longest barrier island in the world. The Lower Laguna Madre, which includes the South Bay and La Bahia Grande complex, has approximately 179,425 acres of surface area. There are approximately 318 miles of bay-estuary-lagoon shoreline and 53 miles of open Gulf shoreline associated with the Upper Laguna Madre and approximately 274 miles of bay-estuary-lagoon shoreline and 71 miles of open Gulf of Mexico shoreline associated with the Lower Laguna Madre. Laguna Madre’s variable depths and salinity supports different types of seagrasses, hyper-saline marshes, algal flats, and lomas; making the habitat important for aquatic breeding grounds and a wintering and stopover area for numerous migratory species (TPWD, 2005c).

Another potential EFH area is the Corpus Christi Bay system covering 106,921 acres of surface area, which includes Redfish, Corpus Christi, Nueces, and Oso Bays. Separated
from the Gulf of Mexico by Mustang Island, the Corpus Christi Bay habitat has approximately 240 miles of bay-estuary-lagoon shoreline and 15 miles of open Gulf of Mexico shoreline.

Some of the species that may be potentially affected by the disturbance of these habitats would include brown shrimp (Penaeus aztecus), white shrimp (Penaeus setiferus), red drum (Sciaenops ocellatus), and Spanish mackerel (Scomberomorus maculates). Further studies would be conducted during the Tier Two environmental processes to determine if any other species may occur. In addition, further analysis of EFH and consultations with state and federal resource agencies, including the GMFMC, would be conducted during Tier Two environmental processes, if necessary.

**Designated Critical Habitat**

Critical habitat for endangered and threatened species can be designated for protection under the ESA. As defined by the ESA, “critical habitat” is:

1. Specific areas within the geographical area occupied by the species, at the time it is federally listed, on which are found those physical or biological features essential to the conservation of the species and which may require special management consideration; and
2. Specific areas outside the geographical area occupied by the species, at the time it is federally listed, upon a determination by the Secretary (of the U.S. Departments of Interior or Commerce) that such areas are essential for the conservation of the species.

Species for which critical habitat has been designated within the study area counties were identified from the USFWS (2003a). Critical habitat is designated by the USFWS for nine federally listed species and comprises approximately 106,062 acres distributed unevenly among Bastrop, Bexar, Burleson, Cameron, Kenedy, Kleberg, Nueces, San Patricio, and Willacy counties. The general locations of critical habitat in the study area counties are identified in Figure 3-44 and brief descriptions for each designation are provided below in Table 3-30.

<table>
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<tr>
<th>Species Critical Habitats</th>
<th>County</th>
<th>Habitat Description</th>
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<td>Seven cave-dwelling invertebrates</td>
<td>Bexar</td>
<td>A total of 1,063 acres in 22 units located north, northwest, and west of the City of San Antonio, is designated as critical habitat for Robber Barron Cave mesh weave, Madla Cave mesh weave, Braken Bat Cave mesh weave, Cokendolpher cave harvestman, Helotes mold beetle, and two unnamed ground beetle species (USFWS, 2003e).</td>
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<tr>
<td>Houston toad</td>
<td>Bastrop, Burleson</td>
<td>Approximately 98,000 acres in east-central Bastrop County and about 2,000 acres in north-central Burleson County are included in this designation (USFWS, 2003g).</td>
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<td>Piping plover</td>
<td>Cameron, Kenedy,</td>
<td>This designation includes approximately 49,997 acres. Most (approximately 93 percent) of this is within Cameron, Kenedy, Kleberg, and Willacy counties.</td>
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Although critical habitat is designated in Bexar County for the seven species of karst-dwelling invertebrates (Robber Baron Cave meshweaver, Madla cave meshweaver, Braken Bat Cave meshweaver, Cokendolpher cave harvestman, two unnamed Rhadine ground beetles, and Helotes mold beetle), this habitat occurs outside of the study area boundary.

3.13 VISUAL AND AESTHETICS

Aesthetics is the science or philosophy concerned with the quality of visual experience. Aesthetic values are determined by the highly variable and often very subjective responses of individuals to physical objects in their surroundings. The development of large public facilities, such as major transportation improvements, would have an impact on the aesthetic quality and identity of the surroundings, and therefore, whether positive or negative, can alter the values that individuals ascribe to specific objects or areas. A project the size of TTC-35 would most likely be perceived by people as having an aesthetic and visual effect.

A study prepared by the USDOT developed a series of objectives to be used for the consideration of user needs in highway development (USDOT-FHWA, 1974). The objectives involve more than just beauty; they consider the motorist’s visual experience during travel and its relationship to the motorist’s performance needs, tasking advantage of the resources available in the surrounding landscape or the facility itself. Aesthetics plays a key role in how land, transportation facility, and visual appeal can be conceived harmoniously. It is the goal of the project sponsors and designers to ensure that all elements of the proposed facility would work together and offer an experience that is visually cohesive and compatible with the area’s natural and man-made scenery.

For the person traveling the highway, the visual experience involves a sequential awareness of individual objects and views in various groupings. The objects and scenes in the visual field stimulate an aesthetic response through color, texture, and shape, and are perceived to various degrees, depending upon their scale-speed relationship. In contrast, the visual experience of individuals in areas adjacent to the transportation facility emanates from a static or fixed position. The view seen by these individuals, which relates more directly to considerations of scale than speed, changes much less dramatically.

The aesthetic value impacts of a proposed project on the environment would depend upon the characteristics of the environment. The most conspicuous natural feature in the study area is the Balcones Escarpment. This geologic fault extends eastward from a point on the Rio Grande near Del Rio, where it is about 1,000 feet high to the northwestern portion of Bexar County. It then turns northeastward and continues through Comal, Hays, and Travis counties. In the San Antonio and Austin areas, the fault is about 300 feet high. It forms the southern edge of the Great Plains, known as the Edwards Plateau. From the coastal plain, the line of southward and eastward facing hills that are the fault line resembles balconies, hence the Spanish name balconies. At the southern edge of the study corridor is the flat Lower Rio Grande Valley, known locally as the Lower Valley. This is the citrus and winter vegetable growing area of Texas. From the valley north to approximately San Antonio is the Rio Grande Plain. This area is relatively flat and partly prairie. Annual
rainfall is generally less than 25 inches. Much of the area is covered by a dense growth of
prickly pear, cactus, mesquite, dwarf oak, catclaw, gualillo, huisache, blackbrush, cenizo,
and other wild shrubs. This area is devoted to the raising of cattle, sheep, and goats.

Moving north, one encounters the Post Oak Belt, an area of diversified farming and
livestock raising. Of note is a small isolated area of loblolly pines in Bastrop State Park in
Bastrop County known as the Lost Pines.

Lying immediately east of the Balcones Escarpment is a triangular area known as the
Blackland Belt. This area of rich soil, ranging in width from 15 miles near its southern end
to 70 miles at its northern edge, extends from the Rio Grande to the Red River. This area
of rolling prairie contains many of the state’s large and medium size cities.

Beyond the natural conditions of the study area that are of visual interest to the traveler is
the string of cities and towns that has formed parallel to the Balcones Escarpment. These
range from the Dallas-Fort Worth metropolitan area at the north to Waco, Temple, Killeen,
Austin, Bryan-College Station, San Antonio, and then down to the border cities of Laredo,
McAllen and Brownsville. Cities represent destinations for the traveler. Cities also serve
as guides to identify where one is located. Locating the transportation facility in a way that
presents the traveler with interesting views of the nearby cities and towns is thus a
desirable goal.

3.14 HAZARDOUS MATERIALS
The Resource Conservation and Recovery Act (RCRA) and the Comprehensive Response,
Compensation, Liability Act (CERCLA) regulates hazardous materials and waste sites.
Hazardous waste is defined by the EPA as any material that has, or, when combined with
other materials, will have a deleterious effect on humans or the natural environment.
Hazardous wastes are characterized as reactive, toxic, infectious, flammable, explosive,
corrosive, or radioactive and may consist of solids, sludges, liquids, or gases. Potential
hazardous waste sites include landfills, dumps, pits, lagoons, salvage yards, and industrial
sites, as well as above and below ground storage tanks.

Impacts to hazardous waste and/or material sites are an important consideration in the
development of any major transportation project. Remediation of such sites can
dramatically increase the overall cost of a project. Therefore, it is important to know early
in the environmental analysis process where potential conflicts with these sites may occur,
so proper planning can be conducted to avoid these locations, where possible.

A hazardous waste site assessment was conducted to identify major sites within the study
area counties. The assessment included a review of the EPA and the TCEQ regulatory
databases to identify major sites within the study area counties that are or potentially
contaminated with hazardous materials or waste. The magnitude of the study area made it
infeasible to conduct a field reconnaissance to identify potential sites not included on the
regulatory database lists. Smaller sites, such as service stations, are one of the most
common generators of potential hazardous materials as older underground storage tanks
may deteriorate and contaminate surrounding soil and groundwater with gasoline and diesel fuel. Since service stations and other smaller sites, such as petroleum storage tanks (PSTs) are ubiquitous throughout the study area counties and many have been determined to be leaking underground storage tanks, no attempt was made to identify all locations of these facilities or other regulated underground storage tanks at the Tier One level. These facilities would be further studied during the Tier Two environmental processes.

The EPA and TCEQ regulatory databases searched included:

- National Priorities List (NPL): This is a subset of Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) and identifies over 1,200 sites for priority cleanup under the Superfund Program.
- State Priorities List (SPL): State Superfund registry identifying those facilities that are listed and have been determined to pose, or may pose, an imminent and substantial endangerment. Sites deleted from this list have also been included.
- Volunteer Clean-up Program (VCP): Established to provide administrative, technical, and legal incentives to encourage the cleanup of contaminated sites in Texas.
- CERCLIS: Contains sites, which are either proposed to or on the NPL, and sites, which are in the screening and assessment phase for possible inclusion on the NPL. Also included in this are CERCLIS sites designated “No Further Remedial Action Planned” and have been removed from CERCLIS.
- Resource Conservation and Recovery Act – Treatment, Storage, and Disposal (RCRA-TSD): Site where a hazardous substance is treated, stored, or disposed.
- Permitted and Industrial Hazardous Waste Sites (PIHW): TCEQ Permitted and Industrial Hazardous Waste Sites. Hazardous waste is defined as any solid waste listed as hazardous or possesses one or more hazardous characteristics as defined in Federal waste regulations. Industrial waste is waste that results from or is incidental to operations of industry, manufacturing, mining, or agriculture.
- Radioactive Waste Sites: Sites in the State of Texas that have been designated as waste sites for radioactive material.

Mapping information for Superfund sites, radioactive waste sites, PIHW sites, and landfills were obtained directly from the TCEQ. The remaining sites were mapped using coordinates provided in the facility reports. Not every site identified in the database search is mapped as some of the sites did not contain any mapping information. Not all of the mapped landfills are considered hazardous, since some landfills listed are sanitary landfills that do not accept hazardous waste.

The database search identified six NPL sites, 30 SPL sites, 781 VCP sites, 711 SWLF sites, 124 CERCLIS sites, 93 RCRA-TSD sites, 926 RCRA-CORRACTS sites, 57 PIHW,
and five radioactive waste sites in the study area counties. A total of 2,692 sites were identified in the study area counties within the search parameters set for this assessment. **Figure 3-45** depicts the locations of hazardous waste sites in the study area. The detailed database search results are contained in **Appendices C-27 through C-34**. The information from the database search is summarized for each county in the study area in **Table 3-31**.

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Table 3-31: Hazardous Waste Sites Occurring Within the Study Area Counties

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<td>0</td>
</tr>
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<td>Nueces</td>
<td>11</td>
<td>6</td>
<td>54</td>
<td>19</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Palo Pinto</td>
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<td>0</td>
<td>5</td>
<td>0</td>
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</tr>
<tr>
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</tr>
<tr>
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</tr>
<tr>
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</tr>
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<td>2</td>
</tr>
<tr>
<td>Smith</td>
<td>6</td>
<td>1</td>
<td>15</td>
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<td>12</td>
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<tr>
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<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
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<td>12</td>
<td>105</td>
<td>13</td>
<td>7</td>
<td>141</td>
</tr>
<tr>
<td>Travis</td>
<td>23</td>
<td>1</td>
<td>56</td>
<td>0</td>
<td>2</td>
<td>44</td>
</tr>
<tr>
<td>Van Zandt</td>
<td>8</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
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<td>Webb</td>
<td>6</td>
<td>1</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Willacy</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Williamson</td>
<td>11</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Wilson</td>
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<td>0</td>
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<td>0</td>
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<tr>
<td>Wood</td>
<td>21</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Zapata</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Totals</td>
<td>711</td>
<td>124</td>
<td>926</td>
<td>93</td>
<td>57</td>
<td>781</td>
</tr>
</tbody>
</table>

4.0 ENVIRONMENTAL CONSEQUENCES

This Chapter discusses the potential direct effects associated with the No Action and the 12 RCAs.

This Chapter answers several questions, including:

- How does CEQ define direct, indirect, and cumulative effects?
- What avoidance measures were used during the development of RCAs?
- How are the potential direct effects of each alternative?
- How would potential direct effects of a TTC-35 facility(ies) be analyzed for each resource category during Tier Two NEPA documents?
- What potential mitigation options are available for Tier Two?

4.1 INTRODUCTION

The NEPA process and CEQ’s regulations, implementing the procedural provisions of NEPA, are designed so as to ensure that all direct, indirect and cumulative effects of a proposed action or project that could significantly affect the quality of the environment are discussed and considered in the environmental documents. The CEQ regulations require that the proposed TTC-35 project, be evaluated with regard direct effects. The CEQ regulations define direct, indirect and cumulative effects as follows:49

Direct effects are defined by the CEQ Regulations as “effects which are caused by the action and occur at the same time and place (40 CFR Section 1508.8).”

Indirect effects are those “which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 CFR Section 1508.8).” Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects to air and water and other natural systems, including ecosystems

Cumulative effects are defined as “the impact on the environment that results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR Section 1508.7).” Cumulative impacts include the direct and indirect impacts of a project together with the reasonably foreseeable future actions of others.

49 The terms “effect” and “impact” are used synonymously in the CEQ regulations (40 CFR Section 1508.8).
The indirect and cumulative effects assessment at the Tier One level of analysis is discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Table 4-1 provides a summary of direct, indirect, and cumulative effects as defined within the context of this Tier One DEIS.

<table>
<thead>
<tr>
<th>Description of actions</th>
<th>General descriptions of actions and direct, indirect, and cumulative effects</th>
<th>No Action Alternative</th>
<th>RCAs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Effects</td>
<td>Completion of all transportation projects currently planned and programmed for the TTC-35 study area.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Selection of a TTC-35 corridor.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>*Assumption that a TTC-35 facility is constructed and operated.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Indirect effects</td>
<td>Direct effects of all projects currently planned and programmed for the Study Area.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Direct effects associated with the selection of a TTC-35 corridor.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Cumulative effects</td>
<td>Indirect effects of all projects currently planned and programmed for the Study Area.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Direct and indirect effects of the construction of TTC-35.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Completion of all transportation projects currently planned and programmed for the TTC-35 study area, and all past, present, and reasonably foreseeable future projects within the study area.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Effects associated with the selection of a TTC-35 corridor and the construction and operation of a TTC-35 facility.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

* This assumption is made strictly for the sake of providing a basis for comparing potential effects of the No Action Alternative to those of the RCAs. Approval of a corridor alternative as the Preferred Alternative, if that happens, will not authorize nor initiate the construction of a TTC-35 facility.
General Description of the Alternatives for Detailed Study
Under the No Action Alternative, a TTC-35 corridor would not be selected.

As described in Chapter 2, Section 2.2 – Alternatives Considered for Further Study, 12 RCAs were identified. These RCAs range in size from a minimum width of 4 or 10 miles, a maximum width of 18 miles, and a total length between 486 and 521 miles. General dimensions for each corridor are listed in Table 4-2. The selection of any RCA as the Preferred Alternative in the Tier One decision will not authorize construction of any TTC-35 facility(ies). The No Action Alternative and each RCA include the assumption that all transportation projects currently planned and programmed for the study area would be completed.

<table>
<thead>
<tr>
<th>RCA</th>
<th>Minimum width (miles)</th>
<th>Maximum width (miles)</th>
<th>Centerline length (miles)</th>
<th>Area (square miles)</th>
<th>Area (acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>18</td>
<td>506</td>
<td>4,983</td>
<td>3,189,120</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>18</td>
<td>506</td>
<td>5,009</td>
<td>3,205,760</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>18</td>
<td>486</td>
<td>5,571</td>
<td>3,565,440</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>18</td>
<td>486</td>
<td>5,597</td>
<td>3,582,080</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>18</td>
<td>521</td>
<td>5,307</td>
<td>3,396,480</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>18</td>
<td>521</td>
<td>5,333</td>
<td>3,413,120</td>
</tr>
<tr>
<td>7</td>
<td>10</td>
<td>18</td>
<td>502</td>
<td>5,895</td>
<td>3,772,800</td>
</tr>
<tr>
<td>8</td>
<td>10</td>
<td>18</td>
<td>501</td>
<td>5,921</td>
<td>3,789,440</td>
</tr>
<tr>
<td>9</td>
<td>4</td>
<td>18</td>
<td>508</td>
<td>5,141</td>
<td>3,290,240</td>
</tr>
<tr>
<td>10</td>
<td>4</td>
<td>18</td>
<td>507</td>
<td>5,167</td>
<td>3,306,880</td>
</tr>
<tr>
<td>11</td>
<td>10</td>
<td>18</td>
<td>488</td>
<td>5,730</td>
<td>3,667,200</td>
</tr>
<tr>
<td>12</td>
<td>10</td>
<td>18</td>
<td>488</td>
<td>5,756</td>
<td>3,683,840</td>
</tr>
</tbody>
</table>

Method for Assessing Direct Effects of Each RCA
The method for addressing the potential direct effects of the selection of a corridor is different in this Tier One DEIS than in traditional NEPA documents (EIS, EA, and CE) that address the effects of an alignment. A corridor and an alignment are defined as:

- **Corridor**: a broad geographical band that follows a general directional flow, which would serve as the initial study area in which future TTC-35 facility(ies) alignments would be evaluated to determine a potential TTC-35 facility location.
- **Alignment**: an actual proposed location for the construction of a TTC-35 facility(ies).
Important issues to keep in mind when considering potential direct, effects associated with the alternatives discussed in this Tier One DEIS:

- a TTC-35 facility(ies) would occupy only a fraction of the total area of a RCA (approximately 2.0 to 2.5 percent if a fully built-out TTC-35 facility was constructed within any RCA);
- it cannot be predicted based on current information where TTC-35 facility(ies) alignments might occur in each RCA;
- much of the “corridor-level” data collected for this Tier One DEIS would not provide useful information for assessing “alignment-level” effects, as they are broad in nature and not as detailed as the data collected for alignment decisions; and
- the selection of a corridor alternative as the Preferred Alternative in the Tier One decision would identify a corridor that would serve as the study area in which much more detailed alignment level investigations would be conducted during Tier Two environmental processes.

Environmental resources are quantified this Chapter in order to disclose the amount of each resource within each RCA based on the best available data. The environmental resource data presented were not used as surrogates for estimating potential effects that may occur should a TTC-35 facility(ies) be constructed within each RCA. Use of these data to estimate potential effects would be highly speculative in the absence of any TTC-35 facility(ies) alignments. In addition, a resource or combination of resources could possibly preclude the identification of an RCA as the Preferred Alternative because, individually or collectively, they completely block the width of an RCA. As part of the process to determine whether a single resource or combination of resources completely blocked the width of an RCA a GIS spatial analysis was conducted. No blocked areas were found within any of the RCAs. Thus, it appears there would be adequate room within each RCA to develop a TTC-35 facility(ies) alignment during Tier Two environmental processes which would avoid and/or minimize effects to environmental resources.

If a corridor is selected as the Preferred Alternative in the Tier One decision, the potential for effects would be thoroughly assessed during Tier Two environmental processes for any proposed TTC-35 facility(ies).

4.2 LAND USE

The NLCD Classification System was used to characterize land use in the study area in Chapter 3, Section 3.1 – Land Use.

Tier One Avoidance Measures

During the delineation of the study area and development of alternatives urbanized areas, military bases, and existing and planned reservoirs were avoided to the extent practicable.
No Action Alternative
The No Action Alternative is not anticipated to have additional direct effects to land use beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives
Land use data based on the best available data from the NLCD is provided in Table 4-3 to disclose the amount of each land use classification within each RCA.
<table>
<thead>
<tr>
<th>RCA</th>
<th>Water</th>
<th>Developed</th>
<th>Barren</th>
<th>Forested Upland</th>
<th>Shrubland</th>
<th>Non-Natural Woody</th>
<th>Herbaceous Upland</th>
<th>Herbaceous Planted/Cultivated</th>
<th>Wetlands</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>12</td>
<td>25</td>
<td>&lt;1</td>
<td>24</td>
<td>35</td>
<td>&lt;1</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>13</td>
<td>25</td>
<td>&lt;1</td>
<td>23</td>
<td>35</td>
<td>&lt;1</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>13</td>
<td>32</td>
<td>&lt;1</td>
<td>22</td>
<td>31</td>
<td>&lt;1</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>13</td>
<td>32</td>
<td>&lt;1</td>
<td>21</td>
<td>31</td>
<td>&lt;1</td>
</tr>
<tr>
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<td>12</td>
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<td>6</td>
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<td>48</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>13</td>
<td>28</td>
<td>&lt;1</td>
<td>13</td>
<td>42</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>13</td>
<td>28</td>
<td>&lt;1</td>
<td>12</td>
<td>42</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>12</td>
<td>22</td>
<td>&lt;1</td>
<td>13</td>
<td>47</td>
<td>1</td>
</tr>
<tr>
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<td>12</td>
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<td>13</td>
<td>29</td>
<td>&lt;1</td>
<td>12</td>
<td>42</td>
<td>1</td>
</tr>
</tbody>
</table>

*Data in this table may add up to more than 100% as a result of rounding. Appendix C-2 contains detailed information regarding the NLCD categories.
Chapter 4
Environmental Consequences
TTC-35 Tier One Draft EIS

RCAs 1 through 4 contain similar percentages of land classified as water (1 percent) and wetlands (less than 1 percent) and RCAs 5 through 12 contain similar percentages of land classified as water (2 percent) and wetlands (1 percent). All RCAs contain similar percentages of land classified as forested upland (approximately 12 to 13 percent), and RCAs 1 through 4 contain the least percentage of land classified as herbaceous planted/cultivated, and the most classified as herbaceous upland. RCAs 5, 6, 9, and 10 contain the greatest percentage of land classified as herbaceous planted/cultivated, and the least percentage of shrubland.

Land use was not used to identify a preferred alternative among the RCAs because all land use categories reviewed for this analysis occur within each RCA. In the absence of a TTC-35 facility(ies) alignment, it is not possible to predict how much of each land use category would be affected by a future TTC-35 facility(ies) alignment.

Actual land that would be acquired for the construction of a TTC-35 facility(ies) would only be a fraction (between 2 and 2.5 percent) of the entire area within a RCA. RCAs that include existing I-35 W, west of the DFW metropolitan area (RCAs 1 through 4), I-35 from San Antonio to Laredo (RCAs 1, 2, 5, 6, 9, and 10), and the planned SH 130 (RCAs 1 through 12), offer opportunities to utilize existing highway infrastructure, which would reduce the total footprint of a TTC-35 facility(ies) and the amount of ROW required. Existing railroads also offer the potential for a reduction in land required for a TTC-35 facility(ies). Existing railroads run parallel for partial lengths of several RCAs, with the longest facility paralleling I-35 from San Antonio to Laredo. In summary, the ability to utilize existing infrastructure would potentially minimize effects to existing land use and the amount of ROW required for a TTC-35 facility(ies).

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, land use would not be directly affected because no immediate changes in land use would occur as a result of the selection of a corridor as the Preferred Alternative. Furthermore, no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on land use that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Tier Two Assessment Method and Potential Mitigation
During Tier Two environmental processes, TxDOT and FHWA would continue to seek input from resource and regulatory agencies, local governments, the general public, and other stakeholders in the development of TTC-35 facility(ies) alignments. Using a systematic, interdisciplinary approach in project development, TxDOT and FHWA could institute design measures that would positively influence land use. For example, context sensitive design (CSD) is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic, and environmental resources, while maintaining safety and
mobility. According to the *Handbook on Integrating Land Use Considerations into Transportation Projects to Address Induced Growth* (NCHRP, 2005), CSD can influence land use by engaging a broader spectrum of professionals in the roadway design process.

Consistent with the tenets of CSD, stakeholder input would be incorporated into TTC-35 facility(ies) alignment selection and facility design as practicable in order to avoid, minimize, and mitigate adverse effects associated with changes to land use.

Tier Two environmental processes would also build upon Tier One efforts that have been initiated to identify changes in land use within the study area. The *Trans-Texas Corridor-35 (TTC-35) Changes in Land Use within the TTC-35 Study Area* report that is included in Appendix D-1 discusses land use changes that have occurred in the TTC-35 study area from 1972 to 2002. These on-going studies include an assessment of land use for the years 1972, 1992, and 2002. Additional datasets would be incorporated into the analyses and past and present land use trends would be identified. These analyses would be used along with information received from scoping efforts to develop estimated future trends in land use.

### 4.3 DEMOGRAPHIC AND SOCIAL EFFECTS

The *Federal-Aid Highway Act of 1970* (23 USC 109(h)) requires that the effects of federal-aid transportation projects upon residences, businesses, and other community resources be considered during transportation decision-making. The social effects evaluated include effects to neighborhood and community cohesion, low-income and minority populations, residential and business relocations, and the economy.

#### Neighborhood and Community Cohesion

Community cohesion is the degree to which residents have a “sense of belonging” to their neighborhood. The boundaries of communities or neighborhoods can often be delineated by physical barriers such as a transportation facility since it may obstruct and/or divide communities.

#### Tier One Avoidance Measures

Efforts were made during the delineation of the study area and the development of alternatives to avoid urban areas because they have high population concentrations.

#### No Action Alternative

The No Action Alternative would have no additional direct effects to neighborhood and community cohesion beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.
Reasonable Corridor Alternatives

Neighborhood and community cohesion was not used to identify a preferred alternative among the RCAs because in the absence of a TTC-35 facility (ies) alignment, it would not be possible to determine how and which neighborhoods and communities would be affected by a TTC-35 facility(ies) alignment.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, neighborhood and community cohesion would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision. However, Tier Two environmental processes could identify potential TTC-35 facility(ies) alignments that may affect neighborhood and community cohesion.

Any indirect and cumulative effects to neighborhoods and communities that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Tier Two Assessment Method and Potential Mitigation

During Tier Two environmental processes, the effects of a proposed TTC-35 facility(ies) on neighborhoods and community cohesion would be determined based on the best available data. Efforts would be made to avoid and/or minimize the effects of a future TTC-35 facility(ies) on communities. People in any affected communities and/or neighborhoods would be engaged through the public involvement process. If effects cannot be avoided, potential mitigation strategies would be identified in accordance with applicable laws and regulations in effect at the time Tier Two environmental processes occur. Examples of project specific mitigation could include:

- the construction of pedestrian overpasses;
- maintaining local travel patterns and community access;
- funding for new community resources;
- the addition of artwork or a facade to a transportation facility to match the aesthetic design goals of a community; and
- providing signage that recognizes specific cultural or historic resources.

Population

Detailed population data within the study area from the Census 2000 are presented in Chapter 3, Section 3.2 – Demographic, Social, and Environmental Characteristics.

Tier One Avoidance Measures

Efforts were made during the delineation of the study area and the development of alternatives to avoid urban areas because they have high population concentrations.

No Action Alternative

The No Action Alternative would have no additional direct effects to population growth and dispersal patterns beyond those that may result from projects already planned and
programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives
Population data based on the best available data at the census tract level from the 
Census 2000 is provided in Table 4-4 to disclose the total population and population density within each RCA.

<table>
<thead>
<tr>
<th>RCA</th>
<th>Total Population</th>
<th>Population Density (people per square-mile)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>945,446</td>
<td>190</td>
</tr>
<tr>
<td>2</td>
<td>876,041</td>
<td>175</td>
</tr>
<tr>
<td>3</td>
<td>886,146</td>
<td>159</td>
</tr>
<tr>
<td>4</td>
<td>816,741</td>
<td>146</td>
</tr>
<tr>
<td>5</td>
<td>980,667</td>
<td>185</td>
</tr>
<tr>
<td>6</td>
<td>911,262</td>
<td>171</td>
</tr>
<tr>
<td>7</td>
<td>921,367</td>
<td>156</td>
</tr>
<tr>
<td>8</td>
<td>851,962</td>
<td>144</td>
</tr>
<tr>
<td>9</td>
<td>970,998</td>
<td>189</td>
</tr>
<tr>
<td>10</td>
<td>901,593</td>
<td>174</td>
</tr>
<tr>
<td>11</td>
<td>911,698</td>
<td>159</td>
</tr>
<tr>
<td>12</td>
<td>842,293</td>
<td>146</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 1999a. (Census 2000).

In general, the most populated RCAs are closest to urban areas. The RCAs with the highest population are RCAs 1, 5, and 9, all of which include the most existing highway infrastructure and, therefore, are closest to the more developed areas. The RCAs with the least population are RCAs 4, 8, and 12, which contain the least amount of existing highway infrastructure. RCA 1 has the highest population density at 190 people per square mile, while RCA 8 has the lowest at 144 people per square mile.

Population data were not used to identify a preferred alternative among the RCAs because in the absence of a TTC-35 facility(ies) alignment it is not possible to predict how much population within each RCA would be affected by a future TTC-35 facility(ies) alignment.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, population would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

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50 Demographic information was calculated using all census tracts within or partially within an RCA.
Any indirect and cumulative effects on population that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Tier Two Assessment Method and Potential Mitigation
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, effects to population growth and dispersal patterns would be evaluated during Tier Two environmental processes using the best available data. Efforts would be made during Tier Two environmental processes to avoid and/or minimize effects of a TTC-35 facility(ies) on population and growth patterns.

Environmental Justice
The definitions used to identify environmental justice populations were in accordance with EO 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994) (U.S. Executive Office of the President, 1994).

No Action Alternative
The No Action Alternative would have no additional direct effects to environmental justice populations in the study area beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives
Minority population and households below poverty level were used as indicators of environmental justice populations within each RCA. Racial demographics based on the best available data at the census tract level\(^{51}\) from the Census 2000 is provided in Table 4-5 to disclose the racial demographics and percent minority population of each RCA.

\(^{51}\) Demographic information was calculated using all census tracts within or partially within an RCA.
Table 4-5: Percent Racial Demographics by RCA

<table>
<thead>
<tr>
<th>One Race</th>
<th>White</th>
<th>Black or African American</th>
<th>American Indian or Alaskan Nat.</th>
<th>Asian</th>
<th>Native Hawaiian &amp; Other Pacific Islander</th>
<th>Some other Race</th>
<th>2 or more Races</th>
<th>Hispanic or Latino (of any race)</th>
<th>Minority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texas</td>
<td>52</td>
<td>11</td>
<td>1</td>
<td>3</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>1</td>
<td>32</td>
<td>48</td>
</tr>
<tr>
<td>RCA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>54</td>
<td>4</td>
<td>&lt;1</td>
<td>1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>1</td>
<td>39</td>
<td>46</td>
</tr>
<tr>
<td>2</td>
<td>54</td>
<td>3</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>1</td>
<td>41</td>
<td>46</td>
</tr>
<tr>
<td>3</td>
<td>56</td>
<td>4</td>
<td>&lt;1</td>
<td>1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>1</td>
<td>37</td>
<td>44</td>
</tr>
<tr>
<td>4</td>
<td>57</td>
<td>3</td>
<td>&lt;1</td>
<td>1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>1</td>
<td>38</td>
<td>43</td>
</tr>
<tr>
<td>5</td>
<td>52</td>
<td>7</td>
<td>&lt;1</td>
<td>1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>1</td>
<td>40</td>
<td>48</td>
</tr>
<tr>
<td>6</td>
<td>52</td>
<td>6</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>1</td>
<td>41</td>
<td>48</td>
</tr>
<tr>
<td>7</td>
<td>53</td>
<td>7</td>
<td>&lt;1</td>
<td>1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>1</td>
<td>38</td>
<td>47</td>
</tr>
<tr>
<td>8</td>
<td>53</td>
<td>6</td>
<td>&lt;1</td>
<td>1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>1</td>
<td>39</td>
<td>47</td>
</tr>
<tr>
<td>9</td>
<td>51</td>
<td>7</td>
<td>&lt;1</td>
<td>1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>1</td>
<td>40</td>
<td>49</td>
</tr>
<tr>
<td>10</td>
<td>51</td>
<td>6</td>
<td>&lt;1</td>
<td>1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>1</td>
<td>41</td>
<td>49</td>
</tr>
<tr>
<td>11</td>
<td>53</td>
<td>7</td>
<td>&lt;1</td>
<td>1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>1</td>
<td>38</td>
<td>47</td>
</tr>
<tr>
<td>12</td>
<td>53</td>
<td>6</td>
<td>&lt;1</td>
<td>1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>1</td>
<td>39</td>
<td>47</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 1999b. (Census 2000).

The minority population in the State of Texas is 48 percent. The RCAs located to the west of the DFW metropolitan area include lower percentages of minority populations than the other RCAs (43 to 46 percent), and lower than the percentage for the State. This is most likely a result of Tarrant County having a much lower percentage of minority population than Dallas County. RCAs 9 and 10 include the highest percentage of minorities, but are only slightly higher than the other RCAs and only one percent higher than the State average. No single RCA substantially differs from the others at the Tier One level of analysis, as the percentage of minorities in each RCA ranges from 43 to 49 percent.

The number and percent of households below the poverty-level based on the best available data at the Census 2000 tract-level data is presented in Table 4-6 to disclose the population at or below the poverty level within each RCA.
Table 4-6: Poverty Data by RCA

<table>
<thead>
<tr>
<th></th>
<th>Total Number of Households</th>
<th>Number of Households below Poverty Level</th>
<th>Percent Households below Poverty Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texas</td>
<td>20,287,300</td>
<td>3,117,609</td>
<td>15</td>
</tr>
<tr>
<td>1</td>
<td>367,375</td>
<td>82,336</td>
<td>22</td>
</tr>
<tr>
<td>2</td>
<td>342,324</td>
<td>76,607</td>
<td>22</td>
</tr>
<tr>
<td>3</td>
<td>355,857</td>
<td>79,562</td>
<td>22</td>
</tr>
<tr>
<td>4</td>
<td>330,806</td>
<td>73,833</td>
<td>22</td>
</tr>
<tr>
<td>5</td>
<td>379,447</td>
<td>90,401</td>
<td>24</td>
</tr>
<tr>
<td>6</td>
<td>354,396</td>
<td>84,672</td>
<td>24</td>
</tr>
<tr>
<td>7</td>
<td>367,929</td>
<td>87,627</td>
<td>24</td>
</tr>
<tr>
<td>8</td>
<td>342,878</td>
<td>81,898</td>
<td>24</td>
</tr>
<tr>
<td>9</td>
<td>395,869</td>
<td>92,547</td>
<td>26</td>
</tr>
<tr>
<td>10</td>
<td>370,818</td>
<td>86,818</td>
<td>23</td>
</tr>
<tr>
<td>11</td>
<td>384,351</td>
<td>89,773</td>
<td>23</td>
</tr>
<tr>
<td>12</td>
<td>359,300</td>
<td>84,044</td>
<td>27</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 1999c. (Census 2000).

As shown in Table 4-6, 15 percent of households in the State of Texas lived below the poverty level in 1999, the year the census data were collected. All RCAs have higher poverty rates than the State average, and this can be related to the primarily rural location of the study area. The percentage of households below the poverty level in the RCAs ranged from 22 to 27 percent. RCAs located to the west of the DFW metropolitan area (RCA 1 through 4) contain slightly fewer low-income households than the remaining RCAs (RCA 5 through 12), which can be attributed to the lower percentage of low-income households in Tarrant County as compared to Dallas County.

Data pertaining to environmental justice populations were not used to identify a preferred alternative among the RCAs because in the absence of a TTC-35 facility(ies) alignment it is not possible to predict, which, if any, environmental justice populations within each RCA would be affected by a future TTC-35 facility(ies) alignment. Furthermore, if a future TTC-35 facility(ies) alignment had potential effects to environmental justice populations, a tailored public involvement process with the potentially affected populations would be necessary to determine how any environmental justice population would be affected by a TTC-35 facility(ies) alignment.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, environmental justice populations would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on environmental justice populations that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.
Tier Two Assessment Method and Potential Mitigation

If this Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, consideration of the effects of a TTC-35 facility(ies) on minority and low-income populations would be addressed during Tier Two environmental processes using the best available data and in accordance with applicable laws and regulations at the time those studies are conducted. Any adversely affected environmental justice populations would be engaged through the Tier Two public involvement process. This would ensure that the concerns and needs of any affected environmental justice populations were considered in future project development decisions and ultimately the design of any new TTC-35 facility(ies). In addition, the effects of tolling on minority and low-income populations would be evaluated during Tier Two environmental processes for any TTC-35 facility(ies) proposed to be tolled. In accordance with EO 12898, efforts would be made to avoid and/or minimize disproportionate or adverse effects of a TTC-35 facility(ies) on minority and low-income populations (U.S. Executive Office of the President, 1994). However, if effects could not be avoided, efforts to identify potential mitigation would be conducted during Tier Two environmental processes.

Relocation

Tier One Avoidance Measures
The avoidance of urban areas because they have high population concentrations and more densely developed areas during the development of alternatives minimized the potential relocation effects associated with a future TTC-35 facility(ies).

No Action Alternative
The No Action Alternative would not result in any additional displacements of residences or businesses beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives
Relocations were not used to identify a preferred alternative among the RCAs because no relocations would occur as a result of the Tier One decision.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative no construction-related activities will be authorized; however, corridor preservation within a corridor selected in the Tier One decision may have limited potential for Tier One direct effects in the locations where corridor preservation occurs. The mechanism by which a corridor may be preserved has yet to be determined. However, such preservation activities require a willing participant and cannot use eminent domain as a mechanism for acquisition.
Tier Two Assessment Method and Potential Mitigation

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, appropriate field investigations and environmental studies would be required, as necessary, prior to any property being acquired for corridor preservation. Furthermore, should corridor preservation occur, or should Tier Two environmental processes result in the identification of a TTC-35 facility(ies) alignment requiring relocations of residences or businesses, relocation benefits and assistance would be made available. In accordance with TxDOT policy, no person would be displaced by the proposed project until adequate decent, safe, and sanitary housing was made available as described in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Relocation benefits and assistance would be made available without regard to race, color, religion, national origin, sex, age, or handicap in accordance with Title VI of the Civil Rights Act of 1964 and Title VIII of the Civil Rights Act of 1968, or based on standards and applicable laws and regulations at the time the Tier Two environmental processes occur.

Economic Characteristics

No Action Alternative

The No Action Alternative would not have any additional direct effects to the Texas economy beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives

Economic characteristics were not used to identify a preferred alternative among the RCAs because data to quantify the potential economic effects are not available at this time.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, direct effects to the Texas economy would be limited to land value changes, which could occur within and near the Preferred Alternative, based on speculation of future placement of an actual TTC-35 facility(ies). Land value changes are difficult to predict, as many variables such as local zoning, local development patterns, and topography can influence the value of land in a particular region. If a corridor alternative is selected as the Preferred Alternative in the Tier One decision, direct effects could be limited to localized increases or decreases in land values. In order to evaluate the potential effect of speculation on land values within a corridor alternative, a review was conducted of studies on land value changes that have occurred following the development of other transportation projects. The report, titled Corridor and Alignment Selection Effects on Property Values (August, 2005), is included in Appendix D-2.

Any indirect and cumulative effects on the economy that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.
Tier Two Assessment Method
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, consideration of the effects of a TTC-35 facility(ies) on the economy would be addressed during Tier Two environmental processes using the best available data standards and applicable laws and regulations at the time the Tier Two environmental processes occur.

4.4 UTILITIES
Linear and power-generating utilities (such as power generating stations, nuclear power plants, electrical power transmission lines, water storage and transmission pipelines, and petroleum and natural gas storage and transmission pipelines) within the study area are discussed in Chapter 3, Section 3.3 - Utilities.

No Action Alternative
The No Action Alternative would have no additional direct effects to utility infrastructure beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives
In the absence of a TTC-35 facility(ies) alignment, the number and location of linear and power-generating utilities within a corridor would not preclude the consideration of any RCA as the preferred alternative.

The number of oil and natural gas wells is provided in Table 4-7 to disclose the total number within each RCA based on the best available data from the RRC.

<table>
<thead>
<tr>
<th>RCA</th>
<th>Oil Well</th>
<th>Oil Well Plugged</th>
<th>Natural Gas Wells</th>
<th>Natural Gas Wells Plugged</th>
<th>Oil/Gas Wells</th>
<th>Oil/Gas Wells Plugged</th>
<th>Total Oil and Natural Gas Wells</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4,242</td>
<td>2,368</td>
<td>3,273</td>
<td>636</td>
<td>20</td>
<td>17</td>
<td>10,556</td>
</tr>
<tr>
<td>2</td>
<td>4,364</td>
<td>2,575</td>
<td>3,274</td>
<td>636</td>
<td>20</td>
<td>17</td>
<td>10,886</td>
</tr>
<tr>
<td>3</td>
<td>2,314</td>
<td>1,486</td>
<td>3,307</td>
<td>678</td>
<td>29</td>
<td>47</td>
<td>7,861</td>
</tr>
<tr>
<td>4</td>
<td>2,436</td>
<td>1,693</td>
<td>3,308</td>
<td>678</td>
<td>29</td>
<td>47</td>
<td>8,191</td>
</tr>
<tr>
<td>5</td>
<td>4,920</td>
<td>2,935</td>
<td>944</td>
<td>291</td>
<td>7</td>
<td>5</td>
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<td>6</td>
<td>5,042</td>
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<td>7</td>
<td>2,992</td>
<td>2,053</td>
<td>978</td>
<td>333</td>
<td>16</td>
<td>35</td>
<td>6,407</td>
</tr>
<tr>
<td>8</td>
<td>3,114</td>
<td>2,260</td>
<td>979</td>
<td>333</td>
<td>16</td>
<td>35</td>
<td>6,737</td>
</tr>
<tr>
<td>9</td>
<td>4,109</td>
<td>2,254</td>
<td>943</td>
<td>291</td>
<td>7</td>
<td>4</td>
<td>7,608</td>
</tr>
<tr>
<td>10</td>
<td>4,231</td>
<td>2,461</td>
<td>944</td>
<td>291</td>
<td>7</td>
<td>4</td>
<td>7,938</td>
</tr>
<tr>
<td>11</td>
<td>2,181</td>
<td>1,372</td>
<td>977</td>
<td>333</td>
<td>16</td>
<td>34</td>
<td>4,913</td>
</tr>
<tr>
<td>12</td>
<td>2,303</td>
<td>1,579</td>
<td>978</td>
<td>333</td>
<td>16</td>
<td>34</td>
<td>5,243</td>
</tr>
</tbody>
</table>

In general, the number of natural gas wells is higher in the RCAs to the west of the DFW metropolitan area (RCAs 1 through 4) than those RCAs to the east (RCAs 5 through 12). In part, this could be a reflection of the natural gas deposits associated with the Barnett-Shale, which has seen activity by several oil and gas companies. RCAs located to the west in south Texas (RCAs 1, 2, 5, 6, 9, and 10) contain substantially more oil wells than those to the east (RCAs 3, 4, 7, 8, 11, and 12). This is likely influenced by the amount of pipeline infrastructure to the west and the additional facilities associated with existing I-35. RCAs 1, 2, 5, and 6 contain the highest number of wells. RCAs 11 and 12 contain the fewest total wells. Oil and gas wells are abundant in all RCAs.

Oil and natural gas wells were not used to identify a preferred alternative because they are not a regulated resource and many oil and natural gas wells could likely be avoided at a Tier Two level of analysis.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, utility infrastructure would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on utility infrastructure that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Tier Two Method and Potential Mitigation.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, consideration of the potential effects of a TTC-35 facility(ies) on utility infrastructure would be addressed during Tier Two environmental processes. Efforts would be made to avoid and/or minimize effects to utility infrastructure in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur. A TTC-35 facility(ies) may require adjustments to utilities such as water lines, sewer lines, gas lines, telephone cables, electrical lines, and other subterranean and aerial utilities within the proposed TTC-35 facility(ies) ROW. If effects could not be avoided in accordance with Section 4, Utility Adjustments, of the TxDOT Project Development Process Manual (August, 2003), TxDOT’s policy is to provide early notification to utility owners as a project moves from the conceptual stage into design (TxDOT, 2003). Detailed design would occur only after the completion of Tier Two environmental processes. TxDOT would consult with the PUCT and the utility owner to minimize effects to these properties in order to reach a definitive agreement concerning potential mitigation measures.

