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## **SOUTHWESTERN PUBLIC SERVICE COMPANY**

### **ENVIRONMENTAL ASSESSMENT AND ALTERNATIVE ROUTE ANALYSIS**

for the

### **OCHILTREE SUBSTATION TO LIPSCOMB SUBSTATION 115-KV TRANSMISSION LINE PROJECT LIPSCOMB AND OCHILTREE COUNTIES, TEXAS**

April 23, 2013

### **DOCKET NUMBER 41334**

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for the

**OCHILTREE SUBSTATION  
TO LIPSCOMB SUBSTATION  
115-KV TRANSMISSION LINE PROJECT  
LIPSCOMB AND OCHILTREE COUNTIES, TEXAS**

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## LIST OF ABBREVIATIONS

APLIC	Avian Power Line Interaction Committee
ATSF	Atchison, Topeka and Santa Fe Railway Company
BMP	best management practice
CCAA	candidate conservation agreement with assurances
CCN	Certificate of Convenience and Necessity
CR	County Road
EPA	U.S. Environmental Protection Agency
EMS	Emergency Medical Service
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
kV	kilovolt
L2EMC	lacustrine littoral emergent seasonally-flooded
LEPC	lesser prairie chicken
LSD	Logan Simpson Design
NLCD	National Land Cover Dataset
NPAT	National Prairies Association of Texas
NPEC	North Plains Electric Cooperative, Inc.
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
PRPC	Panhandle Regional Planning Commission

PUC	Public Utility Commission of Texas
PURA	Public Utility Regulatory Act
PYX	Perryton-Ochiltree County Airport
ROW	right-of-way
RR	Ranch Road
RRTD	Rural Railroad Transportation District
SH	State Highway
SGP CHAT	Southern Great Plains Crucial Habitat Assessment Tool
SPP	Southwest Power Pool
SPS	Southwestern Public Service Company
SSURGO	Soil Survey Geographic (database)
SWPPP	Storm Water Pollution Protection Plan
SWRR	Southwestern Railroad Company
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
TPWD	Texas Parks and Wildlife Department
TxDOT	Texas Department of Transportation
TXNDD	Texas Natural Diversity Database
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WGA	Western Governors' Association

# **CHAPTER 1**

## **DESCRIPTION OF THE PROPOSED PROJECT**

### **1.1 Scope of Project**

Southwestern Public Service Company (SPS), an electric utility subsidiary of Xcel Energy, Inc., proposes to construct a 115-kilovolt (kV) electric transmission line using primarily single-circuit, single-pole self-supporting steel structures. The proposed transmission line would extend between the existing Ochiltree Substation, near the town of Perryton, Texas, and the new Lipscomb Substation near the town of Booker, Texas. The project would also connect to the existing Wade Substation located approximately midway between Perryton and Booker. The project is located primarily within Ochiltree County, but a small portion is located in Lipscomb County in the northern portion of the Texas Panhandle. The alternative transmission line routes are located south of County Road (CR) C, east of State Loop 143/CR15, north of State Loop 143/SW 24th Avenue, and west of CR 4. The recently constructed Ochiltree Substation is located north of the city of Perryton's municipal boundary, west of U.S. Highway 83 (U.S. 83), north of State Highway (SH) 15, and approximately 1,000 feet northwest of the terminus of N. Indiana Street. The new Lipscomb Substation will be located north of E. Santa Fe Lane and west of SH 23/Ranch Road (RR) 1265. The existing Wade Substation is located on the northwest corner of the intersection of CR F and CR 24. Refer to Figure 1-1 for a map of the project Study Area. The proposed transmission line is estimated to be approximately 19.5 to 27.3 miles in length, depending on which alternative route is approved by the Public Utility Commission of Texas (PUC).

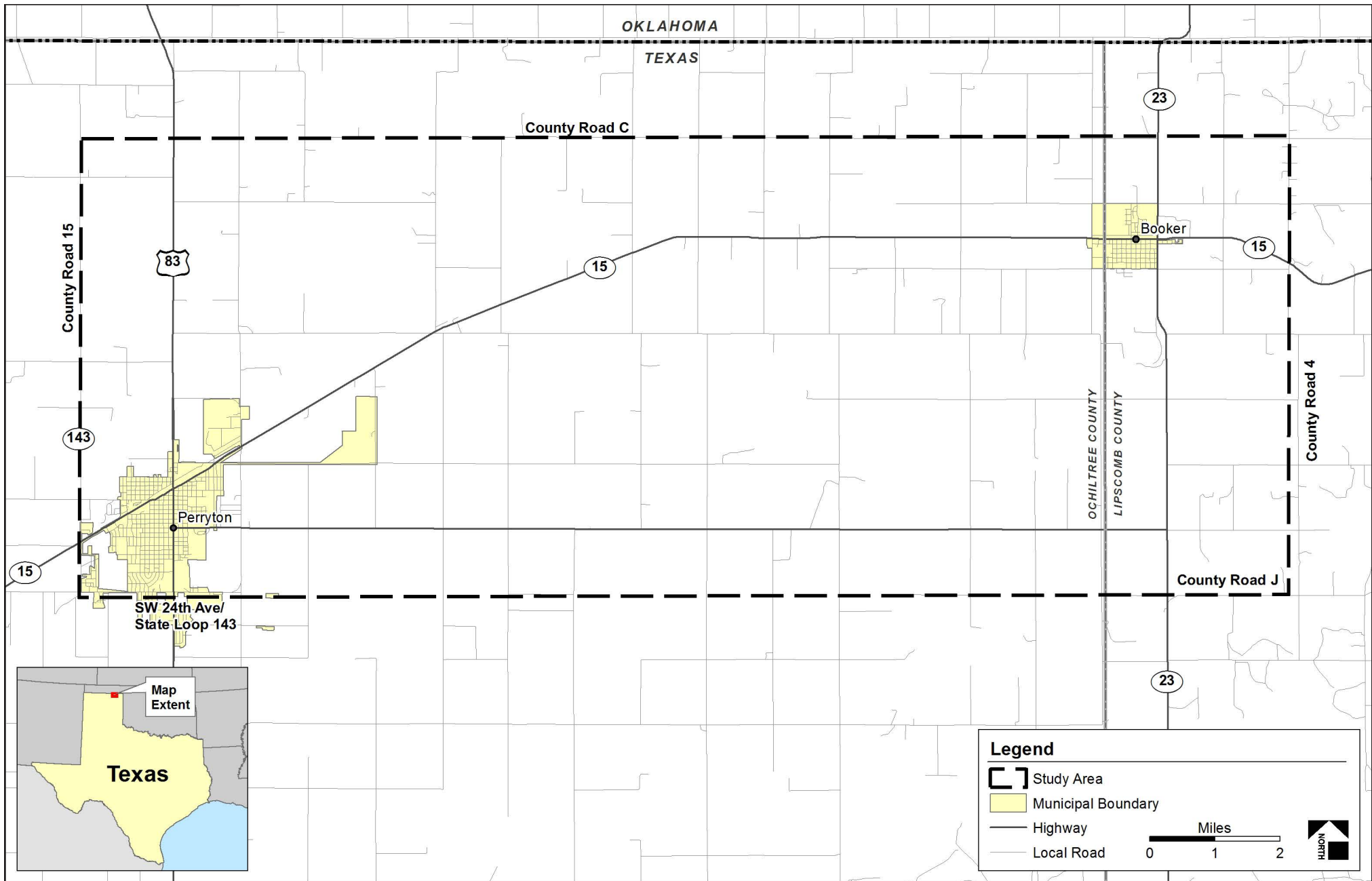
SPS retained Logan Simpson Design (LSD) to delineate and evaluate alternative routes and to prepare this Environmental Assessment and Alternative Route Analysis to support SPS's Certificate of Convenience and Necessity (CCN) application to the PUC. SPS provided LSD with the location of the two key end points (Ochiltree Substation and the new Lipscomb Substation) and the Wade Substation in the center of the project Study Area, a map with some preliminary route options, the project purpose and need, and project design and construction information.

### **1.2 Purpose and Need for Project**

SPS is a member of, and its entire transmission system is located within, the Southwest Power Pool (SPP). As identified by SPS, the proposed 115-kV transmission line is needed to improve reliability of the transmission line system and to increase line capacity. The existing 66-kV transmission line between Perryton and Booker is over 50 years old and was constructed under standards that have since become outdated. The existing 66-kV transmission line structures and hardware are deteriorating, requiring a greater level of maintenance than normal. The existing transmission line experiences outage events, including sustained events, resulting in this line being one of the low-performing transmission lines in the SPS system. The proposed 115-kV line would have a higher thermal rating than the existing 66-kV line, which would improve grid reliability and benefit customers in the service area.

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Source: ESRI Streetmap Data

# Project Location

Ochiltree - Lipscomb 115-kV Transmission Line Project



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Figure 1-1

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## 1.3 Description of Proposed Design and Construction

### 1.3.1 Design Criteria

SPS plans to construct the transmission line using primarily single-circuit, single-pole self-supporting steel structures; it would use direct burial for tangent structures and would use concrete foundations for all angle and corner structures. The typical height of the steel pole structure is between 80 and 140 feet. Refer to Figures 1-2a and 1-2b for a depiction of typical monopoles for a 115-kV transmission line and the CCN application for additional structure graphics. All design criteria comply with applicable statutes and codes, including the appropriate edition of the National Electrical Safety Code and SPS's standard design practices.