Utility owners are typically responsible for utility relocation and adjustment costs. If a utility owner is unable to cover these costs, they may use the State Infrastructure Bank (SIB) that operates as a revolving loan fund but also provides a wide range of financial assistance in addition to loans. TxDOT has designed the SIB to enable qualified borrowers to access funds at negotiated interest rates and terms. Applications are
submitted to the local TxDOT District or to the TxDOT Finance Division. Approval for financial assistance to a private entity is limited to an eligible project that:

- provides transportation services or facilities that demonstrate public benefit; or
- is constructed or operated in cooperation with a state agency or political subdivision in accordance with an agreement between that state agency or political subdivision and the private entity.

The State's Hardship Financing for Utility Adjustment fund enables TxDOT to finance a utility adjustment when a short-term financial condition exists that prevents the utility from being able to fund the adjustment.

### 4.5 AIR QUALITY

Data regarding air quality were obtained for the study area from the EPA and the TCEQ and are discussed in Chapter 3, Section 3.5 – Air Quality.

**No Action Alternative**

The No Action Alternative would have no additional direct effects to air quality beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

**Reasonable Corridor Alternatives**

The designated non-attainment counties and near non-attainment counties for the eight-hour ozone standard are listed in Table 4-8 to disclose the designated counties within each RCA based on the best available data from the EPA and TCEQ.

<table>
<thead>
<tr>
<th>RCA</th>
<th>Non-attainment Counties</th>
<th>Non-attainment Deferred Counties</th>
<th>Near Non-attainment Counties</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Denton, Johnson, Parker, Tarrant</td>
<td>Bexar, Guadalupe</td>
<td>Bastrop, Caldwell, Hood, Travis, Williamson, Wilson</td>
</tr>
<tr>
<td>2</td>
<td>Denton, Johnson, Parker, Tarrant</td>
<td>Bexar, Guadalupe</td>
<td>Bastrop, Caldwell, Hood, Travis, Williamson, Wilson</td>
</tr>
<tr>
<td>3</td>
<td>Denton, Johnson, Parker, Tarrant</td>
<td>Bexar, Guadalupe</td>
<td>Bastrop, Caldwell, Hood, Travis, Williamson, Wilson</td>
</tr>
<tr>
<td>4</td>
<td>Denton, Johnson, Parker, Tarrant</td>
<td>Bexar, Guadalupe</td>
<td>Bastrop, Caldwell, Hood, Travis, Williamson, Wilson</td>
</tr>
<tr>
<td>5</td>
<td>Collin, Dallas, Ellis, Kaufman, Rockwall</td>
<td>Bexar, Guadalupe</td>
<td>Bastrop, Caldwell, Hunt, Travis, Williamson, Wilson</td>
</tr>
</tbody>
</table>
## Table 4-8: Non-Attainment and Near Non-Attainment Counties for Ozone by RCA

<table>
<thead>
<tr>
<th>RCA</th>
<th>Non-attainment Counties</th>
<th>Non-attainment Deferred Counties</th>
<th>Near Non-attainment Counties</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Collin, Dallas, Ellis, Kaufman, Rockwall</td>
<td>Bexar, Guadalupe</td>
<td>Bastrop, Caldwell, Hunt, Travis, Williamson, Wilson</td>
</tr>
<tr>
<td>7</td>
<td>Collin, Dallas, Ellis, Kaufman, Rockwall</td>
<td>Bexar, Guadalupe</td>
<td>Bastrop, Caldwell, Hunt, Travis, Williamson, Wilson</td>
</tr>
<tr>
<td>8</td>
<td>Collin, Dallas, Ellis, Kaufman, Rockwall</td>
<td>Bexar, Guadalupe</td>
<td>Bastrop, Caldwell, Hunt, Travis, Williamson, Wilson</td>
</tr>
<tr>
<td>9</td>
<td>Collin, Dallas, Ellis, Kaufman, Rockwall</td>
<td>Bexar, Guadalupe</td>
<td>Bastrop, Caldwell, Hunt, Travis, Williamson, Wilson</td>
</tr>
<tr>
<td>10</td>
<td>Collin, Dallas, Ellis, Kaufman, Rockwall</td>
<td>Bexar, Guadalupe</td>
<td>Bastrop, Caldwell, Hunt, Travis, Williamson, Wilson</td>
</tr>
<tr>
<td>11</td>
<td>Collin, Dallas, Ellis, Kaufman, Rockwall</td>
<td>Bexar, Guadalupe</td>
<td>Bastrop, Caldwell, Hunt, Travis, Williamson, Wilson</td>
</tr>
<tr>
<td>12</td>
<td>Collin, Dallas, Ellis, Kaufman, Rockwall</td>
<td>Bexar, Guadalupe</td>
<td>Bastrop, Caldwell, Hunt, Travis, Williamson, Wilson</td>
</tr>
</tbody>
</table>

Source: As listed by the EPA in reference to non-attainment of national ambient ozone standards, or listed by the TCEQ as near non-attainment for the same standards.

Each of the RCAs encompasses several non-attainment counties for the 8-hour ozone standard as well as near non-attainment counties. RCAs located to the west of the DFW metropolitan area (RCAs 1 through 4) all cross six counties in non-attainment and six counties in near non-attainment. RCAs 5 through 12 all cross seven counties in non-attainment and six in near non-attainment. All of the RCAs pass through the non-attainment area of DFW, the Austin EAC, and the San Antonio EAC.

Air quality was not used to identify a preferred alternative among the RCAs because all of the RCAs pass through the Dallas-Fort Worth non-attainment area, and the Austin and the San Antonio EACs.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, air quality would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on air quality that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

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52 San Antonio has been designated as non-attainment with a deferred effective date of 2007.
Tier Two Method and Potential Mitigation

MPOs are responsible for demonstrating their MTP and TIP do not conflict with air quality rules and regulations. Transportation conformity under 40 CFR Part 51 requires that the MTP and TIP forecasted on-road mobile source emissions do not exceed the mobile source budget contained in the SIP. Any TTC-35 facility(ies) proposed for federal highway or transit funding during Tier Two environmental processes would be initiated in a manner consistent with federal guidelines in Section 450 of Title 23 CFR and Section 613.200, Subpart B or Title 40 CFR Part 51.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, consideration of the potential effects of a TTC-35 facility(ies) on air quality would be addressed during Tier Two environmental processes. Efforts would be made to avoid and/or minimize effects to air quality. Air quality analysis for any TTC-35 facility(ies) during Tier Two environmental processes would be conducted in accordance with TxDOT Air Quality Guidelines (TxDOT, 1999), and FHWA requirements or the standards required at the time the Tier Two environmental processes occur. In addition, the effects of tolling on air quality would be considered during Tier Two environmental processes for any TTC-35 facility(ies) proposed to be tolled.

During Tier Two environmental processes for any TTC-35 highway facility, the EPA recommends a project-level quantitative analysis of Mobile Source Air Toxic emissions be conducted in order to provide the public with information on the relative air toxics impact of each alternative under consideration.

During Tier Two environmental processes for any TTC-35 highway facility, the EPA and FHWA recommends a project-level qualitative and quantitative analysis of MSAT emissions be conducted in order to provide the public with information on the relative air toxics impact of each alternative under consideration. The FHWA Interim Guidance on Air Toxic Analysis in NEPA Documents issued on February 3, 2006 provides guidance on when and how to analyze MSATs in the NEPA process for highways.

Air quality thresholds with regard to rail and as set forth by the STB in 49 CFR 1105.7(e)(5)(ii) and (e)(6) would be analyzed during the Tier Two environmental processes. Any TTC-35 rail facility(ies) constructed within non-attainment counties would be subject to the requirements of general conformity.

4.6 NOISE

Noise requirements and guidelines from TxDOT, FHWA, FRA, and STB are discussed in Chapter 3, Section 3.6 – Noise.

No Action Alternative
The No Action Alternative would have no additional direct effects to noise and vibration levels beyond those that may result from projects already planned and programmed in the
STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

**Reasonable Corridor Alternatives**

Noise characteristics were not used to identify a preferred alternative among the RCAs because in the absence of a TTC-35 facility(ies) alignment, potential noise receptors (residences, businesses, etc.) cannot be determined and predicted.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, noise and vibration levels would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on noise and vibration levels that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

**Tier Two Method and Potential Mitigation**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, consideration of the potential effects of a TTC-35 facility(ies) on noise and vibration would be addressed during Tier Two environmental processes. Any future analyses would be conducted in accordance with TxDOT’s FHWA approved *Guidelines for Analysis and Abatement of Highway Traffic Noise* (TxDOT, 1996). Rail noise levels would be determined in accordance with FRA guidance *High-Speed Ground Transportation Noise and Vibration Impact Assessment* (USDOT-FRA, 1998). Noise thresholds with regard to rail and as set forth by the STB in 49 CFR 1105.7(e)(5)(ii) and (e)(6) would be analyzed during the Tier Two environmental processes. In addition, any potential effects to noise levels due to tolling a TTC-35 facility(ies) would also be considered.

**4.7 CULTURAL RESOURCES**

Data regarding large NRHP-listed sites and districts were collected for the entire study area from the THC. These data are discussed in more detail in Chapter 3, Section 3.7 – Cultural Resources.

**Tier One Avoidance Measures**

Efforts were made during the development of alternatives to minimize the number of large NRHP-listed sites and districts within the RCAs. As discussed in more detail in the *TTC-35 Corridor Alternatives Development Technical Report* (Appendix B-1), two PCAs were removed from further consideration because of the presence of a large

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53 Large sites and districts are defined as 23 acres or larger in size. In accordance with the Federal NOI dated February 5, 2004, to minimize duplication of effort, the size standard of 23 acres was used in order to be consistent with data standards developed by the I-69/TTC study. The I-69/TTC study established the 23-acre size standard under the assumption that any resource comprising less than five percent of the corridor width of 4 miles would not affect corridor development.
cultural resource district that would preclude the location of a potential Tier Two TTC-35 facility(ies) because they blocked the entire width of the PCAs.

No Action Alternative
The No Action Alternative would have no additional direct effects to cultural resources beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives
The number of large NRHP-listed sites and districts, the area within each RCA, and the percent RCA area are provided in Table 4-9 to disclose the best available data for cultural resources within each RCA. The size of each site was determined using GIS. It is important to note that the number of known NRHP-listed sites within a corridor is not used as an indication of the area’s potential for unidentified sites.

<table>
<thead>
<tr>
<th>RCA</th>
<th>Number of Listed Sites and Districts</th>
<th>Site or District Names</th>
<th>Area located within RCA (Acres)</th>
<th>Percent of RCA area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>Westphalia Rural Historic District&lt;br&gt;Fort McIntosh&lt;br&gt;Seguin Commercial Historic District&lt;br&gt;Barrio Azteca Historic District&lt;br&gt;Blanco Historic District</td>
<td>768</td>
<td>0.02</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>Westphalia Rural Historic District&lt;br&gt;Elgin Commercial Historic District&lt;br&gt;Fort McIntosh&lt;br&gt;Seguin Commercial Historic District&lt;br&gt;Barrio Azteca Historic District&lt;br&gt;Blanco Historic District</td>
<td>1,795</td>
<td>0.06</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>Westphalia Rural Historic District&lt;br&gt;Fort McIntosh&lt;br&gt;Seguin Commercial Historic District&lt;br&gt;Barrio Azteca Historic District&lt;br&gt;Rancho de las Cabras</td>
<td>1,242</td>
<td>0.03</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>Westphalia Rural Historic District&lt;br&gt;Elgin Commercial Historic District&lt;br&gt;Fort McIntosh&lt;br&gt;Seguin Commercial Historic District&lt;br&gt;Barrio Azteca Historic District&lt;br&gt;Rancho de las Cabras</td>
<td>2,269</td>
<td>0.06</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>Westphalia Rural Historic District&lt;br&gt;Fort McIntosh</td>
<td>768</td>
<td>0.02</td>
</tr>
<tr>
<td>RCA</td>
<td>Number of Listed Sites and Districts</td>
<td>Site or District Names</td>
<td>Area located within RCA (Acres)</td>
<td>Percent of RCA area</td>
</tr>
<tr>
<td>-----</td>
<td>------------------------------------</td>
<td>------------------------</td>
<td>--------------------------------</td>
<td>------------------</td>
</tr>
</tbody>
</table>
| 6   | 6                                  | Seguin Commercial Historic District  
Barrio Azteca Historic District  
Blanco Historic District          | 1,795                  | 0.05                          |
| 7   | 5                                  | Westphalia Rural Historic District  
Fort McIntosh  
Seguin Commercial Historic District  
Barrio Azteca Historic District  
Rancho de las Cabras             | 1,242                  | 0.03                          |
| 8   | 6                                  | Westphalia Rural Historic District  
Fort McIntosh  
Seguin Commercial Historic District  
Barrio Azteca Historic District  
Rancho de las Cabras             | 2,269                  | 0.06                          |
| 9   | 6                                  | Denison Commercial Historic District  
Westphalia Rural Historic District  
Fort McIntosh  
Seguin Commercial Historic District  
Barrio Azteca Historic District  
Blanco Historic District          | 826                    | 0.03                          |
| 10  | 7                                  | Denison Commercial Historic District  
Westphalia Rural Historic District  
Elgin Commercial Historic District  
Fort McIntosh  
Seguin Commercial Historic District  
Barrio Azteca Historic District  
Blanco Historic District          | 1,853                  | 0.06                          |
| 11  | 6                                  | Denison Commercial Historic District  
Westphalia Rural Historic District  
Fort McIntosh  
Seguin Commercial Historic District  
Barrio Azteca Historic District  
Rancho de las Cabras             | 1,300                  | 0.04                          |
Table 4-9: Large NRHP-listed Sites and Districts by RCA

<table>
<thead>
<tr>
<th>RCA</th>
<th>Number of Listed Sites and Districts</th>
<th>Site or District Names</th>
<th>Area located within RCA (Acres)</th>
<th>Percent of RCA area</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>7</td>
<td>Denison Commercial Historic District, Westphalia Rural Historic District, Elgin Commercial Historic District, Fort McIntosh, Seguin Commercial Historic District, Barrio Azteca Historic District, Rancho de las Cabras</td>
<td>2,327</td>
<td>0.06</td>
</tr>
</tbody>
</table>


RCAs 4, 8, and 12, which are located to the east in central and south Texas, contain the highest total acreage of large NRHP-listed sites and districts. Although the acreage of large NRHP-listed sites and districts within all of the RCAs varies by more than 1,500 acres, the percentage of the total area of large NRHP-listed sites and districts within each RCA is less than one percent.

Large NRHP-listed sites and districts were not used to identify a preferred alternative among the RCAs because none completely blocked any RCA and many cultural resource sites could likely be avoided at a Tier Two level of analysis.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, efforts would be made to avoid and/or minimize effects to cultural resources during Tier Two environmental processes.

Tier Two environmental processes would include an investigation of all cultural resources within the proposed project area, including archival research and on-site intensive investigations, as well as an in depth examination of the Area of Potential Effect (APE), and the visual effects of the facility on cultural resources. TxDOT would perform Section 106 consultations with the THC, Native American tribes, and other interested parties according to the terms of a PA among FHWA, TxDOT, the THC, and the ACHP. If effects could not be avoided, efforts to avoid, minimize or mitigate adverse
effects would be developed and implemented in accordance with the provisions of the PA between the THC and TxDOT (TxDOT, 2005f) and the Section 106 PA.

4.8 PARKLANDS

Data regarding parklands were obtained from the NPS, USFWS, TPWD, GLO, LCRA, and LWCRP. A more detailed discussion of all parklands in the study area is included in Chapter 3, Section 3.8 - Parklands.

No Action Alternative

The No Action Alternative would have no additional direct effects to parklands beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives

The area covered by parklands (in square-miles) and the percent of the RCA occupied by parklands is presented in Table 4-10 to disclose the amount of parklands within each RCA based on the best available data from the NPS, USFWS, TPWD-LWCRP, GLO, and LCRA.
### Table 4-10: Parklands by RCA

<table>
<thead>
<tr>
<th>RCA</th>
<th>Federal</th>
<th></th>
<th></th>
<th>State</th>
<th></th>
<th></th>
<th>County</th>
<th></th>
<th></th>
<th>City</th>
<th></th>
<th></th>
<th>Unnamed</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area (mi²)</td>
<td>% of Area</td>
<td>Area (mi²)</td>
<td>% of Area</td>
<td>Area (mi²)</td>
<td>% of Area</td>
<td>Area (mi²)</td>
<td>% of Area</td>
<td>Area (mi²)</td>
<td>% of Area</td>
<td>Area (mi²)</td>
<td>% of Area</td>
<td>Area (mi²)</td>
<td>% of Area</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1.27</td>
<td>&lt;1</td>
<td>2.63</td>
<td>&lt;1</td>
<td>7.74</td>
<td>&lt;1</td>
<td>0.14</td>
<td>&lt;1</td>
<td>0.14</td>
<td>&lt;1</td>
<td>0.14</td>
<td>&lt;1</td>
<td>0.14</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>0</td>
<td>4.56</td>
<td>&lt;1</td>
<td>2.53</td>
<td>&lt;1</td>
<td>2.91</td>
<td>&lt;1</td>
<td>0.14</td>
<td>&lt;1</td>
<td>0.14</td>
<td>&lt;1</td>
<td>0.14</td>
<td>&lt;1</td>
<td>0.14</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1.27</td>
<td>&lt;1</td>
<td>2.30</td>
<td>&lt;1</td>
<td>7.62</td>
<td>&lt;1</td>
<td>0.10</td>
<td>&lt;1</td>
<td>0.10</td>
<td>&lt;1</td>
<td>0.10</td>
<td>&lt;1</td>
<td>0.10</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>0</td>
<td>4.56</td>
<td>&lt;1</td>
<td>2.20</td>
<td>&lt;1</td>
<td>2.80</td>
<td>&lt;1</td>
<td>0.10</td>
<td>&lt;1</td>
<td>0.10</td>
<td>&lt;1</td>
<td>0.10</td>
<td>&lt;1</td>
<td>0.10</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0.43</td>
<td>&lt;1</td>
<td>5.17</td>
<td>&lt;1</td>
<td>7.58</td>
<td>&lt;1</td>
<td>0.14</td>
<td>&lt;1</td>
<td>0.14</td>
<td>&lt;1</td>
<td>0.14</td>
<td>&lt;1</td>
<td>0.14</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>0</td>
<td>3.71</td>
<td>&lt;1</td>
<td>5.07</td>
<td>&lt;1</td>
<td>7.67</td>
<td>&lt;1</td>
<td>0.14</td>
<td>&lt;1</td>
<td>0.10</td>
<td>&lt;1</td>
<td>0.10</td>
<td>&lt;1</td>
<td>0.10</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0.43</td>
<td>&lt;1</td>
<td>4.84</td>
<td>&lt;1</td>
<td>7.47</td>
<td>&lt;1</td>
<td>0.10</td>
<td>&lt;1</td>
<td>0.10</td>
<td>&lt;1</td>
<td>0.10</td>
<td>&lt;1</td>
<td>0.10</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>0</td>
<td>3.71</td>
<td>&lt;1</td>
<td>4.74</td>
<td>&lt;1</td>
<td>2.64</td>
<td>&lt;1</td>
<td>0.10</td>
<td>&lt;1</td>
<td>0.10</td>
<td>&lt;1</td>
<td>0.10</td>
<td>&lt;1</td>
<td>0.10</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>0</td>
<td>1.11</td>
<td>&lt;1</td>
<td>5.21</td>
<td>&lt;1</td>
<td>8.18</td>
<td>&lt;1</td>
<td>0.44</td>
<td>&lt;1</td>
<td>0.44</td>
<td>&lt;1</td>
<td>0.44</td>
<td>&lt;1</td>
<td>0.44</td>
</tr>
<tr>
<td>10</td>
<td>0</td>
<td>0</td>
<td>4.40</td>
<td>&lt;1</td>
<td>5.11</td>
<td>&lt;1</td>
<td>3.36</td>
<td>&lt;1</td>
<td>0.44</td>
<td>&lt;1</td>
<td>0.44</td>
<td>&lt;1</td>
<td>0.44</td>
<td>&lt;1</td>
<td>0.44</td>
</tr>
<tr>
<td>11</td>
<td>0</td>
<td>0</td>
<td>1.11</td>
<td>&lt;1</td>
<td>4.88</td>
<td>&lt;1</td>
<td>8.07</td>
<td>&lt;1</td>
<td>0.40</td>
<td>&lt;1</td>
<td>0.40</td>
<td>&lt;1</td>
<td>0.40</td>
<td>&lt;1</td>
<td>0.40</td>
</tr>
<tr>
<td>12</td>
<td>0</td>
<td>0</td>
<td>4.40</td>
<td>&lt;1</td>
<td>4.78</td>
<td>&lt;1</td>
<td>3.25</td>
<td>&lt;1</td>
<td>0.40</td>
<td>&lt;1</td>
<td>0.40</td>
<td>&lt;1</td>
<td>0.40</td>
<td>&lt;1</td>
<td>0.40</td>
</tr>
</tbody>
</table>

There are no federal parklands within any of the 12 RCAs. One WMA associated with Granger Lake occurs within the RCAs (RCAs 2, 4, 6, 8, and 12) that follow the easternmost path through central Texas. All of the RCAs contain less than one percent of the total area of all other park types (state, county, city or unnamed). At the Tier One level of analysis, the potential effects of the Tier One decision on parklands were not a differentiating factor in the identification of a preferred alternative because of the small percent (ranging from 0.11 to 0.29 percent) of each RCA occupied by parklands and the minimal differences (maximum difference of 8.58 square-miles) in the amount of parklands within RCAs.

Parklands were not used to identify a preferred alternative among the RCAs because none completely blocked any RCA and many parklands could likely be avoided at a Tier Two level of analysis.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, parklands would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on parklands that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Tier Two Method and Potential Mitigation

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, efforts would be made to avoid and/or minimize effects to parklands during Tier Two environmental processes. If impacts to parklands protected under 4(f) or Section 6(f) cannot be avoided, the requirements described below in Sections 4.9 and 4.10 of this Chapter would be met.

4.9 SECTION 4(F)

Section 4(f), 49 U.S.C. 303, USDOT policy on lands, wildlife and waterfowl refuges, and historic sites as they apply to transportation projects, stipulates that the FHWA “may not approve the use of land [for a transportation program or project] from a significant publicly owned public park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless a determination is made that:

(i) There is no feasible and prudent alternative to the use of land from the property; and
(ii) The action includes all possible planning to minimize harm to the property resulting from such use.”

Section 4(f) applies to any significant publicly owned park, recreation area, or wildlife and waterfowl refuge, and any land from a historic site of national, state or local significance. The agencies within the USDOT are responsible for applicability determinations, evaluations, findings, and overall compliance of section 4(f) lands.
Tier One Avoidance Measures
Efforts were made during the development of alternatives to avoid large NRHP-listed sites and districts, all of which are protected by Section 4(f). As discussed in more detail in the TTC-35 Corridor Alternatives Development Technical Report (Appendix B-1), two PCAs were removed from further consideration because of the presence of a large cultural resource district that would preclude the location of a potential Tier Two TTC-35 facility(ies) because they blocked the entire width of the PCAs.

No Action Alternative
The No Action Alternative would have no additional effects to Section 4(f) properties beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives
Section 4(f) lands were not used to identify a preferred alternative among the RCAs because in the absence of a TTC-35 facility(ies) alignment, potential effects to 4(f) lands cannot be predicted. Furthermore, many Section 4(f) lands could likely be avoided at a Tier Two level of analysis.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, Section 4(f) properties would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on Section 4(f) properties that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Tier Two Method and Potential Mitigation
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, consideration of the effects of a TTC-35 facility(ies) on Section 4(f) properties would be addressed during Tier Two environmental processes. Should lands protected by Section 4(f) be affected by a potential TTC-35 facility(ies), it must be demonstrated that all possible planning to minimize harm to the resource has been undertaken. At that time, consultation with the appropriate federal, state, and local agencies would occur and efforts would be made to avoid, minimize, and mitigate potential harm of any Section 4(f) lands in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur.

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54 In accordance with the Federal NOI dated February 5, 2004, to minimize duplication of effort, the size standard of 23 acres was used in order to be consistent with data standards developed by the I-69/TTC study. The I-69/TTC study established the 23-acre size standard under the assumption that any resource comprising less than five percent of the corridor width of 4 miles would not effect corridor development.
4.10 SECTION 6(F)

Section 6(f) of the Land and Water Conservation Fund Act (LWCA) of 1965 (16 USC 460l - 460l-11) applies to programs and policies of any agency. The purpose of this Act is to “assist in preserving, developing, and assuring accessibility to outdoor recreation resources and to strengthen the health and vitality of U.S. citizens by providing funds and authorizing federal assistance to states in planning, acquiring and developing land and water areas and facilities, and by providing funds for federal acquisition and development of lands and other areas.” Section 6(f) lands may be associated with Section 4(f) lands.

No Action Alternative
The No Action Alternative would have no additional effects to Section 6(f) lands beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives
Section 6(f) lands were not used to identify a preferred alternative among the RCAs because in the absence of a TTC-35 facility(ies) alignment, potential impacts to 6(f) cannot be predicted. Furthermore, many potential Section 6(f) lands could likely be avoided at a Tier Two level of analysis.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, Section 6(f) lands would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on Section 6(f) lands that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Tier Two Method and Potential Mitigation
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, consideration of the effects of a TTC-35 facility(ies) on Section 6(f) properties would be addressed during Tier Two environmental processes. Coordination with local officials would be necessary to identify Section 6(f) lands during the Tier Two environmental processes. Should lands protected by Section 6(f) be impacted by a potential TTC-35 facility(ies), it must be demonstrated that all possible planning to minimize harm to the resource has been undertaken. At that time, consultation with the appropriate federal, state, and local agencies would occur and efforts would be made to avoid, minimize, and mitigate potential harm of any Section 6(f) lands in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur.
4.11 PRIME FARMLAND SOILS

Data regarding prime farmland soils, as defined by NRCS, were collected for the study area from the NRCS and are discussed in Chapter 3, Section 3.9 – Prime Farmland Soils.

No Action Alternative
The No Action Alternative would have no additional direct effects to prime farmlands beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives
The total area (in square-miles) and percent of RCA area occupied by prime farmland soils is provided in Table 4-11 to disclose the amount of prime farmland soils based on the best available data from the NRCS in each RCA.

<table>
<thead>
<tr>
<th>RCA</th>
<th>Total Area (square-miles)</th>
<th>Percent of RCA Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2,168</td>
<td>44</td>
</tr>
<tr>
<td>2</td>
<td>2,085</td>
<td>42</td>
</tr>
<tr>
<td>3</td>
<td>2,059</td>
<td>39</td>
</tr>
<tr>
<td>4</td>
<td>1,975</td>
<td>37</td>
</tr>
<tr>
<td>5</td>
<td>2,403</td>
<td>45</td>
</tr>
<tr>
<td>6</td>
<td>2,320</td>
<td>43</td>
</tr>
<tr>
<td>7</td>
<td>2,294</td>
<td>41</td>
</tr>
<tr>
<td>8</td>
<td>2,210</td>
<td>39</td>
</tr>
<tr>
<td>9</td>
<td>2,392</td>
<td>47</td>
</tr>
<tr>
<td>10</td>
<td>2,308</td>
<td>45</td>
</tr>
<tr>
<td>11</td>
<td>2,283</td>
<td>42</td>
</tr>
<tr>
<td>12</td>
<td>2,199</td>
<td>40</td>
</tr>
</tbody>
</table>


Prime farmland soils comprise 37 to 47 percent of each RCA.

Prime farmland soils were not used to identify a preferred alternative because in the absence of a TTC-35 facility(ies) alignment obtaining specific data for assessing potential effects on this resource is not possible.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, prime farmland soils would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on prime farmlands that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.
Tier Two Method and Potential Mitigation

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, efforts would be made to avoid and/or minimize the effects of a TTC-35 facility(ies) on prime farmland soils to the extent practicable during Tier Two environmental processes. If Tier Two environmental processes determine direct effects to prime farmland soils would be unavoidable, the *Farmland Conversion Impact Rating for Corridor Type Projects* (Form AD-1006) would be completed and coordination with NRCS would be conducted in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur.

4.12 WATER RESOURCES

Rivers and Reservoirs – Including Water Quality Issues

Data regarding river basins and impaired waters (as defined by TCEQ), were collected for the study area from the GLO and the TCEQ. The data are discussed in Chapter 3, Section 3.10 – Water Resources.

Tier One Avoidance Measures

Efforts were made during the development of alternatives to avoid existing and proposed (as identified in Senate Bill 2) reservoirs to the extent practicable.

No Action Alternative

The No Action Alternative would have no additional direct effects to rivers, streams, or reservoirs beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives

The major rivers basins and impaired stream sections are provided in Table 4-12 to disclose the number of river basins and impaired waters within each RCA based on the best available data from the GLO and TCEQ.

<table>
<thead>
<tr>
<th>RCA</th>
<th>Major River Basins</th>
<th>Impaired Waters* Per RCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brazos, Colorado, Guadalupe, Nueces, Red, Rio Grande, San Antonio, Trinity</td>
<td>19</td>
</tr>
<tr>
<td>2</td>
<td>Brazos, Colorado, Guadalupe, Nueces, Red, Rio Grande, San Antonio, Trinity</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>Brazos, Colorado, Guadalupe, Nueces, Red, Rio Grande, San Antonio, Trinity</td>
<td>19</td>
</tr>
<tr>
<td>4</td>
<td>Brazos, Colorado, Guadalupe, Nueces, Red, Rio Grande, San Antonio, Trinity</td>
<td>18</td>
</tr>
<tr>
<td>5</td>
<td>Brazos, Colorado, Guadalupe, Nueces, Red, Rio Grande, Sabine, San Antonio, Trinity</td>
<td>22</td>
</tr>
<tr>
<td>6</td>
<td>Brazos, Colorado, Guadalupe, Nueces, Red, Rio Grande, Sabine, San Antonio, Trinity</td>
<td>21</td>
</tr>
</tbody>
</table>
Table 4-12: Major River Basins and Impaired Waters by RCA

<table>
<thead>
<tr>
<th>RCA</th>
<th>Major River Basins</th>
<th>Impaired Waters* Per RCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Brazos, Colorado, Guadalupe, Nueces, Red, Rio Grande, Sabine, San Antonio, Trinity</td>
<td>22</td>
</tr>
<tr>
<td>8</td>
<td>Brazos, Colorado, Guadalupe, Nueces, Red, Rio Grande, Sabine, San Antonio, Trinity</td>
<td>21</td>
</tr>
<tr>
<td>9</td>
<td>Brazos, Colorado, Guadalupe, Nueces, Red, Rio Grande, Sabine, San Antonio, Trinity</td>
<td>21</td>
</tr>
<tr>
<td>10</td>
<td>Brazos, Colorado, Guadalupe, Nueces, Red, Rio Grande, Sabine, San Antonio, Trinity</td>
<td>20</td>
</tr>
<tr>
<td>11</td>
<td>Brazos, Colorado, Guadalupe, Nueces, Red, Rio Grande, Sabine, San Antonio, Trinity</td>
<td>21</td>
</tr>
</tbody>
</table>

*Source: TCEQ, 2002; TWDB, no date.

Section 303(d) impaired waters include water bodies (reservoirs) and stream segments. The RCAs with the most 303(d) impaired waters are RCAs 5 and 7, each containing 22 impaired waters.

The total area (in square-miles) and percent of RCA occupied by existing reservoirs is provided in Table 4-13 to disclose the amount of existing reservoirs within each RCA based on the best available data from the TWDB.

Table 4-13: Existing Reservoirs by RCA

<table>
<thead>
<tr>
<th>RCA</th>
<th>Total Area (square miles)</th>
<th>Percent Area of RCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>&lt;1</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>&lt;1</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>&lt;1</td>
</tr>
<tr>
<td>4</td>
<td>13</td>
<td>&lt;1</td>
</tr>
<tr>
<td>5</td>
<td>25</td>
<td>&lt;1</td>
</tr>
<tr>
<td>6</td>
<td>30</td>
<td>&lt;1</td>
</tr>
<tr>
<td>7</td>
<td>24</td>
<td>&lt;1</td>
</tr>
<tr>
<td>8</td>
<td>29</td>
<td>&lt;1</td>
</tr>
<tr>
<td>9</td>
<td>27</td>
<td>&lt;1</td>
</tr>
<tr>
<td>10</td>
<td>32</td>
<td>&lt;1</td>
</tr>
<tr>
<td>11</td>
<td>26</td>
<td>&lt;1</td>
</tr>
<tr>
<td>12</td>
<td>30</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>


RCAs located to the west of the DFW metropolitan area (RCAs 1 through 4) contains less area of existing reservoirs. RCAs 6, 8, 10, and 12 contain the largest area of existing reservoirs, due to the location of Lake Granger in central Texas. However, the total area of reservoirs within all RCAs is less than one percent.

Major river basins were not used to identify a preferred alternative among the RCAs because they occur within each RCA. Impaired stream segments and existing reservoirs...
were not used to identify a preferred alternative among the RCAs because in the absence of a TTC-35 facility(ies) alignment, it is not possible to estimate the effects to impaired stream segments or existing reservoirs.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, rivers and streams including Section 303(d) stream segments and reservoirs, would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on rivers, streams, or reservoirs that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Tier Two Method and Potential Mitigation

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the potential effects of a TTC-35 facility(ies) on surface water resources would be evaluated during Tier Two environmental processes. Efforts would be made to avoid and/or minimize effects to these resources. Additionally, TxDOT would comply with the TCEQ TPDES policy for storm water discharges. Should any TTC-35 facility(ies) cross a navigable waterway, coordination with the United States Coast Guard (USCG) would be conducted during Tier Two environmental processes to obtain a navigable clearance permit under Sections 9 and 10 of the Rivers and Harbors Act of 1899, or in accordance with the most current standards and applicable laws and regulations.

The protection of water quality and ecological functions of surface waters affected by a TTC-35 facility(ies) would be a high priority during the detailed design phase of the project. Mitigation measures and Best Management Practices (BMP) would be implemented where feasible and appropriate, or as set forth in any USACE Section 404 permit; Storm Water, Pollution, Prevention Plan (SW3P); and/or National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP). TxDOT would comply with all requirements of the CWA, as amended, for the construction of a TTC-35 facility(ies).

As any TTC-35 facility(ies) could cross major rivers and associated floodplain areas, coordination would occur with the appropriate USACE office and any needed permits would be acquired and mitigation plans developed prior to construction activities. Mitigation could include the development of wetland mitigation banks, the restoration of riparian corridors, conservation easements, etc.

Groundwater Resources/Aquifers

Data regarding aquifers were collected for the study area from the TWDB and are provided in Chapter 3, Section 3.10 – Water Resources.
No Action Alternative
The No Action Alternative would have no additional direct effects to aquifers in the study area beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives
The major and minor aquifers beneath each RCA are listed in Table 4-14. This information is provided to disclose the aquifers beneath each RCA based on the best available data from the TWDB.

<table>
<thead>
<tr>
<th>RCA</th>
<th>Major Aquifers</th>
<th>Minor Aquifers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Trinity, Edwards, Carrizo</td>
<td>Yegua Jackson, Sparta, Queen City</td>
</tr>
<tr>
<td>2</td>
<td>Trinity, Edwards, Carrizo</td>
<td>Yegua Jackson, Sparta, Queen City</td>
</tr>
<tr>
<td>3</td>
<td>Trinity, Edwards, Carrizo</td>
<td>Yegua Jackson, Sparta, Queen City</td>
</tr>
<tr>
<td>4</td>
<td>Trinity, Carrizo</td>
<td>Yegua Jackson, Sparta, Queen City</td>
</tr>
<tr>
<td>5</td>
<td>Trinity, Edwards, Carrizo</td>
<td>Woodbine, Nacatoch, Brazos River Alluvium, Yegua Jackson, Sparta, Queen City</td>
</tr>
<tr>
<td>6</td>
<td>Trinity, Edwards, Carrizo</td>
<td>Woodbine, Nacatoch, Brazos River Alluvium, Yegua Jackson, Sparta, Queen City</td>
</tr>
<tr>
<td>7</td>
<td>Trinity, Edwards, Carrizo</td>
<td>Woodbine, Nacatoch, Brazos River Alluvium, Yegua Jackson, Sparta, Queen City</td>
</tr>
<tr>
<td>8</td>
<td>Trinity, Carrizo</td>
<td>Woodbine, Nacatoch, Brazos River Alluvium, Yegua Jackson, Sparta, Queen City</td>
</tr>
<tr>
<td>9</td>
<td>Trinity, Edwards, Carrizo</td>
<td>Woodbine, Nacatoch, Brazos River Alluvium, Yegua Jackson, Sparta, Queen City</td>
</tr>
<tr>
<td>10</td>
<td>Trinity, Edwards, Carrizo</td>
<td>Woodbine, Nacatoch, Brazos River Alluvium, Yegua Jackson, Sparta, Queen City</td>
</tr>
<tr>
<td>11</td>
<td>Trinity, Edwards, Carrizo</td>
<td>Woodbine, Nacatoch, Brazos River Alluvium, Yegua Jackson, Sparta, Queen City</td>
</tr>
<tr>
<td>12</td>
<td>Trinity, Carrizo</td>
<td>Woodbine, Nacatoch, Brazos River Alluvium, Yegua Jackson, Sparta, Queen City</td>
</tr>
</tbody>
</table>


Each of the RCAs cross major and minor aquifers. RCAs located to the west of the DFW metropolitan area (RCAs 1 through 4) cross the fewest number of minor aquifers. RCAs 1 through 3, 5 through 7, and 9 through 11 cross the Edwards Aquifer. RCAs that follow the most eastern path through central and south Texas (RCAs 4, 8, and 12) cross the least number of major aquifers, and do not cross the Edwards Aquifer.

Major and minor aquifers were not used to identify a preferred alternative among the RCAs because they occur beneath each RCA and their occurrence would not preclude any RCA from selection as the Preferred Alternative.
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, major or minor aquifers would not be affected because no construction-related activities will be authorized as a result of the Tier One decision. Any indirect and cumulative effects on aquifers that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Tier Two Method and Potential Mitigation
If the Tier One decision results in a corridor alternative as the Preferred Alternative, efforts would be made to avoid and/or minimize the effects of a TTC-35 facility(ies) on reservoirs and aquifers during Tier Two environmental processes. Potential effects of a TTC-35 facility(ies) would be an increase in the amount of impervious cover, which would result in increased runoff. This runoff may contain a wide variety of potential pollutants, including hydrocarbons, toxic substances, and debris. Counties within the RCAs that are subject to the Edwards Aquifer Rules found in the Edwards Aquifer Technical Guidance Manual include Williamson, Travis, and Bexar (TCEQ, 2005b and c). Should Tier Two environmental processes propose a TTC-35 facility(ies) in these counties, work would be conducted in compliance with the Edwards Aquifer Rules.

The protection of water quality and ecological functions of aquifers impacted by any future TTC-35 facility(ies) would be a high priority during the detailed design phase of the project. Mitigation measures and BMPs would be implemented, where feasible and appropriate, or as set forth in any USACE Section 404 permit, SW3P, and/or NPDES CGP. TxDOT would comply with all requirements of the CWA, as amended, for the construction of any TTC-35 facility(ies).

Flood-Prone Areas
Data regarding floodplains were collected from the BEG for the study area and are provided in Chapter 3, Section 3.10 – Water Resources.

No Action Alternative
The No Action Alternative would have no additional direct effects to floodplains beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives
The total flood-prone area (in square-miles) for each RCA and percent of RCA area occupied by flood-prone areas are provided in Table 4-15 to disclose the amount of flood-prone area within each RCA based on the best available data from the BEG.

<table>
<thead>
<tr>
<th>Table 4-15: Flood-prone Areas by RCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCA</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>
Table 4-15: Flood-prone Areas by RCA

<table>
<thead>
<tr>
<th>RCA</th>
<th>Total Flood-prone Area (square-miles)</th>
<th>Percent RCA Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>321</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>722</td>
<td>13</td>
</tr>
<tr>
<td>5</td>
<td>692</td>
<td>13</td>
</tr>
<tr>
<td>6</td>
<td>727</td>
<td>14</td>
</tr>
<tr>
<td>7</td>
<td>902</td>
<td>15</td>
</tr>
<tr>
<td>8</td>
<td>937</td>
<td>16</td>
</tr>
<tr>
<td>9</td>
<td>701</td>
<td>14</td>
</tr>
<tr>
<td>10</td>
<td>736</td>
<td>14</td>
</tr>
<tr>
<td>11</td>
<td>911</td>
<td>16</td>
</tr>
<tr>
<td>12</td>
<td>947</td>
<td>16</td>
</tr>
</tbody>
</table>


The percent of the total area occupied by flood-prone areas within the RCAs ranges from 6 to 16 percent. The RCAs with the highest percentage of flood-prone areas follow the eastern-most path in south Texas (RCAs 7, 8, 11, and 12). The RCAs with the lowest percentage of flood-prone areas are located to the west of the DFW metropolitan area (RCAs 1, 2, and 3). This can be attributed to the differences in slope and topography between the areas.

Flood-prone areas were not used to identify a preferred alternative among the RCAs because, in the absence of a TTC-35 facility(ies) alignment, it is not possible to estimate the potential effects to flood-prone areas.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, flood-prone areas would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects floodplains that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Tier Two Method and Potential Mitigation

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, efforts would be made to avoid and/or minimize the effects of a TTC-35 facility(ies) on floodplains during Tier Two environmental processes. Floodplain mapping would be used to determine floodplain impacts during Tier Two environmental processes. If any TTC-35 highway facility is determined to affect floodplains, the hydraulic design for that facility would be in accordance with current TxDOT and FHWA design policies and procedures. In addition, coordination with FEMA would occur. Any highway facility would permit the conveyance of the design year flood, inundation of the roadway being acceptable, without causing significant damage to the highway, stream or other property. No RCAs pass through the Trinity River CDC Zone.
Wetlands

Data regarding the wetlands in the study area are presented in Chapter 3, Section 3.10 – Water Resources. NLCD data were utilized to identify wetland locations within the RCAs.

No Action Alternative

The No Action Alternative would have no additional direct effects to wetlands, or other waters of the U.S. beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives

The total woody and herbaceous wetland area (in square-miles) for each RCA and percent of RCA area occupied by woody and herbaceous wetlands are provided in Table 4-16 to disclose the amount of wetlands within each RCA based on the best available data from the NLCD.

<table>
<thead>
<tr>
<th>RCA</th>
<th>Woody Wetlands</th>
<th>Emergent Herbaceous Wetlands</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area (square-miles)</td>
<td>Percent of RCA</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>&lt;1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>&lt;1</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>&lt;1</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>&lt;1</td>
</tr>
<tr>
<td>5</td>
<td>24</td>
<td>&lt;1</td>
</tr>
<tr>
<td>6</td>
<td>24</td>
<td>&lt;1</td>
</tr>
<tr>
<td>7</td>
<td>27</td>
<td>&lt;1</td>
</tr>
<tr>
<td>8</td>
<td>27</td>
<td>&lt;1</td>
</tr>
<tr>
<td>9</td>
<td>24</td>
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<tr>
<td>10</td>
<td>24</td>
<td>&lt;1</td>
</tr>
<tr>
<td>11</td>
<td>23</td>
<td>&lt;1</td>
</tr>
<tr>
<td>12</td>
<td>27</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>


Less than one percent of the total area of each RCA is classified as either woody or emergent herbaceous wetland. RCAs located to the west of the DFW metropolitan area (RCAs 1 through 4) contain the least amount of total wetlands, while there is not a substantial difference between the remaining RCAs (RCAs 5 through 12). No WRP sites occur within RCAs 1 through 4. However, one WRP site occurs within RCAs 5 through 12. This WRP site is located in the central portion of the study area and is approximately 358 acres in size.
Wetlands were not used to identify a preferred alternative among the RCAs because, in the absence of a TTC-35 facility(ies) alignment, it is not possible to estimate the potential effects to wetlands.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, wetlands or WRP sites would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on wetlands or WRP sites that may result from the Tier One decision are discussed in **Chapter 5 – Indirect and Cumulative Effects Assessment**.

**Tier Two Method and Potential Mitigation**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, efforts would be made to avoid and/or minimize the effects of a TTC-35 facility(ies) on wetlands and WRP sites during Tier Two environmental processes. If a TTC-35 facility(ies) would affect wetlands, wetland delineations would be performed in accordance with the *1987 USACE Wetlands Delineation Manual* (Environmental Laboratory, 1987), including performance of functional assessments or other applicable requirements at the time Tier Two environmental processes occur. If a TTC-35 facility(ies) would affect a WRP site, consultations with the NRCS would be conducted during Tier Two environmental processes.

**Avoidance**

Avoidance examines all appropriate and practicable possibilities of averting impacts to waters of the U.S. According to a 1990 Memorandum of Agreement (MOA) between EPA and USACE, “appropriate and practicable” measures to offset unavoidable impacts must be determined (EPA, 1990). Such measures should be appropriate to the scope and degree of those impacts and practicable in terms of cost, existing technology, and logistics in light of overall project purposes.

**Minimization**

Minimization includes the examination of appropriate and practicable steps to reduce adverse impacts to waters of the U.S. Implementation of these steps would be required through project modifications and permit conditions. Minimization typically focuses on decreasing the footprint of the proposed project through the reduction of median widths, ROW widths, fill slopes and/or road shoulder widths, and alignments adjustments. Minimization can be effectively employed along the proposed project. Examples of minimization include:

- slight modification of roadway design and alignment;
- elevation of the roadway across wetland areas;
- strict enforcement of BMPs to control sedimentation during project construction;
minimization of vegetation removal and grubbing activity;
- decrease or elimination of discharges into streams;
- reduction of fill slopes at stream/wetland crossings;
- conservative use of culverts and sensitive placement of drainage structures;
- use of spanning structures or bottomless culverts over streams;
- reestablishment of vegetation on exposed areas, with judicious pesticide and herbicide management;
- minimization of in-stream activity; and
- use of responsible litter control practices.

Compensation
Compensatory mitigation is not normally considered until anticipated impacts to waters of the U.S. have been avoided and minimization to the maximum extent possible. It is recognized that “no net loss of wetlands” functions and values may not be achieved in every permit action. Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts that remain after all appropriate and practicable minimization has been achieved. Compensatory actions often include restoration, creation, and enhancement of waters of the U.S., specifically wetlands.

If effects to water resources could not be avoided, mitigation measures and BMPs that may be implemented where feasible and appropriate, or set forth in any USACE Section 404 permit; Section 401 certification; Storm Water Pollution Prevention Plan; or General Permit, would be determined during Tier Two environmental processes and consultations with the USACE and TCEQ and the International Boundary and Water Commission (IBWC), as required. A Letter of Permission Procedure (LOPP) is currently being developed. This procedure is discussed in Chapter 7, Section 7.1 – Subsequent Actions.

4.13 PHYSIOGRAPHY AND TOPOGRAPHY

Soils and Topography
Soils were not identified within each RCA because at the Tier One level of analysis it is not practicable to identify all the soil types within each RCA. However, topography was reviewed and areas of high topographic relief were identified.

Tier One Avoidance Measures
Delineation of the study area and development of alternatives included avoidance of areas with a high density of slopes greater than three percent. As a result of this potential soil disturbance during the construction of a TTC-35 facility(ies) would be minimized.

No Action Alternative
The No Action Alternative would have no additional direct effects to soils and other geologic resources beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.
Reasonable Corridor Alternatives
Slopes may be considered an environmental issue as construction on steeper slopes may increase erosion and sediment transport. In addition, design and construction in areas with steeper slopes would require more extensive cut and fill sections, which could result in increased construction costs and greater environmental effect. The total area (in square-miles) of each RCA and percent of RCA area less than 1 and 3 percent slope are provided in Table 4-17 to disclose the amount of area containing less than 1 and 3 percent slopes within each RCA based on the best available data from the USGS.

<table>
<thead>
<tr>
<th>RCA</th>
<th>&lt;1% (square-miles)</th>
<th>Percent of RCA</th>
<th>&lt;3% (square-miles)</th>
<th>Percent of RCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1,028</td>
<td>21</td>
<td>3,265</td>
<td>66</td>
</tr>
<tr>
<td>2</td>
<td>1,037</td>
<td>21</td>
<td>3,263</td>
<td>65</td>
</tr>
<tr>
<td>3</td>
<td>1,265</td>
<td>23</td>
<td>3,780</td>
<td>68</td>
</tr>
<tr>
<td>4</td>
<td>1,274</td>
<td>23</td>
<td>3,779</td>
<td>68</td>
</tr>
<tr>
<td>5</td>
<td>1,368</td>
<td>26</td>
<td>3,842</td>
<td>72</td>
</tr>
<tr>
<td>6</td>
<td>1,378</td>
<td>26</td>
<td>3,840</td>
<td>72</td>
</tr>
<tr>
<td>7</td>
<td>1,605</td>
<td>27</td>
<td>4,357</td>
<td>74</td>
</tr>
<tr>
<td>8</td>
<td>1,615</td>
<td>27</td>
<td>4,356</td>
<td>74</td>
</tr>
<tr>
<td>9</td>
<td>1,331</td>
<td>26</td>
<td>3,712</td>
<td>72</td>
</tr>
<tr>
<td>10</td>
<td>1,340</td>
<td>26</td>
<td>3,711</td>
<td>72</td>
</tr>
<tr>
<td>11</td>
<td>1,568</td>
<td>27</td>
<td>4,228</td>
<td>74</td>
</tr>
<tr>
<td>12</td>
<td>1,577</td>
<td>27</td>
<td>4,226</td>
<td>73</td>
</tr>
</tbody>
</table>


RCAs located to the west of the DFW metropolitan area (RCAs 1 through 4) contain the least amount of area that is less than 3 percent slope and less than 1 percent slope. The remaining RCAs contain more area of less than 1 percent and less than 3 percent slopes, but are very similar to each other in percent of RCA area. Generally, those RCAs that are located to the west of the DFW metropolitan area are the least favorable alternatives for potential high-speed rail facilities, with only 21 to 23 percent of slopes less than 1 percent. They are also the least favorable for highway facilities with only 65 to 68 percent of slopes less than three percent. RCAs 5 through 12 contain a higher predominance of flatter slopes, which are more suitable for high-speed facilities.

Slope was not used to identify a preferred alternative among the RCAs because the potential affects of slope were already minimized to the extent practicable at the Tier One level of analysis through the delineation of the study area and development of alternatives.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, soils would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.
Any indirect and cumulative effects on soils and topography that may result from the Tier One decision are discussed in **Chapter 5 – Indirect and Cumulative Effects Assessment**.

**Tier Two Method and Potential Mitigation**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, efforts would be made to avoid and/or minimize the effects of a TTC-35 facility(ies) on soil erosion and sedimentation during Tier Two environmental processes. Short-term erosion problems can be minimized by implementing an interim site drainage plan and proper erosion protection techniques during construction. Permanent storm water erosion control measures would be incorporated into TTC-35 facility(ies) design.

Soil erosion/sedimentation could be minimized at the appropriate time by the use, where practicable and feasible, of a combination of any of the following generally recommended methods as set forth in TxDOT’s *Storm Water Management Guidelines for Construction Activities* (TxDOT, 2002b):

- limit the surface area of unprotected, erodible soil exposed to erosion at any one time during construction activities;
- stage clearing of vegetation as needed to keep pace with construction, rather than clearing far in advance;
- upgrade unstable ground underlying the proposed action by means of various engineering activities;
- coordinate temporary and permanent erosion control measures to ensure the best possible control during the construction and post-construction period;
- revegetate disturbed areas as soon as possible using nature’s seasonal cycles to an advantage;
- use native plant species, particularly long-lived, rapid growing species requiring a minimum of maintenance;
- stage mulching and seeding to closely follow the progression of construction operations, particularly on high cuts and fills;
- protect native vegetation cover where active construction is not required, equipment traffic and personnel parking;
- reduce the volume and velocity of construction runoff; and
- utilize temporary measures such as berms, dikes, dams, sediment basins, and slope drains to control surface drainage.

Efforts to determine effects and potential mitigation would be conducted in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur.
Mineral Resources
Data regarding geology and mining activities in the study area were obtained from the BEG, USGS, and RRC, and are presented in Chapter 3, Section 3.11 – Physiography and Topography.

No Action Alternative
The No Action Alternative would have no additional direct effects to mineral resources beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives
The amount of mining activities by RCA are provided in Table 4-18 to disclose the mining activities within each RCA based on the best available data from the RRC.

<table>
<thead>
<tr>
<th>RCA</th>
<th>Mining Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lignite (Coal)</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
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<tr>
<td>4</td>
<td>4</td>
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<td>5</td>
<td>3</td>
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<tr>
<td>6</td>
<td>3</td>
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<tr>
<td>7</td>
<td>4</td>
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<td>8</td>
<td>4</td>
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<tr>
<td>9</td>
<td>3</td>
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<td>10</td>
<td>3</td>
</tr>
<tr>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>4</td>
</tr>
</tbody>
</table>

Source: RRC 2002 and 2004b.

There are three to four lignite mines located within each RCA. There are no uranium mining activities occurring within any of the 12 RCAs. There are three mining sites associated with other minerals: one lime mine site to the west of the DFW metropolitan area (RCAs 1 through 4); one zeolite mine site located in the RCAs that follow the westernmost path in the south (RCAs 3, 4, 7, 8, 11, and 12); and one lime mine site located in those RCAs that follow the easternmost path in the south (RCAs 1, 2, 5, 6, 9, and 10).

Mining activities were not used to identify a preferred alternative among the RCAs because they are not regulated and many could be avoided at a Tier Two level of analysis.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, mineral resources and mining activities would not be directly affected.
because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on lignite or other mining activities that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Tier Two Method and Potential Mitigation
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, efforts would be made to avoid and/or minimize the effects of a TTC-35 facility(ies) on mining activities during Tier Two environmental processes. If effects could not be avoided, TxDOT would consult with the RRC and the mining company to minimize effects to these properties in order to reach a definitive agreement concerning mitigation measures. Efforts to identify effects and potential mitigation would be conducted in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur.

4.14 WILDLIFE, TERRESTRIAL AND AQUATIC COMMUNITIES

Vegetation
Data regarding the natural regions and their associated vegetation types, crossed by the study area are provided in Chapter 3, Section 3.12 – Terrestrial and Aquatic Communities.

No Action Alternative
The No Action Alternative would have no additional direct effects to vegetation beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives
The vegetation communities were not characterized within each RCA because it was not practicable to conduct field surveys within each RCA at the Tier One level of analysis. As a result, vegetation communities were not used to identify a preferred alternative among the RCAs.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, vegetation would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on vegetation that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.
Tier Two Method and Potential Mitigation

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, efforts would be made to avoid and/or minimize the effects of a TTC-35 facility(ies) on vegetation during Tier Two environmental processes. During development of a TTC-35 facility(ies), in accordance with *EO 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping*, landscaping for a TTC-35 facility(ies) would be limited to seeding with the approved TxDOT seeding specification and replanting of ROW with native species of plants where possible (U.S. Executive Office of the President, 1999). Additionally, in accordance with Provision (4)(A)(ii) of the TxDOT-TPWD MOU, habitats given consideration for non-regulatory mitigation include (TxDOT, 1998):

- habitat for federal candidate species (impacted by the project) if mitigation would assist in the prevention of listing the species;
- rare vegetation series (S1, S2, S3) that also locally provides habitat for a state-listed species;
- all vegetation communities listed as S1 or S2, regardless of whether or not the series in question provides habitat for state-listed species;
- bottomland hardwoods, native prairies, riparian sites; and
- any other habitat feature considered locally important.

Efforts would be made during Tier Two environmental processes to minimize impacts to vegetation from a TTC-35 facility(ies). In addition, TxDOT would coordinate with the TPWD for compensatory mitigation for any vegetation community impacts in accordance with Provision (4)(A)(ii) of the TxDOT-TPWD MOU (TxDOT, 1998).

**Wildlife**

Data regarding wildlife species were obtained from the USFWS, TMM, and TPWD and are presented in Chapter 3, Section 3.12 – Terrestrial and Aquatic Communities.

**Tier One Avoidance Measures**

The TTC-35 study area was developed in part based on avoiding and minimizing effects to critical habitat and to federally listed species including Houston toads, black-capped vireos, golden-cheeked warblers, karst-dwelling invertebrate species, and species endemic to Edwards Aquifer-related habitats.

**No Action Alternative**

The No Action Alternative would have no additional direct effects to wildlife beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.
Reasonable Corridor Alternatives
Wildlife species and associated habitat were not characterized within each RCA because it was not practicable to conduct field surveys within each RCA at the Tier One level of analysis. As a result, wildlife species and associated habitat were not used to identify a preferred alternative among the RCAs.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, wildlife would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on wildlife that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Tier Two Method and Potential Mitigation
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, efforts would be made to avoid and/or minimize the effects of a future TTC-35 facility(ies) on wildlife during Tier Two environmental processes.

During development of a TTC-35 facility(ies), TxDOT would use construction practices that minimize adverse effects to wildlife habitats. Existing vegetation would be avoided and preserved where practicable. If effects could not be avoided, efforts to analyze effects and identify potential mitigation would be conducted in accordance with standards and applicable laws and regulations at the time Tier Two environmental processes.

There are several options when developing a mitigation plan to reduce wildlife mortality, increase human safety, and enhance ecosystems. These options include, but are not limited to, roadside revegetation, fencing, mitigation banking (such as wetlands), increased usage of wildlife crossing signs, and/or the usage of high frequency whistles.

Including “ecosystem or habitat connectivity” or “connectivity zones” in the project planning and design is and example of practical strategies for reducing the transportation impacts on wildlife movement and populations. Several crossing and/or connector mechanisms are available for maintaining habitat connectivity. Examples of crossing and connectors include the following:

- **Wildlife overpasses or Ecoducts:** These are normally 164 feet or more in width, covered with soil to a depth of 1.6 feet and 6.6 feet, and vegetated. While these structures are expensive, they appear to accommodate a greater number of species than underpasses and have proven successful in Europe.
- **Wildlife underpasses:** These underpasses (approximately 98 feet wide and 13 feet high) provide relatively unconfined passage for wildlife. While these structures provide adequate light, they may be too dry for use by amphibians.
- **Escape structures:** A structure that allows an animal trapped on the roadway by a diversion fence to exit in only one direction. Structures such as one-way
gates, ramps, or funnel fences make it easy for the animal to escape the roadway, but difficult to enter the ROW.

- **Culverts or pipes**: Designed specifically for wildlife needs such as large box, upland, bottomless (square, rectangle, or arched), and/or continuous (arched pipe, elliptical pipe, or circular pipe) culverts.

- **Bridge extensions**: Usually a 20-foot expanse that allows wildlife to travel under a structure with planned cover instead of cleared ROW. May include a single span or multiple span bridge, a viaduct, and/or a causeway.

If Tier Two environmental processes are initiated, mitigation for specific wildlife species and/or habitats may be required by the regulatory agencies. To date, such agencies have not officially identified any one specific species or unique habitat within the study area as requiring a crossing or any other specific mitigation practice.

**Threatened, Endangered, and Candidate Species**

Data regarding threatened, endangered, and candidate species were obtained from the USFWS, TMM, and TPWD and are presented in Chapter 3, Section 3.12 – Terrestrial and Aquatic Communities.

**Tier One Avoidance Measures**

Efforts were made during the delineation of the study area to avoid and minimize effects to critical habitats and to avoid and minimize effects to the federally listed Houston toad, black-capped vireo, and golden-cheeked warbler, and to species endemic to karst features west of I-35 and the Edwards Aquifer area.

**No Action Alternative**

The No Action Alternative would have no additional direct effects to federally and state-listed threatened, endangered, and candidate species beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

**Reasonable Corridor Alternatives**

The number of threatened, endangered, and candidate species common to the RCAs are presented in Table 4-19 to disclose the species potentially occurring within each RCA based on the best available data from the USFWS and TPWD. Appendix D-3 provides a full list of threatened, endangered and candidate species potentially occurring within the RCAs.
### Table 4-19: Number of Federally and State-Listed Threatened, Endangered, and Candidate Species Potentially Occurring within Each RCA

<table>
<thead>
<tr>
<th>RCA</th>
<th>Federally Listed Species</th>
<th>State-listed Species</th>
<th>Total Species*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13</td>
<td>44</td>
<td>45</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
<td>43</td>
<td>45</td>
</tr>
<tr>
<td>3</td>
<td>13</td>
<td>44</td>
<td>46</td>
</tr>
<tr>
<td>4</td>
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</tr>
<tr>
<td>5</td>
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<td>7</td>
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<td>13</td>
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<td>49</td>
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<tr>
<td>9</td>
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<td>48</td>
</tr>
<tr>
<td>10</td>
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<td>39</td>
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<td>11</td>
<td>12</td>
<td>40</td>
<td>41</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>40</td>
<td>41</td>
</tr>
</tbody>
</table>


* There is some overlap between the lists of federally and State-listed species – most of the federally listed species also are state-listed species.
In general, the numbers of federally and state-listed threatened, endangered, and candidate species identified within each RCA are similar. Overall, there are 40 species common to all RCAs. RCAs 7 and 8 contain the greatest number (49) of potentially occurring federally and state-listed species; RCA 10 contains the least number (40).

The locations of federally and state-listed threatened, endangered, and candidate species were not identified within each RCA because it was not practicable to conduct species-specific field surveys within each RCA at the Tier One level of analysis. As a result, the numbers of federally and state-listed threatened, endangered, and candidate species were not used to identify a preferred alternative among the RCAs.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, federally and state-listed threatened, endangered, and candidate species potentially occurring in the counties traversed by any RCA would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on federally and state-listed threatened, endangered, and candidate species that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Tier Two Method and Potential Mitigation

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, efforts would be made to avoid the effects of a TTC-35 facility(ies) on federally and state-listed threatened, endangered species, and candidate species, their habitats, and designated critical habitats during Tier Two environmental processes.

During development of a TTC-35 facility(ies), TxDOT would use construction practices that minimize adverse effects to important habitats. Existing vegetation would be avoided and preserved where practicable. If effects could not be avoided, reasonable and prudent measures would be developed to minimize potential incidental take.

During the Tier Two environmental process, all federally protected species and their habitat would be addressed through the Section 7 process of the ESA. All impacted state-protected species would be addressed through consultation with TPWD. At the appropriate time, wildlife corridors, high-quality vegetation, and sensitive features such as nesting areas would be identified. Consideration would be given, where feasible and practicable, to the possible use of wildlife crossings described above.

During the Tier Two process, consultations with the USFWS and TPWD would be conducted to avoid and minimize impacts to any designated critical habitats that occur within proposed TTC-35 facility(ies) alignments. Mitigation for impacts to threatened and endangered species could include funding for conservation easements, the preparation of habitat conservation plans, and/or payment to a conservation fund set up to benefit the species.
Significant Publicly Owned and Privately Held Terrestrial and Aquatic Habitats

Data from the NPS, TPWD, and USFWS were collected to identify significant and designated critical habitats in the study area. The data are presented in detail in Chapter 3, Section 3.12 – Terrestrial and Aquatic Communities.

No Action Alternative

The No Action Alternative would have no direct effects to significant publicly owned and privately held terrestrial and aquatic habitats within the study area. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives

The number of and area occupied (in square-miles) by terrestrial or aquatic habitat managed by governmental agencies is presented in Table 4-20. This information is provided to disclose the amount of WMAs within each RCA based on the best available data from the GLO.

<table>
<thead>
<tr>
<th>RCA</th>
<th>Area of WMA (square-miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>3.28</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>3.28</td>
</tr>
<tr>
<td>5</td>
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<tr>
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<td>3.28</td>
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<td>7</td>
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</tr>
<tr>
<td>8</td>
<td>3.28</td>
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<tr>
<td>10</td>
<td>3.28</td>
</tr>
<tr>
<td>11</td>
<td>0</td>
</tr>
</tbody>
</table>


The number of significant publicly owned and privately held terrestrial and aquatic habitats was not used to identify a preferred alternative among the RCAs because based on the best available only one WMA exists within the RCAs and could be avoided during Tier Two environmental processes.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, significant publicly owned and privately held terrestrial and aquatic habitats would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on significant publicly owned and privately held terrestrial and aquatic habitats that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.
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Tier Two Method and Potential Mitigation
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, a more detailed analysis of potential effects to the Lake Granger WMA and other significant publicly owned or privately held terrestrial and aquatic habitats affected by any TTC-35 facility(ies) alignment would be conducted during Tier Two environmental processes. Efforts would be made to avoid and/or minimize effects to this resource. If effects could not be avoided, efforts to analyze effects and identify potential mitigation would be conducted in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur.

Designated Critical Habitat
At the Tier One level of analysis, the potential effects of the Tier One decision on designated critical habitat were not a differentiating factor in the identification of a preferred alternative because earlier efforts to avoid effects to designated critical habitat eliminated them from the RCAs.

Tier One Avoidance Measures
Efforts were made to avoid areas identified as designated critical habitat during the delineation of the study area. Therefore, no areas identified as designated critical habitat are located within any of the RCAs.

No Action Alternative
The No Action Alternative would have no additional direct effects to areas identified as designated critical habitat beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives
No designated critical habitat exists within any of the RCAs. Therefore, designated critical habitat was not used to identify a preferred alternative among the RCAs.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, there would be no direct effects to designated critical habitat because no areas identified as designated critical habitat are located within any of the RCAs.

Any indirect and cumulative effects on designated critical habitat that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Tier Two Method and Potential Mitigation
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, efforts would be made to avoid the effects of a TTC-35 facility(ies) on designated critical habitats during Tier Two environmental processes.
During development of a TTC-35 facility(ies), TxDOT would use construction practices that minimize adverse effects to important habitats. Existing vegetation would be avoided and preserved where practicable. If effects could not be avoided, reasonable and prudent measures would be developed to minimize potential incidental take. Additionally, conservation measures would be implemented, if necessary, as a product of any Biological Opinion for a particular threatened and endangered species.

During the Tier Two environmental process, all federally protected species and their habitats would be addressed through the Section 7 process of the ESA, as amended. All impacted state protected species would be addressed through consultation with TPWD. At the appropriate time, wildlife corridors, high-quality vegetation, and sensitive features such as nesting areas would be identified. Consideration would be given, where feasible and practicable, to the possible use of wildlife crossings previously described.

During the Tier Two environmental process, consultations with the USFWS and TPWD would be conducted to avoid and minimize impacts to any designated critical habitats that occur within a proposed TTC-35 facility(ies) alignment. Mitigation for impacts to critical habitat could include funding for conservation easements, the preparation of habitat conservation plans, payment to a conservation fund set up to benefit the species.

4.15 VISUAL AND AESTHETICS
The visual resources of the study area are described in Chapter 3, Section 3.13 – Visual and Aesthetics.

No Action Alternative
The No Action Alternative would have no additional direct effects to visual resources beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives
An assessment of visual effects includes an assessment of:

- the view from the road;
- those resources that may be seen from the road;
- the view of the road; and
- the effects a TTC-35 facility(ies) may have on the rural settings and historic communities and structures it may be located near.

Visual and aesthetic resources were not used to identify a preferred alternative among the RCAs because in the absence of a TTC-35 facility(ies) alignment it is not possible to predict how visual and aesthetic resources within each RCA would be affected by a future TTC-35 facility(ies) alignment.
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, visual resources would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on visual resources that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Tier Two Method and Potential Mitigation

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, efforts would be made to avoid and/or minimize the effects of a TTC-35 facility(ies) on visual resources during Tier Two environmental processes. If effects to visual resources could not be avoided, mitigation for such effects would be proposed.

Where practicable, visual mitigation plans could incorporate aesthetic features to help better integrate a proposed TTC-35 facility(ies) into the existing environment. Through CSD, TxDOT and FHWA would strive to design transportation facilities that fit into the physical setting, preserving the scenic and aesthetic qualities of the view shed in which any projects would be located. The use of naturally vegetated medians, minimizing ROW clearing, benching of rock cuts, utilizing retaining walls, and promoting roadside native wildflower planting or similar types of programs would create a more aesthetically pleasing TTC-35 facility(ies) that minimizes visual effects. Native plants would be considered for roadside vegetation where practicable, to improve the visual aesthetics and to control the introduction and spread of invasive species. These types of measures can serve to mitigate the views of the roadway and help to minimize effects to the natural beauty of the area. In areas where a roadway is visible to residences, landscaping with evergreens and shrubs can act as screens and can help to soften views of the road.

4.16 HAZARDOUS WASTE SITES

EPA and TCEQ databases were researched to identify hazardous waste sites within the study area counties. Numerous hazardous materials and waste sites occur within the study area; however, these sites are typically small and are ubiquitously distributed throughout the study area. Therefore, only data for Superfund and landfill sites were obtained and used to compare the RCAs at the Tier One level of analysis. The data are presented in Chapter 3, Section 3.14 – Hazardous Materials.

No Action Alternative

The No Action Alternative would not have any additional direct effects to landfills, Superfund sites, and/or other hazardous waste sites beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.
Reasonable Corridor Alternatives
The number of NPL, SPL and landfill sites is listed in Table 4-21 to disclose the number of hazardous waste sites within each RCA based on the best available data from the TCEQ and the EPA.

<table>
<thead>
<tr>
<th>RCA</th>
<th>NPL Sites</th>
<th>SPL Sites-Active</th>
<th>SPL Sites-Proposed</th>
<th>SPL Sites-Deleted</th>
<th>Landfills</th>
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<tr>
<td>1</td>
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<td>55</td>
</tr>
</tbody>
</table>

Source: TCEQ, 2004a; EPA, 2004e.

None of the RCAs contains active NPL or SPL sites. RCAs containing the most (4) proposed SPL sites include RCAs 5, 6, 9, and 10. These RCAs also contain the most (63 to 64) landfill sites. The RCAs with the fewest (0) proposed SPLs include RCAs 3 and 4; these two RCAs also contain the fewest (46) landfill sites. Data regarding the size of landfills are not readily available public information and thus were not collected for this effort.

Hazardous waste sites were not used to identify a preferred alternative among the RCAs because, in the absence of a TTC-35 facility(ies) alignment, it is not possible to estimate the effects to hazardous waste sites within any RCA and many and could be avoided during Tier Two level of analysis.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, superfund sites, landfills, and/or other hazardous waste sites because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on superfund sites, landfills, and/or other hazardous waste sites that may result from the Tier One decision are discussed in Chapter 5 - Indirect and Cumulative Effects Assessment.

Tier Two Method and Potential Mitigation
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, efforts would be made to avoid and/or minimize the effects of a TTC-35 facility(ies) on hazardous waste sites during Tier Two environmental processes. During the Tier Two environmental process, consultations with the EPA and TCEQ would be
conducted to avoid and minimize impacts to any hazardous waste sites that occur within the preferred corridor. Any hazardous waste sites that could not be avoided would be assessed and handled according to all applicable federal, state, and local laws, rules, and regulations. If effects could not be avoided, efforts to analyze effects and identify potential mitigation would be conducted in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur.

4.17 ENERGY

No Action Alternative

The No Action Alternative would have no additional direct effects to energy beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives

All of the RCAs possess the potential for overall energy use benefits when compared to the No Action Alternative. TTC-35 facility(ies) with the flattest and shortest paths would do the most to enhance motor vehicle fuel efficiency. However, since length of a corridor may not be an indicator of the actual length of a TTC-35 facility(ies) that might be constructed within that corridor, trip distance from origination-to-destination points would need to be calculated to estimate total fuel use during Tier Two environmental processes.

The effects on the use of energy were not used to identify a preferred alternative among the RCAs because, in the absence of a TTC-35 facility(ies) alignment, it is not possible to estimate the use of energy.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, energy resources would not be directly affected because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative effects on energy resources that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Tier Two Method and Potential Mitigation

If the Tier One DEIS results in the selection of a corridor alternative as the Preferred Alternative, efforts would be made to avoid and/or minimize the effects of a TTC-35 facility(ies) on energy during Tier Two environmental processes. If effects could not be avoided, efforts to analyze energy effects and identify potential mitigation would be conducted in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur.
4.18 CONSTRUCTION EFFECTS

No Action Alternative
The No Action Alternative would not result in additional construction-related effects beyond those that may result from projects already planned and programmed in the STIP and MTPs. Any direct effects of those projects would be common to all alternatives and would be evaluated under their own environmental studies.

Reasonable Corridor Alternatives
Construction effects were not used to identify a preferred alternative among the RCAs because there would be no construction-related activities that would be authorized as a result of the Tier One decision.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, no direct short-term or long-term construction effects would occur because no construction-related activities will be authorized as a result of the Tier One decision.

Any indirect and cumulative construction effects that may result from the Tier One decision are discussed in Chapter 5 – Indirect and Cumulative Effects Assessment.

Tier Two Method and Potential Mitigation
Any construction that may occur as a result of any TTC-35 facility(ies) alignments selected during the Tier Two environmental processes would adhere to all state regulations pertaining to the minimization of effects to air quality. Dust control techniques such as the most common methods of watering, chemical stabilization, or vehicle speed reduction would be researched and specified during the Tier Two process. Watering is the most common temporary measure. Although chemicals provide more long-term control, they are costly and have potential to adversely affect vegetation and wildlife.

Short-term noise effects could occur during proposed construction of a TTC-35 facility(ies) alignment resulting from the Tier Two environmental processes. However, construction noise levels would be controlled and minimized at the appropriate time by the use of any of the following general methods:

- where noise barriers are determined to be both feasible and reasonable, such noise barriers may be constructed prior to other project-related construction;
- locate stationary equipment as far away from nearby noise sensitive properties as possible;
- install noise reduction devices on equipment;
- shut off idling equipment;
- in populated areas, enforce sun-up to sun-down operating time control;
- if feasible, reschedule construction operations to avoid periods of noise annoyance identified in any complaints; and
notify residences/businesses whenever extremely noisy work would be occurring.

Water pollution could occur due to erosion and sedimentation during construction of a future TTC-35 facility(ies). The CWA makes it unlawful to discharge storm water from construction sites into “waters of the U.S.,” unless authorized by the TCEQ General Permit. A construction project that affects five acres or more is required to file a NOI.

In accordance with TxDOT policies, a SW3P would be prepared before construction of a TTC-35 facility(ies) and adhered to during construction. The SW3P would include temporary erosion control measures to minimize impacts to water quality during construction as specified in the TxDOT Storm Water Management and Guidelines for Construction Activities (2002b).

Because construction of a transportation facility would involve vegetation removal, cleared areas and other areas devoid of vegetation would be subject to erosion. Erosion may cause water quality degradation from runoff and sedimentation. Other possible short-term effects that could occur during construction of a future TTC-35 facility(ies) include disturbance of soils such that local stability of both natural slopes and excavations may be disrupted, increased turbidity, altered flow rates, and possible temperature fluctuations within aquatic habitats caused by the removal of vegetation near water bodies.

Energy consumption can be increased during construction. Measures that could be taken to reduce energy consumption during construction, include limiting the idling of construction equipment and employee vehicles, encouraging carpools or vanpools among construction workers, and locating staging areas as close as possible to work sites.

Mitigation measures that could be utilized during construction would include measures to prevent or minimize erosion and sedimentation. Such measures include erosion and sedimentation plans, provisions for waste materials and storage, storm water management measures, and other BMPs including: scheduling construction activities to minimize exposed land and the duration of exposure; clearing minimal areas before grading; temporary sodding or mulching disturbed areas; use of cover on exposed surfaces prior to revegetation; covering stockpiled soil; and use of water applications to control dust from exposed land.

Efforts to identify construction effects and potential mitigation would be conducted in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur.
4.19 RELATIONSHIP OF LOCAL SHORT-TERM USES VS. LONG-TERM PRODUCTIVITY

No Action Alternative
Although the No Action Alternative would avoid all short-term consequences from a TTC-35 facility, projected population growth for areas adjacent to I-35 and other major roadways and subsequent projected traffic volumes would further reduce the operational efficiency and traffic safety of existing roadways within the study area.

Reasonable Corridor Alternatives
No direct Tier One short-term or long-term consequences are anticipated because the selection of a corridor alternative as the Preferred Alternative will not authorize construction-related activities.

Although the selection of a corridor alternative as the Preferred Alternative would not have direct short-term or long-term effects, the future construction of a TTC-35 facility(ies) may have short-term effects, including:

- relocation of residences;
- inconvenience to residents, businesses, and employees during construction;
- construction machinery related effects such as elevated noise levels, traffic interruption, safety risks, dust, and hydrocarbon emissions, and potential pollution of surface water due to sedimentation in runoff from exposed construction sites;
- short-term increased local employment during construction; and
- economic benefit to local businesses utilized by construction-related personnel during construction.

Long-term consequences of the construction of a TTC-35 facility(ies) would include the removal of private property from tax rolls, thereby reducing city and county tax bases. This loss of taxable property would be expected to be offset long-term by the increased value of property adjacent to the facility. Additional long-term consequences would include the conversion of agricultural land, floodplain, wetland, and habitat for transportation use.

Several potential long-term benefits that may be realized if construction of a TTC-35 facility(ies) resulting from Tier Two environmental processes could include:

- improved motorist safety and convenience;
- reduction in vehicle operating costs and travel time;
- separate truck and auto lanes resulting in better visibility and mobility;
- potential for passenger rail;
- reduction in energy consumption through improved travel efficiency;
• greater potential for area economic development because of improved transportation; and
• potential for a new tax base in the TTC-35 facility(ies) corridor.

If the Tier One decision results in a corridor alternative as the Preferred Alternative, the local short-term effects and use of tax revenue resources by a proposed TTC-35 facility(ies) would be consistent with the maintenance and enhancement of long-term productivity.

4.20 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

No Action Alternative
The cost and time associated with the decreasing level-of-service (LOS) for both auto and truck traffic resulting from the No Action Alternative would result in the irretrievable commitment of resources. The transportation user hardship such as time, money, and loss of life related to the anticipated higher rate of accidents and increased congestion associated with the No Action Alternative would be irretrievable and irreversible.

Reasonable Corridor Alternatives
If options are used as a mechanism for corridor preservation, should a proposed TTC-35 project not proceed in that location, any monies used for the options would be irretrievable. No other Tier One irreversible and irretrievable commitments of resources would be anticipated because the selection of a corridor alternative as the Preferred Alternative will not authorize construction-related activities. If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, Tier Two environmental processes would evaluate the irreversible and irretrievable commitments of resources. Any TTC-35 facility(ies) alignment considered in the Tier Two environmental process, if constructed, would result in a range of natural, physical, human and fiscal resource commitments. Land acquisitions made for the construction of a TTC-35 facility(ies) alignment would be considered an irreversible commitment during the period the land is used for transportation purposes. Land, structures, money, manpower, construction materials, and energy resources would all be committed to project implementation. Any commitment of resources that could be made would be based upon the belief that citizens of the State of Texas, as a whole, will benefit from an improved transportation system. These benefits include congestion relief, improved mobility, access, increased safety and potential for economic development.

Generally, any future TTC-35 facility(ies) that could be constructed as a result of the Tier Two environmental process would involve short-term effects as previously discussed. However, traffic growth, congestion delays, and increasing accident rates along existing transportation facilities within the State of Texas make these improvements an urgent matter. The vision of TTC includes separate truck and passenger vehicle lanes for increased public safety. The need for this separation is based on both national and statewide traffic accident statistics. Any TTC-35 facility(ies) designed as a result of Tier Two environmental processes would be consistent with state and local plans, programs
and policies to improve overall access to an area over the long-term. Thus, any short-term effects associated with the construction of a potential TTC-35 facility(ies) should be consistent with the maintenance and enhancement of long-term productivity for the state and local area.
5.0 INDIRECT AND CUMULATIVE EFFECTS ASSESSMENT

This Chapter discusses the potential indirect and cumulative effects associated with the No Action Alternative and the 12 RCAs.

This Chapter answers several questions, including:

- How does CEQ define direct effects?
- How does CEQ define indirect effects?
- What process was used to evaluate the indirect effects of TTC-35 at a Tier One level of analysis?
- What process would be used to evaluate potential indirect effects of a TTC-35 facility during Tier Two environmental processes?
- How does CEQ define cumulative effects?
- What process was used to evaluate the cumulative effects of TTC-35 at a Tier One level of analysis?
- What process would be used to evaluate potential cumulative effects of a TTC-35 facility during Tier Two environmental processes?

The NEPA process and CEQ’s regulations, implementing the procedural provisions of NEPA, are designed so as to ensure that all direct, indirect and cumulative effects of a proposed action or project that could significantly affect the quality of the environment are discussed and considered in the environmental documents. The CEQ regulations require that the proposed TTC-35 project, and other federal, state, and private actions, be evaluated with regard to indirect and cumulative effects. The CEQ regulations define direct, indirect and cumulative effects as follows:

Direct effects are defined by the CEQ Regulations as “effects which are caused by the action and occur at the same time and place (40 CFR Section 1508.8).”

Indirect effects are those “which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 CFR Section 1508.8).” Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects to air and water and other natural systems, including ecosystems.

Cumulative effects are defined as “the impact on the environment that results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor

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55 The terms “effect” and “impact” are used synonymously in the CEQ regulations (40 CFR Section 1508.8).
but collectively significant actions taking place over a period of time (40 CFR Section 1508.7).” Cumulative impacts include the direct and indirect impacts of a project together with the reasonably foreseeable future actions of others.

The indirect and cumulative effects assessment discussed in this Chapter is for the Tier One level of analysis only. Therefore, this study provides only an initial level of environmental assessment. The Tier Two analysis will necessarily undertake a more comprehensive examination of the potential environmental impacts stemming from the selection of an alignment or a no-build alternative.

All 13 alternatives (No Action Alternative and 12 RCAs) were evaluated for indirect and cumulative effects. Based on the evaluation of the potential indirect effects presented in this DEIS, no environmental factors were determined to preclude any of the RCAs from selection as the Preferred Alternative. Furthermore, based on the evaluation of the potential cumulative effects presented in this DEIS, the three environmental factors evaluated (wetlands, rural/agricultural land, and economic effects) were also not determined to preclude any of the RCAs from selection as the Preferred Alternative. Therefore, at the Tier One level of analysis, indirect and cumulative effects are not a differentiating factor in the identification of a preferred corridor alternative based on the analysis performed for the DEIS.

### 5.1 INDIRECT EFFECTS ASSESSMENT

An approach for assessing the indirect effects of TTC-35 at a Tier One level of analysis was developed based on 23 CFR 771, the FHWA Technical Advisory 6640.8A, and The Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact Considerations in the NEPA Process (Memorandum issued by FHWA on January 31, 2003). TxDOT guidance on assessing indirect effects is currently under development and will be used as a reference for the Final EIS, if it becomes available. The specific steps used in the assessment presented in this Chapter are listed in Table 5-1.

<table>
<thead>
<tr>
<th>Assessment Step</th>
<th>Description</th>
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<tr>
<td>Step 1</td>
<td>Scoping</td>
</tr>
<tr>
<td>Step 2</td>
<td>Identification of Study Area</td>
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<tr>
<td>Step 3</td>
<td>Inventory of Study Area</td>
</tr>
<tr>
<td>Step 4</td>
<td>Identification of Impact-causing Activities of the Selection of Corridor</td>
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<tr>
<td>Step 5</td>
<td>Identification and Analysis of Indirect Effects</td>
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<tr>
<td>Step 6</td>
<td>Mitigation and Enhancement Strategies</td>
</tr>
<tr>
<td>Step 7</td>
<td>Proposed Tier Two Indirect Effects Assessment Method</td>
</tr>
</tbody>
</table>

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56 The *Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects* ("NCHRP Report") (NCHRP, 2002) was also referenced in developing this indirect effects assessment.

57 The steps listed were developed based on the NCHRP Report *Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects* (2002) and the Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact Considerations in the NEPA Process (Memorandum Issued by FHWA January 31, 2003).
Step 1: Scoping

Coordination meetings were held with the following local, state, federal, and international agencies during the development of the Tier One DEIS:

- Brownsville Metropolitan Planning Organization
- Capital Area Metropolitan Planning Organization
- Corpus Christi Metropolitan Planning Organization
- Harlingen-San Benito Metropolitan Planning Organization
- Hidalgo County Metropolitan Planning Organization
- International Boundary and Water Commission
- Killeen-Temple Urban Transportation Study
- Laredo Urban Transportation Study
- Mexican Federal Ministry of Transportation and Communication
- National Marine Fisheries Service
- North Central Texas Council of Governments
- Oklahoma Department of Transportation
- San Antonio-Bexar County Metropolitan Planning Organization
- Sherman-Denison Metropolitan Planning Organization
- State of Tamaulipas, Mexico
- State of Nuevo Leon, Mexico
- State of Coahuila, Mexico
- Texas Commission on Environmental Quality
- Texas Parks and Wildlife Department
- United States Army Corps of Engineers (Fort Worth District)
- United States Army Corps of Engineers (Galveston District)
- United States Army Corps of Engineers (Tulsa District)
- United States Environmental Protection Agency
- United States Fish and Wildlife Service
- United States Department of Agriculture, Natural Resource Conservation Service
- United States Department of Transportation, Surface Transportation Board
- Waco Metropolitan Planning Organization

In addition, 117 public meetings (26 scoping meetings [Spring 2004], 44 meetings [Fall 2004], and 47 meetings [Spring 2005]) were held throughout the study area to gather input on the project throughout the development of the Tier One DEIS. In addition, comments were accepted between public meetings through email and the postal system. Approximately 9,753 people attended the public meetings and a total of 4,336 comments were received.\(^{58}\)

\(^{58}\) Attendance at the public meetings was determined based on signatures at the meeting locations. This number is an estimate because some individuals may have attended more than one meeting.
Chapter 5
Indirect and Cumulative Effects Assessment
TTC-35 Tier One Draft EIS

Step 2: Identification of a Study Area

The study area boundary for this Tier One indirect effects analysis is the Tier One study area. The Tier One study area occupies all or portions of 77 Texas counties and lays primarily parallel to and east of I-35. This study area was delineated in part to avoid the hilly terrain and associated sensitive environmental areas (threatened and endangered species and their habitats, and sensitive Edwards Aquifer recharge and contributing zones) west of I-35. Delineation of the study area also included consideration of:

- other environmental issues (i.e., land use, cultural resources, natural regions, etc.);
- planning and engineering factors;
- transportation factors; and
- public and agency comments obtained during the scoping meetings held in the Spring of 2004.

The process used to delineate the study area is discussed in detail in the Study Area Identification Report (Appendix A-4).

Step 3: Inventory of Study Area

Environmental conditions within the study area are described in Chapter 3 – Affected Environment. The information presented in Chapter 3 utilizes the best available data and mapping information at the time this DEIS was prepared from resource and regulatory agencies, such as, but not limited to the U.S. Census Bureau, EPA, USACE, and USGS. In most cases, data provided in Chapter 3 and the corresponding Appendix C are presented at the county level because it serves as a manageable basis for reporting data at a Tier One level of analysis based on the size of the study area.

Step 4: Identification of Impact-causing Activities of the Selection of a Corridor

Each of the 12 RCAs is a potential TTC-35 corridor, within which a TTC-35 facility(ies), could be constructed and operated, as envisioned in the Plan. Thus, an indirect effect of the selection of a corridor alternative as the Preferred Alternative could be the direct effects of the construction and operation of a TTC-35 facility(ies). Therefore, potential indirect effects for each RCA could include:

- indirect effects associated with the selection of a corridor; and
- direct and indirect effects resulting from the construction and operation of a TTC-35 facility(ies), as envisioned in the Plan.

Under the No Action Alternative, no corridor would be selected. Therefore, the difference between the No Action Alternative and the RCAs, is that each RCA identifies a potential TTC-35 corridor in which a TTC-35 facility(ies) could be constructed and operated.
At this Tier One stage in the project development process of TTC-35 there is no TTC-35 facility(ies) alignment being evaluated. As a result, there is no basis upon which to quantify potential effects on resources as a result of a TTC-35 facility(ies). Accordingly, the indirect effects analysis presented in this Chapter can only describe the types of effects that could occur if a TTC-35 facility(ies) was constructed. This Chapter sets out a qualitative discussion of those effects. The proceeding resource discussions focus on potential effects attributable to the RCAs that would not be expected to occur under the No Action Alternative.

**Step 5: Identification and Analysis of Indirect Effects**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the primary indirect effects that may occur as a result of any TTC-35 facility(ies) constructed with the identified corridor would be effects to land use and the economy. Effects to both land use and the economy may include new commercial, industrial and residential development, labor force relocation, and infrastructure development. However, potential indirect effects may also occur to other resources within the study area. The types of indirect effects that may occur are discussed below.