The proposed 115-kV transmission line would replace the existing 66-kV line that currently supplies electricity to the study area. Once the proposed 115-kV transmission line is on-line and operational, the existing 66-kV line would be removed.

The project also includes modifications to the existing Perryton Substation, the existing Ochiltree Substation, the existing Wade Substation, and construction of a new substation in Booker - the Lipscomb Substation. The existing and new substations are owned and operated by SPS. The following summarizes the substation improvements needed to accommodate a proposed 115-kV transmission line and to remove the existing 66-kV transmission line.

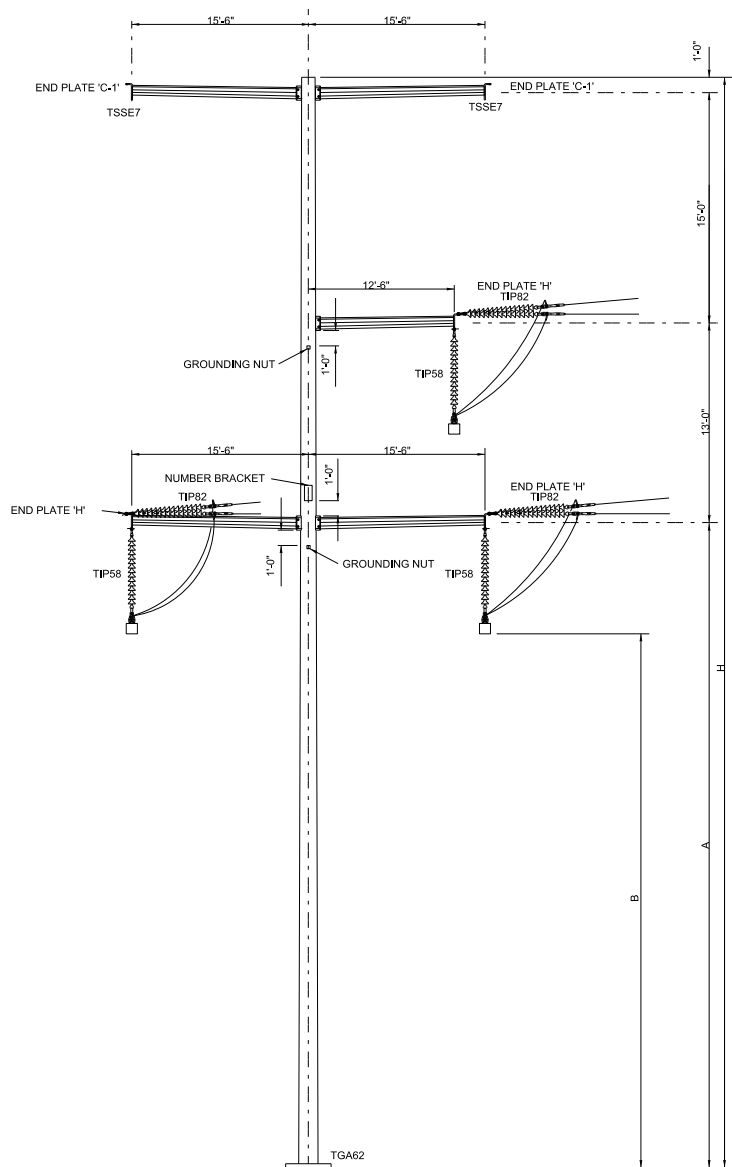
- **Existing Ochiltree Substation.** The 115-kV bus would be expanded to allow for termination of the proposed 115-kV transmission line. In addition, the substation would be modified to add the necessary breakers, switching devices, protective devices, electrical equipment, structures, and foundations for the termination of a new 115-kV line. The improvements would not extend beyond the existing footprint of the current substation fence line or the maximum current height at the substation. The existing Ochiltree Substation site is 20 acres.
- **Existing Perryton Substation.** Switches and breakers associated with the existing 66-kV transmission line would be removed following construction of the proposed 115-kV line and removal of the existing 66-kV line.



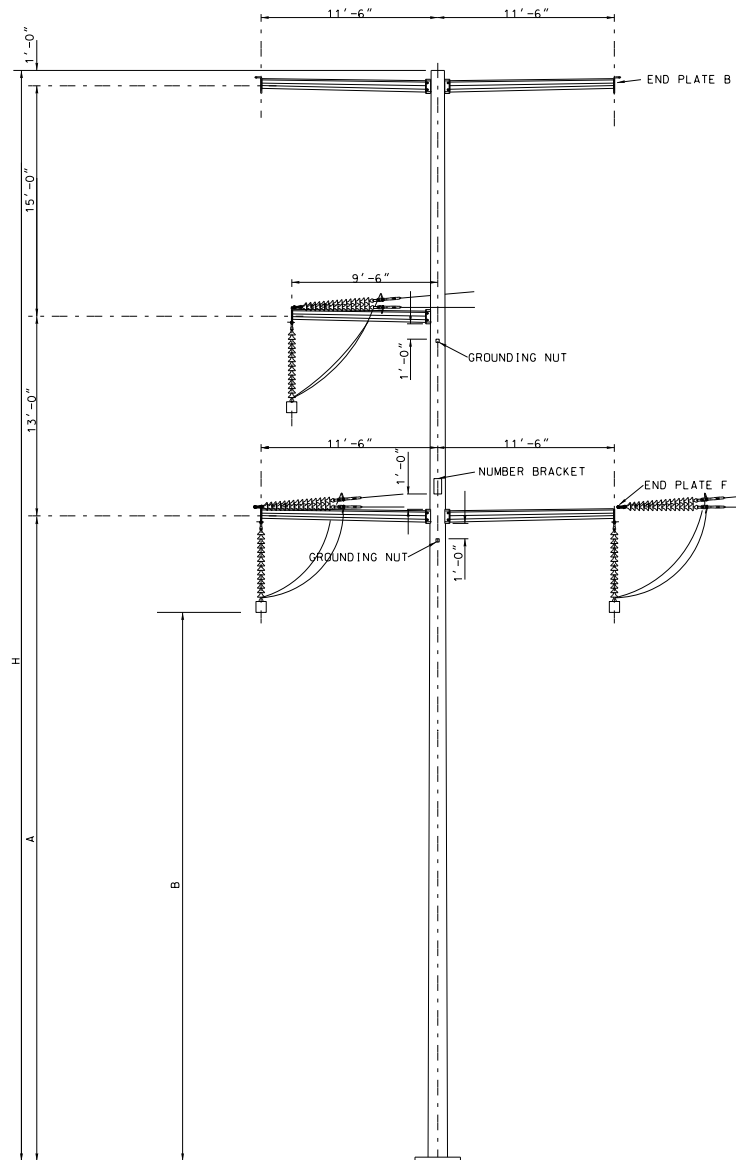
*Existing Ochiltree Substation*

**New Lipscomb Substation.** The new substation would be located north of SH 15/East Industrial Avenue and west of SH 23/RR 1265. This project is the complete installation and commissioning of a new substation consisting of one 28 MVA, 115/34.5-kV power transformer with Load Tap Changers, with a high-side circuit switcher, and with low-side bus and vacuum circuit breakers. The 115-kV line will be a new line that will originate at SPS's Ochiltree Substation. Fiber optic static will be installed in the new line for future use. The other standard substation features would include

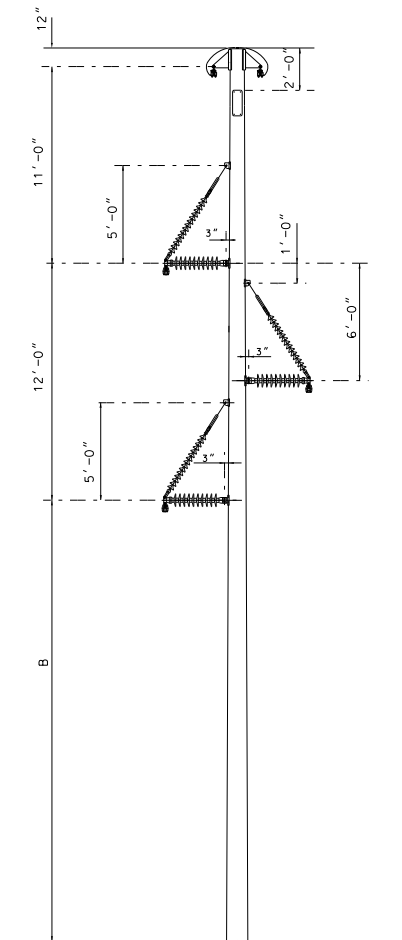
breakers, switching devices, protective devices, electrical equipment, structures, and foundations. The substation site is approximately five acres in size, but not all of that area will be developed for this project. The substation site will be fenced and access controlled. A 34.5-kV line will be run from the new Lipscomb Substation to the Booker Substation, which will be rebuilt from 69-kV to 34.5-kV, and will contain a 34.5/4-kV transformer.