**Land Use**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to land use would include both the indirect effects to land use of a TTC-35 corridor, and the direct and indirect effects to land use of any TTC-35 facility(ies) constructed within the identified corridor. Land use could be indirectly affected by a TTC-35 corridor because land use in and around a corridor selected from the Tier One decision could change in anticipation of a future TTC-35 facility(ies). Additionally, cities and counties in the vicinity of the selected corridor could alter land use planning and zoning in anticipation of a future TTC-35 facility(ies). Furthermore, additional indirect effects to land use could be anticipated because of the construction of a future TTC-35 facility(ies). Such effects could include, but would not be limited to:

- new industrial and commercial development;
- new residential development;
- labor force relocation; and
- infrastructure development, including transportation and utility.

It cannot be predicted at this time where or how much secondary development would occur as a result of a TTC-35 facility(ies). Much would depend on the location of a TTC-35 facility(ies) and its interaction with existing transportation infrastructure. The RCAs considered in this Tier One DEIS tend to avoid urbanized areas that are relatively well developed. TTC-35 induced development may occur in some currently urbanized areas in response to the increased movement of goods and people. However, it is reasonable to assume that much of the indirect development that would occur as a result of a TTC-35 facility(ies) would occur in rural areas. These areas, by definition, are currently relatively free of development and TTC-35-related development here may have proportionally
greater effects to existing conditions than similar development would have in highly urbanized areas. Development would likely cluster around interchanges providing access to and from a TTC-35 facility(ies). However, not all development would occur at these interchanges or in proximity to a TTC-35 facility(ies) – some development would occur away from the TTC-35 facility ROW. This type of development would be analyzed in any future Tier Two environmental processes for a TTC-35 facility(ies).

**Demographic and Social Effects**

**Neighborhood and Community Cohesion**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to communities would include both the direct and indirect effects to communities from any TTC-35 facility(ies) constructed within the identified corridor.

Effects to neighborhood and community cohesion would be anticipated from the induced growth that could result from the construction of a potential future TTC-35 facility(ies). Although attempts were made to avoid urbanized areas during development of the alternatives, increased transportation infrastructure and new residential areas could develop as a result of the identification of a future TTC-35 facility(ies) alignment. Should a TTC-35 facility(ies) alignment be identified, traffic on nearby facilities that pass through local communities could increase. This increase could prompt the need for additional improvements to these existing transportation facilities to accommodate the increased traffic. Such transportation improvements could adversely affect community cohesion, possibly creating a barrier. Additionally, TTC-35 facilities could concentrate residential development near potential highway interchanges, thus promoting the establishment of new neighborhoods and communities.

**Population**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to population would include both the indirect effects to population from the identification of the corridor, and the direct and indirect effects to population from any TTC-35 facility(ies) constructed within the identified corridor.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, indirect effects to population dispersal patterns could occur. This is because although the selection of a corridor alternative as the Preferred Alternative may not directly affect population growth, it could influence where people choose to locate. For example, some rural areas within or near a corridor selected as the Preferred Alternative in the Tier One decision could become more developed in anticipation of a future TTC-35 facility(ies). Exactly how population dispersal patterns may change would likely differ among the RCAs, but the general effect of some population dispersing in response to the selection of a corridor and/or the construction of future facility(ies) would be similar.
Environmental Justice
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to environmental justice populations would include both the direct and indirect effects to environmental justice populations from any TTC-35 facility(ies) constructed within the identified corridor.

Indirect effects to environmental justice populations could include increased transportation options, increased employment opportunities due to facility construction and new development. Potential adverse effects to environmental justice populations could include the operation of the TTC-35 facility(ies) as a tolled facility, as some low-income persons could be less likely to utilize a tolled facility, and traffic on some local non-tolled alternatives could increase.

Economic Characteristics
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect economic effects would include both the direct and indirect economic effects from any TTC-35 facility(ies) constructed within the identified corridor.

As stated in the need and purpose, TTC-35 is intended to sustain and enhance the economic vitality of the State of Texas. Construction of the TTC-35 facility(ies) alignments would positively affect some local economies of area communities. New employment opportunities would be generated by highway or rail construction activities, in addition to the services required to support a large-scale construction operation. A national FHWA (FHWA, 1997) study on employment impacts of highway investment found that every $1 billion in Federal-aid highway investment supported approximately 42,100 total full-time equivalent jobs. Jobs were further classified as direct or on-site highway construction jobs, indirect or supply industry jobs, and secondary or induced jobs. Direct or on-site highway construction jobs are specifically involved with the highway improvement project such as construction laborers, engineers, and construction managers. Indirect or supply industry jobs are those at firms that supply equipment, materials, and administrative support. Secondary or induced jobs are created when construction-based employees spend their wages on various goods and services throughout the area. Additional economic benefits could occur as a result of the movement of industry to less urban areas in response to the location of a TTC-35 facility(ies). Increased development in the corridor could spur the economy of communities in the vicinity of a TTC-35 facility(ies).

If a TTC-35 facility(ies) is constructed within a selected corridor, an indirect effect of the construction of a facility(ies) would be reduced travel time for users of the facility, and potentially reduced travel time for users of I-35, as a result of reduced congestion.

A 2002 report prepared for TxDOT by the Perryman Group entitled, *The Net Economic Benefits of the Trans-Texas Study Area* modeled and analyzed the economic efficiency gains by industry resulting from the development of the TTC through the year 2025. The
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Indirect and Cumulative Effects Assessment
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report projected gains from the development of the entire TTC system as described in the Plan. Overall effects were derived for each infrastructure component of TTC. The economic efficiencies gained by the development of the TTC-35 corridor are projected to produce approximately 434,000 new permanent jobs at project maturity. Approximately 35 percent of the new jobs are projected to be in the trade sector, with another 27 percent in the services sector. The remaining jobs would be distributed throughout other industry sectors.

The Perryman Group Report also measured the economic development potential of the entire TTC system. The Report assumed that Texas’ share of U.S. output would increase by only one percent over the next several decades as a result of the TTC development. This resulted in 13.5 percent growth in Texas during the development period. The economic development stimulus provided by the full build out of the entire TTC system is expected to create approximately 2,155,000 new permanent jobs, which equates to over $135 billion in annual personal income. These figures are in addition to the jobs and income resulting from greater economic efficiencies.

Additional economic studies to analyze the economic effects of TTC-35 are currently underway.

Negative economic effects could include business relocations that would adversely affect local economies. Additionally, the potential exists for adverse effects to the agriculture industry as a result of agricultural land conversions. Additional effects may include loss of land from local tax rolls. Positive effects could include opportunities for new businesses, expansion of some existing businesses, and new employment opportunities.

Utilities
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to utilities would include both the direct and indirect effects to large-scale utilities from any TTC-35 facility(ies) constructed within the identified corridor.

Effects to utilities could potentially include utility relocations as a result of a TTC-35 facility(ies). Additionally, effects could include future opportunities for utility facility locations within the TTC-35 ROW. TTC-35, as currently envisioned, would include a 200-foot dedicated utility corridor. The presence of this dedicated utility corridor could facilitate the construction of utilities that may otherwise not be constructed and concentrate utility locations within a TTC-35 facility(ies) ROW. Utilities that the corridor may accommodate include water, oil and gas, electricity, and telecommunications. Over time, the utility corridor could have the effect of minimizing large-scale utility-related environmental effects, as large-scale utilities are placed within the dedicated corridor and fewer large-scale utilities are placed in new ROWs.
Air Quality
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to air quality would include both the direct and indirect effects to air quality from any TTC-35 facility(ies) constructed within the identified corridor.

The construction of a TTC-35 facility(ies) could have a positive effect on air quality in urban areas designated as non-attainment that experience a reduction in traffic congestion due to the new facility, as through-traffic could be routed onto the new facility and out of the non-attainment area. For this same reason, air quality could worsen in the rural and relatively undeveloped areas that are in attainment and through which a TTC-35 facility(ies) would pass.

Noise
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect noise and vibration effects would include both the direct and indirect noise and vibration effects from any TTC-35 facility(ies) constructed within the identified corridor.

Noise and vibration effects could include increased background levels as a result of a TTC-35 facility(ies) and associated secondary development. Rail facilities associated with a TTC-35 facility(ies) could cause adverse vibration effects to nearby structures. Positive effects could be realized in urban areas if highway congestion is reduced and freight rail is redirected onto a TTC-35 facility(ies).

Cultural Resources
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to cultural resources would include both the direct and indirect effects to cultural resources from any TTC-35 facility(ies) constructed within the identified corridor.

Adverse effects to cultural resources would include effects related to development along a TTC-35 facility(ies). Such development may not be subject to federal regulations that protect cultural resources because it occurs on privately owned property. Positive effects could include the concentration of transportation and utility infrastructure within a single ROW, which could minimize the effects on cultural resources of transportation and utility projects outside the dedicated corridor.

Parklands
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to parklands would include both the direct and indirect effects to parklands from any TTC-35 facility(ies) constructed within the identified corridor.
Effects to parklands could result from secondary development in communities in proximity to a TTC-35 facility(ies). Encroachment could take place because of street widening or changes in land use. Increased development could also affect noise and visual quality of parklands.

**Section 4(f) Properties**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to properties protected by Section 4(f) would include both the direct and indirect effects to Section 4(f) properties from any TTC-35 facility(ies) constructed within the identified corridor.\(^5^9\)

Effects to properties protected by Section 4(f) could include taking of and encroachment on the property protected by Section 4(f) by TTC-35 facility(ies).

**Section 6(f) Properties**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to Section 6(f) properties would include both the direct and indirect effects to Section 6(f) properties from any TTC-35 facility(ies) constructed within the identified corridor.\(^6^0\)

Effects to properties protected by Section 6(f) could include taking of and encroachment on property by TTC-35 facility(ies) in which Section 6(f) funding has been utilized.

**Prime Farmland Soils**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to prime farmland soils would include both the direct and indirect effects to prime farmland soils from any TTC-35 facility(ies) constructed within the identified corridor.

The construction of a TTC-35 facility(ies) may result in effects to prime farmland soils. Some prime farmland soils may be converted to TTC-35 ROW. Additionally, indirect effects of TTC-35 facility(ies) construction would include those caused by development induced by TTC-35 occurring outside of the TTC-35 ROW, which could result in further losses of prime farmland soils.

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\(^5^9\) Section 4(f), 49 U.S.C. 303, USDOT policy on lands, wildlife and waterfowl refuges, and historic sites as they apply to transportation projects, stipulates that the FHWA “may not approve the use of land [for a transportation program or project] from a significant publicly owned public park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless a determination is made that: (i) There is no feasible and prudent alternative to the use of land from the property; and (ii) The action includes all possible planning to minimize harm to the property resulting from such use.”

\(^6^0\) Section 6(f) of the *Land and Water Conservation Fund Act (LWCA) of 1965* (16 USC 460l - 460l-11) applies to programs and policies of any agency. The purpose of this Act is to “assist in preserving, developing, and assuring accessibility to outdoor recreation resources and to strengthen the health and vitality of U.S. citizens by providing funds and authorizing federal assistance to states in planning, acquiring and developing land and water areas and facilities, and by providing funds for federal acquisition and development of lands and other areas.”
Water Resources
Rivers and Reservoirs – Including Water Quality Issues
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to surface waters would include both the direct and indirect effects to surface waters from any TTC-35 facility(ies) constructed within the identified corridor.

Surface waters could be adversely affected where a TTC-35 facility(ies) crosses streams, rivers, and other surface waters. Effects from water crossings could include increased erosion and sedimentation, change in stream hydraulics, clearing of riparian habitat, degraded water quality from road run-off, and degradation of aquatic habitat. Additionally, existing water quality issues may be exacerbated by increased sedimentation and run-off.

Groundwater Resources/Aquifers
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to aquifers would include both the direct and indirect effects to aquifers from any TTC-35 facility(ies) constructed within the identified corridor.

Effects to major and minor aquifers from the construction of at TTC-35 facility(ies) could include increased sedimentation, increased impervious cover could cause loss of filtration, and facility-related run-off could contribute pollutants to recharge. Recharge could also be reduced as a result of secondary development. Additionally, land use changes in contributing zones could alter aquifer recharge characteristics.

Flood-prone Areas
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to flood-prone areas from the identification of a corridor alternative as the Preferred Alternative would include both the direct and indirect effects to flood-prone areas from any TTC-35 facility(ies) constructed within the identified corridor.

The construction of a TTC-35 facility(ies) could cause effects to flood-prone areas by directly and indirectly causing development in flood-prone areas.

Wetlands
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to wetlands would include both the direct and indirect effects to wetlands from any TTC-35 facility(ies) constructed within the identified corridor.

Filling and dredging activities are regulated by the USACE. Construction of a TTC-35 facility(ies) and related development could result in the loss and/or degradation of wetlands from filling and dredging activities. During construction, effects could include
sedimentation, changes in stream hydraulics, or clearing of vegetation in riparian areas. These effects could degrade typical wetland function and values of downstream waters of the U.S. Operation of a TTC-35 facility(ies) and other related transportation facilities would also have the potential to degrade wetlands due to roadway run-off and sedimentation. Secondary development as a result of a TTC-35 facility(ies) could also adversely affect wetlands.

**Physiography and Topography**

**Soils and Topography**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to soils would include both the direct and indirect effects to soils from any TTC-35 facility(ies) constructed within the identified corridor.

Construction of a TTC-35 facility(ies) and associated development would result in a direct loss of some soils as a result of soils being removed from construction sites. Future construction may expose some geologic resources to erosion. This type of exposure would be of short duration and is usually associated with grading, excavation, and placement of fill material. Typically, soils would be removed from the ROW and the remaining soils would be subject to compaction and increased erosion potential. These effects would be short-term, localized, and manageable. Additionally, increased soil disturbance and loss of productivity could result from secondary development.

**Mineral Resources**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to mineral resources would include both the direct and indirect effects to mining activities from any TTC-35 facility(ies) constructed within the identified corridor.

The construction of a TTC-35 facility(ies) could facilitate the movement of mine-related products throughout Texas. Many active mines and permitted mine areas could be avoided during Tier Two environmental processes, and thus productivity at the avoided locations would not be affected. Secondary development could occur on non-permitted areas that would reduce their potential as a future mining site.

**Wildlife, Terrestrial and Aquatic Communities**

**Vegetation**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to vegetation would include both the direct and indirect effects to vegetation from any TTC-35 facility(ies) constructed within the identified corridor.

Construction of a TTC-35 facility(ies) and associated development would result in a direct loss of vegetation as a result of vegetation being removed from construction sites. Some construction sites would be revegetated and maintained as managed ROW. Additional loss of vegetation could result from secondary development. Changing the
structure of natural communities could promote the introduction and establishment of invasive vegetation.

**Wildlife**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to wildlife would include both the direct and indirect effects to wildlife from any TTC-35 facility(ies) constructed within the identified corridor.

Potential effects to wildlife due to construction and operation of a future TTC-35 facility(ies) include habitat fragmentation, mortality, feeding and nesting disruption, displacement, and habitat loss. The extent to which a TTC-35 facility(ies) may cause these effects would depend on many factors including (and not limited to) utilization of existing transportation ROWs and the occurrence of wildlife habitats in the project area. Similar effects could be realized due to secondary development.

**Threatened, Endangered, and Candidate Species**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to federally and/or state-listed threatened, endangered, and candidate species, including both plant and animal species, would include both the direct and indirect effects to federally and state-listed threatened, endangered, and candidate species from any TTC-35 facility(ies) constructed within the identified corridor.

Potential effects to federally and/or state-listed threatened, endangered, and candidate species due to construction and operation of a future TTC-35 facility(ies) include habitat fragmentation, mortality, feeding and nesting disruption, displacement, and habitat loss. The extent to which a TTC-35 facility(ies) may cause these impacts would depend on many factors including (and not limited to) utilization of existing transportation ROWs and the occurrence of wildlife habitats in the project area. Similar effects could be realized due to secondary development.

**Significant Publicly Owned and Privately Held Terrestrial and Aquatic Habitats**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect effects to significant publicly owned and privately held terrestrial and aquatic habitats would include both the direct and indirect effects to significant publicly owned and privately held terrestrial and aquatic habitats from any TTC-35 facility(ies) constructed within the identified corridor.

Effects to significant publicly owned and privately held terrestrial and aquatic habitats could include the direct loss of habitats and reduction in the value and function of some habitats. The latter could occur where areas are fragmented or encroached upon to the point that they do not function well as habitats. Location of a TTC-35 facility(ies) near some of these habitats could provide increased public access which could lead to positive
effects (increased awareness, increased recreational use) and negative effects (increased human presence).

**Designated Critical Habitat**
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, designated critical habitat could be indirectly affected if a TTC-35 facility(ies) in that corridor directly and/or indirectly affected such habitat. None of the RCAs under consideration contain designated critical habitat, though such habitat could be designated in the selected corridor in the future. If critical habitat is designated in the future within the selected corridor, and if that habitat was within a TTC-35 facility(ies) alignment, that habitat would likely be directly affected by the construction and operation of a TTC-35 facility within that alignment. Currently designated and future critical habitat located outside of a TTC-35 facility(ies) alignment could be indirectly affected by a TTC-35-induced secondary development.

**Visual and Aesthetic Resources**
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect visual and aesthetic effects would include both the direct and indirect visual and aesthetic effects from any TTC-35 facility(ies) constructed within the identified corridor.

A future TTC-35 facility(ies) would alter the urban and rural setting in which it is constructed. Effects to visual quality would take two forms: views of the proposed facility from various points, and views from a proposed facility of the surrounding landscape. Secondary development would also affect visual quality of the areas in which a facility is constructed.

**Hazardous Waste Sites**
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect energy effects to hazardous waste sites and landfills would include both the direct and indirect effects to hazardous waste sites and landfills from any TTC-35 facility(ies) constructed within the identified corridor.

Construction of a TTC-35 facility(ies) and associated secondary development could result in the identification, potential avoidance, and remediation of hazardous waste sites.

**Energy**
If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect energy effects would include both the direct and indirect energy effects from any TTC-35 facility(ies) constructed within the identified corridor.

The construction of a TTC-35 facility(ies) could have a positive effect on energy in urban areas that experience a reduction in traffic congestion due to the new facility, as thru-traffic could be routed on to the new facility and out of the urban area. For this same
reason, energy expenditures could increase on the local non-tolled facilities if local traffic congestion increases.

**Construction Effects**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the indirect construction effects would include both the direct and indirect construction effects from any TTC-35 facility(ies) constructed within the identified corridor.

Transportation facility construction can create short-term construction-related effects that are unique from the long-term effects. Construction-related effects vary in nature due to components of the proposed facility, but typically include air quality effects resulting from dust and emissions from heavy equipment, temporary increases in noise, loss of vegetation resources due to clearing with the ROW, and water quality effects resulting from erosion and sedimentation. In addition, construction of a TTC-35 facility(ies) would positively affect some local economies of area communities. These positive effects were previously discussed in more detail in the *Economic Characteristics* section of this Chapter.

**Summary of Identification and Analysis of Indirect Effects**

In summary, all 13 alternatives (No Action Alternative and 12 RCAs) were evaluated for indirect effects. Based on the evaluation of the potential indirect effects presented in this DEIS, no environmental factors were determined to preclude any of the RCAs from selection as the Preferred Alternative. Therefore, at the Tier One level of analysis, indirect effects are not a differentiating factor in the identification of a preferred corridor alternative based on the analysis performed for the DEIS.

**Step 6: Mitigation and Enhancement Strategies**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, efforts would be made during Tier Two environmental processes to avoid and/or minimize the effects of a future TTC-35 facility(ies) on environmental resources. Specific mitigation strategies for individual resources are summarized below.

*Environmental Justice* - In accordance with EO 12898, efforts would be made to avoid and/or minimize disproportionate or adverse effects of a TTC-35 facility(ies) on minority and low-income populations (U.S. Executive Office of the President, 1994). However, if effects could not be avoided, efforts to identify potential mitigation would be conducted during Tier Two environmental processes.

*Relocations* - In accordance with TxDOT policy, no person would be displaced by the proposed project until adequate decent, safe, and sanitary housing was made available as described in the *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended. Relocation benefits and assistance would be made available without regard to race, color, religion, national origin, sex, age, or handicap in
accordance with *Title VI of the Civil Rights Act of 1964* and *Title VIII of the Civil Rights Act of 1968*, or based on standards and applicable laws and regulations at the time the Tier Two environmental processes occur.

**Utilities** - If effects could not be avoided in accordance with Section 4, Utility Adjustments, of the TxDOT *Project Development Process Manual* (August, 2003), TxDOT’s policy is to provide early notification to utility owners as a project moves from the conceptual stage into design (TxDOT, 2003). Detailed design would occur only after the completion of Tier Two environmental processes. TxDOT would consult with the PUCT and the utility owner to minimize effects to these properties in order to reach a definitive agreement concerning potential mitigation measures.

**Cultural Resources** - If effects to cultural resources could not be avoided, efforts to avoid, minimize or mitigate adverse effects would be developed and implemented in accordance with the provisions of the PA between the THC and TxDOT (TxDOT, 2005f) and the Section 106 PA.

**Section 4(f) Properties** - Should lands protected by Section 4(f) be affected by a potential TTC-35 facility(ies), it must be demonstrated that all possible planning to minimize harm to the resource has been undertaken. At that time, consultation with the appropriate federal, state, and local agencies would occur and efforts would be made to avoid, minimize, and mitigate potential harm of any Section 4(f) lands in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur.

**Section 6(f) Properties** - Should lands protected by Section 6(f) be impacted by a potential TTC-35 facility(ies), it must be demonstrated that all possible planning to minimize harm to the resource has been undertaken. At that time, consultation with the appropriate federal, state, and local agencies would occur and efforts would be made to avoid, minimize, and mitigate potential harm of any Section 6(f) lands in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur.

**Farmland Soils** - If Tier Two environmental processes determine direct effects to prime farmland soils would be unavoidable, the *Farmland Conversion Impact Rating for Corridor Type Projects* (Form AD-1006) would be completed and coordination with NRCS would be conducted in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur.

**Surface Waters** - Mitigation measures and Best Management Practices (BMP) would be implemented where feasible and appropriate, or as set forth in any USACE Section 404 permit; Storm water, Pollution, Prevention Plan (SW3P); and/or National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP). TxDOT would comply with all requirements of the CWA, as amended, for the construction of a
TTC-35 facility(ies). Mitigation could include the development of wetland mitigation banks, the restoration of riparian corridors, conservation easements, etc.

**Wetlands** - Coordination would be required with the USACE for any effects to wetlands. Compensatory mitigation is not normally considered until anticipated impacts to waters of the U.S. have been avoided and minimization to the maximum extent possible. It is recognized that “no net loss of wetlands” functions and values may not be achieved in every permit action. Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts that remain after all appropriate and practicable minimization has been achieved. Compensatory actions often include restoration, creation, and enhancement of waters of the U.S., specifically wetlands.

**Critical Habitat** - Habitats given consideration for non-regulatory mitigation include: habitat for federal candidate species (impacted by the project) if mitigation would assist in the prevention of listing the species; rare vegetation series (S1, S2, S3) that also locally provides habitat for a state-listed species; all vegetation communities listed as S1 or S2, regardless of whether or not the series in question provides habitat for state-listed species; bottomland hardwoods, native prairies, riparian sites; and any other habitat feature considered locally important (TxDOT, 1998). Efforts would be made during Tier Two environmental processes to minimize impacts to vegetation from a TTC-35 facility(ies). In addition, TxDOT would coordinate with the TPWD for compensatory mitigation for any vegetation community impacts in accordance with Provision (4)(A)(ii) of the TxDOT-TPWD MOU (TxDOT, 1998).

**Wildlife, Threatened and Endangered Species** - Coordination with the USFWS would be required for effects to threatened and endangered species. If effects could not be avoided, efforts to analyze effects and identify potential mitigation would be conducted in accordance with standards and applicable laws and regulations at the time Tier Two environmental processes. There are several options when developing a mitigation plan to reduce wildlife mortality, increase human safety, and enhance ecosystems. These options include, but are not limited to, roadside revegetation, fencing, mitigation banking (such as wetlands), increased usage of wildlife crossing signs, and/or the usage of high frequency whistles. Including “ecosystem or habitat connectivity” or “connectivity zones” in the project planning and design is an example of practical strategies for reducing the transportation impacts on wildlife movement and populations. Several crossing and/or connector mechanisms are available for maintaining habitat connectivity. Mitigation for specific wildlife species and/or habitats may be required by the regulatory agencies. To date, such agencies have not officially identified any one specific species or unique habitat within the study area as requiring a crossing or any other specific mitigation practice. Mitigation for impacts to threatened and endangered species and critical habitats could include funding for conservation easements, the preparation of habitat conservation plans, and/or payment to a conservation fund set up to benefit the species.

**Aesthetics** - The use of naturally vegetated medians, minimizing ROW clearing, benching of rock cuts, utilizing retaining walls, and promoting roadside native wildflower planting
or similar types of programs would create a more aesthetically pleasing TTC-35 facility(ies) that minimizes visual effects. Native plants would be considered for roadside vegetation where practicable, to improve the visual aesthetics and to control the introduction and spread of invasive species. These types of measures can serve to mitigate the views of the roadway and help to minimize effects to the natural beauty of the area. In areas where a roadway is visible to residences, landscaping with evergreens and shrubs can act as screens and can help to soften views of the road.

Hazardous Waste - Any hazardous waste sites that could not be avoided would be assessed and handled according to all applicable federal, state, and local laws, rules, and regulations. If effects could not be avoided, efforts to analyze effects and identify potential mitigation would be conducted in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur.

Step 7: Proposed Tier Two Indirect Effects Assessment Method

If the Tier One decision results in a corridor alternative as the Preferred Alternative and TTC-35 advances to Tier Two environmental process, those Tier Two NEPA documents would focus on an individual TTC-35 facility(ies). At that point in the project development process, alignment-level preliminary design information for a proposed TTC-35 facility(ies) would be available to allow a quantitative analysis to evaluate indirect effects of a TTC-35 facility(ies). Although the exact process used to evaluate indirect effects of individual TTC-35 facilities would be determined during Tier Two environmental processes, the indirect effects assessment would follow a process as outlined in the TxDOT guidance on accessing indirect effects that is currently under development.

In general, transportation improvement projects often reduce transportation costs and improve accessibility to surrounding land for individuals and businesses. Increased accessibility can lead to induced growth effects specifically related to land use changes as vacant land is developed for residential or commercial uses and the existing built environment is converted to more intensive uses based on increased pressures and demands. Induced growth effects to the natural, cultural, and social environments will vary depending on the specific location of a TTC-35 facility(ies). Potential indirect impacts associated with the development of a TTC-35 facility(ies) that could be assessed during the Tier Two process include, but are not limited to:

Land Use - could be altered as a result of secondary development that requires or leads to changes in land use.

Neighborhood and Community Cohesion - could be altered as a result of secondary development that disrupts neighborhoods and/or communities.

Environmental Justice - potential indirect effects could be positive and/or negative depending on resulting development patterns, potential long-term shifts in population characteristics, and creation of new employment opportunities.
Agricultural Land - in some places access to some agricultural lands could be impeded by some secondary development, while secondary development of a transportation facility(ies) could improve access to some agricultural lands in other places.

Economy - indirect economic effects could include loss of some jobs and disruption of businesses, reduction in local or county tax roles as land is converted to a TTC-35 use, and the creation of new jobs and business opportunities. Furthermore, the indirect effects of tolling would be considered during Tier Two environmental processes for any TTC-35 facility(ies) proposed to be tolled.

Cultural Resources - some cultural resources could be impacted by secondary development.

Prime Farmland Soils - some prime farmland soils could be lost when incorporated into secondary development.

Water Resources - some surface water and groundwater resources could be affected by secondary development.

Air Quality and Noise - air quality and noise could be altered especially where secondary development occurs in relatively undeveloped areas.

Wildlife - in some places wildlife could be displaced by secondary development, and wildlife habitats could be adversely affected.

5.2 CUMULATIVE EFFECTS ASSESSMENT
The cumulative effects assessment presented in this section is based on the 8-step approach described in the TxDOT Interim Guidance on Preparing Cumulative Impact Analyses (TxDOT, 2006). The Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact Considerations in the NEPA Process (Memorandum issued by FHWA on January 31, 2003) was also referenced. However, since the TxDOT 8-step approach does not address cumulative effects at a Tier One level of analysis, the approach was modified for a Tier One level of analysis. The specific steps used in TTC-35 Tier One cumulative effects assessment are listed in Table 5-2 along with the corresponding TxDOT step.

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61 The CEQ's Considering Cumulative Effects Under the National Environmental Policy Act, Council on Environmental Quality, Office of the President (CEQ, 1997) and the CEQ memorandum regarding Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (CEQ, 2005) were also references in developing this cumulative effects assessment.
Table 5-2: Method for Assessing Cumulative Effects Associated with the TTC-35 Tier One Decision

<table>
<thead>
<tr>
<th>Assessment Step</th>
<th>Description</th>
<th>Corresponding Texas Department of Transportation Interim Guidance on Preparing Cumulative Impact Analyses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Scoping to Identify the Significant Cumulative Effects Issues Associated with TTC-35</td>
<td>Step 1 (Identify resources to consider in the cumulative impact analysis)</td>
</tr>
<tr>
<td>Step 2</td>
<td>Define the Geographic Scope for the Analysis</td>
<td>Step 2 (Define the study area for each resource)</td>
</tr>
<tr>
<td>Step 3</td>
<td>Define the Time Frame for the Analysis</td>
<td>Step 3, Part B (Describe the current health and historical context for each resource)</td>
</tr>
<tr>
<td>Step 4</td>
<td>Identify Other Actions Affecting the Environmental Resources of Concern</td>
<td>Step 5 (Identify other reasonably foreseeable actions that affect each resource)</td>
</tr>
<tr>
<td>Step 5</td>
<td>Characterize the Resources of Concern and Identify the Cause-and-Effect Relationships Between Human Activities and the Resources</td>
<td>Step 3 (Describe the current health and historical context for each resource)</td>
</tr>
<tr>
<td>Step 6</td>
<td>Determine the magnitude and significance of cumulative effects</td>
<td>Step 4 (identify the direct and indirect impacts of the proposed project that might contribute to a cumulative impact)</td>
</tr>
<tr>
<td>Step 7</td>
<td>Mitigation and enhancement strategies</td>
<td>Step 8 (Assess the need for mitigation)</td>
</tr>
<tr>
<td>Step 8</td>
<td>Proposed Tier Two cumulative effects assessment method</td>
<td>No corresponding step in TxDOT 8-step approach. Therefore, this step was added for Tier One level of analysis.</td>
</tr>
</tbody>
</table>

62 The CEQ’s Considering Cumulative Effects Under the National Environmental Policy Act, Council on Environmental Quality, Office of the President (CEQ, 1997) and the CEQ memorandum regarding Guidance on the Consideration of Past Actions in Cumulative Effects Analysis (CEQ, 2005) were also references in developing this cumulative effects assessment.

63 The TxDOT Interim Guidance step 7 is to report the results of the analysis. The entire Section 5.2 of this Tier One DEIS reports the results of the analysis.
Step One: Scoping to Identify the Significant Cumulative Effects Issues Associated with TTC-35

Scoping to gather data and other information for TTC-35 to use in this cumulative effects analysis was conducted with the federal, state, regional and local agencies, including Oklahoma and Mexico. The federal, state, and Mexican agencies that were contacted to gather input from are listed in Table 5-3.

<table>
<thead>
<tr>
<th>Table 5-3: Federal and State Agency List - Cumulative Effects Scoping</th>
</tr>
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<tbody>
<tr>
<td>Texas Water Development Board</td>
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<tr>
<td>Texas Railroad Commission</td>
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<tr>
<td>Texas Parks and Wildlife Department</td>
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<tr>
<td>Texas Commission on Environmental Quality</td>
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<tr>
<td>Texas General Land Office</td>
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<tr>
<td>International Boundary and Water Commission</td>
</tr>
<tr>
<td>U.S. Forest Service</td>
</tr>
<tr>
<td>U.S. Army Corps of Engineers (Fort Worth, Galveston, and Tulsa districts)</td>
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<tr>
<td>U.S. Environmental Protection Agency</td>
</tr>
<tr>
<td>National Park Service</td>
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<tr>
<td>National Oceanic and Atmospheric Administration</td>
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<tr>
<td>National Marine Fisheries Service</td>
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<tr>
<td>U.S. Department of Agriculture, National Resource Conservation Service</td>
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<tr>
<td>U.S. Fish and Wildlife Service</td>
</tr>
<tr>
<td>U.S. Department of Transportation – Surface Transportation Board</td>
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<tr>
<td>Oklahoma Department of Transportation</td>
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<tr>
<td>Mexican Federal Ministry of Transportation and Communication</td>
</tr>
<tr>
<td>State of Tamaulipas, Mexico</td>
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<tr>
<td>State of Nuevo Leon, Mexico</td>
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<td>State of Coahuila, Mexico</td>
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The regional and local agencies that were contacted to gather input from are listed in Table 5-4.
<table>
<thead>
<tr>
<th>Anderson County</th>
<th>Alice Chamber of Commerce</th>
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<td>San Antonio-Bexar County Metropolitan</td>
<td>San Marcos Chamber of Commerce</td>
<td>Greater San Marcos Economic Development</td>
<td>San Patricio County</td>
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Table 5-4 - Regional and Local Agency List - Cumulative Effects Scoping
### Table 5-4 - Regional and Local Agency List - Cumulative Effects Scoping

<table>
<thead>
<tr>
<th>Planning Organization</th>
<th>Corporation</th>
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<tr>
<td>Schertz Economic Development</td>
<td>Seguin Area Chamber of Commerce</td>
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<tr>
<td>Smith County</td>
<td>Somervell County</td>
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<tr>
<td>Tarrant County</td>
<td>Taylor Chamber of Commerce</td>
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<td>Van Zandt County</td>
<td>Greater Waco Chamber of Commerce</td>
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<tr>
<td>Weslaco Chamber of Commerce</td>
<td>Weslaco Economic Development Corporation</td>
</tr>
<tr>
<td>Wise County</td>
<td>Wood County</td>
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In addition, 117 public meetings (26 scoping meetings [Spring 2004], 44 meetings [Fall 2004], and 47 meetings [Spring 2005]) were held throughout the study area to gather input on the project throughout the development of the Tier One DEIS. In addition, comments were accepted between public meetings through email and the postal system. Approximately 9,753 people attended the public meetings and a total of 4,336 comments were received.64

As a result of the agency coordination and public involvement process for TTC-35, three major resources were identified to which require an evaluation of the cumulative effects of TTC-35 at a Tier One level of analysis. These three resources are:

1. Wetlands;
2. Rural/agricultural land; and
3. Economic Effects on the State of Texas.

Wetlands were identified for an assessment of cumulative effects of TTC-35 at the Tier One level of analysis because they are a regulated resource and the USACE, which is a cooperating agency in the development of this Tier One DEIS, expressed concern regarding effects to wetlands as a result of TTC-35.

Rural/agricultural land was identified for an assessment of cumulative effects of TTC-35 at the Tier One level of analysis because concerns about the effects of TTC-35 on rural/agricultural land was the most common comment received during the public involvement process. Furthermore, during agency coordination, both the TPWD and the NRCS expressed specific concerns about the potential loss of land through conversion to a transportation use.

The economic effects of TTC-35 on the State of Texas were identified for an assessment of cumulative effects of TTC-35 at the Tier One level of analysis because public comments expressed interest in the potential positive economic effect of TTC-35 on the economy of Texas.

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, the cumulative effects to other environmental resources within the study area would include the direct effects (which are discussed in Chapter 4 – Environmental Consequences) and indirect effects (discussed in Chapter 5.1 – Indirect Effects) of a future TTC-35 facility(ies), as well as those effects of other past, present, and reasonably foreseeable future actions regardless of whether or not they are transportation-related. An analysis would need to be performed to ascertain the cumulative impacts on the following:

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64 Attendance at the public meetings was determined based on signatures at the meeting locations. This number is an estimate because some individuals may have attended more than one meeting.
• Land use;
• Neighborhood and community cohesion;
• Environmental justice;
• Utilities;
• Air quality;
• Noise;
• Cultural resources;
• Parklands;
• Section 4(f) properties;
• Section 6(f) properties;
• Rivers and reservoirs;
• Groundwater resources/aquifers;
• Flood-prone areas;
• Soils and topography;
• Mineral resources;
• Vegetation;
• Wildlife;
• Threatened, endangered, and candidate species;
• Significant publicly owned and privately held terrestrial and aquatic habitats;
• Designated critical habitat;
• Visual and aesthetic resources;
• Hazardous waste sites; and
• Energy.

Step Two: Define the Geographic Scope of the Analysis

The geographic scope of this cumulative effects analysis was resource specific. The Tier One study area covers approximately 52,500 square-miles, or approximately 20 percent of the total area of Texas. The geographic scope for assessing the cumulative effects of TTC-35 at a Tier One level of analysis on wetlands and agricultural/rural lands was defined as the TTC-35 Tier One study area because a TTC-35 fully built facility alignment would only comprise 0.23 percent of the study area. Thus, the study area was determined to be of sufficient size to evaluate cumulative effects on the economy from TTC-35 at a Tier One level of analysis. The geographic scope for the economic cumulative effects analysis was much broader. A future TTC-35 facility(ies) may have potential cumulative effects on the economy of adjacent states within the sphere of influence of the facility.

Step Three: Define the Time Frame of the Analysis

This cumulative effects analysis evaluates the past (defined as 1972 to 2001), present (defined as 2002 to 2005), and reasonably foreseeable future (defined as 2006 to 2030). The year 1972 was used as the past time frame because 1972 is the first year land cover
imagery data was available that covered the entire study area. The year 2030 was used for the reasonably foreseeable future because FHWA regulations and under 23 CFR 450.322 require metropolitan transportation plans cover a 20-year planning horizon. Currently, the plans of the MPOs within the study area typically extend to the year 2030. Furthermore, the planning horizon for local land use plans is typically for a 20 to 30-year period. Beyond these dates, reliable data on the past, present and reasonably foreseeable future was not available for the entire study area and would be speculative and weaken the technical integrity of this cumulative effects analysis.

**Step Four: Identify Other Actions Affecting the Environmental Resources of Concern**

Other actions occurring in the study area that may affect wetlands, rural/agricultural lands, and the economy include transportation projects as well as other major federal, state, or privately funded actions. The effects of these other actions would occur under the No Action Alternative as well as the RCAs.

Information from TxDOT’s database was available for highway projects implemented between 1992 and 2005. In addition, information was obtained from TxDOT’s database for projects scheduled to be let to construction through the year 2030. Figures 5-1 through 5-4 illustrate the past, present and reasonably foreseeable future highway projects in the study area based on the information in TxDOT’s database. In addition, Appendix E-1 provides listings of past, present and reasonably foreseeable future highway projects based on the information contained in TxDOT’s database.

Information was obtained from the American Association of Railroads regarding rail projects implemented between 1972 and 2005. Figure 5-5 shows the past and present rail lines within the study area. In addition, information was obtained from the TxDOT Texas Rail Systems Plan (TxDOT, 2005e) on rail project planned through the year 2030. Figure 5-6 shows the reasonably foreseeable future rail projects within the study area. In addition, Appendix E-1 provides information on past, present and reasonably foreseeable future rail projects based on the information obtained from the Association of Railroads and the Texas Rail Systems Plan.

Land cover data from 1972 through 2002 were used to show the changes in land cover. Figures 5-7 through 5-10 show the change in developed land between 1972 and 2002. This data were used to capture the past and present changes in development within the study area. Data were obtained from the agencies listed in Table 5-3 regarding reasonably foreseeable future land development projects. The list of reasonably foreseeable future land development projects is included in Appendix E-1. The explanation of the method used to evaluate the land cover data is included in Appendix E-2.

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65The land cover classifications used in this cumulative effects analysis were developed using Landsat imagery from 1972 and 2002.
Step Five: Characterize the Resources of Concern

Step 1 identified the resources of concern with regard to the cumulative effects of TTC-35 at the Tier One level of analysis as wetlands, rural/agricultural lands, and economic effects. As explained in Step 1, these resources were identified based on agency scoping and public involvement. Each resource is characterized below.

Wetlands
As previously described in Chapter 3 – Affected Environment, the locations within the study area of potential wooded and emergent wetlands were based on the 1992 NLCD (USGS, 1992). These data were the best available data that covered the entire study area. General descriptions of typical wooded and emergent wetlands are addressed by major river basin within the study area counties. It is important to note that wetlands identified by the NLCD are not necessarily jurisdictional wetlands as defined by Section 404 of the CWA. These data in combination with data collected for the cumulative effects assessment provide a baseline for wetlands.

For the purposes of the cumulative effects analysis, the amount of mapped wetlands within the study area counties in 1972 was compared to the amount mapped in the 2002 land cover data. The amounts were compared to identify trends in wetlands in the study area. Based on the data evaluated, there was approximately a 35 percent increase in the amount of wetlands mapped within the study area from 1972 to 2002. Seventy-one percent of the study area counties measured an increase in the amount of wetlands mapped within the county. In the northern and central regions, the increase was approximately 60 percent, and in the southern region, there was a loss of approximately 9 percent. Figures 5-11 through 5-14 show the change in wetlands within the study area from 1972 to 2002.

Changes in the regulatory process in the past 30 years have yielded substantial changes in the abundance of wetlands. The Federal mandate of “no net loss” to wetlands has ensured that current numbers will not decrease without changes to legislation allowing effects to wetlands.

The overall increase in wetlands within the study area is likely due to the following factors:

1. Changes in the regulation of wetlands which have helped to ensure there is “no net loss of wetlands”;
2. Changes between how the 1992 and 2002 NLCD classified wetlands (areas classified in 1992 as forest were classified as palustrine wetlands in 2002); and,
3. Technology used to map wetlands has improved in the 30-year period evaluated (more spectral diversity exist to present mapping technology, which creates better ways of finding “wet” areas).
Rural/Agricultural Lands

A wide variety of comments were received from the public as a result of TTC-35 scoping efforts and public meetings. Two frequently received comments could best be summarized as “the project [TTC-35] would destroy high-quality farmland” and “the project would destroy the rural/agricultural ways of life.” These two comments are related as they both express a concern that agricultural pursuits, which are most often associated with rural land, could be affected by TTC-35. The following three data sets were used in this cumulative effects analysis to characterize agriculture-related trends:

1. Land Cover Data;
2. USDA National Agricultural Statistics Service Data (2002 Census of Agriculture); and,
3. NRCS Prime Farmland Soils Data.

Land Cover Data

Land cover data was identified by reviewing satellite imagery to determine the presence of agricultural land. Several land classifications, including orchards/vineyards/other, pasture/hay, row crops, small grains, fallow, and urban/recreational grasses, were combined for the purposes of analysis to create an “agricultural land” class. The amount of mapped agricultural land within the study area counties in 1972 was compared to the amount mapped in the 2002 land cover data to identify changes in agricultural lands within the study area. Figures 5-15 through 5-18 show the change in agricultural land from 1972 to 2002 within the study area counties. From 1972 to 2002, there was approximately a 10 percent increase in the amount of agricultural land mapped within the study area. Seventy-one percent of the 77 study area counties measured an increase in the amount of agricultural land mapped within the county. In the northern region, there was approximately a 5 percent increase in the amount of land identified as agricultural. In the central region, the increase was approximately 24 percent, and there was an increase of approximately 15 percent in the southern region. These increases could partially be attributed to changes in the quality of the data collected in 1972 versus the data collected in 2002. Additionally, the only land classification that showed a loss between 1972 and 2002 was forested lands.

USDA National Agricultural Statistics Service 2002 Census of Agriculture Data

The USDA National Agricultural Statistics Service (NASS) defines a farm as "any establishment from which $1,000 or more of agricultural products were sold or would normally be sold during the year." (USDA-NASS, 2006a). As shown in Chart 5-1, the USDA-NASS 2002 Census of Agriculture shows the amount of farmland in Texas is declining. In fact, from 1972 to 2002, the number of acres of farmland decreased from 142,000 thousand acres to 130,500 thousand acres, respectively. As shown in Chart 5-2, during that same time, the number of farms in Texas increased from 209,000 in 1972 to 230,000 in 2002.
Chapter 5
Indirect and Cumulative Effects Assessment
TTC-35 Tier One Draft EIS

Chart 5-1 - Texas Land in Farms from 1972 to 2002

Source: USDA-NASS, 2006b, 2002 Census of Agriculture

Chart 5-2 - Texas Farms from 1972 to 2002

Source: USDA-NASS, 2006b, 2002 Census of Agriculture
NRCS Prime Farmland Soils Data

As was previously mentioned in Chapter 3 - Affected Environment (3.9 Prime Farmland Soils), prime farmland soils are defined by the USDA as soils that are best suited for the production of food, feed, forage, fiber, and oilseed crops. The counties located within the study area consist of approximately 16 million acres currently designated as prime farmland.

NRCS prime farmland soils data were compared to areas mapped as developed land from 1972 and 2002 land cover data. **Figures 5-19 through 5-22** show the change in prime farmland soils from 1972 and 2002. In 1972, there were 370,000 acres of prime farmland soils under developed land within the study area counties. In 2002, prime farmland soils under developed land had increased to 601,000 acres within the study area counties. Over the thirty-year period, a 38 percent increase of urbanization occurred over prime farmland soils.

**Economic Characteristics**

Baseline economic data for the study area and the State of Texas are included in Chapter 3 - Affected Environment. As discussed in Chapter 3, similar to the national economy, Texas has experienced substantial growth in service industry employment combined with a substantial decline in manufacturing employment. In Texas, service industry employment (e.g. professional, technical, & business services, food, entertainment, health care, education, waste management, and arts) grew from 20 percent to 30 percent of total employment from 1980 to 2001. During this period, manufacturing employment declined from 14 percent to 9 percent. Prior to 1980, the oil industry greatly dominated the Texas economy. However, beginning in the early 1980s, the oil and gas industry steadily decreased its role in the Texas economy. Presently, services are an important segment of the Texas economy and manufacturing has become more highly technical. As a result, in the industry shift, the Texas economy is less volatile and employment tends to be more closely mirroring the U.S. employment rate.

**Step Six: Identify the Cause-and-Effect Relationships Between Human Activities and the Resources and Determine the Magnitude and Significance of Cumulative Effects Resulting from a TTC-35 Corridor**

In the absence of a TTC-35 facility(ies) alignment, it is not possible to quantitatively predict the magnitude or significance of the effects on wetlands, rural/agricultural lands, or the economy of Texas. Therefore, the discussion below qualitatively presents the potential cumulative effects to wetlands, rural/agricultural lands, and the Texas economy. Furthermore, it should be noted if the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, no construction-related activities will be authorized. The types of effects to wetlands, rural/agricultural lands, and the economy of Texas described below could incrementally occur as a result of TTC-35 only if a TTC-35 facility(ies) advanced to Tier Two environmental processes and were constructed. Therefore, if no TTC-35 facilities are approved through Tier Two environmental processes, none of the effects described below would result from TTC-35.
Wetlands
Cumulative effects to wetlands would include those direct effects to wetlands discussed in Chapter 4 – Environmental Consequences - Water Resources - Wetlands (direct effects) and those indirect effects to wetlands described in the previous section (Section 5.1 – Indirect Effects), as well as the effects caused by the projects listed in Appendix E-1. It should be noted that effects caused by projects listed in Appendix E-1 would be common to all RCAs and to the No Action Alternative. The most common cause and effect issue is land conversion from wetlands to other uses, primarily urban/developed land. As a result of such development, stresses on wetlands may include water quality effects, changes in water levels, and overall effects from urban development and agricultural activities. The construction of a TTC-35 facility(ies) may affect wetlands in some locations. In the absence of a TTC-35 facility alignment, the amount or quality of wetlands that may be affected by a TTC-35 facility cannot be calculated. However, effects to wetlands from the construction of a TTC-35 facility(ies) alignment and associated secondary development would be limited based on the current regulations and the USACE would require some type of mitigation. Because of the federal mandate with regard to wetlands, “no net loss” of wetlands from future TTC-35 facility alignments would be anticipated.

In summary, all 13 alternatives (No Action Alternative and 12 RCAs) were evaluated for cumulative effects to wetlands. Based on the analysis of the potential cumulative effects, wetlands were not determined to preclude any of the RCAs from selection as the Preferred Alternative. Therefore, at the Tier One level of analysis, cumulative effects to wetlands are not a differentiating factor in the identification of a preferred corridor alternative based on the analysis performed for the DEIS.

Rural/Agricultural Land
Cumulative effects to rural/agricultural land would include those general direct effects to land use discussed in Chapter 4.2- Environmental Consequences, Land Use and those indirect effects discussed in the previous section (Section 5.1 – Indirect Effects), as well as the effects caused by the projects listed in Appendix E-1. It should be noted that effects caused by projects listed in Appendix E-1 would be common to all RCAs and to the No Action Alternative. Conversion of farmland to developed land primarily results from population and employment growth. Even under the No Action Alternative, as Texas continues to grow, the conversion of farmland to accommodate development will likely continue as a result of the future projected population and employment growth. Transportation projects may influence land conversion by inducing development in some locations. The construction of a TTC-35 facility(ies) may accelerate the conversion of rural land in some locations, particularly where interchanges are constructed. However, in the absence of a TTC-35 facility(ies) alignment, it is not possible to predict where or what land may be converted by induced development or even during what time frame that development may occur.

In summary, all 13 alternatives (No Action Alternative and 12 RCAs) were evaluated for cumulative effects to rural/agricultural land. Based on the analysis of the potential
cumulative effects, rural/agricultural land was not determined to preclude any of the RCAs from selection as the Preferred Alternative. Therefore, at the Tier One level of analysis, cumulative effects to rural/agricultural land are not a differentiating factor in the identification of a preferred corridor alternative based on the analysis performed for the DEIS.

**Economic Effects**
Cumulative economic effects would include the direct effects of the identification of a corridor, land value change; indirect effects of the identification of a corridor, land use changes; and the combination of those effects, the potential Tier Two effects of the construction of TTC-35 facility(ies) and the effects of projects proposed by others. Additional analysis based on the studies currently underway on the cumulative economic effects of a TTC-35 facility(ies) may be performed and included in the FEIS. Primary cause and effect issues for the economy include economic benefits for areas with improved access due to a transportation facility, economic benefits for users of a transportation facility, and economic benefits to those in areas which experienced reduced congestion as a result of improved transportation. Additional issues could include business relocations that would adversely affect local economies, and loss of land from local tax rolls. Additional effects on the economy of Texas could include increased cost of petroleum products, urban congestion, increasing cost of insurance, and increased housing costs.

In summary, all 13 alternatives (No Action Alternative and 12 RCAs) were evaluated for cumulative economic effects. Based on the analysis, the potential cumulative economic effects were not determined to preclude any of the RCAs from selection as the Preferred Alternative. Therefore, at the Tier One level of analysis, cumulative economic effects are not a differentiating factor in the identification of a preferred corridor alternative based on the analysis performed for the DEIS.

**Step Seven: Mitigation and Enhancement Strategies**

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative, efforts would be made during Tier Two environmental processes to avoid and/or minimize the effects of a future TTC-35 facility(ies) on environmental resources. Specific mitigation strategies for individual resources are summarized below.

*Environmental Justice* - In accordance with EO 12898, efforts would be made to avoid and/or minimize disproportionate or adverse effects of a TTC-35 facility(ies) on minority and low-income populations (U.S. Executive Office of the President, 1994). However, if effects could not be avoided, efforts to identify potential mitigation would be conducted during Tier Two environmental processes.

*Relocations* - In accordance with TxDOT policy, no person would be displaced by the proposed project until adequate decent, safe, and sanitary housing was made available as described in the *Uniform Relocation Assistance and Real Property Acquisition Policies*
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Act of 1970, as amended. Relocation benefits and assistance would be made available without regard to race, color, religion, national origin, sex, age, or handicap in accordance with Title VI of the Civil Rights Act of 1964 and Title VIII of the Civil Rights Act of 1968, or based on standards and applicable laws and regulations at the time the Tier Two environmental processes occur.

Utilities - If effects could not be avoided in accordance with Section 4, Utility Adjustments, of the TxDOT Project Development Process Manual (August, 2003), TxDOT’s policy is to provide early notification to utility owners as a project moves from the conceptual stage into design (TxDOT, 2003). Detailed design would occur only after the completion of Tier Two environmental processes. TxDOT would consult with the PUCT and the utility owner to minimize effects to these properties in order to reach a definitive agreement concerning potential mitigation measures.

Cultural Resources - If effects to cultural resources could not be avoided, efforts to avoid, minimize or mitigate adverse effects would be developed and implemented in accordance with the provisions of the PA between the THC and TxDOT (TxDOT, 2005f) and the Section 106 PA.

Section 4(f) Properties - Should lands protected by Section 4(f) be affected by a potential TTC-35 facility(ies), it must be demonstrated that all possible planning to minimize harm to the resource has been undertaken. At that time, consultation with the appropriate federal, state, and local agencies would occur and efforts would be made to avoid, minimize, and mitigate potential harm of any Section 4(f) lands in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur.

Section 6(f) Properties - Should lands protected by Section 6(f) be impacted by a potential TTC-35 facility(ies), it must be demonstrated that all possible planning to minimize harm to the resource has been undertaken. At that time, consultation with the appropriate federal, state, and local agencies would occur and efforts would be made to avoid, minimize, and mitigate potential harm of any Section 6(f) lands in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur.

Farmland Soils - If Tier Two environmental processes determine direct effects to prime farmland soils would be unavoidable, the Farmland Conversion Impact Rating for Corridor Type Projects (Form AD-1006) would be completed and coordination with NRCS would be conducted in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur.

Surface Waters - Mitigation measures and Best Management Practices (BMP) would be implemented where feasible and appropriate, or as set forth in any USACE Section 404 permit; Storm Water, Pollution, Prevention Plan (SW3P); and/or National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP). TxDOT
would comply with all requirements of the CWA, as amended, for the construction of a TTC-35 facility(ies). Mitigation could include the development of wetland mitigation banks, the restoration of riparian corridors, conservation easements, etc.

Wetlands - Coordination would be required with the USACE for any effects to wetlands. Compensatory mitigation is not normally considered until anticipated impacts to waters of the U.S. have been avoided and minimization to the maximum extent possible. It is recognized that “no net loss of wetlands” functions and values may not be achieved in every permit action. Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts that remain after all appropriate and practicable minimization has been achieved. Compensatory actions often include restoration, creation, and enhancement of waters of the U.S., specifically wetlands.

Critical Habitat - Habitats given consideration for non-regulatory mitigation include: habitat for federal candidate species (impacted by the project) if mitigation would assist in the prevention of listing the species; rare vegetation series (S1, S2, S3) that also locally provides habitat for a state-listed species; all vegetation communities listed as S1 or S2, regardless of whether or not the series in question provides habitat for state-listed species; bottomland hardwoods, native prairies, riparian sites; and any other habitat feature considered locally important (TxDOT, 1998). Efforts would be made during Tier Two environmental processes to minimize impacts to vegetation from a TTC-35 facility(ies). In addition, TxDOT would coordinate with the TPWD for compensatory mitigation for any vegetation community impacts in accordance with Provision (4)(A)(ii) of the TxDOT-TPWD MOU (TxDOT, 1998).

Wildlife, Threatened and Endangered Species - Coordination with the USFWS would be required for effects to threatened and endangered species. If effects could not be avoided, efforts to analyze effects and identify potential mitigation would be conducted in accordance with standards and applicable laws and regulations at the time Tier Two environmental processes. There are several options when developing a mitigation plan to reduce wildlife mortality, increase human safety, and enhance ecosystems. These options include, but are not limited to, roadside revegetation, fencing, mitigation banking (such as wetlands), increased usage of wildlife crossing signs, and/or the usage of high frequency whistles. Including “ecosystem or habitat connectivity” or “connectivity zones” in the project planning and design is an example of practical strategies for reducing the transportation impacts on wildlife movement and populations. Several crossing and/or connector mechanisms are available for maintaining habitat connectivity. Mitigation for specific wildlife species and/or habitats may be required by the regulatory agencies. To date, such agencies have not officially identified any one specific species or unique habitat within the study area as requiring a crossing or any other specific mitigation practice. Mitigation for impacts to threatened and endangered species and critical habitats could include funding for conservation easements, the preparation of habitat conservation plans, and/or payment to a conservation fund set up to benefit the species.
Aesthetics - The use of naturally vegetated medians, minimizing ROW clearing, benching of rock cuts, utilizing retaining walls, and promoting roadside native wildflower planting or similar types of programs would create a more aesthetically pleasing TTC-35 facility(ies) that minimizes visual effects. Native plants would be considered for roadside vegetation where practicable, to improve the visual aesthetics and to control the introduction and spread of invasive species. These types of measures can serve to mitigate the views of the roadway and help to minimize effects to the natural beauty of the area. In areas where a roadway is visible to residences, landscaping with evergreens and shrubs can act as screens and can help to soften views of the road.

Hazardous Waste - Any hazardous waste sites that could not be avoided would be assessed and handled according to all applicable federal, state, and local laws, rules, and regulations. If effects could not be avoided, efforts to analyze effects and identify potential mitigation would be conducted in accordance with standards and applicable laws and regulations at the time the Tier Two environmental processes occur.

Step Eight: Proposed Tier Two Cumulative Effects Method

If the Tier One decision results in the selection of a corridor alternative as the Preferred Alternative and TTC-35 advances to Tier Two environmental process, those Tier Two NEPA documents would focus on an individual TTC-35 facility(ies). At that point in the project development process, alignment-level preliminary design information for a proposed TTC-35 facility(ies) would be available to allow a quantitative analysis to evaluate cumulative effects of a TTC-35 facility(ies). Although the exact process used to evaluate the cumulative effects of individual TTC-35 facilities would be determined during Tier Two environmental processes, the cumulative effects assessment would follow a process similar to that described in the TxDOT 8-step approach as utilized in the above analysis. Furthermore, any cumulative effects analysis completed for a TTC-35 facility(ies) during Tier Two environmental processes would follow any future guidance on assessing the cumulative effects of transportation projects that may be developed by TxDOT.

Scoping would be completed as the first step, in any Tier Two environmental process to identify the resources that the proposed TTC-35 facility(ies), along with other past, present and reasonably foreseeable future projects, may pose a cumulative effect to. The types of resources that may be evaluated include, but are not limited to:

- Land use;
- Neighborhood and community cohesion;
- Environmental justice;
- Economic characteristics;
- Utilities;
- Air quality;
- Noise;
- Cultural resources;
• Parklands;
• Section 4(f) properties;
• Section 6(f) properties;
• Prime farmland soils;
• Rivers and reservoirs;
• Groundwater resources/aquifers;
• Flood-prone areas;
• Wetlands;
• Soils and topography;
• Mineral resources;
• Vegetation;
• Wildlife;
• Threatened, endangered, and candidate species;
• Significant publicly owned and privately held terrestrial and aquatic habitats;
• Designated critical habitat;
• Visual and aesthetic resources;
• Hazardous waste sites; and
• Energy.
6.0 TRANSPORTATION PLANNING AND ENGINEERING ANALYSIS

This Chapter evaluates the alternatives based on transportation planning and engineering characteristics. The RCAs were evaluated based on their ability to incorporate existing infrastructure and their ability to fulfill the need and purpose of the TTC-35 project based on travel demand. Additionally, this Chapter discusses cost estimates for the construction of a TTC-35 facility(ies) as envisioned in the Plan.

6.1 SLOPE

Slope may be considered an engineering issue as well as a constructability issue since construction on steeper slopes may increase erosion and sediment transport. In addition, design and construction in areas with steeper slopes would require more extensive cut and fill sections, which could result in increased construction costs and greater environmental effect. The total area (in square-miles) of each RCA and percent of RCA area less than 1 and 3 percent slope are provided in Table 6-1 to disclose the amount of area containing less than 1 and 3 percent slopes within each RCA based on the best available data from the USGS.

<table>
<thead>
<tr>
<th>RCA</th>
<th>&lt;1% (square-miles)</th>
<th>Percent of RCA</th>
<th>&lt;3% (square-miles)</th>
<th>Percent of RCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1,028</td>
<td>21</td>
<td>3,265</td>
<td>66</td>
</tr>
<tr>
<td>2</td>
<td>1,037</td>
<td>21</td>
<td>3,263</td>
<td>65</td>
</tr>
<tr>
<td>3</td>
<td>1,265</td>
<td>23</td>
<td>3,780</td>
<td>68</td>
</tr>
<tr>
<td>4</td>
<td>1,274</td>
<td>23</td>
<td>3,779</td>
<td>68</td>
</tr>
<tr>
<td>5</td>
<td>1,368</td>
<td>26</td>
<td>3,842</td>
<td>72</td>
</tr>
<tr>
<td>6</td>
<td>1,378</td>
<td>26</td>
<td>3,840</td>
<td>72</td>
</tr>
<tr>
<td>7</td>
<td>1,605</td>
<td>27</td>
<td>4,357</td>
<td>74</td>
</tr>
<tr>
<td>8</td>
<td>1,615</td>
<td>27</td>
<td>4,356</td>
<td>74</td>
</tr>
<tr>
<td>9</td>
<td>1,331</td>
<td>26</td>
<td>3,712</td>
<td>72</td>
</tr>
<tr>
<td>10</td>
<td>1,340</td>
<td>26</td>
<td>3,711</td>
<td>72</td>
</tr>
<tr>
<td>11</td>
<td>1,568</td>
<td>27</td>
<td>4,228</td>
<td>74</td>
</tr>
<tr>
<td>12</td>
<td>1,577</td>
<td>27</td>
<td>4,226</td>
<td>73</td>
</tr>
</tbody>
</table>


RCAs located to the west of the DFW metropolitan area (RCAs 1 through 4) contain the least amount of area that is less than 3 percent slope and less than 1 percent slope. The remaining RCAs contain more area of less than 1 percent and less than 3 percent slopes, but are very similar to each other in percent of RCA area. Generally, those RCAs that are located to the west of the DFW metropolitan area are the least favorable alternatives for potential high-speed rail facilities, with only 21 to 23 percent of slopes less than 1 percent. They are also the least favorable for highway facilities with only 65 to 68 percent of slopes less than 3 percent. RCAs 5 through 12 contain a higher predominance of flatter slopes, which are more suitable for high-speed facilities.
Slope was not used to identify a preferred alternative among the RCAs because the potential affects of slope were already minimized to the extent practicable at the Tier One level of analysis through the delineation of the study area and the development of alternatives.

6.2 EXISTING INFRASTRUCTURE

Existing highway and rail infrastructure within the study area is identified in Chapter 3, Section 3.4 – Existing Transportation System. For this assessment, “existing highway infrastructure” was defined as divided highways with four or more lanes, either existing or under construction at the time this DEIS was prepared. Only facilities within each RCA that provide travel in the same general direction as the RCA are included. Highways that are perpendicular to the general direction of an RCA are not included, though it is recognized that there may be interchanges at many of these roadways.

As part of the planning for TTC-35, freight railroad lines that provide intercity freight rail service were inventoried. The inventory information included the owners, the name the owner applies to the line, the end points of the line segment, and its length. Line segments were generally defined between junction points. Railroad lines that only provided freight railroad service to local customers were generally not included. In general, RCAs that contain more rail lines were assumed to be more suitable for future higher speed rail facilities.

As a result of comments received during the public meetings, the inclusion of existing infrastructure in corridors was given additional consideration. Miles of existing highway and rail within the RCAs are presented in Table 6-2. This information includes rail facilities and highways with four or more lanes and a general north-south orientation.

<table>
<thead>
<tr>
<th>RCA</th>
<th>Highway Facilities</th>
<th>Highway Miles</th>
<th>Rail Facilities</th>
<th>Rail Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I-35 N. of Denton, SH 130, and I-35 S. of San Antonio to Laredo</td>
<td>223</td>
<td>BNSF Gainesville to Dallas, BNSF Metro to Alliance, BNSF Cleburne to Temple, UP Temple to Granger, UP San Antonio to Laredo</td>
<td>321</td>
</tr>
<tr>
<td>2</td>
<td>I-35 N. of Denton, small section of SH 130, and I-35 S. of San Antonio to Laredo</td>
<td>173</td>
<td>BNSF Gainesville to Dallas, BNSF Metro to Alliance, BNSF Cleburne to Temple, UP Taylor to Smithville, UP San Antonio to Laredo</td>
<td>344</td>
</tr>
<tr>
<td>3</td>
<td>I-35 N. of Denton and SH 130</td>
<td>118</td>
<td>BNSF Gainesville to Dallas, BNSF Metro to Alliance, BNSF Cleburne to Temple, UP Temple to Granger</td>
<td>173</td>
</tr>
<tr>
<td>4</td>
<td>I-35 N. of Denton and small section of SH 130</td>
<td>68</td>
<td>Gainesville to Dallas, BNSF Metro to Alliance, BNSF Cleburne to Temple, UP Taylor to Smithville</td>
<td>195</td>
</tr>
</tbody>
</table>
Table 6-2: Existing Transportation Infrastructure by RCA

<table>
<thead>
<tr>
<th>RCA</th>
<th>Facilities</th>
<th>Miles</th>
<th>Facilities</th>
<th>Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>SH 130 and I-35 S. of San Antonio to Laredo</td>
<td>195</td>
<td>UP Waco to Temple, UP Temple to Granger, and UP San Antonio to Laredo</td>
<td>214</td>
</tr>
<tr>
<td>6</td>
<td>Small section of SH 130 and I-35 S. of San Antonio to Laredo</td>
<td>145</td>
<td>UP Waco to Temple, UP Taylor to Smithville, and UP San Antonio to Laredo</td>
<td>237</td>
</tr>
<tr>
<td>7</td>
<td>SH 130</td>
<td>90</td>
<td>UP Waco to Temple, UP Temple to Granger</td>
<td>66</td>
</tr>
<tr>
<td>8</td>
<td>Small section of SH 130</td>
<td>40</td>
<td>UP Waco to Temple, UP Taylor to Smithville</td>
<td>88</td>
</tr>
<tr>
<td>9</td>
<td>US 75/US 69 near Denison, SH 130, and I-35 S. of San Antonio to Laredo</td>
<td>195</td>
<td>UP Waco to Temple, UP Temple to Granger, and UP San Antonio to Laredo</td>
<td>272</td>
</tr>
<tr>
<td>10</td>
<td>US 75/US 69 near Denison, small section of SH 130, and I-35 S. of San Antonio to Laredo</td>
<td>145</td>
<td>UP Waco to Temple, UP Taylor to Smithville, and UP San Antonio to Laredo</td>
<td>294</td>
</tr>
<tr>
<td>11</td>
<td>US 75/US 69 near Denison and SH 130</td>
<td>90</td>
<td>UP Waco to Temple, UP Temple to Granger</td>
<td>96</td>
</tr>
<tr>
<td>12</td>
<td>US 75/US 69 near Denison, small section of SH 130</td>
<td>40</td>
<td>UP Waco to Temple, UP Taylor to Smithville</td>
<td>146</td>
</tr>
</tbody>
</table>


RCAs 1, 2, 5, 6, 9, and 10 include the greatest amount of existing highway and rail infrastructure. RCAs with existing infrastructure can offer future opportunities to incorporate existing facilities into a TTC-35 facility(ies) alignment, utilize existing ROW, and reduce costs and environmental effects. The amount of existing facilities within each RCA was a differentiating factor in the identification of a preferred alternative, because of the potential to utilize existing ROW, reduce costs, and reduce environmental effects. Many public comments expressed support for utilizing existing infrastructure for a TTC-35 facility(ies).

6.3 COST ESTIMATES

Table 6-3 shows the estimated costs reported in the Plan for TTC components (TxDOT, 2002a). Based on the Plan, the TTC system (excluding ROW acquisition costs) would cost an estimated $31.4 million per centerline mile. Roadway costs (approximately $7 million) include the pavement costs for truck and passenger lanes, mobilization, clearing of ROW, excavation, embankment, drainage structures, landscaping, signing and pavement markings, and safety features. The costs for grade-separated bridge structures and interchanges are based on an estimated average of structures per mile of roadway and do not account for specific terrain. The estimate for commuter and freight rail (approximately $7.4 million) includes mobilization, excavation, embankments, and incidental expenses associated with the construction of new track; however, it does not include passenger stations or dispatch control centers. The costs (approximately $3.6
million) to construct the utility portion of the TTC system would likely vary as result of technological advances, terrain, and other geologic issues.

<table>
<thead>
<tr>
<th>TTC Component</th>
<th>Cost/centerline mile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roadway: Trucks/passenger vehicles</td>
<td>$6,997,000</td>
</tr>
<tr>
<td>Grade-separation bridge structures</td>
<td>$5,175,000</td>
</tr>
<tr>
<td>Interchanges</td>
<td>$3,195,000</td>
</tr>
<tr>
<td>Commuter and freight rail</td>
<td>$7,357,000</td>
</tr>
<tr>
<td>High-speed passenger rail</td>
<td>$5,000,000</td>
</tr>
<tr>
<td>Utilities</td>
<td>$3,650,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$31,374,000</strong></td>
</tr>
</tbody>
</table>

Source: TxDOT, 2002a.

1ROW and miscellaneous costs are not included.

These cost estimates from the Plan for the conceptual TTC system are generalized and are not based on alignment or topographical information. When project specific alignment data for a TTC-35 facility(ies) is available in the Tier Two environmental process a more precise cost estimation would be prepared.

6.4 TRANSPORTATION EVALUATION CRITERIA

*Reasonable Corridor Alternatives*

Five transportation criteria were used to evaluate the No Action Alternative and the 12 RCAs. These criteria provide an estimate of the performance of each alternative on fulfilling the need and purpose of the TTC-35 project. The transportation criteria were selected based upon three objectives:

1. Strong adherence to the TTC-35 need and purpose;
2. Ability to discern differences among RCAs; and
3. Traditional evaluation parameters that are fully defendable as travel demand variables in the context of a Tier One level of analysis as well as a model developed and calibrated based on system-wide statistics at the scale of the SAM (TxDOT, 2004a).

Each of the five criteria were evaluated for both non-toll and toll scenarios for the forecast year 2030. Appendix F-1, *TTC-35 Transportation Criteria for the Evaluation of Reasonable Corridor Alternatives* (August, 2005), provides further detail on the methodologies, assumptions, and scoring results. The following discussion is intended to provide a general summary of the modeling and results.

In the context of the proposed TTC-35, whereby a new facility is being considered to function in concert with an existing facility, the No Action Alternative reflects I-35,
including improvements noted in the STIP and that are planned to occur within the MPO long-range planning horizon year of 2030.

Travel demand models were used to estimate traffic for the No Action Alternative and each of the 12 RCAs using the SAM. Furthermore, given the relevance to travel demand estimates of tolling transportation infrastructure, separate models were run to estimate tolled and non-tolled scenarios for each RCA.

The five criteria were applied to each of the 12 RCAs. RCA scores were ranked for each criterion with the RCA or RCAs that scored best for a given criterion assigned a score of 1. A transportation performance composite score was calculated for each RCA by summing the ranks that the RCA received for each of the five transportation criteria.

For example, an RCA that received ranks of 6, 11, 12, 5, and 6 for Criteria 1 through 5, respectively, would receive a total transportation performance composite score of 40 (6 + 11 + 12 + 5 + 6 = 40). The RCAs with lower transportation performance composite scores are those that, in general, scored well for transportation criteria as compared to RCAs with higher transportation performance composite scores.

Each of the five criteria is described below.

**Criterion 1: Average total vehicle flow on I-35**
This criterion was selected to provide an estimate of the average number of vehicles (trucks and autos combined) on each segment of I-35 during a 24-hour period. I-35 can be thought of as composed of a series of 574 sequentially connected segments (or links) each bounded by interchanges at which vehicles may enter and exit the interstate. “Average total vehicle flow on I-35” was calculated by first estimating the total vehicle flow (number of vehicles) on each segment of I-35 during a 24-hour period and then calculating the average of these values. In comparing values calculated for each RCA for this criterion, lower values indicate a general improvement of traffic conditions on I-35 as decreasing average total vehicle flow would be achieved by an overall decrease in the number of vehicles operating on segments of I-35.

**Criterion 2: Average total truck flow on I-35**
This criterion was calculated similarly as Criterion 1 except that Criterion 2 focuses solely on truck traffic. In comparing values calculated for this criterion, lower values indicate a general improvement of traffic conditions on I-35 due to a decrease in average total truck flows.

**Criterion 3: Total vehicle hours of travel (VHT) on I-35**
This criterion was selected to provide an estimate of the number of hours of vehicle operation (vehicle hours) on I-35 during a 24-hour period. The calculation of values for this criterion is based on segments of I-35 as described for Criterion 1. “Total VHT on I-35” was calculated by first estimating the VHT for each segment of I-35. For a given segment, this was done by estimating the number of vehicles on that segment during a
24-hour period and multiplying that by the travel-time for that segment. For instance, if 10,000 vehicles operated on a segment during a day, and travel-time for the segment is 0.5 hours, then the VHT for the segment would be 5,000 vehicle-hours (10,000 vehicles x 0.5 hours). The VHT was calculated for each segment and then summed to estimate the total VHT on I-35. In comparing values for each RCA for this criterion, lower values indicate a general improvement of traffic conditions on I-35 as decreasing VHT would be achieved by either decreasing the number of vehicles or the amount of time spent on I-35 per vehicle, or both.

**Criterion 4: Average maximum volume/capacity (V/C) ratio on I-35**

This criterion was selected to provide an estimate of the traffic volume on segments of I-35 in relationship to the traffic capacity of those segments over a 24-hour period. V/C ratio is calculated by dividing traffic volume (number of vehicles) by the traffic capacity (number of vehicles). Congested traffic conditions are often described as existing when the V/C ratio is 0.90 or greater, meaning that traffic volume is 90 percent or more of traffic capacity. “Average maximum V/C ratio on I-35” was calculated by first estimating the maximum V/C ratio for each segment of I-35 (as described for Criterion 1) and then calculating the average of these values. In comparing values for each RCA for this criterion, lower values indicate a general improvement in traffic conditions on I-35 as decreasing the V/C ratio would be achieved by decreasing the volume of traffic on segments of I-35.

**Criterion 5: Combined travel-time between urban regions in the study area**

This criterion was selected to provide an estimate of connectivity among urban regions in the study area in terms of travel times among these regions. Six urban regions occur within the study area – Austin, Brownsville/McAllen, Corpus Christi, Dallas/Fort Worth, Laredo, and San Antonio. “Combined travel-time among urban regions in the study area” was calculated by first estimating the travel-time (in hours) between every combination of two urban regions and summing these values. In comparing values for each RCA for this criterion, lower values indicate a general improvement in travel conditions and connectivity among urban regions in the study area.

**Table 6-4** lists the transportation performance composite score for both toll and non-toll scenarios for each RCA.

<p>| Table 6-4: Transportation Performance Composite Scores: Non-tolled and Tolled Scenarios |
|---------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|</p>
<table>
<thead>
<tr>
<th>RCA</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite score (non-tolled)</td>
<td>27</td>
<td>37</td>
<td>30</td>
<td>40</td>
<td>10</td>
<td>23</td>
<td>11</td>
<td>18</td>
<td>29</td>
<td>38</td>
<td>25</td>
<td>38</td>
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<tr>
<td>Composite score (tolled)</td>
<td>37</td>
<td>46</td>
<td>33</td>
<td>40</td>
<td>9</td>
<td>15</td>
<td>8</td>
<td>27</td>
<td>18</td>
<td>25</td>
<td>32</td>
<td>40</td>
</tr>
</tbody>
</table>

Based on the transportation performance composite scores, RCAs 5 and 7 perform the best at meeting the TTC-35 need and purpose. RCA 5 performs slightly better than RCA
7 under the non-tolled scenario (receiving scores of 10 and 11, respectively). RCA 7 performs slightly better than RCA 5 under the tolled scenario (receiving scores of 8 and 9, respectively). The transportation performance composite score of each RCA was a differentiating factor in the identification of a preferred alternative, because RCAs 5 and 7 scored substantially better than did all other RCAs. RCAs 5 and 7 scored 40 and 47 percent better, respectively, than the next best scoring RCA for the tolled scenario, and they scored 44 and 39 percent better, respectively, than the next best scoring RCA for the non-tolled scenario.

*No Action Alternative*

Based on the traffic analysis performed and discussed above, all of the RCAs show improvement in projected future conditions over the No Action Alternative.
7.0 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

This Chapter identifies the preferred alternative based on a comparison of the information presented in Chapter 4 – Environmental Consequences, Chapter 5 – Indirect and Cumulative Effects Assessment, and Chapter 6 – Transportation Planning and Engineering Analysis. In addition, Table 7-1 provides a summary matrix of the transportation, planning/engineering, and environmental criteria considered in evaluating the RCAs. The environmental criteria listed include those environmental resources that could be quantified at the corridor level. Based on the information provided in this table, no single RCA scored best for each transportation, planning/engineering, or environmental criterion listed.

Many large-scale (defined as of sufficient size to substantially block a 10-mile wide corridor) environmental resources were avoided when the study area was delineated and when alternatives were developed. The environmental resources within the RCAs are not distributed so that they completely block the width of any RCA. Thus, any one of the RCAs could be considered as the Preferred Alternative from an environmental perspective. As a result, there is potential for identifying future TTC-35 facility(ies) alignments within any of the RCAs that would avoid many of the environmental resources considered in this Tier One DEIS. For this reason, environmental resources were not used as a basis for identifying the Preferred Alternative.

All 13 alternatives (No Action Alternative and 12 RCAs) were evaluated for indirect and cumulative effects. Based on the evaluation of the potential indirect effects presented in this DEIS, no environmental factors were determined to preclude any of the RCAs from selection as the Preferred Alternative. Furthermore, based on the evaluation of the potential cumulative effects presented in this DEIS, the three environmental factors evaluated (wetlands, rural/agricultural land, and economic effects) were also not determined to preclude any of the RCAs from selection as the Preferred Alternative. Therefore, at the Tier One level of analysis, indirect and cumulative effects are not a differentiating factor in the identification of a preferred corridor alternative based on the analysis performed for the DEIS.

The environmental resources that were quantifiable at a Tier One level of analysis are listed in Table 7-1. As previously discussed in Chapter 4 – Environmental Consequences, efforts would be made during Tier Two environmental processes to avoid and/or minimize the effects of a TTC-35 facility(ies) on environmental resources. In addition, mitigation would be developed for any effects that could not be avoided or minimized.
### Table 7-1: Reasonable Corridor Alternative Summary Matrix

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Reasonable Corridor Alternative</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5*</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
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<tbody>
<tr>
<td><strong>Transportation</strong></td>
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<tr>
<td>Transportation Performance Score (Non-tolled)$^3$</td>
<td></td>
<td>27</td>
<td>37</td>
<td>30</td>
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<td>11</td>
<td>18</td>
<td>29</td>
<td>38</td>
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<td>38</td>
</tr>
<tr>
<td>Transportation Performance Score (Tolled)$^3$</td>
<td></td>
<td>37</td>
<td>46</td>
<td>33</td>
<td>40</td>
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<td>27</td>
<td>18</td>
<td>25</td>
<td>32</td>
<td>40</td>
</tr>
<tr>
<td><strong>Planning/Engineering</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Length (miles)</td>
<td></td>
<td>506</td>
<td>506</td>
<td>486</td>
<td>486</td>
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<td>502</td>
<td>508</td>
<td>507</td>
<td>488</td>
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<td>Total Area (square-miles)</td>
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<td>5,597</td>
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<td>5,895</td>
<td>5,921</td>
<td>5,141</td>
<td>5,167</td>
<td>5,730</td>
<td>5,756</td>
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<td>Percentage of Slope ≤ 1 Percent</td>
<td></td>
<td>21%</td>
<td>21%</td>
<td>23%</td>
<td>23%</td>
<td>26%</td>
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<td>27%</td>
<td>27%</td>
<td>26%</td>
<td>26%</td>
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<tr>
<td>Percentage of Slope ≥ 3 Percent</td>
<td></td>
<td>66%</td>
<td>65%</td>
<td>68%</td>
<td>68%</td>
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<td>74%</td>
<td>72%</td>
<td>72%</td>
<td>74%</td>
<td>73%</td>
</tr>
<tr>
<td>Length of existing divided highway with 4 or more lanes that run in the same direction</td>
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<td>223</td>
<td>173</td>
<td>118</td>
<td>68</td>
<td>195</td>
<td>145</td>
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<td>145</td>
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<td>Length of existing rail line$^3$</td>
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<td>321</td>
<td>344</td>
<td>173</td>
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<td>214</td>
<td>237</td>
<td>66</td>
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<tr>
<td>Total Area of RCA Occupied by Developed Lands (square-miles)</td>
<td></td>
<td>92.62</td>
<td>89.28</td>
<td>82.57</td>
<td>79.23</td>
<td>94.80</td>
<td>91.45</td>
<td>84.74</td>
<td>81.40</td>
<td>95.96</td>
<td>92.61</td>
<td>85.90</td>
<td>82.56</td>
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<td>Percentage of RCA Occupied by Developed Lands</td>
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<td>1.86%</td>
<td>1.78%</td>
<td>1.48%</td>
<td>1.42%</td>
<td>1.79%</td>
<td>1.72%</td>
<td>1.44%</td>
<td>1.37%</td>
<td>1.87%</td>
<td>1.79%</td>
<td>1.50%</td>
<td>1.43%</td>
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<td>886,146</td>
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<td>910,593</td>
<td>911,698</td>
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<td>Population Density (population /RCA total area)</td>
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<td>175</td>
<td>159</td>
<td>146</td>
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<td>171</td>
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<td>144</td>
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<td>174</td>
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<td>Percentage of Minority Population</td>
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<td>48.50%</td>
<td>46.60%</td>
<td>46.66%</td>
<td>48.68%</td>
<td>48.89%</td>
<td>46.97%</td>
<td>47.06%</td>
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<td>Percentage of Households Below the Poverty Level</td>
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<td>23.82%</td>
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<tr>
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<tr>
<td>Number of oil/natural gas wells</td>
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<td>20</td>
<td>29</td>
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<tr>
<td>Number of plugged oil/natural gas wells</td>
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<td>17</td>
<td>17</td>
<td>47</td>
<td>47</td>
<td>5</td>
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<td><strong>Air Quality</strong></td>
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<td>Number of Non-Attainment Counties (within or partially with RCA)</td>
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<tr>
<td><strong>Cultural Resources</strong></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Total Area Occupied by Cultural Resources (square-miles)</td>
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<td>2.81</td>
<td>1.94</td>
<td>3.55</td>
<td>1.20</td>
<td>2.81</td>
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<td>3.55</td>
<td>1.29</td>
<td>2.90</td>
<td>2.03</td>
<td>3.64</td>
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<tr>
<td>Percentage of Area Occupied by Cultural Resources</td>
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<td>0.02%</td>
<td>0.06%</td>
<td>0.03%</td>
<td>0.06%</td>
<td>0.02%</td>
<td>0.05%</td>
<td>0.03%</td>
<td>0.06%</td>
<td>0.03%</td>
<td>0.06%</td>
<td>0.04%</td>
<td>0.06%</td>
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<td>Number of National Register-listed sites or districts of 23 Acres or Greater</td>
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<td>5</td>
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<tr>
<td>Criterion</td>
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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5*</td>
<td>6</td>
<td>7</td>
<td>8</td>
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<td>10</td>
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<td>12</td>
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</tr>
<tr>
<td><strong>Parklands</strong></td>
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<td>6.37</td>
<td>13.32</td>
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<td>7.91</td>
<td>14.95</td>
<td>10.03</td>
<td>14.46</td>
<td>9.54</td>
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<tr>
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<td>0.14%</td>
<td>0.21%</td>
<td>0.11%</td>
<td>0.25%</td>
<td>0.16%</td>
<td>0.22%</td>
<td>0.13%</td>
<td>0.29%</td>
<td>0.19%</td>
<td>0.25%</td>
<td>0.17%</td>
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<tr>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Total Area of Prime Farmland Soils (square-miles)</td>
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<td>2,085</td>
<td>2,059</td>
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<td>2,294</td>
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<td>2,283</td>
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<tr>
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<td>44%</td>
<td>42%</td>
<td>39%</td>
<td>37%</td>
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<td>39%</td>
<td>47%</td>
<td>45%</td>
<td>42%</td>
<td>40%</td>
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<tr>
<td><strong>Water Resources</strong></td>
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</tr>
<tr>
<td>Total Area of Existing Reservoirs within the RCA (square-miles)</td>
<td>9.86</td>
<td>14.68</td>
<td>14.05</td>
<td>12.98</td>
<td>15.44</td>
<td>27.43</td>
<td>28.56</td>
<td>27.27</td>
<td>32.10</td>
<td>25.56</td>
<td>30.39</td>
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</tr>
<tr>
<td>Percentage of the RCA Occupied by Flood-prone Areas</td>
<td>9.55%</td>
<td>10.21%</td>
<td>5.77%</td>
<td>12.89%</td>
<td>13.03%</td>
<td>13.63%</td>
<td>15.30%</td>
<td>15.83%</td>
<td>13.63%</td>
<td>14.25%</td>
<td>15.90%</td>
<td>16.45%</td>
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</tr>
<tr>
<td>Number of Impaired Stream Segments (303(d))</td>
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<td>18</td>
<td>19</td>
<td>18</td>
<td>22</td>
<td>21</td>
<td>22</td>
<td>21</td>
<td>21</td>
<td>20</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Area Occupied by Wetlands (square-miles)</td>
<td>6.53</td>
<td>6.53</td>
<td>10.58</td>
<td>10.59</td>
<td>38.23</td>
<td>38.24</td>
<td>42.29</td>
<td>42.30</td>
<td>38.79</td>
<td>38.80</td>
<td>42.84</td>
<td>42.85</td>
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</tr>
<tr>
<td>Percentage of RCA Occupied by Wetlands</td>
<td>0.13%</td>
<td>0.13%</td>
<td>0.19%</td>
<td>0.19%</td>
<td>0.72%</td>
<td>0.72%</td>
<td>0.72%</td>
<td>0.72%</td>
<td>0.71%</td>
<td>0.75%</td>
<td>0.75%</td>
<td>0.75%</td>
<td>0.74%</td>
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<tr>
<td>Number of Major Aquifers Occurring within RCA</td>
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<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Number of Minor Aquifers Occurring within RCA</td>
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<td>3</td>
<td>3</td>
<td>3</td>
<td>6</td>
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<tr>
<td><strong>Wildlife and Terrestrial and Aquatic Communities</strong></td>
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<td>Total Area Occupied by Terrestrial or Aquatic Habitats (wildlife management area-WMAs) Managed by Governmental Agencies (square-miles)</td>
<td>0</td>
<td>3.28</td>
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<tr>
<td><strong>Threatened and Endangered Species</strong></td>
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<td>Number of federally listed threatened and endangered species potentially occurring within the counties in or partially within the RCA</td>
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<td>Number of state-listed threatened and endangered species potentially occurring within the counties in or partially within the RCA</td>
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</table>

1. The column highlighted in yellow identifies the Preferred Alternative (RCA 5).
2. The lower transportation performance score, the better the RCA performs at meeting the need and purpose of TTC-35.
3. Rail line segments or operating segments were generally defined between significant junction points. Where a line fell within an RCA, it was determined whether the line was only crossing the corridor, or if it was providing transportation in the same general direction as the RCA. If a rail line-operating segment touched a RCA, the entire length of that operating segment was counted to be within the RCA.
Public comments received during the public involvement process were used in identifying the Preferred Alternative. Input from the public supported placing TTC-35 in proximity to I-35, in order to support existing community economies and not serve as a growth catalyst away from communities. In addition, public comments expressed that if TTC-35 were located in proximity to I-35 it would minimize effects it may have on rural communities. Furthermore, public comments supported the use of existing infrastructure for a future TTC-35 facility(ies) to the extent possible.

Planning/engineering criteria varied among the RCAs but these also did not on their own merit provide a quantifiable basis for precluding RCAs from consideration as the Preferred Alternative.

Transportation criteria varied among these RCAs and did, own their own merit, provide a quantifiable basis for precluding RCAs from consideration as the Preferred Alternative. As a result, transportation criteria were used as a primary basis for identifying the Preferred Alternative.

RCA 5 and RCA 7 performed substantially better than all other RCAs based on transportation criteria. RCAs 5 and 7 scored 40 and 47 percent better, respectively, than the next best scoring RCA for the tolled scenario, and they scored 44 and 39 percent better, respectively, than the next best scoring RCA for the non-tolled scenario respectively. RCA 5 and RCA 7 scored so similarly that the two RCAs were not distinguished from each other based solely on their ranking for the transportation criteria.