90° Corner Structure



10° - 30° Corner Structure



Braced Line Post  
Tangent Structure  
(Foundation)

**Typical MonoPole Design** (Corner & Tangent)

Ochiltree - Lipscomb 115-kV Transmission Line Project

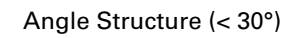
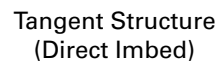


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Figure 1-2a

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- **Existing Booker Substation.** The existing Booker Substation would retain the 35/4-kV transformer, regulators, and three feeder circuit breakers; however, the existing 66-kV bus and assets would be removed. An existing 35-kV distribution line currently in place running from the Booker Substation toward the new Lipscomb Substation site would be used to serve the existing Booker Substation.
- **Existing Wade Substation.** The existing Wade Substation would be modified by adding a new 115-kV bus to accommodate the new transmission line. In addition, the substation would be modified to include a circuit switcher and a 7 MVA, 115/12.5-kV transformer. Improvements would include all associated switching devices, protective devices, and electrical equipment. The existing 66-kV bus and assets would be removed. The Wade Substation site is approximately one acre in size, with a 60-foot x 90-foot foundation. The site will be expanded from one to two acres to the north and west, and the improvements would be similar in height to the existing substation structures.



*Existing Wade Substation*

### 1.3.2 Right-of-Way

Most alternatives would be constructed primarily within newly acquired SPS Right-of-Way (ROW); though ROWs owned by others would be utilized where available and practical. One of the alternatives would be located primarily within an existing abandoned railroad ROW. The proposed 115-kV transmission line would require a 70-foot-wide ROW; a narrower ROW width would be possible in select areas where constrained.

## 1.4 Construction Considerations

### 1.4.1 Clearing

Brush, trees, and vegetation within the proposed ROW would need to be removed if they impede safe construction of the transmission line. Since a majority of the project Study Area is developed or in agricultural production, very few trees exist in the ROW of the proposed routes. However, trees located within the ROW would be cleared for construction. The upgrades proposed at the two existing substations (Ochiltree and Wade) would require limited clearing and grading for facility foundations and equipment. As noted previously, the improvements at the Ochiltree Substation would occur within the existing 20-acre site. The Wade Substation would be expanded from one acre to two acres; the site is currently surrounded by agricultural uses, therefore clearing is not expected to be needed. The new Lipscomb Substation would require clearing and grading and possibly the removal of several trees. Brush and trees cleared from the ROW or substation site would be mulched and salvaged (re-used in ground cover) if possible. The ROW would be used for short-term access during the construction phase, as well as for long-term access for maintenance. Adjacent public roads, or, where necessary, easements through private property, would provide access to and from the ROW.

## **1.4.2 Construction**

The proposed transmission structures would be constructed either by directly embedding a steel pole in the ground or by using concrete foundations. Concrete foundations are proposed for angle and corner structures. All tangent structures would be directly embedded in augured holes and backfilled with native soils, crushed rock, or other backfill material. Geotechnical investigations would be performed to best determine the specific pole placement location and construction requirements. The concrete foundations would vary in size and range from 6 feet x 12 feet to 10 feet x 20 feet, depending on soil conditions, load specifications, and angle degree. Tangent structure holes would be augured and would be approximately 4 feet in diameter and between 13 and 26 feet deep, depending on pole height and soil conditions. After the poles are erected, the conductors and shield wires would be installed by a tensioning system. Once wires are tensioned appropriately, ends would be permanently clamped in place. Guard structures are proposed during the construction phase where the transmission line crosses existing transmission and distribution lines, telephone lines, and roadways. Once the transmission line is permanently attached, those structures would be removed.

The proposed span length of the steel monopoles would vary between 600 and 900 feet, depending on terrain, structure type, and adjacent land uses. If a ROW narrower than 70-feet is necessary to mitigate a constraint, a shorter span length is possible. Depending on which alternative route is selected for construction, the 115-kV line would require an approximate total of between 166 and 231 structures, consisting of the following: between 139 and 203 tangent structures, and between 20 and 28 angle/corner structures.

A few routes cross seasonal playas that may require special foundations and preconstruction geotechnical surveys. According to SPS engineers, foundations located within playas would need to be designed to rise at least one foot above the high water line. If the geotechnical investigation concludes that a water table exists, vibratory caissons as well as a special “shell” to vibrate into the saturated soils may be needed. Special precautions would also be required for construction access to the foundation site. One option to limit impacts and avoid vehicle sinking includes using special “mats.” Foundations located within playas would increase construction costs, as addressed in Section 4.2.1.

One staging area would be required to store equipment and materials. The site would be approximately 25 acres in size and located between Perryton and Booker. An appropriate site would be a previously disturbed or fallow agriculture site, depending on site negotiations with landowners.

## **1.4.3 Cleanup**

Following construction, disturbed areas would be restored to preconstruction conditions where feasible and native vegetative cover or other erosion protection measures would be implemented. For agricultural land, disturbed areas will be returned to their preconstruction agricultural use. All construction debris would be removed from within and adjacent to the ROW, as well as at the substation sites. The following measures would be incorporated into the post-construction phase, as necessary:

1. Sedimentation/erosion control protection measures may be used where clearing and grading have occurred. The preference is to use native vegetative cover where possible. Gravel or rock may be used in areas where native cover is not likely to reestablish. Temporary use of fiber rolls, netting, or jute can be employed to help minimize erosion during the rainy season (May-August) when native cover is starting to reestablish.

2. In areas where native cover does not naturally reseed, hydroseeding may be employed.
3. Temporary roads or access will be restored to preconstruction conditions.
4. Temporary fencing will be removed and repairs/replacement of permanent fencing will be completed, as warranted.
5. Construction waste and debris will be hauled to an approved landfill or recycling center, as warranted.

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## **CHAPTER 2**

### **SELECTION AND EVALUATION**

### **OF ALTERNATIVE TRANSMISSION LINE ROUTES**

The final set of alternative transmission line routes was evaluated in accordance with Section 37.056(c)(4) of the Public Utility Regulatory Act (PURA), as referenced in P.U.C. SUBST. R. 25.101(b)(3)(B), and was addressed with respect to relevant sections in the PUC Application for a CCN for a proposed transmission line. The evaluation process included consideration of environmental constraints and opportunities, the human environment and siting opportunities, as well as information received during a public open-house meeting and input from SPS planning, ROW, and engineering staff.

#### **2.1 Objective of the Study**

An alternative route analysis was carried out to identify viable transmission line route alternatives between the existing Ochiltree Substation site near Perryton, Texas, and the new Lipscomb Substation site in Booker, Texas. Alternatives considered also had to connect to the existing Wade Substation located approximately midway between Perryton and Booker. Alternatives that were identified as viable were then carried forward and evaluated for land use conflicts, engineering factors, and costs to determine the routes that best met project needs while minimizing conflicts with existing land uses and obstructions and minimizing overall project costs. Considerations included those criteria identified by P.U.C. Substantive Rules, PURA, and the PUC CCN application, described in more detail in Section 2.3.3. Lastly, the viable alternatives were evaluated for potential environmental effects, and those conclusions were then considered in the selection of an alternative that best meets the needs of SPS and best addresses the requirements of PURA and PUC Substantive Rules. .

#### **2.2 Data Collection**

Baseline data were collected from field investigations conducted during the week of September 17, 2012, literature reviews conducted during preparation of the analysis, and through contact with local officials and organizations. The September 2012 field investigation was carried out by a senior project manager with experience in transmission line routing and permitting, supported by a biologist who is knowledgeable in the flora and fauna of the southwestern United States. Data acquired through field investigations included locations and descriptions of existing habitable structures, transmission and distribution lines, communication installations, airports, general vegetation and biological habitat conditions, water features, park and recreation facilities, schools, and general land uses.

LSD also contacted the Perryton-Ochiltree Chamber of Commerce, the Booker city manager, North Plains Electric Cooperative, Inc. (NPEC), the Perryton-Ochiltree County Airport, the Perryton city manager, the Perryton director of Economic Development, Ochiltree County Texas Parks and Wildlife, and Lipscomb County Texas Parks and Wildlife in an effort to gather information about the project Study Area.

Additional data were compiled from a variety of web-based sources and published documents. State and federal agency sources included, but were not limited to, the Texas Parks and Wildlife Department (TPWD), the Texas Department of Transportation (TxDOT), the Natural Resource Conservation Service, the U.S. Fish and Wildlife Service (USFWS), the University of Texas at Austin, the Federal Aviation Administration (FAA), and the Federal Communications Commission (FCC). (A complete list

of references is provided in Chapter 8.) A Class I literature review was also conducted by LSD in October 2012 to identify the occurrence of previously identified cultural resources and to determine the potential for cultural resources in the alternative route study area.

## 2.3 Delineation of Alternative Routes

### 2.3.1 Project Study Area Delineation

The project Study Area was defined in the early phase of the routing analysis by selecting an area that was sufficiently large to provide a range of routing opportunities between the two end points. The project Study Area, shown in Figure 1-1, is depicted on all route maps and environmental resource maps within this analysis. The project Study Area boundary generally follows CR C to the north, State Loop 143/CR 15 to the west, SE 24th Avenue/State Loop 143 to the south, and CR 4 to the east. Lands within the project Study Area include all or portions of the following sections listed in Table 2-1. The project Study Area was surveyed by block and section methodology, under the historic Texas land grant survey system.