Since RCAs 5 and 7 scored similarly on the transportation criteria, public comments supporting the use of existing infrastructure for a future TTC-35 facility(ies) were used to identify the Preferred Alternative. RCA 5 contains much greater length of both existing highway (195 miles compared to 90 miles) and existing rail line (214 miles compared to 66 miles) than RCA 7. The greater presence of these existing facilities in RCA 5 means that there would be greater potential in RCA 5, compared to RCA 7, for utilizing existing facilities; therefore, there would be greater potential in RCA 5 to reduce costs and environmental effects.

The following provides an explanation of why each alternative was or was not identified as the Preferred Alternative based on the information provided in Table 7-1 and discussed in Chapter 4 – Environmental Consequences, Chapter 5 – Indirect and Cumulative Effects Assessment, and Chapter 6 – Transportation Planning and Engineering Analysis.

The No Action Alternative would not identify a corridor alternative for meeting future transportation demand within the study area (as described in the Need and Purpose Statement Support Document [Appendix A-3]) as envisioned for TTC-35 in the Plan. Planned capacity improvements within the study area, including those along I-35, are not expected to substantially reduce congestion levels projected for 2025, and the additional
capacity needed beyond the planned improvements would likely prove to be cost-prohibitive in many cases because of development constraints along existing facilities particularly in urban areas.

**RCA 1** was not identified as the Preferred Alternative because of poor performance at meeting the TTC-35 need and purpose when compared to other RCAs. RCA 1 received transportation performance scores of 27 for the non-tolled scenario and 37 for the tolled scenario – neither score was in the top two for its scenario.

**RCA 2** was not identified as the Preferred Alternative because of poor performance at meeting the TTC-35 need and purpose when compared to other RCAs. RCA 2 received transportation performance scores of 37 for the non-tolled scenario and 46 for the tolled scenario - neither score was in the top two for its scenario.

**RCA 3** was not identified as the Preferred Alternative because of poor performance at meeting the TTC-35 need and purpose when compared to other RCAs. RCA 3 received transportation performance scores of 30 for the non-tolled scenario and 33 for the tolled scenario - neither score was in the top two for its scenario.

**RCA 4** was not identified as the Preferred Alternative because of poor performance at meeting the TTC-35 need and purpose when compared to other RCAs. RCA 4 received transportation performance scores of 40 for both the non-tolled and tolled scenarios - neither score was in the top two for its scenario.

**RCA 5** was identified as the Preferred Alternative because:

- RCAs 5 and 7 scored 40 and 47 percent better, respectively, than the next best scoring RCA for the tolled scenario, and they scored 44 and 39 percent better, respectively, than the next best scoring RCA for the non-tolled scenario respectively, which means they were the two best performing RCAs at meeting the TTC-35 need and purpose; and
- RCA 5 contains much more existing highway (195 miles compared to 90 miles) and rail line (214 miles compared to 66 miles) facilities than RCA 7, and thus provides more potential than RCA 7 for reducing costs and environmental effects.

**Figure 7-1** depicts RCA 5, the Preferred Alternative that has been identified during the analysis conducted in this DEIS.

**RCA 6** was not identified as the Preferred Alternative because of poor performance at meeting the TTC-35 need and purpose when compared to other RCAs. RCA 6 received transportation performance composite scores of 23 for the non-tolled scenario and 15 for the tolled scenario – neither score was in the top two for its scenario.
RCA 7 received transportation performance scores of 11 for the non-tolled scenario and 8 for the tolled scenario - scoring in the top one or two for each scenario, along with RCA 5. However, RCA 7 was not identified as the Preferred Alternative because it contained fewer miles of existing highway (90 miles compared to 195 miles) and rail line (66 miles compared to 214 miles) facilities than did RCA 5. As a result, RCA 7 may not provide as much potential for utilizing existing infrastructure for a future TTC-35 facility(ies).

RCA 8 was not identified as the Preferred Alternative because of poor performance at meeting the TTC-35 need and purpose when compared to other RCAs. RCA 8 received transportation performance scores of 18 for the non-tolled scenario and 27 for the tolled scenario - neither score was in the top two for its scenario.

RCA 9 was not identified as the Preferred Alternative because of poor performance at meeting the TTC-35 need and purpose when compared to other RCAs. RCA 9 received transportation performance scores of 29 for the non-tolled scenario and 18 for the tolled scenario - neither score was in the top two for its scenario.

RCA 10 was not identified as the Preferred Alternative because of poor performance at meeting the TTC-35 need and purpose when compared to other RCAs. RCA 10 received transportation performance scores of 38 for the non-tolled scenario and 25 for the tolled scenario - neither score was in the top two for its scenario.

RCA 11 was not identified as the Preferred Alternative because of poor performance at meeting the TTC-35 need and purpose when compared to other RCAs. RCA 11 received transportation performance scores of 25 for the non-tolled scenario and 32 for the tolled scenario - neither score was in the top two for its scenario.

RCA 12 was not identified as the Preferred Alternative because of poor performance at meeting the TTC-35 need and purpose when compared to other RCAs. RCA 12 received transportation performance scores of 38 for the non-tolled scenario and 40 for the tolled scenario - neither score was in the top two for its scenario.

7.1 SUBSEQUENT ACTIONS

Public and Agency Review and Comment
This signed Tier One DEIS has been provided to various public agencies and made available to the general public. A comment period of a minimum of 45 days has been opened. During this period, TxDOT will hold public hearings throughout the study area. At these hearings, TxDOT and its representatives will present the Tier One DEIS and will receive comments from interested parties. During the comment period, TxDOT will also accept comments via mail and e-mail. All comments received will be reviewed and considered during the preparation of the Tier One FEIS. The Tier One FEIS will include a summary of and response to substantive comments received from agencies and the general public.
General Advanced Conceptual Mitigation Strategies
If the Tier One FEIS recommends a corridor alternative as the Preferred Alternative, it may also include summaries of potential conceptual mitigation strategies, as appropriate, that could be available during Tier Two environmental processes. These potential strategies would be developed based in part on input provided by stakeholders including agencies, private organizations, and the general public. The identification of potential conceptual mitigation strategies in the Tier One FEIS would not preclude the development of additional strategies during subsequent Tier Two environmental processes.

Environmental Management System
TxDOT and FHWA intend to establish an Environmental Management System (EMS) within the overall environmental mitigation strategy for the proposed TTC-35 project. An EMS is a set of processes and practices designed to enable an organization to reduce its environmental impacts. A fundamental goal of the EMS concept is to make environmental protection an integral part of the culture of the organization, rather than an isolated function.

The EMS, as envisioned, would be compliance-based and performance-oriented and would build upon the many environmental management activities and programs already existing, including 43 TAC 2.40. The primary elements of the EMS for TTC-35 would include the following:

- a written environmental statement confirming the TxDOT’s commitment to the environment;
- identification of significant environmental issues and impacts;
- development of objectives and targets for environmental performance;
- an implementation plan to meet objectives and targets through an efficient system of operational controls, assessment, and communication;
- training to ensure that employees are aware and capable of meeting their environmental responsibilities; and
- management review and continual improvement.

Preliminary Segments of Independent Utility
The length and transportation modal complexity of TTC-35 precludes the planning, development, and decision-making of a fully built TTC-35 facility(ies) alignment alternative as a single project. If the Tier One FEIS recommends a corridor alternative as the Preferred Alternative for TTC-35, preliminary SIUs for highway and rail may be identified in the corridor. Any SIUs identified in the FEIS would be determined in accordance with FHWA regulations outlined in 23 CFR 771.111 (f) and (g). Preliminary SIUs would only be identified in the FEIS, if a plan for future development and phasing of TTC-35 facilities is completed prior to the FEIS. To avoid commitments to related transportation improvements before they are fully evaluated, each highway or rail SIU would be evaluated in an EIS, EA, or CE that would:
1. Connect logical termini and be of sufficient length to address environmental matters on a broad scope;
2. Have independent utility or independent significance, i.e., be usable and be a reasonable expenditure even if no additional transportation improvements in the area are made; and
3. Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

The logical termini for project development are defined as rational end points for:

1. A transportation improvement; and
2. A review of the environmental impacts.

The environmental impact review for each TTC-35 SIU during the Tier Two environmental process would cover a broad geographic area so as not to preclude or hinder further connection to an adjacent SIU. In addition, each SIU would be developed in a reasonable time frame to address regional and local modal needs.

Refine Modal Concepts
The transportation multimodal concept described in the Plan includes a series of multimodal corridors which would feature:

- a high-speed, controlled-access tollway with separate lanes for passenger vehicles (three lanes in each direction) and trucks (two lanes in each direction);
- two-way rail (six tracks, three in each direction) with separate commuter/freight and high-speed passenger facilities; and
- a dedicated utility zone for transmission of oil, natural gas, energy, water and data.

Corridor Preservation
If the Tier One FEIS recommends a corridor alternative as the Preferred Alternative, the FEIS may include a summary of areas within the corridor that TxDOT may consider for potential corridor preservation. Corridor preservation may be considered in portions of the corridor where the area available to future TTC-35 facility(ies) alignments is limited by environmental resources, cultural resources, encroaching development, or some other characteristic. The mechanism by which a corridor may be preserved has yet to be determined. However, such preservation activities require a willing participant and cannot use eminent domain as a mechanism for acquisition.

Letter of Permission Procedure with the USACE
TxDOT and FHWA are working cooperatively with the USACE to develop a Letter of Permission Procedure (LOPP) for potential future TTC-35 Tier Two environmental processes. The LOPP would establish certain conditions, limitations, and methods under
which a future project would be permitted to impact jurisdictional waters. In some cases, the granting of a Letter of Permission under the LOPP could serve as an alternative to the traditional Nationwide and/or Individual Section 404 permitting processes. The LOPP is being developed with the USACE concurrently with this Tier One DEIS and may be established at such a time that TxDOT and FHWA could utilize the procedure for potential future TTC-35 Tier Two environmental processes, should they occur.

Completion of the Tier One Final EIS and Issuance of a Record of Decision
The current schedule anticipates the TTC-35 Tier One FEIS will be completed in 2007. When this occurs, a Notice of Availability (NOA) will be published in the Federal Register and the Tier One FEIS will be available to interested parties. The FHWA may publish a ROD at least 30 days after the Tier One FEIS NOA is published. FHWA can accept the No Action Alternative, one of the RCAs, or may seek additional work.
8.0 PUBLIC INVOLVEMENT AND AGENCY COORDINATION

Public involvement and coordination with local elected officials and state and federal regulatory and resource agencies was an extensive part of the development of this Tier One DEIS. The purpose of this coordination and public involvement effort was to ensure every reasonable opportunity was made available to interested citizens, civic groups, public officials, and state and federal resource agencies to participate in the development of the TTC-35 Tier One DEIS. To date, 117 public meetings have been held across the study area. Twenty-six public scoping meetings were held during the Spring of 2004, 44 meetings during the Fall of 2004, and 47 public meetings were held during the Spring of 2005. The TTC-35 Tier One public involvement program is an on-going effort that continues to be updated and enhanced by stakeholder participation.

This Chapter provides answers to such questions as:

- What type of resource and regulatory agency coordination and public involvement was conducted?
- When and where were public meetings held?
- How was the public notified of the meetings?

8.1 COMMUNICATION TOOLS

Communication tools are key on-going elements of the TTC-35 Tier One public involvement program. These tools include a project website, toll-free hotline, and a comprehensive mailing list.

TTC-35 Website

A project website was established to provide those with internet capability 24-hour access to project information. This website, located at www.ttc35.com, went live in January 2004 and was promoted in introductory project letters.

The TTC-35 website was redirected in March 2004 to www.transtx.com. The new website address was promoted through media relations, at public scoping meetings, and through project team presentations. This website was updated throughout the TTC-35 Tier One scoping process and the Fall 2004 public meetings.

The TTC-35 website was redirected a second time on March 4, 2005 to TxDOT’s official TTC website, www.keeptexasmoving.org. This change was made in order to place TTC-35 information in the same location with other TTC project content. The new website address was promoted through media relations and at the Spring 2005 public meetings.

Toll-Free Telephone Hotline: 1-877-872-6789

A toll-free hotline was established October 6, 2003 to respond to public inquiries about TTC-35. Individuals who call the hotline between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday, speak to a public involvement team representative, if available,
or leave a message. All calls are returned within 24 hours, or the following business day. Inquiries concerning public meetings; comment submission procedures; requests to receive meeting materials or handouts; and general project, environmental, engineering, planning, and financial questions are responded to by the TTC-35 project team.

**TTC-35 Mailing List**

Early in the development of the TTC-35 Tier One DEIS, an extensive mailing list (consisting of 11,000+ entries) was developed using a variety of online resources and local directories. This list is updated regularly throughout the project development process and is used to inform interested stakeholders of upcoming events and key milestones. The list includes local elected officials, state agencies, chambers of commerce, school districts, libraries, utility providers, railroad companies, airlines, community organizations, media, regional transportation organizations, councils of government, and MPOs.

### 8.2 RESOURCE AND REGULATORY AGENCY COORDINATION

Coordination meetings were held with state and federal resource and regulatory agencies to insure continued dialogue concerning TTC-35 environmental issues. As part of this process, agencies having special jurisdiction or offering special expertise regarding issues to be addressed in the TTC-35 Tier One EIS were asked to become cooperating agencies throughout the environmental study process. As previously mentioned in Chapter 1 – Need and Purpose the cooperating agencies for the TTC-35 Tier One EIS are the EPA, STB, and USACE. Coordination occurred with cooperating agencies throughout the environmental process. Copies of the letter sent from FHWA requesting these agencies to be cooperating agencies and their response letters are included in Appendix A-1. In addition, the cooperating agencies were provided an opportunity to comment on a preliminary copy of this Tier One DEIS prior to its approval for circulation.

**Scoping Process**

In accordance with 40 CFR 1501.7, 23 CFR 771, and TxDOT’s public involvement procedures, scoping efforts were promptly initiated following the issuance of the NOI for the TTC-35 Tier One EIS. Scoping is defined in 23 CFR 771.123 as the process used “to identify the range of alternatives and impacts and the significant issues to be addressed in the EIS . . .”

During the scoping process, coordination meetings were held with state and federal resource and regulatory agencies to initiate their early involvement and cooperation in the development of this Tier One NEPA document. At each meeting, TxDOT staff presented an overview of TTC-35 that included a discussion of the TTC concept, the proposed Tier One study area, the goals and objectives of TTC-35, schedule, and status. Coordination meetings were held with:

- Texas Commission on Environmental Quality (TCEQ) (April 30, 2004);
- Texas General Land Office (GLO) (April 23, 2004);

The TCEQ stated it had received calls inquiring about the project in the Corsicana area. This agency indicated it would involve its Water Quality Assessment Division in future project discussions and would meet with TxDOT as project development warrants.

The GLO and the NMFS each reviewed the study area maps presented and stated the primary area of concern was the coastal zone. These agencies indicated they would follow the project development process and would become more involved, if appropriate, when the TTC concept (TTC-35 and I-69/TTC) was more fully developed and the environmental process was further along.

The TPWD stated they understood TxDOT’s reasoning in avoiding more environmentally sensitive areas west of I-35. TPWD also stated by “staying to the eastern portion” of the study area, impacts to the blackland prairie could be minimized. TPWD stated the blackland prairie is a fairly small, limited resource and should be avoided, if possible, if the project proceeds to location specific studies. This agency also urged project planners to avoid the Houston Toad critical habitat in the Bastrop area and suggested avoiding native brush areas in the lower Rio Grande Valley and around Falcon Lake.

The USACE cautioned routing TTC-35 perpendicular to drainage areas, due to water quality concerns, and supported exploring options for the movement of wildlife across TTC-35. This agency also acknowledged the extensiveness of the project and noted the need to coordinate with Oklahoma.

The EPA stated its concerns were principally associated with air and water quality issues and cumulative impact analyses. This agency acknowledged some of these issues would become of greater concern should the TTC-35 project proceed to the Tier Two environmental process.

The USFWS expressed concern for critical wildlife crossing areas and the ocelot habitat in South Texas.

**Fall 2004 Coordination**

In a continuing effort to seek input from state and federal resource and regulatory agencies, agency coordination meetings were held in the Fall of 2004. During this meeting process, TxDOT staff updated agencies on TTC-35 progress and status and solicited comments regarding PCAs. Coordination meetings were held with:
Texas Commission on Environmental Quality (October 4, 2004);  
Texas Parks and Wildlife Department (October 21, 2004);  
U. S. Army Corps of Engineers – Fort Worth (October 15, 2004);  
U. S. Environmental Protection Agency (October 14, 2004); and  
U. S. Fish and Wildlife Service (October 19, 2004)

The TCEQ stated it was pleased to be involved in the TTC-35 Tier One environmental process and acknowledged issues such as design would become of greater concern should the TTC-35 project proceed to the Tier Two environmental process.

The TPWD discussed mitigation banking efforts currently being discussed with other agencies and offered to provide a map that included natural resource information within the TTC-35 Tier One study area.

The USACE stated it had concerns over how mitigation would be handled, but appreciated being involved in the TTC-35 environmental process. This agency discussed TTC-35 and I-69/TTC and decided it would get back with TxDOT on cooperating agency status for these projects.

The EPA questioned the partnership of TxDOT and railroads, as well as project funding. This agency also asked for clarification of the relationship between TTC-35 and I-69/TTC as part of the overall Trans-Texas corridor plan.

The USFWS expressed concern for ocelot habitat in southeast Texas, as well as statewide habitat fragmentation. This agency offered support in helping identify and manage critical wildlife areas, and in minimizing habitat fragmentation should the TTC-35 project proceed to the Tier Two environmental process.

**Spring 2005 Coordination**

Additional coordination meetings were held in the Spring of 2005 to again update state and federal resource and regulatory agencies on TTC-35 development progress and status and to solicit comments on the refined PCAs. Coordination meetings were held with:

- Texas Commission on Environmental Quality (February 28, 2005);  
- Texas Parks and Wildlife Department (April 1, 2005) (Joint meeting with I-69/TTC);  
- U. S. Army Corps of Engineers – Fort Worth (February 7, 2005);  
- U. S. Army Corps of Engineers – Galveston (April 20, 2005) (Joint meeting with I-69/TTC);  
- U. S. Environmental Protection Agency (February 15, 2005; April 6, 2005);  
- U. S. Fish and Wildlife Service (February 3, 2005);  
- U. S. D. A. Natural Resource Conservation Service (NRCS) (January 12, 2005); and  
- U. S. DOT Surface Transportation Board (STB) (April 21, 2005).
The TCEQ gave a presentation on the evaluation of environmental management systems and brought additional staff to learn more about TTA projects.

The TPWD inquired about project termini for TTC-35 and I-69/TTC, and expressed interest in public comment to date. This agency discussed large-scale ecosystem mitigation efforts and inquired as to how existing infrastructure will be considered within the context of Trans-Texas.

The USACE discussed permitting issues and how the letter of permission concept may or may not be applicable to TTC-35. This agency stated it intends to accept FHWA’s invitation to become a cooperating agency and named the Fort Worth office as its lead for TTC-35.

The EPA presented an overview of its GIS screening tool and discussed its relationship to the Texas ecological assessment protocol. This agency inquired about coordination with Mexico and NRCS, and discussed differences in project developmental history between TTC-35 and I-69/TTC.

The USFWS expressed continued concern about southern Texas ocelot habitat and discussed various solutions to minimize habitat fragmentation should the TTC-35 project proceed to the Tier Two environmental process. In conjunction with this topic, this agency discussed the splitting of transportation modes that could become necessary depending on need and community constraints.

Based on information provided by the EPA and the USACE, meetings were held with the NRCS. This agency explained its land programs and inquired as to the possibility of TxDOT digitizing some of its maps to aid in the TTC-35 Tier One environmental study process.

STB discussed the I-69/TTC process manual and differences in the EIS processes between TTC-35 and I-69/TTC. STB requested to receive the DEIS to review by chapter, and discussed the rail collocation within the TTC corridor footprint and South Texas termini evaluation/decision.

Appendix G-1 contains meeting minutes from Scoping, Fall 2004 and Spring 2005 resource and regulatory agency coordination.

**Joint Agency Coordination with I-69/TTC-35**

On-going coordination meetings were jointly held in June 2005 with I-69/TTC. At each meeting, TxDOT staff updated agencies on TTC-35 project progress and status. These joint coordination meetings were held with TPWD; USACE; EPA; and USFWS.
8.3 ADDITIONAL COORDINATION

Coordination with Federally Recognized Native American Tribes

Section 106 of the NHPA, as amended, advises consultation with federally recognized Native American Tribes during the NEPA process while a wide range of alternatives are under consideration. Correspondence inviting tribal participation in the development of the TTC-35 Tier One EIS was sent by TxDOT on behalf of FHWA to 25 federally recognized Native American Tribes on January 7, 2005, and to two federally recognized Native American Tribes on January 10, 2005. This correspondence contained meeting brochures from the Fall 2004 public meetings and a schedule of TTC-35 activities to date. Tribal representatives interested in participating in the planning process for TTC-35 were asked to return the letter with their signature and identify any issues or areas of cultural importance that should be considered during the development of the Tier One EIS. Table 8-1 lists the Native American Tribes invited to participate in the development of the TTC-35 Tier One EIS. Tribes indicating their desire to participate in the process are designated with an asterisk (*).

<table>
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<tr>
<th>Table 8-1: Native American Tribes Invited to Participate in the TTC-35 Tier One Environmental Planning Process</th>
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Appendix G-2 contains Native American tribal correspondence.

Coordination with Oklahoma

The TTC-35 project team coordinated with the Oklahoma Department of Transportation (ODOT) to request a copy of the Oklahoma STIP. The Oklahoma STIP, sent to the TTC-35 project team on September 17, 2004, details the utilization of Oklahoma’s federal and state transportation funds appropriated for regionally significant projects requiring federal action, and includes a list of priority transportation projects to be carried out over a three-year period. The TTC-35 project team reviewed the document and began consideration of how the TTC-35 preliminary alternatives could be connected with Oklahoma’s existing and planned transportation infrastructure. On February 10, 2005, TxDOT updated ODOT on the status of TTC-35, the tiered environmental process, and
refinements to the preliminary corridor alternatives. Summaries of coordination with Oklahoma are available in Appendix G-3.

**Coordination with International Boundary and Water Commission**

The TTC-35 project team coordinated with the International Boundary and Water Commission (IBWC) concerning international flood control projects along the Rio Grande under the control of the IBWC. These projects contain infrastructures such as levees, diversion dams, control weirs and drop structures, and their associated riverbed and riverbanks. The IBWC requests that development in the U.S. near the international border not alter existing surface drainage patterns and design flow capacities. As TTC-35 project needs are identified, the IBWC requests that sufficient information be provided as to make a determination of whether or not there would be transboundary drainage and pollution impacts or structures limiting access to IBWC infrastructure. A letter of coordination from the IBWC is available in Appendix G-4.

**Coordination with Mexico**

On June 8, 2005, TxDOT and FHWA met with representatives from the Mexican Federal Ministry of Transportation and Communication and representatives from the Mexican states of Tamaulipas, Nuevo Leon, and Coahuila. The purpose of the exchange was to initiate communication and begin coordinating and planning projects to enhance connectivity between Mexico and the TTC system. Presentations were made by representatives from each country regarding existing and planned transportation projects. The outcome of the informal technical exchange was a framework that would be used to coordinate efforts as each country moves forward in its planning processes. A transcript of this meeting is included in Appendix G-5.

**Coordination with Metropolitan Planning Organizations**

Prior to the Spring 2005 public meetings, the TTC-35 project team collected preliminary website and hardcopy map data from MPOs concerning local planning efforts throughout the study area. Following the Spring 2005 public meetings, the TTC-35 project team reviewed feedback from each of the local areas where data had been collected, and began to hold scheduled meetings with MPOs in an effort to coordinate regional planning efforts and TTC-35 development.

**Coordination for Cumulative Effects Assessment**

Coordination occurred with 20 state and federal agencies and 231 local and regional agencies in order to obtain information for developing the cumulative effects assessment presented in Chapter 5 – Indirect and Cumulative Effects Assessment. A complete list of the agencies contacted is included in Tables 5-3 and 5-4. The information obtained from the agencies was used to develop the list of past, present, and reasonably foreseeable projects within the study area and to identify the resources (wetlands, rural/agricultural land, and economic effects) that required an evaluation of the cumulative effects of TTC-35 at a Tier One level of analysis.
8.4 PUBLIC MEETINGS

Scoping Process

In accordance with 40 CFR 1501.7, 23 CFR 771, and TxDOT’s public involvement procedures, scoping efforts were initiated following the issuance of the NOI for the TTC-35 Tier One EIS. A letter introducing the project and providing the project website and toll-free phone number was sent to state senate and house representatives in January 2004. In April 2004, a letter introducing the project was sent to state and federal resource and regulatory agencies. Later the same month, the TTC-35 mailing list was used to send an introductory letter about TTC-35 to approximately 11,000 stakeholders in the study area. This letter solicited comments, input, and feedback to be considered during the development of the Tier One EIS. Appendix G-6 contains representative copies of these initial scoping letters.

A series of 26 TTC-35 Tier One EIS public scoping meetings (“public scoping meetings”) were then held within or adjacent to the proposed TTC-35 Tier One study area between April 7 and June 15, 2004. The purpose of these meetings was to initiate scoping for the TTC-35 Tier One EIS and present the proposed study area. Meeting locations are listed alphabetically and shown geographically in Appendix G-7.

Notification

Media advisories announcing public scoping meetings were sent to local papers by TxDOT’s public involvement office. In addition, stakeholders identified on the TTC-35 mailing list were sent postcards by the TTC-35 project team announcing the times, dates, and locations of the meetings to be held in their area.

Legal notices were published in newspapers having general circulation within the study area. These notices were published approximately 30 and 10 days prior to each public meeting in accordance with TxDOT’s public involvement procedures. In addition, supplemental display ads announcing the meeting times, dates and locations were published in the main body of each newspaper. The public notices varied slightly by area so as to announce the meetings in the targeted area.

Efforts were made to reach populations of low-income, minorities, and persons with limited English proficiency (principally Spanish-speaking) that live in or near the study area. Attempts to reach these populations included placing legal notices in Spanish publications, providing Spanish translators at public meetings, and offering Spanish translated handouts and public meeting display boards/exhibit copies. The use of Spanish-language materials and media was based on county demographic population statistics and consultation with local TxDOT districts. Any county shown to have a higher percentage of Hispanic population than the Texas average was targeted for Spanish-language meeting materials and had Spanish-speaking interpreters available at public meeting locations.
Appendix G-8 contains a table, by meeting location, of the newspapers in which public notices (legal and display ads) appeared for the public scoping meetings. This table also identifies the county in which each paper has primary circulation. A total of 313 ads were placed in 64 newspapers in the study area between March 8 and June 5, 2004, to advertise the TTC-35 Tier One EIS scoping meetings. Of these, 199 were English 30-day and 10-day legal ads, 19 were Spanish 30-day and 10-day legal ads, 82 were English display ads, and 13 were Spanish display ads. Appendix G-9 contains representative copies of postcards, and public notices (legal and display ads) used for notification purposes.

Meeting Format
Public involvement efforts undertaken in conjunction with the TTC-35 Tier One EIS were designed to address public, local official, and agency concerns throughout the study process. Public meeting locations were selected based on population concentrations and distributed so most people in the study area had at least one location that was reasonably convenient to attend. All facilities at which meetings were held were handicap accessible. Newspaper ads encouraged anyone who planned to attend a meeting and needed special communication or required special accommodation to call the TTC-35 hotline at least two business days prior to the meeting to request assistance. No requests for special accommodations were received during the public scoping process.

All public scoping meetings were held in a two-session open house format. The first session, held from 4:00 p.m. to 5:00 p.m., allowed public officials (elected officials, city managers, county administrators, and agency heads and staff) to attend, view displays, and interact with the TTC-35 project team. The second session, held from 6:00 p.m. to 9:00 p.m., allowed members of the public to attend, view displays, and interact with the TTC-35 project team. The open house format facilitated the exchange of information through one-on-one discussions with the TTC-35 project team and enabled participants to attend at their convenience, pursue topics of personal interest, and stay as long as they desired.

Upon entering the room, attendees were greeted, asked to sign an attendance register, and were provided informational handouts. Copies of exhibits/display boards also were available upon request. All handouts and exhibit copies were available in English and Spanish and are included in Appendix G-10.

During the meetings, attendees circulated throughout the room, reviewing exhibits. Project team members were available to interact with attendees, answer questions, and provide information. One or more court reporters were available at each location to transcribe oral comments from meeting attendees, if they desired to make a verbal comment. A comment drop-box was also available in the center of each meeting room with table and chairs if attendees desired to submit written comment forms while in attendance. The deadline for the submission of written comments (by mail or email) was June 25, 2004.
Meeting Attendance
Attendance at the public scoping meetings is estimated at 746 people, determined by signatures at meeting locations. Some individuals attended more than one meeting (signing in more than once) and a few individuals refused to sign the attendance record; thus, 746 represents an estimate of attendees, rather than exact total. Of those signing-in, 619 were general public, 29 were media and 98 were public officials and agency representatives. Appendix G-11 contains a detailed attendance breakdown of TTC-35 public scoping meetings.

Comment Summary
A total of 396 comments were received during the public scoping process. To be included in the official record of the public scoping process, comments must have been submitted on or before June 25, 2004. For purposes of postal mail, any comment postmarked on or before the deadline was included. Comments received after the deadline were included as part of the project record and considered in the overall development of this Tier One DEIS, but not included as part of the public scoping process.

Individuals submitting comments throughout the public scoping process had the opportunity to record up to four comments in a single day using four different media:

- verbal comments via a court reporter at a public meeting;
- written comments at a public meeting drop-box;
- emailed comments through the project website; and
- written comments via postal mail.

If an individual submitted more than one email, drop-box comment, or letter on a single day or recorded more than one verbal comment at a single public scoping meeting, all comments from that medium were combined and counted as a single comment.

**Table 8-2** summarizes the most commonly expressed public comments received during the public scoping process.

<table>
<thead>
<tr>
<th>Table 8-2: TTC-35 Tier One EIS Public Scoping Meeting Comment Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>TTC-35 concept provides separate lanes for cars and large trucks which would reduce congestion, increase safety, and aid in the transport of hazardous materials</td>
</tr>
<tr>
<td>New rail lines would help reduce traffic congestion</td>
</tr>
<tr>
<td>TTC-35 would help create jobs and have economical benefit</td>
</tr>
<tr>
<td>I-35W Corridor is in immediate need of relief from heavy truck and vehicle traffic near Fort Worth</td>
</tr>
<tr>
<td>High-speed rail lines would be most beneficial if they terminated near city centers</td>
</tr>
<tr>
<td>A connection to Oklahoma’s Indian Nation Turnpike would greatly benefit Paris/Lamar County Area</td>
</tr>
<tr>
<td>TTC-35 is needed, but have concern for parks and wildlife areas</td>
</tr>
<tr>
<td>TTC-35 would relieve congestion on existing I-35, but needs to minimize impacts to Blackland Prairie soils and prime farmlands</td>
</tr>
<tr>
<td>Economic benefits of TTC-35 would greatly aid Frio County</td>
</tr>
<tr>
<td>TTC-35 would help route truck traffic around San Antonio area with Loop 1604 E, I-37, I-35, and I-10</td>
</tr>
</tbody>
</table>
### Table 8-2: TTC-35 Tier One EIS Public Scoping Meeting Comment Summary

<table>
<thead>
<tr>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>west of Seguin</td>
</tr>
<tr>
<td>TTC-35 is needed, but have concern for historical and archeological resources</td>
</tr>
<tr>
<td>TTC-35 is needed, but have concern for wetlands and endangered species</td>
</tr>
<tr>
<td>High-speed rail an alternative to single-occupancy vehicles</td>
</tr>
<tr>
<td>TTC-35 would destroy prime farmlands/family farms and ranches</td>
</tr>
<tr>
<td>Concern fair market value will not be paid for property</td>
</tr>
<tr>
<td>TTC-35 would take funds away from other transportation projects</td>
</tr>
<tr>
<td>Opposed to tolling in general</td>
</tr>
<tr>
<td>Additional cost of rail and truck lanes cannot be justified</td>
</tr>
<tr>
<td>TTC-35 will disrupt communities, impact historic resources and divide the state</td>
</tr>
<tr>
<td>TTC-35 will reduce emergency response and access</td>
</tr>
<tr>
<td>TTC-35 will promote terrorism by providing a target</td>
</tr>
<tr>
<td>Only need high-speed rail, not the rest of the TTC concept</td>
</tr>
<tr>
<td>TTC-35 is too big/expensive and takes too much right-of-way</td>
</tr>
<tr>
<td>TTC-35 will remove property from local tax rolls and impact tax base of local communities</td>
</tr>
<tr>
<td>TxDOT should upgrade existing facilities rather than build TTC-35</td>
</tr>
<tr>
<td>Tolling is not a viable travel option for low income families</td>
</tr>
<tr>
<td>TTC-35 would bring urban problems to rural areas</td>
</tr>
<tr>
<td>Consider widening and improving I-35, I-45, I-30 and US 75</td>
</tr>
<tr>
<td>TTC-35 would disrupt NAFTA “River of Trade”</td>
</tr>
<tr>
<td>TTC-35 would be too noisy</td>
</tr>
<tr>
<td>TTC-35 would impact aquifers and cause runoff</td>
</tr>
<tr>
<td>TTC-35 would restrict access and create barrier difficult to go around with equipment</td>
</tr>
<tr>
<td>TTC-35 is secretive and is only beneficial for politicians</td>
</tr>
<tr>
<td>TTC-35 would disrupt wildlife</td>
</tr>
<tr>
<td>TTC-35 does not take alternative fuel source concept into account</td>
</tr>
<tr>
<td>TTC-35 appears to be located too far east of Temple for area to benefit</td>
</tr>
<tr>
<td>TTC-35 will diminish hunting areas</td>
</tr>
<tr>
<td>TTC-35 will create bottleneck at Oklahoma border</td>
</tr>
</tbody>
</table>

### Fall 2004 Public Meetings

A series of 44 public meetings were held between October 19 and November 18, 2004. The purpose of these meetings was to show the public the refined study area and present the preliminary corridor alternatives. Meeting locations are listed alphabetically and shown geographically in Appendix G-7.

### Notification

Meeting notification for the TTC-35 Tier One EIS Fall 2004 public meetings (“Fall public meetings”) was accomplished through a combination of direct mailings, media advisories, and published public notices. Meeting information also was posted on the TTC-35 website (www.transtx.com).

The TTC-35 mailing list was updated following the TTC-35 public scoping process as individuals requested to be added (through the TTC-35 website, calls to the hotline at the TTC-35 office and TxDOT, direct emails, and comment submittals). The updated mailing list was used to send public meeting notifications of the Fall 2004 public meetings. Each individual/stakeholder on the mailing list was sent a flyer announcing the
times, dates, and locations of the meetings to be held in their area. Individuals requesting email notification were emailed an electronic version of the flyer. In addition, posters were sent to libraries, postmasters, county judges, city managers, city administrators, and organizations that maintain community bulletin boards (such as churches and shopping centers).

Public officials on the mailing list also were sent a flyer announcing the times, dates, and locations of the meetings to be held in their areas. In addition, TxDOT held a legislative briefing for state-elected officials on October 1, 2004. All officials in attendance were given a legislative briefing packet containing: a public meeting flyer, a TTC-35 fact sheet, an environmental study timeline, a description of the environmental study process, a map of the PCAs, a map of the TTC-35 study area, and an executive summary of findings for the TTC. In addition, the packet included a description of the Comprehensive Development Agreement (CDA) and a list of proposer teams. Appendix G-12 contains a copy of the Fall 2004 legislative briefing packet.

To advise the media of upcoming meetings, press kits were made available October 1, 2004 by TxDOT. These kits contained the same information as the legislative briefing packets given to the state elected officials. Media advisories announcing the Fall 2004 public meetings were sent to local papers and public notices were published in newspapers having general circulation in the study area.

Public notices were published approximately 30 and 10 days prior to each public meeting in accordance with TxDOT’s public involvement procedures. Supplemental display ads announcing the meeting times, dates and locations also were published in the main body of each newspaper. The public notices varied slightly by area (north, central and south) so as to announce the meetings in the targeted area. A total of 1,174 ads were placed in 78 newspapers in the study area between September 15 and November 18, 2004, to advertise the Fall 2004 public meetings. Of these, a total of 551 were English 30-day and 10-day legal ads, 136 were Spanish 30-day and 10-day legal ads, and 487 were display ads. Appendix G-8 contains a table, by meeting location, of the newspapers in which the (legal and display ads) appeared for the Fall 2004 meetings. This table identifies which ads/displays were in Spanish and the county in which each paper has primary circulation. Appendix G-9 contains representative copies of flyers, posters, media advisories, and public notices (legal and display ads) used for notification purposes.

As with the public scoping process, efforts were made to reach populations of low-income, minorities, and persons with limited English proficiency (principally Spanish-speaking) living in or near the study area. Attempts to reach these populations included placing legal notices in Spanish publications, providing Spanish translators at public meetings, and offering Spanish translated handouts and public meeting display boards/exhibit copies. The use of Spanish-language materials and media was based on county demographic population statistics and consultation with local TxDOT districts.  

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66 A CDA is a method of project delivery being utilized by TxDOT for proposed TTC-35.
Any county shown to have a higher percentage of Hispanic population than the Texas average was targeted for Spanish-language meeting materials and had Spanish-speaking interpreters available at public meeting locations.

Meeting Format
The meeting format for the Fall 2004 public meetings was similar to that of the public scoping meetings with all meetings having a two-session open house format. The first session for public officials was held from 4:00 p.m. to 5:00 p.m., similar to the public scoping meetings. The second session for the public was held immediately following the public officials’ session, from 5:00 p.m. to 8:00 p.m., an hour earlier than the public scoping meetings. As with the scoping meetings, all facilities at which meetings were held were handicap accessible and no requests for special accommodations were received during the Fall 2004 public meetings.

Upon entering the room, attendees were greeted, asked to sign an attendance register, and were provided informational handouts. Copies of exhibits/display boards were available upon request. All handouts and exhibit copies were available in English and Spanish and are included in Appendix G-10.

One or more court reporters were available to transcribe oral comments and a comment drop-box was present in the center of each meeting room with table and chairs. In addition, an eight-minute video produced by TxDOT and entitled “The Mobility Challenge” was also available for attendees to view on a continuous television loop in front of a small seating area. This video discussed issues regarding transportation challenges in Texas and how these impact daily life, as well as a discussion of the current funding mechanism used to develop transportation projects. The deadline for the submission of written comments (by mail, or email) was December 3, 2004.

Meeting Attendance
Attendance at the Fall 2004 public meetings is estimated at 2,895 people, determined by signatures at meeting locations. Some individuals attended more than one meeting (signing in more than once) and a few individuals refused to sign the attendance record; thus, 2,895 represents an estimate of attendees, rather than exact total. Of those signing-in, 2,557 were general public, 49 were media and 289 were public officials and agency representatives. Appendix G-11 contains a detailed attendance breakdown of the Fall 2004 public meetings.

Comment Summary
A total of 924 comments were received during the Fall 2004 public meeting process. To be included in the official record of the Fall 2004 public meeting process, comments must have been submitted on or before December 3, 2004. For purposes of postal mail, any comment postmarked on or before the deadline was included. Comments received after the deadline were included as part of the project record and considered in the overall
development of this Tier One DEIS, but not included as part of the Fall 2004 public meeting process.

As with the public scoping meetings, individuals submitting comments had the opportunity to record up to four comments in a single day using four different media. If an individual submitted more than one email, drop-box comment, or letter on a single day or recorded more than one verbal comment at a single public meeting, all comments from that medium were combined and counted as a single comment.

Table 8-3 summarizes the most commonly expressed public comments received during the Fall 2004 public meetings.

<table>
<thead>
<tr>
<th>Table 8-3: TTC-35 Tier One EIS Fall 2004 Public Meeting Comment Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wants TTC-35 to locate in his/her area</td>
</tr>
<tr>
<td>TTC-35 would help create jobs and have economical benefit</td>
</tr>
<tr>
<td>Supports use of rail in general</td>
</tr>
<tr>
<td>TTC-35 would greatly relieve traffic congestion</td>
</tr>
<tr>
<td>Supports TTC-35 multimodal concept</td>
</tr>
<tr>
<td>Lamar County pleased with the expansion of the Study Area from previous meetings and the consideration of a connection to the Indian Nations Turnpike in Oklahoma</td>
</tr>
<tr>
<td>TTC-35 corridor should be placed close to the south side of San Antonio</td>
</tr>
<tr>
<td>TTC-35 would provide rerouting of freight rail out of San Antonio center and would greatly improve safety and reduce congestion</td>
</tr>
<tr>
<td>Support near Hillsboro stated the economy in that area was built around the existing I-35 and asked TTC-35 not be moved too far away from that area</td>
</tr>
<tr>
<td>Support TTC-35 concept, but concerned about air quality, impact to wildlife and accessibility for farmers and ranchers</td>
</tr>
<tr>
<td>TTC-35 would destroy prime farmlands/family farms and ranches</td>
</tr>
<tr>
<td>Concern fair market value will not be paid for property</td>
</tr>
<tr>
<td>TTC-35 would restrict access and create barrier across properties that is difficult to go around with equipment</td>
</tr>
<tr>
<td>TTC-35 would destroy rural/agricultural ways of life</td>
</tr>
<tr>
<td>Objects to taking private property in general/ concern for loss of property value</td>
</tr>
<tr>
<td>Opposed to tolling in general</td>
</tr>
<tr>
<td>TTC-35 would destroy economy in small communities</td>
</tr>
<tr>
<td>TTC-35 would take property off of local tax rolls</td>
</tr>
<tr>
<td>TTC-35 would require too much land</td>
</tr>
<tr>
<td>TTC-35 will reduce emergency response and access</td>
</tr>
<tr>
<td>TTC-35 will promote terrorism by providing a target</td>
</tr>
<tr>
<td>Objects to foreign consortiums gaining control of properties taken by the State</td>
</tr>
<tr>
<td>TTC-35 is too big/expensive</td>
</tr>
<tr>
<td>Believes it is unethical for private consortiums to benefit from land taken under eminent domain</td>
</tr>
<tr>
<td>TxDOT should upgrade existing facilities rather than build TTC-35- suggests SH 130 or SH 281</td>
</tr>
<tr>
<td>TTC-35 would negatively impact archaeological resources</td>
</tr>
<tr>
<td>TTC-35 would produce too much noise</td>
</tr>
<tr>
<td>TTC-35 would damage springs, wells, aquifers, and water delivery systems</td>
</tr>
<tr>
<td>TTC-35 would disrupt wildlife, Blackland Prairie ecosystems, and water resources</td>
</tr>
</tbody>
</table>
Spring 2005 Public Meetings

On-going public involvement efforts for TTC-35 continued during the Spring of 2005 with another round of public meetings and agency briefings. The purpose of these meetings was to solicit comments regarding PCAs that had been refined in response to previous public comment received during the Fall 2004 public meetings and additional analyses. A series of 47 public meetings were held between February 7 and March 31, 2005. Meeting locations are listed alphabetically and shown geographically in Appendix G-7.

Notification

Meeting notification for the TTC-35 Tier One EIS Spring 2005 public meetings (“Spring 2005 public meetings”) was accomplished through a combination of direct mailings, media advisories, published public notices. Meeting information also was posted on the TTC-35 website (www.keeptexasmoving.org).

The TTC-35 mailing list was updated from previous scoping and public meetings as individuals requested to be added (through the TTC-35 website, calls to the hotline at the TTC-35 office and TxDOT, direct emails, and comment submittals). The updated mailing list was used to send public meeting notifications of the Spring 2005 public meetings. Each individual/stakeholder on the mailing list was sent a flyer announcing the times, dates, and locations of the meetings to be held in their area. Individuals requesting email notification were emailed an electronic version of the flyer. In addition, posters were sent to libraries, postmasters, county judges, city managers, city administrators, and organizations that maintain community bulletin boards.

Public officials on the mailing list also were sent a flyer announcing the times, dates, and locations of the meetings to be held in their areas. As with the Fall 2004 public meetings, TxDOT held a legislative briefing for state-elected officials on January 21, 2005. All officials were given a legislative briefing packet containing a public meeting flyer, a preliminary corridor alternatives map, a TTC-35 fact sheet, an environmental study timeline, a description of the environmental study process. In addition, a list of developer team members for the CDA also was included in the packet. Appendix G-12 contains a copy of the Spring 2005 legislative briefing packet.