**Table 2-1. Sections Crossed by the Alternative Routes**

Section No.	Section No.	Section No.	Section No.	Section No.	Section No.
4	118	130	143	1099	1178
19	119	131	144	1101	1180
49	120	132	145	1102	1184
50	121	133	146	1108	1185
51	122	134	147	1109	1186
54	123	136	148	1110	1187
55	124	137	1093	1111	1188
56	125	138	1094	1173	1178
57	126	139	1095	1174	
58	127	140	1096	1175	
59	128	141	1097	1176	
117	129	142	1098	1177	

### 2.3.2 Constraints Mapping

Several key environmental constraints that could potentially drive the routing options were assessed. In addition to data gathered in the field, LSD conducted an initial desktop analysis and literature review to research the presence of designated wildlife areas, sites designated on the National Register of Historic Places (NRHP), known historic and archaeological sites, surface waters, wetlands designated on the National Wetlands Inventory (NWI), and areas with known sensitive wildlife species. Surface waters, including streams and playas, were identified and mapped within the project Study Area, along with NWI-designated wetlands and Texas Natural Diversity Database (TXNDD) and TPWD known wildlife areas. In addition, eight cultural resource sites were identified within the cultural resources study area; refer to Section 3.10 for the definition of the cultural study area and the findings of the Class I inventory.

The constraints mapping phase also included identification of potential land use constraints, including airports, communication towers, irrigated croplands (center-pivot and rolling), and schools. (Refer to Figure 5-1 in Chapter 5 for a map of the preliminary opportunities and constraints generated during the

public involvement and data-gathering phase of the project.) Following the initial identification of environmental and land use constraints, the routing analysis was then carried forward to also address key engineering criteria and additional land use constraints pursuant to PUC criteria described in Section 2.3.3.

### **2.3.3 Routing Criteria**

A list of routing criteria, which include engineering constraints and opportunities, environmental constraints, and land use constraints, was developed in coordination with SPS. The list includes PUC-defined criteria related to other electronic installations, aviation, habitable structures, ability to parallel other linear ROWs, and recreation facilities. The following list of criteria was used to identify the preliminary route segments. Specifically, P.U.C. SUBST. R. 25.101(b)(3)(B) defines the criteria as follows:

(B) Routing: An application for a new transmission line shall address the criteria in PURA §37.056(c) and considering those criteria, engineering constraints, and costs, the line shall be routed to the extent reasonable to moderate the impact on the affected community and landowners unless grid reliability and security dictate otherwise. The following factors shall be considered in the selection of the utility's alternative routes unless a route is agreed to by the utility, the landowners whose property is crossed by the proposed line, and owners of land that contains a habitable structure within 300 feet of the centerline of a transmission project of 230 kV or less, or within 500 feet of the centerline of a transmission project greater than 230 kV, and otherwise conforms to the criteria in PURA §37.056(c):

- (i) whether the routes utilize existing compatible rights-of-way, including the use of vacant positions on existing multiple-circuit transmission lines;
- (ii) whether the routes parallel existing compatible rights-of-way;
- (iii) whether the routes parallel property lines or other natural or cultural features; and
- (iv) whether the routes conform with the policy of prudent avoidance.

The criteria considered during the routing analysis included the PUC criteria as well as other routing and siting criteria commonly used for siting linear utility infrastructure projects. All criteria considered are listed below. Some of these criteria are considered in the routing process for centerline placement, but not necessarily quantified, such as direct obstructions from existing infrastructure or utilities. In addition, it should be noted that some of the criteria listed below were found not to apply to the alternative routes or the project study area and were therefore not included in the final quantified analysis, as described further on in this chapter.

### **Routing Criteria**

- Number of habitable structures within 300 feet of segment centerline;
- Number of AM towers within 10,000 feet of segment centerline;
- Number of FM, microwave, cell and other electronic installations within 2,000 feet of segment centerline;

- Number of private airstrips and FAA-registered airstrips with runways shorter than 3,200 feet within 10,000 feet of centerline;
- Number of FAA-registered airstrips with at least one runway longer than 3,200 feet within 20,000 feet of centerline;
- Number of heliports within 5,000 feet of centerline;
- Number of center-pivot and rolling irrigation systems crossed;
- Number of parks and recreational areas (owned by a governmental body or an organized group, club, or church) within 1,000 feet of centerline;
- Route length;
- Length of route parallel to existing transmission lines;
- Length of route parallel to existing roads;
- Length of route parallel to existing railroads;
- Length of route parallel to existing distribution lines;
- Length of route parallel to oil and gas transmission lines;
- Percent of route parallel to linear rights of way (transmission lines, roads, railroads, distribution lines, and oil and gas transmission lines).
- Length of route using existing right of way;
- Number of transmission lines crossed;
- Adjacency to schools, nursing homes, or hospitals;
- Obstructions such as oil wells, water wells, and windmills;
- Number of county or local roads crossed;
- Number of U.S. highways crossed;
- Number of State highways or loops crossed;
- Number of railroads crossed;
- Length crossing cultivated crops (potentially irrigated manually or by truck);
- Length of route parallel to streams;
- Length crossing NWI wetlands/playas;
- Length of route within foreground (1/2-mile) of U.S. or state highways;
- Length of route within foreground (1/2-mile) of parks and recreation facilities;
- Length parallel to property lines not already paralleling other ROWs;
- Number of recorded cultural sites crossed (or historic/prehistoric);
- Number of cultural sites or areas with high archaeological/historic site potential within 1000 feet of route centerline; and
- ROW and construction costs.



### **2.3.4 Preliminary Alternative Routes**

Initially, SPS had identified four potential end-to-end routes between the existing Ochiltree and Lipscomb Substation sites. These four routes followed existing linear corridors and included routes further north and south of these corridors to broaden the range of alternatives to consider. Using this as a starting point, LSD conducted a field investigation and identified a number of other potential route segments within the project Study Area that would link to form end-to-end alternative routes. These initial route segments were laid out in areas of greatest opportunity, such as following existing roads and other linear features (e.g., distribution and transmission lines, abandoned railroad ROW), while minimizing conflicts with potential land use constraints listed in the criteria above. A map of the preliminary route segments was developed and shared with the public in the project notice letters and again at the public open-house meeting. Refer to Figure 2-1 (enclosed in map pocket) and Section 5.3 for a description of the public participation effort.

There were initially a total of 89 segments included in the Preliminary Route Segments map. LSD evaluated the preliminary route segments, taking into consideration the routing criteria listed in Section 2.3.3, and public input from the October 30, 2012 open-house meeting and questionnaires that were returned by the public following the meeting. Engineering, land use, and environmental constraints data was quantified for each of the segments. Refer to Appendix A, Table A-1 for the quantitative data associated with the original set of preliminary route segments in relation to routing criteria. After quantifying the routing criteria for the initial set of segments, the analysis focused on identifying which segments should be dropped due to constraints or route redundancy. A number of segments were dropped from the original Preliminary Route Segment Map (Figure 2-1), based on input from public officials, the attendees at the open house meeting, and review of the quantitative routing criteria data for each segment. Refer to Appendix A for a summary of the segments removed during the early stages of the analysis.

After the removal of dropped and unused segments, LSD identified a preliminary set of 14 end-to-end route alternatives using the remaining 67 segments. Refer to Appendix A, Table A-2 for a list of these preliminary route segments and segment combinations, along with Figures A-1 to A-3 (Appendix A) for schematics of these initial routes. The quantitative routing data for the initial 14 routes were evaluated and compared to identify seven reasonable end-to-end routes to carry forward into this analysis. Refer to Appendix A, Table A-4 for the quantitative data and comparative analysis of the initial 14 routes.

### **2.3.5 Identification of Top Seven Alternative Routes**

Seven alternative routes were selected from the preliminary set of 14 end-to-end routes, based on a review of the PUC criteria, other routing criteria, and associated engineering, land use and environmental data. Four alternative routes were selected from the central part of the project Study Area, providing the shortest and most direct routes between the Ochiltree and Lipscomb Substations. In an effort to provide a reasonable range of alternatives from a geographic perspective, two routes were selected from the northern portion of the project Study Area and one route was selected from the southern portion of the project Study Area. Refer to Figure 2-2 for a schematic of the seven end-to-end

route alternatives: Alternative Routes 1, 2, 3, 4, 5, 6, and 7. These seven routes are reflected as Routes 1, 2, 3, 4, 5, 6, and 13 in Appendix A. "Route 13" was renamed to "Route 7" once seven routes were selected to carry forward into this route analysis and environmental assessment.

The top seven routes were quantitatively compared using the routing criteria to determine which route or routes had the least constraints and the greatest opportunities, before evaluating them further for environmental impacts. Some of the criteria did not apply to the final set of seven routes and were therefore removed from the final table: 1) length parallel to oil and gas lines was removed since the final set of routes do not parallel any main transmission lines but rather cross them in a few areas; 2) number of railroads crossed was removed since none of the routes cross an active railroad, only the abandoned railroad ROW; 3) number of school structures within 300-feet of centerline; 4) number of private airstrips and FAA-registered airstrips with runways shorter than 3,200 feet within 10,000 feet of centerline; 5) number of heliports within 5,000 feet of centerline; 6) length parallel to streams since there are a number of small stream crossings but none of the seven routes parallel a stream; and 7) number of recorded cultural sites crossed since the closest recorded site is well outside any of the alternative route ROWs. Refer to Tables 2-2 and 2-3 for this analysis.

As Table 2-2 shows, Alternative Routes 1, 5, and 6 had the best rankings with a total of ten or eleven "best" scores, compared with Routes 2, 3, 4, and 7 that all had between five and seven "best" scores. Routes 1 and 6 had the same number of "moderate" scores at four each and Route 5 had six "moderate" scores. While Route 6 has a slightly higher number of "best" scores than Route 1, and Route 5 has a higher number of "moderate" scores than Route 1, Route 1 was deemed better than Routes 5 or 6 for two main reasons. First, it uses existing abandoned railroad ROW for 59% of its length, compared to 0% for Routes 5 and 6. Second, it has the greatest length of route paralleling other linear ROWs at 97% of its route, compared to 59% for Routes 5 and 6. As a result, Route 1 would minimize encroachment into the edge of cultivated croplands. Further, Route 1 ranks better in length as it is 2.6 to 3.6 miles shorter than Routes 5 and 6. Route 1 was estimated to have the lowest cost compared to the other six routes. Route 1 does impact more habitable structures (66) than Routes 5 and 6 (32 and 36, respectively). The other key difference between Route 1 and Routes 5 and 6 is that it has a much greater length of route within the foreground of U.S. and state highways. This resulted in a "worst" score for that criteria; however, as described in Section 4.6.2, the majority of that length is along SH 15 and the impacts to motorist views are not considered to be significant. Overall, the rankings for Route 1 were deemed to outweigh the rankings of Routes 5 and 6.

Following Routes 1, 6, and 5, Route 2 results in seven "best" scores, slightly better than Routes 3 and 4. As described further in the environmental analysis in Chapters 3 and 4, Route 2 would have the greatest potential impact to playas, crossing two large playas totaling 9,131 linear feet along Segments L and W. While Route 2 is longer than Routes 3 and 4, the construction costs associated with Route 2 would be higher due to special construction measures and materials required when placing foundations within playa inundation limits. Alternatively, Route 2 would impact substantially fewer habitable structures than Routes 3 and 4, at 25 structures versus 71 and 64 structures for Routes 3 and 4, respectively. Routes 3 and 4 have similar rankings, with Route 4 being slightly better than Route 3 by having eight "moderate" scores compared to seven with Route 3. Routes 3 and 4 are also similar in length and associated costs. Route 7 ranks the worst out of all seven routes, with a total of only five "best" scores

and eleven "worst" scores. Route 7 is the longest route, at almost eight miles longer than Route 1, has the highest number of road crossings, has three center-pivot irrigation systems that fall within the 70-foot ROW, 60 habitable structures within 300-feet, crosses a number of small to moderate sized playas, and is the most expensive. The following is the preliminary ranking of the top seven routes, from best to worst, before further evaluating for potential environmental effects in Chapters 3 and 4:

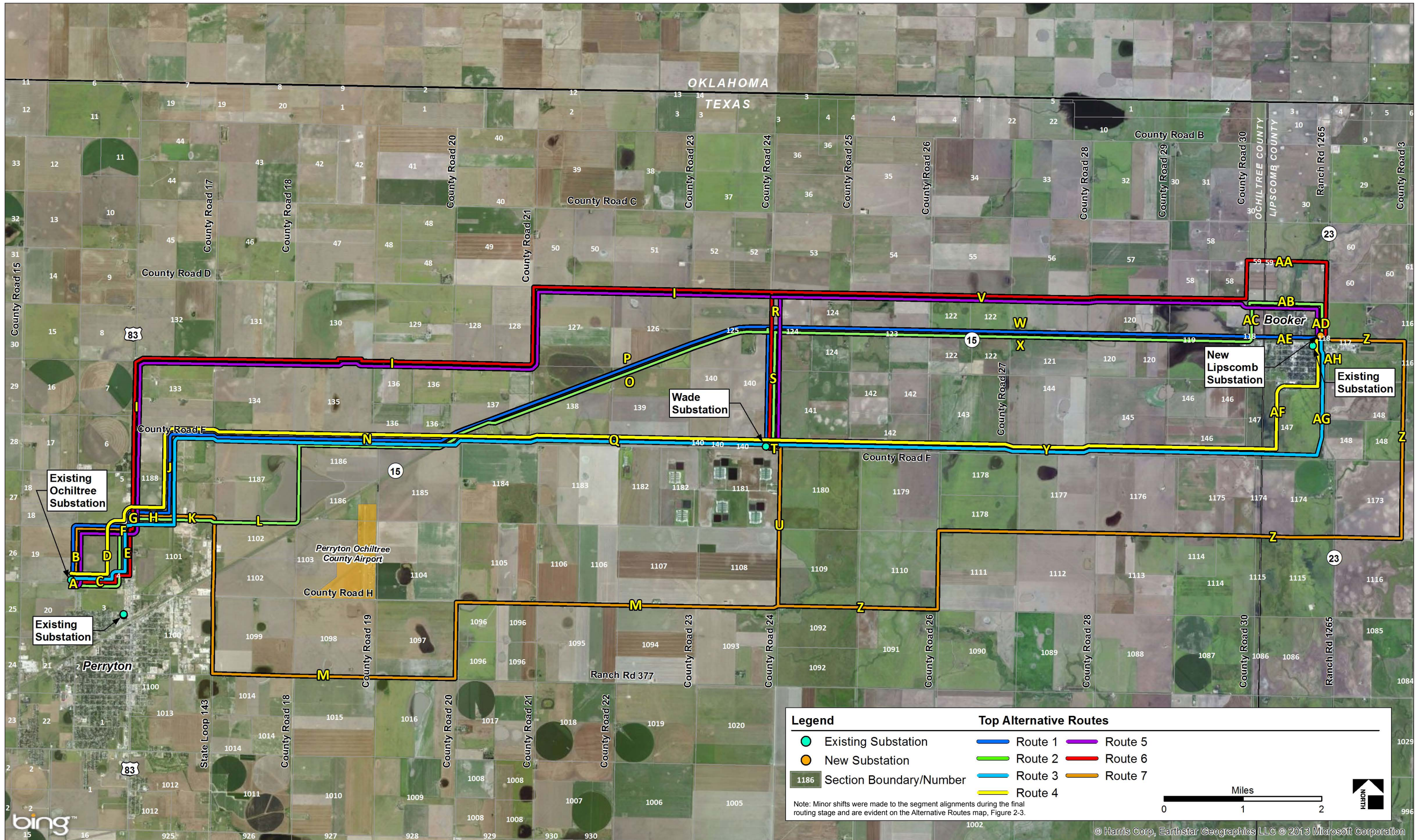
- Route 1;
- Route 6;
- Route 5;
- Route 2;
- Routes 3 and 4; and
- Route 7.

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## **Figure 2-1. Preliminary Route Segments (pocket map)**

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Table 2-2. Quantitative Comparison of Top Seven Routes

Route Number	1	2	3	4	5	6	7
Criteria							
Route Length							
Route Length (Miles)	19.51	20.57	19.24	19.29	22.12	23.13	27.34
Engineering (Length measured in feet)							
Length Parallel to Existing Transmission	27,037	12,588	71,747	71,747	3,586	3,006	4,469
Length Parallel to Existing Roads	72,426	65,477	40,424	38,121	39,534	39,533	74,451
Length Parallel to Existing Distribution Lines	1,327	4,969	1,065	1,065	8,441	11,137	8,235
Length Parallel to Existing Railroad ROW	60,311	53,148	0	0	0	0	6,069
A. Length Parallel to Property Lines Not Already Paralleling other ROWs (roads, RR, utilities)	3,411	11,435	2,820	7,489	47,619	45,886	3,411
B. Length Not Paralleling ROWs or Property Lines (i.e., crossing parcels)	0	3,633	874	3,633	0	4,545	8,946
% Parallel to linear ROWs (TLs, DLs, Roads, RRs) = Total Route Length Minus A + B	97%	86%	96%	89%	59%	59%	91%
Use of Existing ROW (percentage of total route)	59%	0%	0%	0%	0%	0%	0%
Crossings							
Number of Transmission Lines Crossed	2	2	2	2	0	0	2
Number of County and Local Roads Crossed	13	13	14	14	13	13	16
Number of US and State Highways Crossed	3	3	6	6	3	3	6
Habitable Structures (within 300 ft)							
All Structures (Residential, Commercial, Industrial, Other)	66	25	71	64	32	36	60
Communication Structures (distance in feet from center line)							
AM Towers (within 10,000')	2	2	2	2	1	1	2
FM, Microwave, Cell, and Other Electronic Installations (within 2,000')	1	1	1	1	1	1	1
FAA Registered Airports with Runway >3,200' (20,000')	1	1	1	1	1	1	1
Biological, Cultural and Visual Resources							
Length of ROW within NWI Wetlands (feet) - Includes Playas	4,942	9,131	697	697	3,821	3,821	6,279
Cultural Resources or Areas of High Archaeological/Historic Site Potential (within 1,000' of centerline)	4	1	4	3	0	0	2
Cemetery (within 1,000' of centerline)	0	0	1	0	0	0	0
Length of Route CL within foreground (1/2-mile) of U.S. and State Highways (feet)	74,920	84,236	22,931	23,612	12,516	11,902	31,158
Length of Route CL within foreground (1/2-mile) of Parks & Recreation Facilities (feet)	13,558	17,505	8,987	8,987	8,633	6,761	7,662
Agriculture							
Length Across Cultivated Crops (feet)	32,410	58,437	73,155	70,286	78,088	81,624	76,799
Number of Center Pivots Irrigation within ROW	0	0	2	2	0	0	3
Parks and Recreation							
Number of Parks & Recreation Areas (Gov Owned, Churches, Private Clubs) within 1,000' of CL	2	2	1	1	1	0	1
Costs							
Estimated Construction and ROW Costs - TL and Substations	\$16,721,724	\$18,340,794	\$17,088,987	\$17,015,975	\$17,821,205	\$18,452,005	\$20,584,109