To advise the media of upcoming meetings, press kits were made available on January 21, 2005 by TxDOT. These kits contained information similar to that provided in the legislative briefing packets given to the state elected officials. Media advisories announcing the Spring 2005 public meetings were sent to local papers and public notices were published in newspapers having general circulation in the study area.

The public notices were published approximately 30 and 10 days prior to each public meeting in accordance with TxDOT’s public involvement procedures. A total of 1,341 ads ran in 87 newspapers in the study area between January 4, 2005 and March 31, 2005 to advertise the Spring 2005 public meetings. Of these, 582 were English 30-day and 10-
day legal ads, 181 were Spanish 30-day and 10-day legal ads, 551 were English display ads, and 27 were Spanish display ads. Appendix G-8 contains a table, by meeting location, of the newspapers in which the public notices (legal and display ads) appeared for the Spring 2005 public meetings. This table also identifies the county in which each newspaper has primary circulation. Although more public meetings were held in the Spring of 2005 than in the Fall of 2004 and more newspapers were used for advertising, fewer ads were run for the Spring 2005 public meetings. This was due primarily to the scheduling of two meetings per night, rather than one, which allowed more efficiency in the publication schedule. In addition, many of the meetings that took place on the same night were in proximity to one another, and therefore could be included in the same advertisement. Appendix G-9 contains representative copies of flyers, posters, media advisories, and public notices (legal and display ads) used for notification purposes.

Efforts were made to reach populations of low-income, minorities, and persons with limited English proficiency (principally Spanish-speaking) living in or near the study area. Attempts to reach these populations included placing legal notices in Spanish publications, providing Spanish translators at public meetings, and offering Spanish translated handouts and public meeting display boards/exhibit copies. The use of Spanish-language materials and media was based on county demographic population statistics and consultation with local TxDOT districts. Any county shown to have a higher percentage of Hispanic population than the Texas average was targeted for Spanish-language meeting materials and had Spanish-speaking interpreters available at public meeting locations.

Meeting Format
The meeting format for the Spring 2005 public meetings was like that of the Fall 2004 public meetings. Public officials were invited to the 4:00 p.m. to 5:00 p.m. session, while the general public was invited to the 5:00 p.m. to 8:00 p.m. session. As with the public scoping meetings and the Fall 2004 public meetings, all facilities at which public meetings were held were handicap accessible and no requests for special accommodations were received during the Spring 2005 public meetings.

Upon entering the room, attendees were greeted, asked to sign an attendance register, and provided informational handouts. Copies of exhibits/display boards were available upon request. All handouts and exhibit copies were available in English and Spanish and are included in Appendix G-10.

As with the public scoping meetings and Fall 2004 public meetings, one or more court reporters were available to transcribe oral comments and a comment drop-box was present in the center of each meeting room with table and chairs. In addition, a six-minute video produced by TxDOT and entitled “Keep Texas Moving” was also available for attendees to view on a continuous television loop in front of a small seating area. This video discussed the future challenges of mobility within Texas, the concept of the Trans-Texas Corridor, the status of TTC-35, and the environmental process.
Meeting Attendance
Attendance at the Spring 2005 public meetings is estimated at 6,112 people, determined by signatures at meeting locations. Some individuals attended more than one meeting (signing in more than once) and a few individuals refused to sign the attendance record; thus, 6,112 represents an estimate of attendees, rather than exact total. Of those signing-in, 5,743 were general public, 88 were media and 281 were public officials, agency representatives, and Native American tribal representatives. Appendix G-11 contains a detailed attendance breakdown of the Spring 2005 public meetings.

Comment Summary
To be included in the official record of the Spring 2005 public meeting process, comments must have been submitted on or before April 22, 2004. For purposes of postal mail, any comment postmarked on or before the deadline was included.

As with the previous public meetings, individuals submitting comments had the opportunity to record up to four comments in a single day using four different media. If an individual submitted more than one email, drop-box comment, or letter on a single day or recorded more than one verbal comment at a single public meeting, all comments from that medium were combined and counted as a single comment.

Table 8-4 summarizes the most commonly expressed public comments received during the Spring 2005 public meetings by region.

<table>
<thead>
<tr>
<th>Table 8-4: TTC-35 Tier One EIS Spring 2005 Public Meeting Comment Summary by Region</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>North Region</strong></td>
</tr>
<tr>
<td>Gainesville/Cooke County supporters recognized the positive impact TTC-35 could have on their area’s economic development.</td>
</tr>
<tr>
<td>Denton/Denton County and McKinney/Collin County area individuals emphasized the need for commuter rail to those areas with a connection to city centers.</td>
</tr>
<tr>
<td>Paris/Lamar County individuals expressed concern for air quality issues around the Dallas-Fort Worth Metroplex that could be alleviated by using a TTC-35 route through Lamar County and connect with the Indian Nations Turnpike in Oklahoma.</td>
</tr>
<tr>
<td>Dallas-Fort Worth residents emphasized TTC-35 be placed between I-35E and I-35W north of Hillsboro, then mode-by-mode alignment determinations made to feed it from urban connectors.</td>
</tr>
<tr>
<td>Athens/Henderson County area supporting comments emphasized the need for “truck only” lanes and was in favor of TTC-35 improving the economic prosperity of the region.</td>
</tr>
<tr>
<td>Clifton/Meridian/Bosque County and Hillsboro/Hill County area residents suggested keeping TTC-35 as close as possible to existing I-35 so as not to devastate the small cities and communities there currently relying on its economic benefits.</td>
</tr>
<tr>
<td>Gainesville/Cooke County and Sherman/Grayson County area residents expressed concern for personal property impacts relating to local farm families and the region’s agricultural economy.</td>
</tr>
<tr>
<td>Denton/Denton County area individuals expressed concern for the increase in smuggling of illegal immigrants, contraband, and terrorist activities TTC-35 would bring to their area.</td>
</tr>
<tr>
<td>McKinney/Collin County area residents objected to the amount of agricultural land and resources TTC-35 would impact and emphasized the improvement of existing roadways in their areas.</td>
</tr>
<tr>
<td>Dallas-Fort Worth Metroplex residents expressed concern over toll roads and stated TTC-35 would take traffic north to Oklahoma when there is actually more travel demand for traffic heading northeast through Texarkana.</td>
</tr>
</tbody>
</table>
### Table 8-4: TTC-35 Tier One EIS Spring 2005 Public Meeting Comment Summary by Region

<table>
<thead>
<tr>
<th>Region</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulphur Springs/</td>
<td>Sulphur Springs/Hopkins County area individuals were concerned about drawing traffic away from existing NAFTA corridors, I-35 and I-30.</td>
</tr>
<tr>
<td>Hopkins County area</td>
<td>Clifton/Meridian/Bosque County area residents expressed great concern for the loss of prime agricultural property.</td>
</tr>
<tr>
<td>Hill County area</td>
<td>Hillsboro/Hill County area residents expressed concerns about the loss of prime agricultural property, challenges to farmland access with large equipment, and the overall destruction of rural ways of life.</td>
</tr>
<tr>
<td>Central Region</td>
<td>Waco/McLennan County area supporters emphasized the desire for TTC-35 to serve as a truck and rail reliever from existing I-35 and not be a growth catalyst to detract from current metropolitan areas.</td>
</tr>
<tr>
<td>Bryan/College Station/Brazos County individuals</td>
<td>Bryan/College Station/Brazos County individuals emphasized the desire for separate truck lanes and high-speed rail between large Texas cities.</td>
</tr>
<tr>
<td>Rockdale/Cameron County area supporters</td>
<td>Rockdale/Cameron County area supporters recognized the economic benefit to their region’s manufacturers who would benefit from lower transportation costs, but cautioned overly impacting agricultural properties.</td>
</tr>
<tr>
<td>Temple/Bell County area residents</td>
<td>Temple/Bell County area residents emphasized rail as an environmentally friendly and convenient alternative, as long as the terminal connections are placed in convenient and usable urban areas, not on the outskirts like most airports.</td>
</tr>
<tr>
<td>Waco/McLennan County area individuals</td>
<td>Waco/McLennan County area individuals objected to the use of foreign investors, the taking of so much property off local tax rolls, and any building TTC-35 while existing I-35 needs upgraded.</td>
</tr>
<tr>
<td>Temple/Bell County area residents</td>
<td>Temple/Bell County area residents expressed concerns about the loss of prime agricultural property, endangered species, and the overall destruction of rural ways of life.</td>
</tr>
<tr>
<td>Rockdale/Milam County area individuals</td>
<td>Rockdale/Milam County area individuals expressed concern regarding the taking of private property, the destruction of prime agricultural property, the destruction of historical resources and cemeteries, and the potential damage to springs, wells, aquifers, and water delivery systems.</td>
</tr>
<tr>
<td>Austin/eastern Travis County area residents</td>
<td>Austin/eastern Travis County area residents objected to the size of TTC-35, the removal of so much land from local tax rolls, and the redundancy of the proposed SH 130 project and TTC-35.</td>
</tr>
<tr>
<td>Bastrop/Bastrop County area residents</td>
<td>Bastrop/Bastrop County area residents expressed concern about fair market value paid for property used for TTC-35, objected to a plan that utilizes depleting oil and gas reserves, and suggested abandoning or scaling back the size of TTC-35.</td>
</tr>
<tr>
<td>Giddings/Lee County area individuals</td>
<td>Giddings/Lee County area individuals objected to the taking of family farmland to help urban areas solve their traffic problems.</td>
</tr>
<tr>
<td>South Region</td>
<td></td>
</tr>
<tr>
<td>Lockhart/Caldwell County and Seguin/Guadalupe County area residents</td>
<td>Lockhart/Caldwell County and Seguin/Guadalupe County area residents supported TTC-35 as a way to relieve local roads of truck traffic.</td>
</tr>
<tr>
<td>San Antonio/Bexar County area supporters</td>
<td>San Antonio/Bexar County area supporters suggested the initial use of the planned SH 130 project, then staying as close to the metro area as possible for the fully built TTC-35 to provide optimal connectivity to existing highway, arterial, and rail networks.</td>
</tr>
<tr>
<td>Pearsall/Frio County and Laredo/Webb County area individuals</td>
<td>Pearsall/Frio County and Laredo/Webb County area individuals favored a route south of San Antonio close to or utilizing existing I-35, based on the amount of trade currently crossing the Port of Laredo.</td>
</tr>
<tr>
<td>Corpus Christi/Nueces County and Brownsville/McAllen/Rio Grande Valley area supporters</td>
<td>Corpus Christi/Nueces County and Brownsville/McAllen/Rio Grande Valley area supporters stated the need for separate truck and car lanes, and emphasized the area’s future economic well-being would be tied to TTC-35 and/or the proposed I-69 project.</td>
</tr>
<tr>
<td>San Antonio/Bexar County area individuals</td>
<td>San Antonio/Bexar County area individuals expressed concern for the vast size of a project that would fragment the state of Texas.</td>
</tr>
<tr>
<td>George West/Live Oak County area residents</td>
<td>George West/Live Oak County area residents objected to the taking of private property for the gain of a foreign consortium and fear TTC-35 will increase NAFTA related problems.</td>
</tr>
<tr>
<td>Tilden/McMullen County area individuals</td>
<td>Tilden/McMullen County area individuals objected to the taking of so much property and suggested the widening of I-35 south of San Antonio instead of building TTC-35 through their county.</td>
</tr>
</tbody>
</table>
Burleson County Information Exchange

An “information exchange” was conducted at the Caldwell Civic Center in the city of Caldwell, TX on April 11, 2005. This session was requested, advertised, and scheduled by the Burleson County Commissioners’ Court, as it was planned separately from the Spring 2005 public meeting schedule. TTC-35 project team members staffed the session and presented the same materials displayed at the Spring 2005 public meetings. Comments received from this informational session were included as part of the Spring 2005 public meeting record, since the Spring 2005 public comment period was still open.

8.5 GENERAL COMMENT PERIOD

Since the publication of the NOI in February 2004, there have been three formal comment periods offered to the public for input: the public scoping meetings (April 7 to June 25, 2004), the Fall 2004 public meetings (October 19 to December 3, 2004), and the Spring 2005 public meetings (February 7 to April 22, 2005). Comments submitted to the TTC-35 project team through email and the postal system outside of these time periods were also considered in the development of the Tier One EIS and are referred to as general comments.

Table 8-5 provides a public comment summary for the public meetings and general comment periods for comparison.

<table>
<thead>
<tr>
<th>Period</th>
<th>Meeting and General Comment Periods</th>
<th>Date</th>
<th>Attendance</th>
<th>Comments Received (written and verbal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>General Comment Period*</td>
<td>2/6/04-4/6/04</td>
<td>N/A</td>
<td>24</td>
</tr>
<tr>
<td>2</td>
<td>Scoping Meetings</td>
<td>4/7/04-6/25/04</td>
<td>746</td>
<td>396</td>
</tr>
<tr>
<td>3</td>
<td>General Comment Period*</td>
<td>6/26/04-10/18/04</td>
<td>N/A</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>Fall 2004 Public Meetings</td>
<td>10/19/04-12/03/04</td>
<td>2,895</td>
<td>924</td>
</tr>
<tr>
<td>5</td>
<td>General Comment Period*</td>
<td>12/4/04-2/6/05</td>
<td>N/A</td>
<td>157</td>
</tr>
<tr>
<td>6</td>
<td>Spring 2005 Public Meetings</td>
<td>2/7/05-4/22/05</td>
<td>6,112</td>
<td>2544</td>
</tr>
<tr>
<td>7</td>
<td>General Comment Period*</td>
<td>4/23/05-11/30/05</td>
<td>N/A</td>
<td>283</td>
</tr>
<tr>
<td>TOTAL</td>
<td>--</td>
<td>--</td>
<td>9,753</td>
<td>4,336</td>
</tr>
</tbody>
</table>

*General Comment Period refers to any time period following the publication of the Notice of Intent that was not part of an official public meeting period.

Appendix G-13 contains maps (at a comparative scale) depicting responses by zip code for comments received during each round of the public meetings (Public Scoping, Fall 2004, and Spring 2005), comments received between public meetings (General), and an
overall map showing responses by zip code for all comments received from the NOI (February 2004) to the date of the DEIS (this report).

Copies of the public comments received between the NOI and approval of the DEIS are arranged by zip code and included in Appendix G-14. To help facilitate the examination of any particular comment, the comment copies are preceded by two indices. The first index (City-Zip Code Index) is arranged alphabetically by city with corresponding zip code(s) listed. The second index (Comments Index) is arranged numerically by zip code then alphabetically by the individual’s last name. If a zip code was provided by an individual submitting a comment, the provided zip code was used. If an individual disclosed what city they resided in, but did not indicate a zip code, a general zip code was used for the city indicated. If an individual attended a public meeting and did not disclose his/her zip code, the public meeting zip code was assigned. Comments not falling into the above categories were assigned a zip code category of “unknown”. Comments received from other states and countries are presented by country/state with comments arranged alphabetically.

Appendix G-15 contains copies of TTC-35 phone call logs, arranged alphabetically. These logs document conversations with individuals who called the TTC-35 hotline and summarize the caller’s key questions and responses to these questions. Persons expressing opinions about TTC-35 were asked to submit formal comments to the project in writing, via email or mail, for inclusion in the TTC-35 project record.

8.6 CONSIDERATION OF COMMENTS IN DEVELOPMENT OF TTC-35

Comments received from the public and resource and regulatory agencies during the Scoping Meetings (Spring 2004) and the public meetings (Fall 2004 and Spring 2005) were used to further refine the study area and select criteria for identifying PCAs and RCAs.

Based on comments received through the scoping process, the study area was further refined by:

- adding counties to the study area as requested through public comments;
- expanding the study area boundary in key locations to allow for connections to existing transportation facilities; and
- expanding the study area boundary in key locations to allow for consideration of utilizing existing infrastructure as elements of TTC-35.

Several PCAs centered on existing transportation facilities were identified based on comments received. Connectivity with existing infrastructure, wetlands, prime farmland soils, and cultural resource sites and districts were all used as criteria for identifying PCAs and RCAs in response to comments provided by the public and/or resource and regulatory agencies.
During the evaluation of the RCAs, when RCAs 5 and 7 performed substantially better in the traffic analysis than did all other RCAs, but they performed similar to each other. Criteria based on public comments were used to help distinguish between RCAs 5 and 7. Specifically, public comments requesting consideration of utilizing existing highway and railroad infrastructure as elements of TTC-35 were used to identify RCA 5 as the Preferred Alternative over RCA 7, since RCA 5 had over 100 more miles of existing highway and 148 more miles of existing railroad infrastructure within it than RCA 7.

8.7 PUBLIC HEARING AND DRAFT EIS REVIEW AND COMMENT PERIOD

The signed TTC-35 Tier One DEIS has been made available to the general public and provided to the agencies listed in Chapter 10 – List of Agencies, Organizations and Persons to Whom Copies of the Tier One Draft Environmental Impact Statement Are Sent. In addition, a comment period of a minimum of 45 days is underway. During this period, TxDOT will hold public hearings throughout the study area. At these hearings, this Tier One DEIS will be presented and comments from the public will be received. TxDOT will also accept comments via mail and e-mail during the comment period. All comments received during the public hearing comment period will be reviewed and substantive comments will be considered during the preparation of the TTC-35 Tier One Final Environmental Impact Statement (FEIS). The Tier One FEIS will include a summary of and response to substantive comments received from agencies and the general public.
9.0 LIST OF PREPARERS

The following organizations and individuals have been involved in the preparation of this EIS.

**Federal Highway Administration**

Brett Jackson, P.E., TTC Engineer. Mr. Jackson has 13 years of experience in project management, NEPA documentation and analysis, and engineering. He holds a B.S. in Civil Engineering.

Tom Bruechert, Environmental/Transportation Planning Coordinator. Mr. Bruechert has 15 years experience in transportation project development/environment. He holds a B.S. in Landscape Architecture.

**Texas Department of Transportation**

Phillip E. Russell, P.E., General Project Oversight. Mr. Russell has 27 years experience in transportation planning. He holds a B.S. in Civil Engineering and a J.D. in Law.

Edward Pensock, Jr., P.E., Engineering and Planning Management. Mr. Pensock has 25 years experience in transportation planning. He holds a B.S. in Civil Engineering.

Dieter Billek, P.E., TTC-35 Project Engineering and Planning Management. Mr. Billek has 12 years experience in transportation planning, design, and construction. He holds a B.S. in Civil Engineering.

Doug Booher, Environmental Management. Mr. Booher has 15 years experience in environmental studies, transportation planning, NEPA documentation, and natural resource management. He holds a B.A. in History and a M.A. in Information Science.

Jimmy Tyree, Environmental and Planning Management. Mr. Tyree has 8 years experience in environmental planning and project management. He holds a B.S. in Environmental Studies and a M.S. in Applied Geography specializing in Urban Regional Planning.

Gaby Garcia, Public Information Officer for the Texas Turnpike Authority. Ms. Garcia has 14 years experience in media relations. She holds a B.A. in Advertising.

Ann Zeeck, Public Information Officer for the Texas Department of Transportation. Ms. Zeeck has 8 years experience in public involvement and advertising. She holds a B.A. in Advertising and Public Relations.
HNTB

John Bourne, P.E., Project Manager. Mr. Bourne has 20 years experience in transportation design and construction. He holds a B.S. in Civil Engineering.

Paul Huston, P.E., Deputy Project Manager. Mr. Huston has 14 years experience in transportation project management and innovative contracting. He holds a B.S. in Civil Engineering and an M.S. in Infrastructure Systems Engineering.

Wendy Gasteiger Travis, AICP, Environmental Manager. Ms. Travis has 13 years experience in transportation planning, public involvement, and NEPA documentation. She holds a B.A. in Social Ecology and a Master’s in Urban and Regional Planning.

Stacey Benningfield, Environmental Technical Advisor. Ms. Benningfield has 23 years experience in transportation planning, including 15 years experience in preparation, review, and management of environmental documents.

Casey S. Berkhouse, Environmental. Mr. Berkhouse has 14 years experience in environmental research, endangered species consultations, and document preparation. He holds a B.S. in Aquatic Biology and a M.S. in Biology.

Michelle R. Dippel, RPA, Environmental. Ms. Dippel has 9 years of experience in cultural resource management, environmental planning, and NEPA documentation. She holds a B.A. in Archaeological Studies and a Master’s in Anthropology.

Susan Moorhead Mooney, Environmental. Ms. Mooney has 14 years experience in Section 106 and NEPA planning; including large transportation corridors and pipelines. She holds a B.S. in Biology and Anthropology and a M.A. in Anthropology.

Shelley Randolph, P.E., Environmental. Ms. Randolph has 10 years experience in preliminary transportation planning, environmental studies, public involvement, and NEPA documentation. She holds a B.S. in Civil Engineering.

Jared Heiner, P.E., Roadway Engineering. Mr. Heiner has 7 years experience in transportation, master planning, and municipal engineering projects. He holds a B.S. in Civil Engineering and a M.S. in Civil Engineering-Transportation.

Joseph A. Lileikis, Rail Engineering. Mr. Lileikis has 25 years experience in railroad and operations. He holds a B.S. in Civil Engineering.

Bradley T. Peel, AICP, Environmental and Planning. Mr. Peel has 14 years of experience in transportation planning, public involvement, and NEPA documentation. He holds a B.A. in Geography and a Master’s in Community and Regional Planning.
William F. Hood, Environmental. Mr. Hood has 20 years of experience in environmental transportation; including threatened and endangered species, hydrology, and NEPA documentation and review. He holds a B.S. in Biology and a M.S. in Wildlife Biology and Range Management.

CJ Boggs, Administration. Ms. Boggs has 8 years of administrative experience in support of transportation and environmental studies.

Jamie Spiares Pitchford, Public Involvement. Ms. Pitchford has 3 years experience in environmental studies. She holds a B.S. in Plant and Soil Science and a M.S. in Environmental Soil Science.

Tricia Bruck, Public Involvement. Ms. Bruck has 3 years experience in environmental studies, public involvement, and NEPA documentation. She holds a B.S. in Biology and a M.S. in Environmental Science.

Laura Eichner, Administration. Ms. Eichner has 30 years experience in education, office management, administration, and document preparation. She holds a B.A. in Business Education and a B.S. in Secretarial Administration.

HDR, Inc.

David G. Williams, P.E, Engineering and Planning. Mr. Williams has 20 years experience in transportation planning and design. He holds a B.S. in Civil Engineering.

Bob Leahey, P.E., Engineering Design Manager. Mr. Leahey has 19 years of experience in transportation engineering. He holds a B.S. in Civil Engineering and a Master’s in Public Administration.

Albert Amos, Economics. Mr. Amos has 11 years of experience in transportation planning, economic analysis, and financial analysis. He holds a B.A. in Psychology, a Master’s in International Affairs, and a Master’s in Business Administration.

Devyn M. Richardson, Environmental. Ms. Richardson has 9 years experience in ecological studies and environmental documentation. She holds a B.S. in Range Management and a M.S. in Range Sciences.

Joanna Sobala, Project Controls Manager. Ms. Sobala has 6 years of experience in transportation, schedule management and information systems. She holds B.S. in Engineering and a M.S. in Computer Information Systems, and a Master of Business Administration.
Jimmy H. Cruse, Engineering. Mr. Cruse has 25 years of experience in transportation; including construction management, design, environmental surveys and documentation, planning, right-of-way, and surveying.

Charles C. DeWeese, Rail Engineering. Mr. DeWeese has 47 years experience in railroad operations, planning, and right-of-way acquisition. He holds a B.S. in Mathematics.

Brenda Damer, Administration. Ms. Damer has 30 years experience in office management, administration, and document preparation.

Jeannette Gilpin, Document Control. Ms. Gilpin has 12 years administrative experience and document preparation. She holds a B.A. in Business Administration.

**Wilbur Smith Associates**

Thomas A. Williams, Planning. Mr. Williams has 18 years experience in transportation planning. He holds a B.S. in Forestry and a Master’s in Urban Planning.

Will Smithson, AICP, Planning. Mr. Smithson has 14 years experience in transportation planning, public involvement, and travel demand modeling. He holds a B.S. in Urban and Regional Planning and a Master’s in City and Regional Planning.

**Blanton and Associates**

Dave Severinson, Environmental. Mr. Severinson has 16 years experience in water resources planning, natural resource impact assessment, and NEPA documentation. He holds a B.A. in Biology and graduate studies in Botany.

Robert W. Ryan, Environmental and GIS. Mr. Ryan has 9 years of experience in Geographic Information Systems (GIS). He holds a B.A. in Geography.

Lori Erickson, Environmental and GIS. Ms. Erickson has 15 years of experience in Geographic Information Systems (GIS) for natural resource management. She holds a B.S. in Geography and a M.S. in Geography.

Jeffery L. Gerber, Environmental. Mr. Gerber has 25 years of experience in NEPA documentation and planning for energy production and transmission, and transportation. He holds a B.G.S. in Geography and a M.S. in Natural Resources Development.
Nancy Ledbetter Associates

Steve Craddock, Public Involvement. Mr. Craddock has 21 years experience in public involvement, urban planning, land development, and transportation. He holds a B.A. in Sociology and a M.S. in Community and Regional Planning.

Julie Petrich, Public Involvement Manager. Ms. Petrich has 12 years of experience in constituent services and public relations. She holds a B.A. in Government.

Erin Toedtman, Public Involvement. Ms. Toedtman has 7 years of experience in transportation and land use planning and public involvement. She holds a B.S. in Political Science and a M.S. in Urban and Regional Planning.

Lynda Shanblum, Public Involvement. Ms. Shanblum has 30 years experience in public relations, public involvement, media, and community relations. She holds a Bachelors in Journalism.

Sandy Powell, Public Involvement. Ms. Powell has more than 40 years experience in office management and 7 years in public relations/involvement.

Michael Baker, Jr. Inc.

Matthew J. Barkley, Environmental. Mr. Barkley has 9 years experience in environmental studies and construction. He holds a B.S. in Environmental Resource Management and a M.A. in Organizational Management.

Timothy J. Smith, Environmental. Mr. Smith has 16 years experience in environmental studies, transportation planning, and NEPA documentation. He holds a B.S. in Forest Biology and a M.S. in Wildlife Science.

Tonya Hamilton, Public Involvement. Ms. Hamilton has 8 years experience in Project Administration and Document Control. She holds a B.B.A. in General Business.

Kathie M. Goldsmith, Public Involvement. Ms. Goldsmith has 7 years experience in transportation planning, public involvement, and NEPA documentation. She holds a B.A. in Geography and Planning and a Master’s in Geography and Environmental Management.

Carter & Burgess, Inc.

Dan Rogers, P.E, Engineering. Mr. Rogers has 17 years experience in transportation engineering. He holds a B.S. in Civil Engineering.
Sangeeta Jain, Transportation Planning- Public Involvement. Ms. Jain has 9 years of experience in land use and transportation planning. She holds a Masters in Community Planning from University of Rhode Island.

HB Media Group, Inc.

Lona Smith, Document Control and EDMS Manager. Ms. Smith has 26 years of experience in document control, records management, quality assurance and EDMS (electronic document management systems) within the Nuclear Power and Transportation industry.
10.0 LIST OF AGENCIES, ORGANIZATIONS AND PERSONS TO WHOM COPIES OF THE TIER ONE DRAFT ENVIRONMENTAL IMPACT STATEMENT ARE SENT

FEDERAL AGENCIES
- International Boundary and Water Commission
- Surface Transportation Board
- U.S. Army Corps of Engineers, Fort Worth District
- U.S. Army Corps of Engineers, Galveston District
- U.S. Army Corps of Engineers, Tulsa District
- U.S. Department of the Air Force
- U.S. Department of the Army
- U.S. Department of Agriculture – Farm Service Agency
- U.S. Department of Agriculture – Forest Service
- U.S. Department of Agriculture – Natural Resource Conservation Service
- U.S. Department of Commerce - National Marine Fisheries Service
- U.S. Department of Energy - Federal Energy and Regulatory Commission
- U.S. Department of Homeland Security – Coast Guard
- U.S. Department of Housing & Urban Development
- U.S. Department of the Interior - Fish & Wildlife Service
- U.S. Department of Justice
- U.S. Department of the Navy
- U.S. Department of Transportation - Federal Aviation Administration
- U.S Department of Transportation - Federal Railroad Administration
- U.S Department of Transportation - Federal Transit Administration, Region 6
- U.S. Department of Veterans Affairs - National Cemetery Administration
- U.S. Environmental Protection Agency, Region 6

STATE AGENCIES
- Arkansas State Highway and Transportation Department
- Texas Department of State Health Services
- Electric Reliability Council of Texas, Inc.
- Louisiana Department of Transportation and Development
- New Mexico Department of Transportation
- State of Texas Office of Attorney General
- Oklahoma Department of Transportation
- Oklahoma Turnpike Authority
- Public Utility Commission of Texas
- State of Texas Office of the Governor
- State of Texas Office of the Lieutenant Governor
- Texas Bureau of Economic Geology
- Texas Commission on Environmental Quality
Texas Comptroller of Public Accounts
Texas Department of Agriculture
Texas Department of Public Safety
Texas Forest Service
Texas General Land Office
Texas Historical Commission
Texas Parks and Wildlife Department
Texas Railroad Commission
Texas Soil and Water Conservation Board
Texas Water Development Board
Texas Workforce Investment Council

NATIVE AMERICAN TRIBES
Absen tee-Shawnee Tribe
Alabama-Coushatta Tribe of Texas
Alabama-Quassarte Tribe
Apache Tribe of Oklahoma
Caddo Nation of Oklahoma
Choctaw Nation of Oklahoma
Comanche Nation of Oklahoma
Coushatta Tribe of Louisiana
Eastern Shawnee Tribe of Oklahoma
Kialegee Tribal Town
Kickapoo of Kansas
Kickapoo of Oklahoma
Kickapoo Traditional Tribe of Texas
Kiowa Indian Tribe of Oklahoma
Mescalero Apache Tribe
Po Quapaw Tribal Business Committee
Poarch Creek Indians
Seminole Nation of Oklahoma
The Delaware Nation
The Jicarilla Apache Nation
Thlopthlocco Tribe
Tonkawa Tribe of Oklahoma
Tunica-Biloxi Indian Tribe
United Keetowah Band of Cherokee Indians
Wichita and Affiliated Tribes
Ysleta del Sur Pueblo

U. S. SENATORS AND REPRESENTATIVES
Senator John Cornyn, U.S. Senate
Senator, Kay Bailey Hutchison, U.S. Senate
Congressman Louie Gohmert, U.S. House of Representatives, 1st District
Congressman Sam Johnson, U.S. House of Representatives, 3rd District
Congressman Ralph Hall, U.S. House of Representatives, 4th District
Congressman Jeb Hensarling, U.S. House of Representatives, 5th District
Congressman Joe L. Barton, U.S. House of Representatives, 6th District
Congressman Michael McCaul, U.S. House of Representatives, 10th District
Congressman Kay Granger, U.S. House of Representatives, 12th District
Congressman William "Mac" Thornberry, U.S. House of Representatives, 13th District
Congressman Ruben Hinojosa, U.S. House of Representatives, 15th District
Congressman Chet Edwards, U.S. House of Representatives, 17th District
Congressman Charles Gonzalez, U.S. House of Representatives, 20th District
Congressman Lamar Smith, U.S. House of Representatives, 21st District
Congressman Henry Bonilla, U.S. House of Representatives, 23rd District
Congressman Kenny Marchant, U.S. House of Representatives, 24th District
Congressman Lloyd Doggett, U.S. House of Representatives, 25th District
Congressman Michael Burgess, U.S. House of Representatives, 26th District
Congressman Solomon P. Ortiz, U.S. House of Representatives, 27th District
Congressman Henry Cuellar, U.S. House of Representatives, 28th District
Congressman Bernice Johnson, U.S. House of Representatives, 30th District
Congressman John C. Carter, U.S. House of Representatives, 31st District
Congressman Pete Sessions, U.S. House of Representatives, 32nd District

STATE OFFICIALS
Governor Rick Perry, Office of the Governor
Lieutenant Governor David Dewhurst, Office of the Lieutenant Governor
Senator Kevin Eltife, Texas State Senate, District 1
Senator Robert F. Deuell, M.D., Texas State Senate, District 2
Senator Todd Staples, Texas State Senate, District 3
Senator Steve Ogden, Texas State Senate, District 5
Senator Florence Shapiro, Texas State Senate, District 8
Senator Chris Harris, Texas State Senate, District 9
Senator Kim Brimer, Texas State Senate, District 10
Senator Jane Nelson, Texas State Senate, District 12
Senator Gonzalo Barrientos, Texas State Senate, District 14
Senator John J. Carona, Texas State Senate, District 16
Senator Kenneth Armbrister, Texas State Senate, District 18
Senator Frank Madla, Texas State Senate, District 19
Senator Juan Hinojosa, Texas State Senate, District 20
Senator Judith Zaffirini, Texas State Senate, District 21
Senator Kip Averitt, Texas State Senate, District 22
Senator Royce West, Texas State Senate, District 23
Senator Troy Fraser, Texas State Senate, District 24
Senator Jeff Wentworth, Texas State Senate, District 25
Senator Leticia Van De Putte, Texas State Senate, District 26
Senator Eddie Lucio, Jr., Texas State Senate, District 27
Senator Craig Estes, Texas State Senate, District 30
Representative Dan Flynn, Texas House of Representatives, District 2
Representative Mark Homer, Texas House of Representatives, District 3
Representative Betty Brown, Texas House of Representatives, District 4
Representative Bryan Hughes, Texas House of Representatives, District 5
Representative Leo Berman, Texas House of Representatives, District 6
Representative Tommy Merritt, Texas House of Representatives, District 7
Representative Byron Cook, Texas House of Representatives, District 8
Representative Jim Pitts, Texas House of Representatives, District 10
Representative Fred Brown, Texas House of Representatives, District 14
Representative Robert L. Cook, III, Texas House of Representatives, District 17
Representative Dan Gattis, Texas House of Representatives, District 20
Representative Geanie W. Morrison, Texas House of Representatives, District 30
Representative Ryan Guillen, Texas House of Representatives, District 31
Representative Eugene Seaman, Texas House of Representatives, District 32
Representative Vilma Luna, Texas House of Representatives, District 33
Representative Abel Herrero, Texas House of Representatives, District 34
Representative Yvonne Gonzalez Toureilles, Texas House of Representatives, District 35
Representative Ismael Flores, Texas House of Representatives, District 36
Representative Rene O. Oliveira, Texas House of Representatives, District 37
Representative Jim Solis, Texas House of Representatives, District 38
Representative Armando Martinez, Texas House of Representatives, District 39
Representative Aaron Pena, Texas House of Representatives, District 40
Representative Veronica Gonzales, Texas House of Representatives, District 41
Representative Richard Raymond, Texas House of Representatives, District 42
Representative Juan Manuel Escobar, Texas House of Representatives, District 43
Representative Edmund Kuempel, Texas House of Representatives, District 44
Representative Patrick M. Rose, Texas House of Representatives, District 45
Representative Dawnna M. Dukes, Texas House of Representatives, District 46
Representative Terry Keel, Texas House of Representatives, District 47
Representative Donna Howard, Texas House of Representatives, District 48
Representative Elliott Naishrat, Texas House of Representatives, District 49
Representative Mark Strama, Texas House of Representatives, District 50
Representative Eddie Rodriguez, Texas House of Representatives, District 51
Representative Mike Krusee, Texas House of Representatives, District 52
Representative Suzanna Gratia Hupp, Texas House of Representatives, District 54
Representative Dianne White Delisi, Texas House of Representatives, District 55
Representative Charles "Doc" Anderson, Texas House of Representatives, District 56
Representative Jim Dunnam, Texas House of Representatives, District 57
Representative Rob Orr, Texas House of Representatives, District 58
Representative Sid Miller, Texas House of Representatives, District 59
Representative Jim Keffler, Texas House of Representatives, District 60
Representative Phil S. King, Texas House of Representatives, District 61
Representative Larry Phillips, Texas House of Representatives, District 62
Representative Mary Denny, Texas House of Representatives, District 63
Representative Myra Crownover, Texas House of Representatives, District 64
Representative Burt R. Solomons, Texas House of Representatives, District 65
Representative Brian McCall, Texas House of Representatives, District 66
Representative Jerry Madden, Texas House of Representatives, District 67
Representative Richard L. Hardcastle, Texas House of Representatives, District 68
Representative Ken Paxton, Texas House of Representatives, District 70
Representative Tracy King, Texas House of Representatives, District 80
Speaker of the House Tom Craddick, Texas House of Representatives, District 82
Representative Jodie Laubenberg, Texas House of Representatives, District 89
Representative Lon Burnam, Texas House of Representatives, District 90
Representative Bob E. Griggs, Texas House of Representatives, District 91
Representative Todd Smith, Texas House of Representatives, District 92
Representative Toby Goodman, Texas House of Representatives, District 93
Representative Kent Grusendorf, Texas House of Representatives, District 94
Representative Marc Veasey, Texas House of Representatives, District 95
Representative Bill Zedler, Texas House of Representatives, District 96
Representative Anna Mowery, Texas House of Representatives, District 97
Representative Vicki Truitt, Texas House of Representatives, District 98
Representative Charlie L. Geren, Texas House of Representatives, District 99
Representative Terri Hodge, Texas House of Representatives, District 100
Representative Elvira Reyna, Texas House of Representatives, District 101
Representative Tony Goolsby, Texas House of Representatives, District 102
Representative Rafael Anchia, Texas House of Representatives, District 103
Representative Roberto Alonzo, Texas House of Representatives, District 104
Representative Linda Harper-Brown, Texas House of Representatives, District 105
Representative Kirk T. England, Texas House of Representatives, District 106
Representative Bill Keffer, Texas House of Representatives, District 107
Representative Daniel H. Branch, Texas House of Representatives, District 108
Representative Helen Giddings, Texas House of Representatives, District 109
Representative Jesse Jones, Texas House of Representatives, District 110
Representative Yvonne Davis, Texas House of Representatives, District 111
Representative Fred Hill, Texas House of Representatives, District 112
Representative Joe Driver, Texas House of Representatives, District 113
Representative Will Hartnett, Texas House of Representatives, District 114
Representative Jim Jackson, Texas House of Representatives, District 115
Representative Trey Martinez Fischer, Texas House of Representatives, District 116
Representative David McQuade Leibowitz, Texas House of Representatives, District 117
Representative Carlos I. Uresti, Texas House of Representatives, District 118
Representative Robert R. Puente, Texas House of Representatives, District 119
Representative Ruth Jones McClendon, Texas House of Representatives, District 120
Representative Joe Straus, Texas House of Representatives, District 121
Representative Frank J. Corte, Jr., Texas House of Representatives, District 122
Representative Michael Villarreal, Texas House of Representatives, District 123
Representative Jose Menendez, Texas House of Representatives, District 124
Representative Joaquin Castro, Texas House of Representatives, District 125

COUNTY JUDGES
The Honorable Carey G. McKinney, Anderson County Judge
The Honorable Diana J. Bautista, Atascosa County Judge
The Honorable Ronnie McDonald, Bastrop County Judge
The Honorable Jimmy Martinez, Bee County Judge
The Honorable Jon Burrows, Bell County Judge
The Honorable Nelson W. Wolff, Bexar County Judge
The Honorable Cole Word, Bosque County Judge
The Honorable Randy Sims, Brazos County Judge
The Honorable Joe B. Garcia, Brooks County Judge
The Honorable Mike Sutherland, Burleson County Judge
The Honorable H. T. Wright, Caldwell County Judge
The Honorable Gilberto Hinojosa, Cameron County Judge
The Honorable Ron Harris, Collin County Judge
The Honorable Bill Freeman, Cooke County Judge
The Honorable Margaret Keliher, Dallas County Judge
The Honorable Hugh Whitney, Delta County Judge
The Honorable Mary Horn, Denton County Judge
The Honorable Ben Prause, DeWitt County Judge
The Honorable Frank Ponce, Dimmit County Judge
The Honorable Edmundo Garcia, Duval County Judge
The Honorable Chad Adams, Ellis County Judge
The Honorable Tab Thompson, Erath County Judge
The Honorable Thomas Sehon, Falls County Judge
The Honorable Derrell Hall, Fannin County Judge
The Honorable Edward F. Janecka, Fayette County Judge
The Honorable Linda Grant, Freestone County Judge
The Honorable Carlos A. Garcia, Frio County Judge
The Honorable Harold F. Gleinser, Goliad County Judge
The Honorable David Bird, Gonzales County Judge
The Honorable Tim McGraw, Grayson County Judge
The Honorable Donald L. Schraub, Sr., Guadalupe County Judge
The Honorable Fred Cox, Hamilton County Judge
The Honorable David Holstein, Henderson County Judge
The Honorable Ramon Garcia, Hidalgo County Judge
The Honorable Kenneth Davis, Hill County Judge
The Honorable Andy Rash, Hood County Judge
The Honorable Cletis Millsap, Hopkins County Judge
The Honorable Joe Bobbit, Hunt County Judge
The Honorable Mitchell Davenport, Jack County Judge
The Honorable Agapito Molina, Jim Hogg County Judge
The Honorable L. Arnoldo Saenz, Jim Wells County Judge
The Honorable Roger Harmon, Johnson County Judge
Chapter 10
List of Agencies, Organizations and Persons to Whom Copies of the Draft EIS are Sent
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The Honorable Alger H. Kendall, Jr., Karnes County Judge
The Honorable Wayne Gent, Kaufman County Judge
The Honorable J.A. Garcia, Jr., Kenedy County Judge
The Honorable Pete De La Garza, Kleberg County Judge
The Honorable Joel Rodriguez, La Salle County Judge
The Honorable M.C. Superville Jr., Lamar County Judge
The Honorable Ronald L. Leck, Lavaca County Judge
The Honorable Evan A. Gonzales, Lee County Judge
The Honorable Byron Ryder, Leon County Judge
The Honorable Elenor Holmes, Limestone County Judge
The Honorable Jim Huff, Live Oak County Judge
The Honorable Jim Lewis, McLennan County Judge
The Honorable Linda Lee Henry, McMullen County Judge
The Honorable James E. Barden, Medina County Judge
The Honorable Frank Summers, Milam County Judge
The Honorable James Kittrell, Montague County Judge
The Honorable Alan Bristol, Navarro County Judge
The Honorable Terry Shamsie, Nueces County Judge
The Honorable Mickey West, Palo Pinto County Judge
The Honorable Mark Riley, Parker County Judge
The Honorable Joe Dougherty, Rains County Judge
The Honorable Fred Elliot, Robertson County Judge
The Honorable Bill Bell, Rockwall County Judge
The Honorable Terry Simpson, San Patricio County Judge
The Honorable Becky Dempsey, Smith County Judge
The Honorable Walter Maynard, Somervell County Judge
The Honorable Tom Vandergriff, Tarrant County Judge
The Honorable Samuel T. Biscoe, Travis County Judge
The Honorable Rhita Koches, Van Zandt County Judge
The Honorable Louis Bruni, Webb County Judge
The Honorable John C. Doerfler, Williamson County Judge
The Honorable Marvin Quinney, Wilson County Judge
The Honorable Dick Chase, Wise County Judge
The Honorable Royce McCoy, Wood County Judge
The Honorable David Morales, Zapata County Judge

CITY OFFICIALS
The Honorable Robert Lee Tufts, City of Abbott Mayor
The Honorable Joe Chow, Town of Addison Mayor
The Honorable Carl Vajdos, City of Agua Dulce Mayor
The Honorable Rudy Villarreal, City of Alamo Mayor
The Honorable Louis Cooper, City of Alamo Heights Mayor
The Honorable Orvin Carroll, Town of Alba Mayor
The Honorable Sue Langley, City of Aledo Mayor
The Honorable Grace Saenz-Lopez, City of Alice Mayor
Chapter 10
List of Agencies, Organizations and Persons to Whom Copies of the Draft EIS are Sent
TTC-35 Tier One Draft EIS