1. Criteria excluded that did not apply: 1) length parallel to oil and gas lines; 2) number of railroads crossed; 3) number of school structures within 300-feet of centerline; 4) number of private airstrips and FAA-registered airstrips with runways shorter than 3,200 feet within 10,000 feet of centerline; 5) number of heliports within 5,000 feet of centerline; 6) length parallel to streams; and 7) number of recorded cultural sites crossed.

Best

Moderate

Worst

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**Table 2-3. Quantitative Ranking Categories**

<b>Criteria</b>	<b>Best</b>	<b>Moderate</b>	<b>Worst</b>
Route Length (Miles)	19.24 - 20.57	22.12 - 23.22	25.35 - 27.34
Total % Parallel to Linear ROWs (includes TLs, DLs, Roads, RRs)	> 90%	70-89%	50-69%
Use of Existing ROW (% of route)	> 50%	25-49%	< 25%
Number of Transmission Lines Crossed	0	1	2
Number of County and Local Roads Crossed	13	14	16
Number of US and State Highways Crossed	3	5	6
Habitable Structures within 300-feet of CL (Residential, Commercial, Industrial, Other)	0-25	26-50	51-75
AM Towers within 10,000' of CL	1	2	-
FM, Microwave, Cell and Other Electronic Installations within 2,000' of CL	1	2	-
FAA Registered Airports with Runway >3,200' within 20,000' of CL	0	1	-
Length within NWI Wetlands (feet) - Includes Playas	< 3,000	3,000-6,000	> 6,000
Cultural Resources or Areas of High Archaeological/Historic Site Potential (within 1,000')	0	1-2	3-4
Cemetery (within 1,000')	0	1	-
Length of Route CL within foreground of U.S. and State Highways (ft)	0-15,000	15,100-30,000	> 30,000
Length of Route CL within foreground of Parks & Recreation Facilities (ft)	0-10,000	10,100-15,000	>15,000
Length Across Cultivated Crops (feet)	< 49,000	49,100 - 65,499	> 65,500
Number of Center Pivots Irrigation within ROW	0-1	2	3
No. of Parks & Recreation Areas (Gov Owned, Churches, Private Clubs) within 1,000' of CL	0	1	2
Construction and ROW costs (transmission and substations)	< \$17 million	\$17 to \$18 million	> \$18 million

The top seven route alternatives, consisting of 36 segments, are listed below in Table 2-4 and shown in the detailed map for the alternative routes (Figure 2-3, enclosed in map pocket). The alternative route segments are described in detail below.

**Table 2-4. Top Seven Alternative Routes and Associated Route Segments**

<b>Route Number</b>	<b>Segments</b>
1	A, B, F, G, H, J, N, O, S, X, AE, AJ
2	A, C, D, F, G, H, K, L, N, P, S, W, AC, AB, AD
3	A, C, E, G, H, J, N, Q, T, Y, AG, AH, AI, AJ
4	A, C, D, F, G, H, J, N, Q, T, Y, AF, AH, AI, AJ
5	A, B, F, G, I, R, S, V, AB, AD
6	A, C, E, G, I, R, S, V, AA, AD
7	A, B, F, G, H, K, M, U, T, Z, AI, AJ

## **Segment Descriptions**

### ***Segment A***

Segment A originates at the existing Ochiltree Substation, near the southeast corner of Section 19, and extends east approximately 262 feet following the southern section boundary of Section 19. Before terminating, Section A crosses the east boundary of Section 19 into the southwest corner of Section 4. Segment A terminates at the intersection with Segments B and C in the southwest corner of Section 4. Segment A parallels an existing 115-kV transmission line.

### ***Segment B***

Segment B originates at the intersection of Segments A, B and C in the southwest corner of Section 4 and extends north for approximately 3,582 feet, paralleling the Section 4's western section line. Segment B parallels the east side of an existing 230-kV transmission line for approximately 3,296 feet of this stretch before it turns directly east at the intersection of Sections 18, 19, 4 and 5. From this point, Segment B extends approximately 2,779 feet east, paralleling the south side of the northern boundary of Section 4 until it terminates at the intersection of Segments B, D and F approximately 900 feet west of U.S. 83. The total length of Segment B is 6,230 feet.

### ***Segment C***

Segment C originates at the intersection of Segments A, B and C in the southwest corner of Section 4 and extends directly east, following the north side of the southern section boundary of Section 4, for approximately 2,761 feet before turning north. This first portion of Segment C (2,761 feet) parallels an existing 115-kV transmission line. Segment C then extends approximately 475 feet north, terminating at the intersection of Segments C, D and E approximately 900 feet west of U.S. 83.

### **Figure 2-3. Alternative Routes (pocket map)**

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### ***Segment D***

Segment D originates at the intersection of Segments C, D and E in the southeast quadrant of Section 4. The intersection of these three segments is approximately 900 feet west U.S. 83, and approximately 970 feet north of an unnamed east-west dirt road. Segment D extends approximately 3,160 feet directly north before it terminates at the intersection of Segments B, D and F, approximately 900 feet west of the western edge of U.S. 83.

### ***Segment E***

Segment E originates at the intersection of Segments C, D and E in the southeast quadrant of Section 4. The intersection of these three segments is approximately 900 feet west of U.S. 83, and approximately 970 feet north of an unnamed east-west dirt road. Segment E extends approximately 847 feet directly east before turning north on the west side of U.S. 83. Segment E extends directly north for 3,078 feet, paralleling the west side of U.S. 83 until it terminates at the intersection of Segments E, F and G, also on the west side of U.S. 83, in the northeast corner of Section 4.

### ***Segment F***

Segment F originates at the intersection of Segments B, D and F, in the northeast quadrant of Section 4, approximately 900 feet west of U.S. 83. Segment F extends approximately 833 feet directly east, paralleling the northern boundary of Section 4, and terminating at the intersection of Segments E, F and G on the west side of U.S. 83 in the northeast corner of Section 4.

### ***Segment G***

Segment G originates at the intersection of Segments E, F and G in the northeast corner of Section 4, on the west side of U.S. 83. Segment G extends approximately 177 feet directly east, crossing U.S. 83. On the east side of U.S. 83, Segment G is within the northwest corner of Section 1101. Segment G then turns north, paralleling the east side of the highway for approximately 790 feet before extending another 178 feet, crossing over State Loop 143 and terminating at the intersection of Segments G, H and I in the southwest corner of Section 1188. The total length of Segment G is approximately 1,105 feet.

### ***Segment H***

Segment H originates at the intersection of Segments G, H and I in the southwest corner of Section 1188, east of U.S. 83 and north of State Loop 143. Segment H extends approximately 95 feet in a southeast direction, before turning directly east, paralleling the north side of State Loop 143 and the southern boundary of Section 1188, for approximately 2,540 feet before terminating at the intersection of Segments H, J and K, at approximately the midpoint of the southern boundary of Section 1188, and on the west side of the north-south existing 66-kV transmission line, and east of a north-south dirt access road to an oil well.

### ***Segment I***

Segment I originates at the intersection of Segments G, H and I in the southwest corner of Section 1188, east of U.S. 83 and north of State Loop 143. Segment I extends approximately 3,124 feet directly north, paralleling the east side of U.S. 83 before crossing an unnamed small stream. Segment I continues north, paralleling the highway for another 1,992 feet before crossing CR F. Segment I continues north,

across CR F, entering the southwest corner of Section 133 and extending 5,221 feet, until it reaches about 100 feet south of the northern boundary, in the northwest corner of Section 133 where it angles approximately 340 feet in a northeast direction, until it crosses into the southwest corner of Section 132. From this point, Segment I parallels the southern boundary of Sections 132, 131 and 130 for approximately 12,752 feet. Beginning at the approximate midpoint of the southern boundary of Section 130, Segment I parallels the north side of the beginning of CR E and angles slightly northeast for approximately 426 feet, and then turns directly east extending approximately 1,812 feet before crossing into the southwest corner of Section 129. Segment I continues extending east another 680 feet before angling slightly southeast for about 177 feet back to the north side of the section line, in order to avoid industrial storage tanks and tank batteries. Segment I parallels the north side of CR E, extending approximately 4,486 feet east, paralleling the southern boundary of Section 129 before crossing CR 20. Segment I continues directly east 5,307 feet paralleling the southern boundary of Section 128 and the north side of CR E, until it crosses CR 21 and enters the southwest corner of Section 127. Segment I turns directly north, paralleling the east side of CR 21, and the western boundary of Section 127 for 5,214 feet before turning east at the intersection of Sections 49, 128, 50 and 127. Segment I extends east 10,559 feet, within and paralleling the northern boundaries of Sections 127 and 126 before crossing CR 23 and entering the northwest corner of Section 125. Segment I continues east another 5,321 feet paralleling the southern side of the northern boundary of Section 125 before crossing CR 24. Segment I extends approximately 70 feet east of CR 24 and terminates at its intersection with Segments R and V in the northwest corner of Section 124. The total length of Segment I is approximately 57,481 feet (11 miles).

### ***Segment J***

Segment J originates at the intersection of Segments H, J and K, on the north side of State Loop 143, between U.S. 83 and CR 17, at approximately the midpoint along the southern boundary of Section 1188. Segment J extends approximately 2,351 feet directly north, through the middle of Section 1188, paralleling the west side of an existing 66 kV transmission line and an improved, man-made drainage channel, until it reaches a small unnamed stream that is a tributary to the man-made channel. The man-made channel stops at this intersection with the stream. Segment J extends north, crossing the small stream, for approximately 2,843 feet before crossing CR F. Segment J extends another 87 feet north, crossing the road and entering Section 133 before turning east. Segment J extends 2,622 feet east, paralleling the north side of CR F, the southern boundary of Section 133, and the existing 66-kV transmission line before crossing CR 17 and entering the southwest corner of Section 134. At this point, Segment J continues east another 182 feet before turning south and extending approximately 137 feet, crossing the existing 66-kV transmission line and CR F, entering the northwest corner of Section 1187. From this point, Segment J turns directly east and extends another 5,374 feet east, paralleling the south side of CR F, and the northern boundary of Section 1187 until it terminates at the intersection of Segments J, L and N in the northeast corner of Section 1187. The total length of Segment J is approximately 13,596 feet (2.5 miles).

### ***Segment K***

Segment K originates at the intersection of Segments H, J and K, on the north side of State Loop 143, between U.S. 83 and CR 17, at approximately the midpoint along the southern boundary of Section 1188. Segment K extends approximately 150 feet east, crossing an existing 66-kV transmission line and an improved, man-made drainage channel, before continuing east another 2,551 feet paralleling the southern boundary of Section 1188 and the north side of State Loop 143, except the final 744 feet where



State Loop 143 turns south. At approximately 75 feet west of CR 17, Segment K angles in a southeast direction for 210 feet, crossing CR 17 and terminating inside the northwest corner of Section 1102 at the intersection of Segments K, L and M. The total length of Segment K is approximately 2,911 feet.

### ***Segment L***

Segment L originates at the intersection of Segments K, L and M in the northwest corner of Section 1102. Segment L extends 5,351 feet directly east, following the northern boundary of Section 1102. At the intersection of Sections 1187, 1102, 1186, and 1103, Segment L turns north, extending approximately 5,230 feet north, following the eastern boundary of Section 1187 and crossing approximately 3,800 feet of a seasonal playa, before terminating at the intersection of Segments J, L and N on the south side of CR F in the northeast corner of Section 1187. The total length of Segment L is 10,581 feet (2 miles).

### ***Segment M***

Segment M originates at the intersection of Segments K, L and M in the northwest corner of Section 1102. Segment M extends approximately 279 feet at a slight southeast angle away from CR 17 before turning and angling southwest for about 555 feet back toward State Loop 143. From this point Segment M extends 2,869 feet directly south, paralleling the east side of the western boundary of Section 1102 and the east side of State Loop 143 before it crosses the railroad ROW (abandoned rail line) and SH 15. Segment M extends another 189 feet south crossing the railroad ROW and SH 15 ROW before entering the southwest quadrant of Section 1102. Segment M continues south another 1,297 feet, paralleling the east side of the western boundary of Section 1102 and the east side of State Loop 143/East Loop Road (south of SH 15, this road has two names) before it turns directly east on the north side of CR H. Segment M extends approximately 346 feet east before turning south for another 70 feet, crossing CR H and entering the northwest corner of Section 1099. From this point Segment M extends approximately 3,084 feet south, passing the edge of one seasonal playa before it angles for about 567 feet in a southwest direction back toward State Loop 143/East Loop Road, crossing a second seasonal playa. Segment M extends directly south for another 1,651 feet, paralleling the east side of the western boundary of Section 1099 and the east side of State Loop 143/East Loop Road before it turns east at the southwest corner of Section 1102, north of RR 377. From this point, Segment M extends approximately 16,193 feet directly east, paralleling the north side of RR 377 and the southern boundaries of Sections 1099, 1098 and 1097, before turning north on the west side of CR 20. Segment M spans two small seasonal playas (1,000 feet and 794 feet span width) and crosses by the edge of a third small playa along this stretch of the route. Segment M extends approximately 5,143 feet north, paralleling the west side of CR 20 and the eastern boundary of Section 1097 before turning east just south of CR H. Segment M crosses CR 20, entering the northwest corner of Section 1096, and extends 5,259 feet east, spanning approximately 1,300 feet of a seasonal playa, paralleling the south side of CR H and the northern boundary of Section 1096. Segment M continues east, crossing CR 21, for approximately 10,669 feet paralleling the south side of CR H and the northern boundaries of Sections 1095 and 1094. Segment M continues east crossing CR 23 and extending another 1,307 feet before crossing a small unnamed stream. Segment M continues to extend east, paralleling the south side of CR H and northern boundary of Section 1093 for approximately 3,486 feet before angling in a northeast direction for 324 feet, crossing CR 24 and CR H and terminating at the intersection of Segments M, U and Z in the southwest corner of Section 1109. The total length of Segment M is 53,100 feet (10 miles).

### ***Segment N***

Segment N originates at the intersection of Segments J, L and N, on south side of CR F in the northwest corner of Section 1186. Segment N extends directly east approximately 9,840 feet, paralleling the south side of CR F and the south side of the northern boundary of Sections 1186 and 1185, before terminating at the intersection of Segments N, O, P and Q on the north edge of the railroad ROW and north of SH 15 in northeast half of Section 1185. The total length of Segment N is 9,711 feet.

### ***Segment O***

Segment O originates at the intersection of Segments N, O, P and Q in the northeast half of Section 1185, on the north edge of the railroad ROW, north of SH 15 and south of CR F. Segment O follows the railroad ROW (abandoned rail line) in a northeast direction. Segment O extends approximately 90 feet before crossing the existing 66-kV transmission line, then continues another 75 feet before crossing CR F and entering the southeast corner of Section 136. Segment O extends approximately 561 feet before crossing CR 20 and entering the southwest corner of Section 137. After crossing CR 20, Segment O extends 5,685 feet in a northeast direction, staying within the railroad ROW, paralleling the north side of SH 15. Segment O crosses CR 21, entering Section 138 at approximately the midpoint on the section's western boundary, and continues in a northeastern direction within the railroad ROW, north of SH 15, for another 5,707 feet before crossing into the northwest corner of Section 139. Segment O stays within the railroad ROW, extending to the northeast another 1,843 feet before entering the southern portion of Section 126. Segment O extends approximately 3,914 feet across Section 126 before crossing CR 23 and entering Section 125 at its western section boundary in the southwest quadrant. Segment O remains within the railroad ROW, extending northeast 5,549 feet before crossing CR 24. Approximately 1,900 feet west of CR 24, Segment O makes a slight southerly bend, heading directly eastward. Segment O extends east 75 more feet before terminating at the intersection of Segments O, P, R, W, X and S on the east side of CR 24 and north of SH 15, just inside the midpoint on the western boundary of Section 124. The total length of Segment O is 23,486 feet (4.5 miles).

### ***Segment P***

Segment P originates at the intersection of Segments N, O, P and Q in the northeast half of Section 1185, on the north edge of the railroad ROW and north of SH 15, south of CR F. Segment P extends north approximately 37 feet before crossing the existing 66-kV transmission line and then another 46 more feet north crossing CR F, entering the southeast corner of Section 136. Segment P continues extending north approximately 68 feet before turning to the northeast. Segment P extends northeast approximately 653 feet before crossing CR 20 and entering the southeast corner of Section 136. Approximately 73 feet east of CR 20, Segment P angles north another 20 degrees and extends approximately 3,220 feet around the north side of the grain facility and turning back southeast to the north boundary of the railroad ROW. From this point, Segment P extends 2,618 feet northeast along the north side of the railroad ROW, within Section 137 before crossing CR 21 and entering Section 138 at approximately the midpoint on the section's western boundary. Segment P continues in a northeast direction on the north side of the railroad ROW and north of SH 15 for another 5,743 feet before crossing into the northwest corner of Section 139. Segment P continues to parallel the north side of the railroad ROW, extending to the northeast another 1,391 feet before entering the southern portion of Section 126. Segment P extends approximately 4,287 feet across Section 126 before crossing CR 23 and entering Section 125 at its western section boundary in the southwest quadrant. Segment P continues to parallel the north side of the railroad ROW, extending northeast for 3,562 feet, slightly

bending south and heading another 1,854 feet directly east before angling southeast for 166 feet, crossing CR 24, and terminating at the intersection of Segments O, P, R, W, X and S on the east side of CR 24 and north of SH 15, just inside the midpoint on the western boundary of Section 124. The total length of Segment P is 23,645 feet (4.5 miles).