The Honorable Steve Terrell, City of Allen Mayor
The Honorable Bill Blackman, Town of Alma Mayor
The Honorable Salvador Vela, City of Alton Mayor
The Honorable Tom Durington, City of Alvarado Mayor
The Honorable Edwin Strange, Town of Alvord Mayor
The Honorable Eben D. Stover, City of Angus Mayor
The Honorable Kenneth Pelham, City of Anna Mayor
The Honorable Olan Usher, Town of Annetta Mayor
The Honorable Kenneth Hall, Town of Annetta North Mayor
The Honorable Gerhard Kleinschmidt, Town of Annetta South Mayor
The Honorable James Hamner, City of Aquilla Mayor
The Honorable Jesus Galvan, City of Aransas Pass Mayor
The Honorable Richard Tucker, Town of Argyle Mayor
The Honorable Robert Cluck, City of Arlington Mayor
The Honorable Vernon Bedair, City of Arp Mayor
The Honorable Sam Galvan, City of Asherton Mayor
The Honorable Randy Daniel, City of Athens Mayor
The Honorable Tim Leslie, City of Aubrey Mayor
The Honorable Barbara Brammer, City of Aurora Mayor
The Honorable Will Wynn, City of Austin Mayor
The Honorable Linda Arrington, City of Azle Mayor
The Honorable John Robert Stephens, City of Bailey Mayor
The Honorable Wayne Middleton, City of Balch Springs Mayor
The Honorable Jim Craven, City of Balcones Heights Mayor
The Honorable P.W. Gentry, City of Bardwell Mayor
The Honorable Tommy Hill, City of Bartlett Mayor
The Honorable John Wade Braly, City of Barry Mayor
The Honorable Ron Robertson, City of Bartonville Mayor
The Honorable Tom Scott, City of Bastrop Mayor
The Honorable Marc Sundquist, Town of Bayview Mayor
The Honorable Jim Story, City of Bedford Mayor Pro Tem
The Honorable Caroline Murphy, Village of Bee Cave Mayor
The Honorable Kenneth Chesshir, City of Beeville Mayor
The Honorable Eldon Hall, City of Bellmead Mayor
The Honorable Todd Bass, Town of Bells Mayor
The Honorable Dwayne Digby, City of Belton Mayor
The Honorable Cynthia Canales, City of Benavides Mayor
The Honorable Jerry Dittrich, City of Benbrook Mayor
The Honorable James Colvin, Town of Berryville Mayor
The Honorable Douglas Woodward, City of Beverly Hills Mayor
The Honorable Gloria Flores, City of Big Wells Mayor
The Honorable Geraldine Ryppe, City of Bishop Mayor
The Honorable Gene Hollingsworth, City of Blooming Grove Mayor
The Honorable Roger Johnson, City of Blossom Mayor
The Honorable Jace Preston, City of Blue Mound Mayor
The Honorable Danny Standeford, City of Blue Ridge Mayor
The Honorable Elaine Edwards, Town of Blum Mayor
The Honorable Roy Floyd, City of Bonham Mayor
The Honorable Brandon Earp, City of Bowie Mayor
The Honorable Brent Wilson, City of Boyd Mayor
The Honorable Nancy Heaton, City of Bremond Mayor
The Honorable James Hamnett, Village of Briarcliff Mayor
The Honorable James Dunn, City of Briaroaks Mayor
The Honorable Donald Majka, City of Bridgeport Mayor
The Honorable Ronnie Harris, City of Brownsboro Mayor
The Honorable Eddie Trevino Jr., City of Brownsville Mayor
The Honorable Rick Eaton, City of Bruceville-Eddy Mayor
The Honorable Ernie Wentreck, City of Bryan Mayor
The Honorable Kenneth Boland, City of Bryson Mayor
Council Member Angela Morgan, City of Buckholts
The Honorable John Trube, City of Buda Mayor
The Honorable Ken Stevens, City of Buffalo Mayor
The Honorable C.R. "Connie" Vaughan, Town of Bullard Mayor
The Honorable Ken Shetter, City of Burleson Mayor
The Honorable Lawana Jolene Custer, Town of Bynum Mayor
The Honorable Buel Bentley, City of Caddo Mills Mayor
The Honorable Bernard Rychlik, City of Caldwell Mayor
The Honorable Bob Henderson, City of Callisburg Mayor Pro Tem
The Honorable Marcus Greaves, City of Calvert Mayor
The Honorable William Meacham, City of Cameron Mayor
The Honorable Nick Jordan, City of Campbell Mayor
The Honorable Joe Barron, City of Caney City Mayor
The Honorable R. C. Anderson, City of Canton Mayor
The Honorable Carl Cornelius, Town of Carl's Corner Mayor
The Honorable Sally Bridie, City of Carmine Mayor
The Honorable Ralph Salinas, City of Carrizo Springs Mayor
The Honorable Becky Miller, City of Carrollton Mayor
The Honorable Marcy Harper, City of Castle Hills Mayor
The Honorable Jesse Byars, City of Castroville Mayor
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The Honorable Bob Lemon, City of Cedar Park Mayor
The Honorable Pat Jones, City of Celeste Mayor
The Honorable Corbett Howard, Town of Celina Mayor
The Honorable Billy Walters, City of Centerville Mayor
The Honorable Joyce Rains, City of Chandler Mayor
The Honorable Augustine Munoz, City of Charlotte Mayor
The Honorable James Robinson, City of Chico Mayor
The Honorable Dennis Dunk, City of China Grove Mayor
The Honorable Walter W. Stevens, City of Christine Mayor
The Honorable Johnny Sutton, City of Cibolo Mayor
The Honorable William Merritt, City of Clark Mayor
The Honorable Ted Reynolds, City of Cleburne Mayor
The Honorable W. Leon Smith, City of Clifton Mayor
The Honorable C.P. Slayton, City of Cockrell Hill Mayor
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The Honorable David Kelly, City of Colleyville Mayor
The Honorable Brad Kerr, City of Collinsville Mayor
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The Honorable Bill Quinn, City of Combine Mayor
The Honorable Sheryl Zelhart, City of Commerce Mayor
The Honorable Roy Darby, City of Como Mayor
The Honorable Craig Martin, City of Converse Mayor
The Honorable Tommy A. Hull, City of Cool Mayor
The Honorable Bobby Jacobs, Town of Coolidge Mayor
The Honorable Scott Stegall, City of Cooper Mayor
The Honorable Doug Stover, City of Coppell Mayor
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The Honorable Vic Burgess, City of Corinth Mayor
The Honorable Henry Garrett, City of Corpus Christi Mayor
The Honorable C.L. Brown, City of Corsicana Mayor
The Honorable Stephen Struck, City of Cottonwood Mayor
The Honorable Juan R. Domínguez, City of Cotulla Mayor
The Honorable Shirley Erickson, City of Covington Mayor
The Honorable Joe Baker, City of Crandall Mayor
The Honorable David Witte, City of Cranfills Gap Mayor
The Honorable David Posten, Town of Crawford Mayor
The Honorable Robert Wilhite, City of Creedmoor Mayor
The Honorable John Carroll, City of Cresson Mayor
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The Honorable Wava McCullough, Town of Cross Timber Mayor
The Honorable Billy Davis, City of Crowley Mayor
The Honorable W. L. "Buzz" Edge, City of Cuero Mayor
The Honorable Travis Baxley, City of Cumby Mayor
The Honorable Laura Miller, City of Dallas Mayor
The Honorable Albert A. Taub, City of Dalworthington Gardens Mayor
The Honorable Paula Sears, Town of Dawson Mayor
The Honorable Dick Pruitt, City of DeCordova Mayor
The Honorable Joe Lambert, City of Decatur Mayor
The Honorable Bill Lindsay, City of Denison Mayor
The Honorable Euline Brock, City of Denton Mayor
The Honorable Mike Francies, City of Deport Mayor
The Honorable Michael B. Hurtt, City of DeSoto Mayor
The Honorable Steve Lopez, City of Devine Mayor
The Honorable Russell J. Foster, City of Dilley Mayor
The Honorable Jackie Lackey, City of Dodd City Mayor
The Honorable Ricardo L. Morales, City of Donna Mayor
The Honorable Alice Stewart, Town of Dorchester Mayor
The Honorable Dick Cook, Town of Double Oak Mayor
The Honorable Ted Ozuna, City of Driscoll Mayor
The Honorable James "Red" Seigars, City of Dublin Mayor
The Honorable David L. Green, City of Duncanville Mayor
The Honorable Gary Vaughan, City of East Tawokani Mayor
The Honorable Mary Dean Norris, City of Ector Mayor
The Honorable Ramiro Silva, City of Edcouch Mayor
The Honorable Mary King, Town of Edgecliff Village Mayor
The Honorable Charles Prater, Town of Edgewood Mayor
The Honorable Richard Garcia H., City of Edinburg Mayor
The Honorable Barbara Crow, City of Edom Mayor
The Honorable Raul Reyes, City of El Cenizo Mayor
The Honorable Eric Carlson, City of Elgin Mayor
The Honorable Joe B. Burris, Town of Elkhart Mayor
The Honorable Thomas P. Hicks, City of Elmendorf Mayor
The Honorable Tony Barco, City of Elsa Mayor
The Honorable Johnny Pattison, Town of Emhouse Mayor
The Honorable Cay House, City of Emory Mayor
The Honorable Don Warner, Town of Enchanted Oaks Mayor
The Honorable Javier Mancha, City of Encinal Mayor
The Honorable Russell Thomas, City of Ennis Mayor
The Honorable Mary Lib Saleh, City of Euless Mayor
The Honorable Barney Thomas, City of Eureka Mayor
The Honorable Robert T. Pickle, City of Eustace Mayor
The Honorable Alma "Fritz" Green, Town of Evant Mayor
The Honorable Jim Stephenson, City of Everman Mayor
The Honorable E.L. Gaubatz, City of Fair Oaks Ranch Mayor
The Honorable Roy Hill, City of Fairfield Mayor
The Honorable Sim Israeloff, Town of Fairview Mayor
The Honorable J. Wesley Jacobs, City of Falfurrias Mayor
The Honorable Vi Malone, City of Falls City Mayor
The Honorable Bob Phelps, City of Farmers Branch Mayor
The Honorable Robbin H. Lamkin, City of Farmersville Mayor
The Honorable David Hill, City of Fate Mayor
The Honorable Ronald Pflughaupt, City of Fayetteville Mayor
The Honorable Scott T. Born, City of Ferris Mayor
The Honorable Lori Berger, Town of Flatonia Mayor
The Honorable Paul Ward, City of Florence Mayor
The Honorable Raymond Ramirez, City of Floresville Mayor
The Honorable Jody Smith, Town of Flower Mound Mayor
The Honorable Darrell Grooms, City of Forney Mayor
The Honorable James Gosey, City of Forest Hill Mayor
The Honorable Mike Moncrief, City of Fort Worth Mayor
List of Agencies, Organizations and Persons to Whom Copies of the Draft EIS are Sent
TTC-35 Tier One Draft EIS

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The Honorable James Gouger, Town of Frankston Mayor
The Honorable Arnoldo Cantu, City of Freer Mayor
The Honorable Mike Simpson, City of Frisco Mayor
The Honorable Kenneth Reed, City of Frost Mayor
The Honorable Danny Gilliam, City of Fruitvale Mayor
The Honorable Glenn Loch, City of Gainesville Mayor
The Honorable Bob Day, City of Garland Mayor
The Honorable Florinda “Flo” Smith, Town of Garrett Mayor
The Honorable August Caron, Jr., City of George West Mayor
The Honorable Gary Nelon, City of Georgetown Mayor
The Honorable James Arndt, City of Giddings Mayor
The Honorable Pam Miller, City of Glen Rose Mayor
The Honorable Alvin DuBois, City of Glenn Heights Mayor
The Honorable Larry Richeson, City of Godley Mayor
The Honorable William Schaefer, City of Goliad Mayor
The Honorable Anthony Wagner, City of Golinda Mayor
The Honorable Bobby O’Neal, City of Gonzales Mayor
The Honorable Willie Washington, City of Goodlow Mayor
The Honorable Pat Sublett, City of Gordon Mayor
The Honorable Carl Walston, City of Graford Mayor
The Honorable David Southern, City of Granbury Mayor
The Honorable Charles England, City of Grand Prairie Mayor
The Honorable Terry Tolar, City of Grand Saline
The Honorable Brandon Wright, City of Grandview Mayor
The Honorable Jerry Lalla, City of Granger Mayor
The Honorable Rafael Garza, City of Granjeno Mayor
The Honorable William Tate, City of Grapevine Mayor
The Honorable Don Murray, Village of Grays Prairie Mayor
The Honorable Jim Morris, City of Greenville Mayor
The Honorable Fernando P. Gomez, City of Gregory Mayor
The Honorable Ann Mabry, City of Grey Forest Mayor
The Honorable Mike McLelland, City of Groesbeck Mayor
The Honorable Paul Eaton, City of Gun Barrel City Mayor
The Honorable Mark A. Millar, City of Gunter Mayor
The Honorable Brenda Lewallen, Town of Hackberry Mayor
The Honorable Warren Grindeland, City of Hallettsville Mayor
The Honorable Mike Glockzin, City of Hallsburg Mayor
The Honorable Calvin White, City of Haltom City Mayor
The Honorable Roy Rumsey, City of Hamilton Mayor
The Honorable Ed Mullen, City of Harker Heights Mayor
The Honorable Richard Rodriguez, City of Harlingen Mayor
The Honorable Gary Hulsey, City of Haslet Mayor
The Honorable Leeta Goolsby, City of Hawk Cove Mayor
The Honorable Wayne Kirkpatrick, City of Hawkins Mayor
List of Agencies, Organizations and Persons to Whom Copies of the Draft EIS are Sent

TTC-35 Tier One Draft EIS

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The Honorable Kelly Clem, Town of Hebron Mayor
The Honorable Jon Allen, City of Helotes Mayor
The Honorable J. W. Fullen, City of Henderson Mayor
The Honorable Charles D. Turner, City of Hewitt Mayor
The Honorable Jeff Price, Town of Hickory Creek Mayor
The Honorable Stan Bundy, City of Hico Mayor
The Honorable John David Franz, City of Hidalgo Mayor
The Honorable Bill Lawrence, City of Highland Village Mayor
The Honorable William D. White, Jr., Town of Highland Park Mayor
The Honorable Kirk W. Francis, City of Hill Country Village Mayor
The Honorable Will Lowrance, City of Hillsboro Mayor
The Honorable Curt Murray, Town of Holland Mayor
The Honorable Sean P. Martinez, Town of Hollywood Park Mayor
The Honorable James W. Danner, City of Hondo Mayor
The Honorable Fred Seibenthal, City of Honey Grove Mayor
The Honorable Michael Babb, City of Hooks Mayor
The Honorable Michael Jones, City of Howe Mayor
The Honorable Terry Reddell, City of Hubbard Mayor
The Honorable Gene L. Voyles, City of Hudson Oaks Mayor
The Honorable Richard Ward, City of Hurst Mayor
The Honorable Artis Johnson, City of Hutchins Mayor
The Honorable Mike Ackerman, City of Hutto Mayor
The Honorable Gene Stewart, City of Ingleside Mayor
The Honorable Al Robbins, City of Ingleside on the Bay Mayor
The Honorable Royce Heath, City of Iredell Mayor
The Honorable Herbert Gears, City of Irving Mayor
The Honorable Frank Jackson, Town of Italy Mayor
The Honorable Brian Kelley, City of Italca Mayor
The Honorable Jerry Craft, City of Jacksboro Mayor
The Honorable Wayne E. Cavalier, City of Jarrell Mayor
The Honorable Judi Kirkpatrick, City of Jewett Mayor
The Honorable James Brown, City of Jonestown Mayor
The Honorable Gilbert Hess, City of Josephine Mayor
The Honorable Stan McVey, City of Joshua Mayor
The Honorable Tammy K. Clark, City of Jourdanton Mayor
The Honorable Ed Trietsch, City of Justin Mayor
The Honorable Don Tymrak, City of Karnes City Mayor
The Honorable Paula Bacon, City of Kaufman Mayor
The Honorable Gary Heinrich, City of Keene Mayor
The Honorable Julie Tandy, City of Keller Mayor
The Honorable Billy Teel, Town of Kemp Mayor
The Honorable Randy Garza, City of Kenedale Mayor
The Honorable Jim Norwood, City of Kennedale Mayor
Chapter 10

List of Agencies, Organizations and Persons to Whom Copies of the Draft EIS are Sent

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The Honorable Joe Baxter, City of Kerens Mayor
The Honorable Maureen J. Jouett, City of Killeen Mayor
The Honorable Sam Fugate, City of Kingsville Mayor
The Honorable Ray Martin, City of Kirby Mayor
City Commissioner Ken Sessions, City of Kirvin
The Honorable Richard Roelke, City of Knollwood Village Mayor
The Honorable Robert O'Neal, Town of Kosse Mayor
The Honorable Shelby Moore, City of Krugerville Mayor
The Honorable Larry Lamonica, City of Krum Mayor
The Honorable Bobby Kurten, City of Kurten Mayor
The Honorable Miguel Gonzalez, City of Kyle Mayor
The Honorable Henry Seay, City of La Coste Mayor
The Honorable Lalo Sosa, City of La Feria Mayor
The Honorable Janet Moerbe, City of La Grange Mayor
The Honorable William Billy Leo, City of La Joya Mayor
The Honorable D. Bradford Beck, City of La Vernia Mayor
The Honorable Carlos Perez, City of La Villa Mayor
The Honorable Calvin Hodde, City of Lacy-Lakeview Mayor
The Honorable Leon Hurse, City of Ladonia Mayor
The Honorable Dennis Jones, City of Lago Vista Mayor
The Honorable David Privett, Town of Laguna Vista Mayor
The Honorable Dwayne Slaten, City of Lake Bridgeport Mayor
The Honorable Gene Herod, Town of Lake City Mayor
The Honorable Marjory Johnson, City of Lake Dallas Mayor
The Honorable Walter Bowen, City of Lake Worth Mayor
The Honorable E.H. Gentry, Town of Lakeside (San Patricio County) Mayor
The Honorable Raymond E. Beck, Town of Lakeside (Tarrant County) Mayor
The Honorable Steve Swan, City of Lakeway Mayor
The Honorable Frank Jaromin, City of Lakewood Village Mayor
The Honorable Joe Tillotson, City of Lancaster Mayor
The Honorable Elizabeth G. Flores, City of Laredo Mayor
The Honorable Jim Albright, Town of Lavon Mayor
The Honorable John Cowman, City of Leander Mayor
City Secretary Chris Jervis, City of Ledbetter
The Honorable Christy Riley, City of Leon Valley Mayor
The Honorable Travis J. Oden, City of Leona Mayor
The Honorable Bill Yoss, City of Leonard Mayor
The Honorable David Williams, City of Leroy Mayor
The Honorable Gene Carey, City of Lewisville Mayor
The Honorable Robert Willrich, City of Lexington Mayor
The Honorable Connie Fuller, City of Liberty Hill Mayor
The Honorable Bill Kashouty, City of Hideaway Mayor
The Honorable Loretta Ray, Town of Lincoln Park Mayor
The Honorable Bobby McClenny, Town of Lindale Mayor
The Honorable Steven Zwinggi, Town of Lindsay Mayor
The Honorable Alford Spencer, City of Lipan Mayor
The Honorable Doug Cravey, Town of Little Elm Mayor
The Honorable Ronnie W. White, City of Little River Academy Mayor
The Honorable Henry O. Edwards, City of Live Oak Mayor
The Honorable James Bertram, City of Lockhart Mayor
The Honorable Roger E. “Gene” Bearden, City of Log Cabin Mayor
The Honorable Harold Slemmons, Town of Lone Oak Mayor
The Honorable Stacy Garvin, City of Lorena Mayor
The Honorable David N. Winstead Jr., City of Los Fresnos Mayor
The Honorable Stanley Greeley, Town of Indian Lake Mayor
The Honorable Tina Bennett, Town of Los Indios Mayor
The Honorable Connie Johnson, City of Lott Mayor
The Honorable Greg Piatt, City of Lowry Crossing Mayor
The Honorable Bob Sanders, City of Lucas Mayor
The Honorable Mike Hendricks, City of Luling Mayor
The Honorable David Clarida, City of Lyford Mayor
The Honorable Horace Fincher, City of Lytle Mayor
The Honorable Larry Teague, Town of Mabank Mayor
The Honorable Pat Isaascon, City of Malakoff Mayor
The Honorable James A. Lucko, City of Malone Mayor
The Honorable Jeff Turner, City of Manor Mayor
The Honorable Mel Neuman, City of Mansfield Mayor
The Honorable Glenn A. Hild, City of Marion Mayor
The Honorable Norman D. Erskine, City of Marlin Mayor
The Honorable Stynette Clary, City of Marquez Mayor
The Honorable Steven White, Town of Marshall Creek Mayor
The Honorable Richard Bryant, City of Mart Mayor
The Honorable Lola Walker, City of Martindale Mayor
The Honorable Vincente Gonzalez, City of Mathis Mayor
The Honorable Medford Marion, City of Maypearl Mayor
The Honorable Richard Cortez, City of McAllen Mayor
The Honorable James S. Hering, City of McGregor Mayor
The Honorable Bill Whitfield, City of McKinney Mayor
The Honorable Michael D. Donegan, City of McLendon-Chisholm Mayor
The Honorable David Dorman, City of Melissa Mayor
The Honorable Joel Quintanilla, City of Mercedes Mayor
The Honorable Clark Vandergriff, City of Meridian Mayor
The Honorable Linda Maples, Town of Mertens Mayor
The Honorable Mike Anderson, City of Mesquite Mayor
The Honorable Steve Brewer, City of Mexia Mayor
The Honorable Boyce Whatley, City of Midlothian Mayor
The Honorable Billy Barnett, City of Milano Mayor
The Honorable Nancy Johnson, Town of Mildred Mayor
The Honorable Claude Wakeland, Town of Milford Mayor
The Honorable Jamie French, Town of Millsap Mayor
Mr. Tom Lyons, City of Millican City Secretary  
The Honorable Pete Smith, City of Mineola Mayor  
The Honorable Clarence Holliman, City of Mineral Wells Mayor  
The Honorable Milo Moffitt, City of Mingus Mayor  
The Honorable Norberto Salinas, City of Mission Mayor  
The Honorable Wanda Cooper, City of Mobile City Mayor  
The Honorable Mike Alton, City of Moody Mayor  
The Honorable Teresa Stacy, City of Morgan Mayor  
The Honorable Malvin Fischer, City of Morgan's Point Resort Mayor  
The Honorable Kathy Koranek, Town of Moulton Mayor  
The Honorable Jimmy Tucker, City of Mount Calm Mayor  
The Honorable Henry Weinzapfel, City of Muenster Mayor  
The Honorable Larry Everett, City of Murchison Mayor  
The Honorable Bret Baldwin, City of Murphy Mayor  
The Honorable Jackie Bounds, Town of Mustang Mayor  
The Honorable Alfred Vallejo, City of Mustang Ridge Mayor  
The Honorable Ruby Vera, City of Natalia Mayor  
The Honorable Benny Horn, Town of Navarro Mayor  
The Honorable Christy Schell, City of Nevada Mayor  
The Honorable Gil Merkle, City of New Berlin Mayor  
The Honorable Johnny Branson, City of New Boston Mayor  
The Honorable J. T. Pinkerton, City of New Chapel Hill Mayor  
The Honorable Johnny Hamm, Town of New Hope Mayor  
The Honorable Bill Malone, City of Newark Mayor  
The Honorable Bruce Boyer, City of New Braunfels Mayor  
The Honorable Kathy Wilson, Town of Neylandville Mayor  
The Honorable Don Chessher, City of Nixon Mayor  
The Honorable Paul Gibbs, City of Nocona Mayor  
The Honorable C.W. Carter, City of Nolanville Mayor  
The Honorable Mike Turman, City of Noonday Mayor  
The Honorable Paul Bauman, City of Nordheim Mayor  
The Honorable Tim Taylor, Town of Normangee Mayor  
The Honorable Oscar Trevino, City of North Richland Hills Mayor  
The Honorable Michael Savoic, Town of Northlake Mayor  
The Honorable Kirby McClanahan, Town of Oak Grove Mayor  
The Honorable Walter Adams, Town of Oak Leaf Mayor  
The Honorable Duane Olson, City of Oak Point Mayor  
The Honorable Roy W. Perkins, Town of Oak Ridge Mayor  
The Honorable Trey Rickert, Town of Oak Ridge Mayor  
The Honorable Bob O’Dell, Town of Oak Valley Mayor  
The Honorable Teresa Brewer, Town of Oakwood Mayor  
The Honorable Jessie Rodriguez, Sr., City of Odem Mayor  
The Honorable Gerald Z. Dubinski, City of Olmos Park Mayor  
The Honorable Seale Brand, City of Orange Grove Mayor  
The Honorable Robert Young, City of Overton Mayor
The Honorable Bill Turner, City of Ovilla Mayor
The Honorable Carolyn Salter, City of Palestine Mayor
The Honorable Ray Elledge, City of Palm Valley Mayor
The Honorable Don Huskins, Town of Palmer Mayor
The Honorable Ramiro J. Rodriguez, City of Palmhurst Mayor
The Honorable Jorge G. Garcia, City of Palmview Mayor
The Honorable Dorothy Aderholt, Town of Pantego Mayor
The Honorable Gerald Cleveland, City of Paradise Mayor
The Honorable Curtis Fendley, City of Paris Mayor
The Honorable Doug Garber, City of Parker Mayor
The Honorable J. D. Meredith, Town of Payne Springs Mayor
The Honorable George Cabasos, City of Pearsall Mayor
The Honorable Warner Cheney, City of Pecan Gap Mayor
The Honorable John Keene, City of Pecan Hill Mayor
The Honorable Marilyn Hawkins, City of Pelican Bay Mayor
The Honorable Inez Arriola, Town of Penelope Mayor
The Honorable Servando Ramirez, City of Penitas Mayor
The Honorable Jerry Hedrick, Village of Pernitas Point Mayor
The Honorable William J. Ordner, City of Petronila Mayor
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The Honorable Leo Palacios, City of Pharr Mayor
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The Honorable Sharon Royal, City of Quinlan Mayor
The Honorable Larry W. Robertson, City of Quitman Mayor
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The Honorable David Brooks, City of Reno (Lamar County) Mayor
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The Honorable Lonnie Glasscock, III, City of San Patricio Mayor
The Honorable Oscar De Luna, City of San Perlita Mayor
The Honorable Cliff Scallan, Town of Sanctuary Mayor
The Honorable Tommy Kincaid, City of Sanger Mayor
The Honorable Robert Armstrong, City of Sansom Park Mayor
The Honorable David D. Mueller, City of Santa Clara Mayor
The Honorable Ruben Ochoa, Town of Santa Rosa Mayor
The Honorable Clete Stogsdill, City of Savoy Mayor
The Honorable Olive Stephens, Town of Shady Shores Mayor
The Honorable Harold D. Baldwin, City of Schertz Mayor
The Honorable Roger Moellenberndt, City of Schulenburg Mayor
The Honorable George Williams, City of Seagoville Mayor
The Honorable Betty Anne Matthies, City of Seguin Mayor
The Honorable James E. Parma, City of Selma Mayor
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The Honorable Bill Magers, City of Sherman Mayor
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The Honorable Donnie Janicek, City of Smiley Mayor
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The Honorable Fred Gonzales, City of Somerset Mayor
The Honorable Tommy Thompson, City of Somerville Mayor
The Honorable Bob Pinkerton, Jr., Town of South Padre Island Mayor
The Honorable Andy Wambsganss, City of Southlake Mayor
The Honorable Billy Kerr, City of Southmayd Mayor
The Honorable Wayne LaCava, City of Springtown Mayor
The Honorable Walter Bingham, City of Star Harbor Mayor
The Honorable Rusty Jergins, City of Stephenville Mayor
The Honorable Johnny Stahl, City of Stockdale Mayor
The Honorable David Day, City of Strawn Mayor
The Honorable Dorothy Whalen, Town of Streetman Mayor
The Honorable Gumaro Flores, City of Sullivan City Mayor
The Honorable Clay Walker, City of Sulphur Springs Mayor
The Honorable Maria Z. Wagnon, City of Sun Valley Mayor
The Honorable Jim Phaup, Town of Sunnyvale Mayor
The Honorable Danny Russell, City of Sunset Mayor
The Honorable Terry Cowan, City of Sunset Valley Mayor
The Honorable Jerry L. King, City of Taft Mayor
The Honorable Earl Carter, City of Talty Mayor
The Honorable Donald Hill, City of Taylor Mayor
The Honorable Earnest Pack, City of Teague Mayor
The Honorable H. Doug East Jr., City of Tehuacana Mayor
Chapter 10
List of Agencies, Organizations and Persons to Whom Copies of the Draft EIS are Sent
TTC-35 Tier One Draft EIS

The Honorable William A. Jones, III, City of Temple Mayor
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The Honorable J. Bradford Camp, City of Terrell Hills Mayor
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The Honorable Billy Simank, City of Thorndale Mayor
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The Honorable Troy Marx, City of Thrall Mayor
The Honorable Felipe Q. Martinez, City of Three Rivers Mayor
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The Honorable J. Jason Waller, City of Toco Mayor
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The Honorable Scott Confer, City of Tool Mayor
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The Honorable Virginia DuPuy, City of Waco Mayor
The Honorable Roy Tovar, City of Waelder Mayor
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The Honorable Henry Jeffries, City of Watauga Mayor
The Honorable Jay Barksdale, City of Waxahachie Mayor
The Honorable Joe Tison, City of Weatherford Mayor
The Honorable Hector Gonzales, Village of Webberville Mayor
The Honorable Joe V. Sanchez, City of Weslaco Mayor
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The Honorable Dwight Thompson, City of West Lake Hills Mayor
The Honorable Earle Shields, Town of Westover Hills Mayor
The Honorable Andy Fontenot, City of Westworth Village Mayor
The Honorable Bill Stausing, Town of West Tawakoni Mayor
The Honorable Scott Bradley, Town of Westlake Mayor
The Honorable Phillip Goplin, City of Westminster Mayor
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The Honorable Gwen Evans, Town of Whitney Mayor
The Honorable Mervin Walker, City of Weir Mayor
The Honorable James Poythress, City of Willow Park Mayor
The Honorable Roy Caldwell, City of Wills Point Mayor
The Honorable Don Hudson, City of Wilmer Mayor
The Honorable Jack H. Leonhardt, City of Windcrest Mayor
The Honorable Bill Roberts, Town of Windom Mayor
The Honorable Carolyn S. Jones, City of Winnsboro Mayor
The Honorable Glynn Marsh, Town of Winona Mayor
The Honorable Ruby Andrews, City of Wixon Valley Mayor
The Honorable Bethel Henslee, City of Wolfe City Mayor
The Honorable Donald J. Baker, City of Woodway Mayor
The Honorable Judy Edwards, Town of Wortham Mayor
The Honorable John Mondy, City of Wylie Mayor
The Honorable Jerry E. Miller, City of Yantis Mayor
The Honorable Annie Rodriguez, City of Yoakum Mayor
The Honorable Patricia B. Nelson, City of Yorktown Mayor

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Alexander Memorial Library
Alice Public Library
Allen Memorial Public Library
Chapter 10

List of Agencies, Organizations and Persons to Whom Copies of the Draft EIS are Sent

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Allen Public Library
Alvarado Public Library
Alvord Public Library
Arlington Public Library System
Aubrey Area Library
Audelia Road Branch Library
Austin History Center Library
Austin Public Library
Azle Public Library
Bailey H. Dunlap Memorial Library
Balch Springs Public Library
Bastrop Public Library
Bazan Branch Library
Bedford Public Library
Bell/Whittington Public Library
Benbrook Public Library
Bertha Voyer Memorial Library
Betty Foster Public Library
Betty Warmack Branch Library
Bishop Branch Library
BJ Hill Library
Black Bridge Library
Blue Mound Community Library
BOLD Butler Housing Community Library
Bonham Public Library
Bowie Public Library
Boyce Ditto Public Library
Boyd Public Library
Bremond Public Library
Bridgeport Public Library
Brook Hollow Branch Library
Brownsville Public Library
Bruni Plaza Branch Library
Bryan College Station Public Library System
Buda Public Library
Buffalo Public Library
Bullard Community Library
Burleson Public Library
Cameron Public Library
Cameron-J. Jarvis Troup Municipal Library
Carl and Mary Welhausen Library
Carnegie Center of Brazos Valley History
Carrollton Public Library
Carrollton Public Library at Hebbron & Josey
Carver Branch Library (Austin, TX)
Carver Branch Library (San Antonio, TX)
Casa View Branch Library
Castroville Public Library
Cavile Outreach Opportunity Library
Cedar Park Public Library
Celina Community Library
Charles J. Rike Memorial Library
Charlotte Public Library
Chico Public Library, Inc.
Christopher A Parr Library
Cleburne Public Library
Cockrell Hill Public Library
Cody Branch Library
Colleyville Public Library
Collins Garden Branch Library
Collinsville Community Library
Commerce Public Library
Converse Area Public Library
Cooke County Library
Corpus Christi Public Libraries
Corsicana Public Library
Cortez Branch Library
Crandall-Combine Community Library
Crowley Public Library
Cuero Public Library
D. Brown Memorial Library
Dallas Public Library
Dallas West Branch Library
Daniel E. Ruiz Branch Library
Decatur Public Library
Delta County Public Library
Denison Public Library
Denton Public Library
Denton Public Library North Branch
Denton Public Library South Branch
DeSoto Public Library
Diamond Hill/Jarvis Branch Library
Dilley Public Library
Dimmit County Public Library
Donna Public Library
Dr. Eugene Clark Library
Driscoll Public Library
Dublin Public Library
Duncanville Public Library
Duval County/Benavides Branch Library
Duval County/Freer Branch Library
Duval County/San Diego Public Library
East Arlington Branch Library
East Berry Branch Library
East Branch Library
East Parker County Library
East Regional Branch Library
East Waco Library
Ed and Hazel Richmond Public Library
Ed Rachal Memorial Library
Edinburg Public Library
Elgin Public Library
Ellen Brooks West Memorial Library of Forney
Elmer P. & Jewel Ward Memorial Library
Elroy Community Library
Elsa Public Library
Ennis Public Library
Ethel L. Whipple Memorial Library
Euless Public Library
Eustasio Cepeda Branch Library
Everman Public Library
Fairfield Library Association
Falls City Public Library
Farmers Branch Manske Public Library
Fayette Public Library
Ferris Public Library
Flatonia Public Library
Florence Public Library
Flower Mound Public Library
Forest Green Branch Library
Forest Hills Branch Library
Fort Worth Public Library
Franklin County Library
Fretz Park Branch Library
French Simpson Memorial Library
Frisco Public Library
Georgetown Public Library
Gibbs Memorial Library
Giddings Public Library
Gilbreath Memorial Library
Gilliam Memorial Public Library
Gladys Harrington Library
Gladys Johnson Ritchie Public Library
Goliad County Library
Gonzales Public Library
Grand Prairie Public Library System
Grand Saline Public Library
Grandview Public Library
Grapevine Public Library
Great Northwest Branch Library
Greenwood Branch Library
Guerra Branch Library
Haltom City Public Library
Hampton-Illinois Branch Library
Harker Heights Public Library
Harlingen Public Library
Harriet P. Woodson Memorial Library
Haslet Public Library
Henderson County Clint W. Murchison Memorial Library
Henderson County Library East
Hewitt Community Library
Hidalgo County Library System
Hidalgo Public Library
Highland Hills Branch Library
Highland Park Library
Hillsboro City Library
Hoffie and Lank Wolters Shiner Public Library
Hondo Public Library
Hood County Public Library
Howe Community Library
Howe High School Library
Howson Branch Library
Hurst Public Library
Hutchins-Atwell Public Library
Ingleside Public Library
Irving Bookmobile
Irving Public Library
J.B. Nickells Memorial Library
Janet F Harte Public Library
Jim Hogg County Public Library
Joe A. Hall High School and Community Library
Joe Barnhart Bee County Library
John Ed Keeter Public Library
Johnston Branch Library
Jonestown Community Library
Joshua School & Public Library
Jourdanton Community Library
Justin Community Library
Karnes City Public Library
Kaufman County Library
Keller Public Library
Kenedy Public Library
Kerens Library
Killeen City Library System
Kleberg-Rylie Branch Library
Krueger Elementary Karrer Campus Library
Krum Public Library
Kyle Community Library
La Joya Municipal Library
Lago Vista Community Library
Laguna Vista Public Library
Lake Arlington Branch Library
Lake Cities Library
Lake Travis Community Library
Lake Whitney Public Library
Lakewood Branch Library
Lancaster Veterans Memorial Library
Lancaster-Kiest Branch Library
Landa Branch Library
Laredo Public Library
Laredo Public Library Bookmobile
Lark Branch Library
Larry J. Ringer Public Library
Las Palmas Branch Library
Leander Public Library
Lena Armstrong Library
Leon Valley Public Library
Leonard Public Library
LER Schimelpfenig Library
Lewisville Public Library
Lexington Public Library
Liberty Hill Public Library
Library on Wheels (LOW)
Lindale Library
Little Elm Public Library
Little Walnut Creek Branch Library
Live Oak County Branch Library (Three Rivers, TX)
Live Oak County Library (George West, TX)
Lone Oak Area Public Library
Lucy Hill Patterson Memorial Library
Lytle Public Library
Maffett Memorial Library
Manchaca Road Branch Library
Manor Public Library
Mansfield Public Library
Maribelle M Davis Library
Marion Community Library
Marion Middle School Library
Marlin Public Library
Martin Luther King, Jr. Library/LC
Mary Lou Reddick Public Library
Mathis Public Library
Maud Public Library
McAllen Memorial Library
McCreless Branch Library
McGinley Memorial Public Library
McKinney Memorial Public Library
Meadowbrook Branch Library
Melissa Public Library
Memorial Branch Library
Mercedes Memorial Library
Meridian Public Library
Mesquite North Branch Library
Mesquite Public Library
Milwood Branch Library
Mineola Memorial Library
Moody Community Library
Mount Calm Public Library
Mountain Creek Branch Library
Muenster Public Library
Nancy Nail Memorial Library
Nellie Pederson Civic Library
New Braunfels Public Library
Newark Public Library
Nicholas P. Sims Library & Lyceum
Nicholson Memorial Library System
Nocona Public Library
 Noonday Community Library
Norma Krueger Elementary Library
North Garland Branch Library
North Oak Cliff Branch Library
North Richland Hills Public Library
North Village Branch Library
Northeast Branch Library
Northside Branch Library
Northwest Branch Library (Corpus Christi, TX)
Northwest Branch Library (Irving, TX)
Nueces County Public Library
Oak Lawn Branch Library
Oak Springs Branch Library
Oakwell Branch Library
Odem Public Library
Old Quarry Branch Library
Orange Grove School/Public Library
Palestine Public Library
Palm View Branch Library
Pan American Branch Library
Park Forest Branch Library
Parkdale Branch Library
Pearsall Public Library
Pflugerville Community Library
Pharr Memorial Library
Pilot Point Community Library
Plano Public Library System
Pleasant Grove Branch Library
Pleasant Hill Branch Library
Pleasanton Public Library
Polk-Wisdom Branch Library
Port Isabel Public Library
Poteet Public Library
Pottsboro Area Public Library
Premont Public Library
Preston Royal Branch Library
Princeton Community Library
Prosper Community Library
Quitman Public Library
Rains County Public Library
Ralph W Yarborough Branch Library
RB Hoover Library
Reagan High School & Public Library
Reber Memorial Library
Red Oak Public Library
Red Waller Community Library
Renner Frankford Branch Library
Rhome Public Library
Richardson Public Library
Richland Hills Public Library
Ridgewood Branch Library
Ridglea Branch Library
Rio Hondo Public Library
Rita & Truett Smith Public Library
Riter C. Hulsey Public Library
River Oaks Public Library
Riverside Branch Library
Roanoke Public Library
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Runge Public Library
Sachse Public Library
Salado Public Library District
Sam Fore, Jr. Wilson County Public Library
San Antonio Public Library
San Benito Public Library
San Juan Public Library
San Marcos Public Library
San Pedro Branch Library
Sanger Public Library
Santo Nino Branch Library
Schertz Public Library
Schulenburg Public Library
Seagoville Public Library
Seguin-Guadalupe County Public Library
Seminary South Branch Library
Shamblee Branch Library
Sinton Public Library
Skillman Southwestern Branch Library
Skyline Branch Library
Smithville Public Library
Smith-Welch Memorial Library
Somervell County Library
South Garland Branch Library
South Waco Library
Southeast Austin Community Branch Library
Southeast Branch Library
Southlake Public Library
Southwest Branch Library
Southwest Regional Branch Library
Speer Memorial Library
Spicewood Springs Branch Library
Springtown Public Library
St John Branch Library
Stella Ellis Hart Memorial Library
Stephenville Public Library
Sulphur Springs Public Library
Summerglen Branch Library
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Tawakoni Area Public Library
Taylor Public Library
Teague Public Library
Teinert Memorial Library
Temple Public Library
Terrazas Branch Library
The Aphne Pattillo Nixon Public Library
The Colony Public Library
The Kennedale Library
The Library at Cedar Creek Lake
The Paris Public Library
The Sherman Public Library
Thousand Oaks/El Sendero Branch Library
Tri-Community Library
Tri-County Library
Twin Oaks Branch Library
Tyler Public Library
Universal City Public Library
University Hills Branch Library
University Park Public Library
Valley Mills Public Library
Valley Ranch Branch Library
Van Alstyne Library
Van Zandt County Library
W. Walworth Harrison Public Library
Waco-McLennan County Library
Waelder Public Library
Walnut Creek Branch Library
Walnut Hill Branch Library
Watauga Public Library
Weatherford Public Library
Wedgwood Branch Library
Wells Branch Community Library
Weslaco Public Library
West Public Library
Westbank Community Library
Westfall Branch Library
White Settlement Public Library
Whitehouse Community Library
Whitesboro Public Library
Whitewright Public Library
Will Hampton Branch at Oak Hill
William R. ‘Bill’ Ellis Memorial Library
William T Cozby Public Library
Wills Point High School/Wingo Public Library
Windsor Park Branch Library
WO Haggard, Jr. Library
Wolfe City Public Library
Woodland West Branch Library
Yorktown Public Library
Zapata County Public Branch Library
Zapata County Public Library
Zula Bryant Wylie Library

OTHERS
Federal Ministry of Transportation and Communication of Mexico
State of Coahuila, Mexico
State of Nuevo Leon, Mexico
State of Tamaulipas, Mexico


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7. 2003b. Endangered and threatened wildlife and plants; delisting the plant Frankenia johnstonii (Johnston’s frankenia) and notice of petition finding. Federal Register 68(99):27961-27969.

8. 1999. Endangered and threatened wildlife and plants; proposed rule to remove the bald eagle in the lower 48 states from the list of endangered and threatened wildlife; proposed rule. Federal Register 64(128):36454-36464.


# 12.0 LIST OF ACRONYMS AND ABBREVIATIONS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACHP</td>
<td>Advisory Council on Historic Preservation</td>
</tr>
<tr>
<td>ADT</td>
<td>average daily traffic</td>
</tr>
<tr>
<td>AML</td>
<td>Abandoned Mine Land</td>
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<tr>
<td>APE</td>
<td>Area of Potential Effect</td>
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<tr>
<td>BEG</td>
<td>Bureau of Economic Geology</td>
</tr>
<tr>
<td>BMP</td>
<td>Best Management Practice</td>
</tr>
<tr>
<td>BNSF</td>
<td>Burlington Northern-Santa Fe Railroad Company</td>
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<tr>
<td>B.P.</td>
<td>before present</td>
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<tr>
<td>CAA</td>
<td>Clean Air Act</td>
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<tr>
<td>CBRA</td>
<td>Coastal Barrier Resources Act</td>
</tr>
<tr>
<td>CCC</td>
<td>Commodity Credit Corporation</td>
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<tr>
<td>CDA</td>
<td>Comprehensive Development Agreement</td>
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<td>CDC</td>
<td>Trinity River [Comprehensive Development Code] Zone</td>
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<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act</td>
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<tr>
<td>CERCLIS</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Information System</td>
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<tr>
<td>CEQ</td>
<td>Council on Environmental Quality</td>
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<td>CFR</td>
<td>Code of Federal Register</td>
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<td>CGP</td>
<td>Construction General Permit</td>
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<td>CMP</td>
<td>Coastal Management Program</td>
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<td>CO</td>
<td>carbon monoxide</td>
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<td>CSD</td>
<td>Context Sensitive Design</td>
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<td>Clean Water Act</td>
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<td>Coastal Zone Management Program</td>
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<td>A-weighted decibel levels</td>
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<td>Draft Environmental Impact Statement</td>
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<td>Department of Health and Human Services</td>
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<td>EAC</td>
<td>Early Action Compact</td>
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<td>EFH</td>
<td>Essential Fish Habitat</td>
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<td>Energy Information Administration</td>
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<td>Environmental Management System</td>
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<td>Executive Order</td>
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<td>Electric Reliability Council of Texas</td>
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<td>FEIS</td>
<td>Final Environmental Impact Statement</td>
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<td>Federal Emergency Management Agency</td>
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<tr>
<td>Acronym</td>
<td>Definition</td>
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