### ***Segment Q***

Segment Q originates at the intersection of Segments N, O, P and Q in the northeast half of Section 1185, on the north edge of the railroad ROW and north of SH 15, south of CR F. Segment Q extends approximately 270 feet directly east crossing the railroad ROW and SH 15, paralleling the south side of CR F and the existing 66-kV transmission line. Segment Q continues east another 982 feet, paralleling the south side of the northern boundary of Section 1185, the 66-kV transmission line and the south side of CR F before crossing CR 20 and entering the northwest corner of Section 1184. Segment Q extends directly east for approximately 4,711 feet, paralleling the south side of CR F, along the northern section boundary of Section 1184, before angling northeast for 490 feet, crossing CR F and the existing 66-kV transmission line, entering the southwest corner of Section 138. Segment Q continues east, paralleling the north side of CR F and the existing 66-kV transmission line, along the southern section line of Section 138, for approximately 4,823 feet before entering the southwest corner of Section 139. Segment Q continues extending east on the north side of CR F, paralleling the 66-kV transmission line and southern boundary of Section 130 for 5,244 feet before crossing into the southwest corner of Section 140. From this point, Segment Q extends directly east for approximately 5,272 feet, paralleling the existing 66-kV transmission line, the north side of CR F and the southern boundary of Section 140 until it reaches the Wade Substation and terminates at the intersection of Segments Q, S and T west of CR 24 and north of CR F. The total length of Segment Q is 21,792 feet (4.1 miles).

### ***Segment R***

Segment R originates at the intersection of Segments I, R and V in the northwest corner of Section 124, east of CR 24. Segment R extends approximately 2,551 feet directly south, paralleling the east side of CR 24 and the western boundary of Section 124 before it terminates at the intersection of Segments R, P, O, W, X and S on the north side of SH 15 and east of CR 24.

### ***Segment S***

Segment S originates at the intersection of Segments R, P, O, W, X and S on the north side of SH 15 and east of CR 24, at approximately the midpoint on the western boundary of Section 124. Segment S extends approximately 219 feet south crossing the railroad ROW (abandoned) and SH 15 before entering the southwest quadrant of Section 124. Segment S continues extending south approximately 2,547 feet, paralleling the east side of CR 24 and the western boundary of Section 124 before it enters into Section 141. Segment S continues south 2,951 feet, paralleling the east side of CR 24 and the western boundary of Section 141 before it crosses a stream. From this point, Segment S continues south another 2,023 feet before it angles to the southwest for approximately 116 feet, crossing CR 24 and terminating at the intersection of Segments Q, S and T at the Wade Substation. The total length of Segment S is 7,856 feet.

### ***Segment T***

Segment T originates at the Wade Substation in the southeast corner of Section 140, at the intersection of Segments Q, S and T. Segment T extends directly east, crossing CR 24, paralleling the north side of CR F and the existing 66-kV transmission line for 845 feet until it terminates at the intersection of Segments T, U and Y in the southwest corner of Section 141.

### ***Segment U***

Segment U originates at the intersection of Segments T, U and Y in the southwest corner of Section 141, on the north side of CR F. Segment U extends south approximately 277 feet, crossing the existing 66-kV transmission line and CR F before entering the northwest corner of Section 1180. At this point, Segment U continues extending south another 5,082 feet, paralleling the east side of CR 24 and western boundary of Section 1180 until it crosses into Section 1109. Segment U continues south another 742 feet, before crossing a stream. From this point, Segment U extends another 4,299 feet, paralleling the east side of CR 24 and the western boundary of Section 1109 before terminating at the intersection of Segments U, M and Z in the southwest corner of Section 1109, north of CR H and east of CR 24. The total length of Segment U is 10,400 feet (1.9 miles).

### ***Segment V***

Segment V originates at the intersection of Segments I, R and V in the northwest corner of Section 124, east of CR 24. Segment V extends directly east, paralleling the south side of the northern boundary of Section 124, for approximately 5,187 feet before crossing CR 25. Segment V spans a small seasonal playa for a width of approximately 706 feet, just to the east of CR 24. Segment V extends another 5,289 feet east, crossing CR 25, entering the northwest corner of Section 123 and continuing east paralleling the south side of the northern boundary of Section 123 before crossing CR 26. Segment V continues east, crossing CR 26 and entering the northwest corner of Section 122, extending approximately 5,298 feet across the south side of the northern boundary of Section 122 before entering the northwest corner of Section 121. Segment V crosses another small seasonal playa along this stretch of Section 122, with a width of approximately 600 feet. Segment V continues east, paralleling the south side of the northern boundary of Section 121 for another 5,301 feet. Segment V crosses CR 28 and then angles in a northeast direction for approximately 553 feet, crossing CR D and entering the southwest corner of Section 57, before turning due east. From this point, Segment V continues east, paralleling the north side of CR D and the southern boundary of Section 57 for approximately 4,741 feet. Segment V crosses CR 29 into the southwest corner of Section 58 and continues to parallel the north side of CR D for approximately 5,221 feet before terminating at the intersection of Segments V, AA, AB and AC on the northwest corner of the intersection of CR D and CR 30, in the southeast corner of Section 58. The total length of Segment V is 31,590 feet (6 miles).

### ***Segment W***

Segment W originates at the intersection of Segments R, P, O, W, X and S on the north side of SH 15 and east of CR 24, at approximately the midpoint on the western boundary of Section 124. Segment W extends northeast for approximately 133 feet before turning directly east, paralleling the north side of SH 15, and abutting the northern edge of the railroad ROW for its entire length. Segment W extends approximately 5,130 feet through the middle of Section 124 before crossing CR 25. Segment W crosses CR 25, entering the middle of Section 123, extending another 5,337 feet before crossing CR 26. Segment W continues directly east, crossing CR 26 and cutting through the middle of Section 122 for

approximately 607 feet before crossing a small unnamed stream. Segment W continues extending another 4,722 feet east before crossing into midpoint of the western boundary of Section 121. Segment W extends approximately 507 feet into Section 121 before crossing a small unnamed stream. Segment W continues east another 835 feet crossing two more sections of the same stream. Segment W continues east for approximately 3,960 feet before crossing CR 28. Segment W crosses CR 28, entering the middle of Section 120, and extends approximately 1,823 feet before crossing an unnamed stream. Segment W continues east another 3,543 feet before entering the middle of Section 119 and crossing a stream that connects the playa on the north side of SH 15 to a playa located south of the highway. Segment W extends about 537 feet east before crossing a large playa. Segment W is located on the north side of the railroad ROW. Segment W would cross approximately 4,550 feet of the playa before crossing another 82 feet of non-playa lands and angling 160 feet southeast, crossing CR 30 and terminating at the intersection of Segments W, X, AE and AC on the northeast corner of the intersection of CR 30 and SH 15, at approximately the midpoint along the western boundary of Section 118. The total length of Segment W is 31,926 feet (6 miles).

### ***Segment X***

Segment X originates at the intersection of Segments R, P, O, W, X and S on the north side of SH 15 and east of CR 24, at approximately the midpoint on the western boundary of Section 124. Segment X extends directly east, within and following the existing railroad ROW (abandoned) for its entire length, like Segment O. Segment X extends approximately 5,216 feet through the middle of Section 124 before crossing CR 25. Segment X crosses CR 25, entering the middle of Section 123, extending another 5,337 feet before crossing CR 26. Segment X continues directly east, crossing CR 26 and cutting through the middle of Section 122 for approximately 607 feet before crossing a small unnamed stream. Segment X continues extending another 4,722 feet east before crossing CR 27. Segment X crosses CR 27, entering the middle of Section 121, and extends approximately 507 feet before crossing a small unnamed stream. Segment X continues east another 720 feet, then 115 feet before crossing two more sections of the same unnamed stream, respectively. Segment X continues east for approximately 3,960 feet before crossing CR 28 and entering the middle of Section 120. Segment X extends another 1,823 feet east before crossing an unnamed stream. Segment X continues east another 3,543 feet before entering the middle of Section 119 and crossing a stream that connects a playa on the north side of SH 15 to a playa located south of the highway. Segment X continues extending east approximately 4,662 feet, on top of the railroad ROW berm before reaching CR 30. The transmission line itself would not be within the playa. Segment X would then extend 80 feet, crossing CR 30 and terminating at the intersection of Segments W, X, AE and AC on the northeast corner of CR 30 and SH 15, at approximately the midpoint along the western boundary of Section 118. The total length of Segment X is 31,292 feet (6 miles).

### ***Segment Y***

Segment Y originates at the intersection of Segments T, U and Y in the southwest corner of Section 141, on the north side of CR F. Segment Y extends directly east, paralleling the north side of CR F, the existing 66-kV transmission line, and the southern boundaries of Sections 141, 142 and 143 for approximately 11,248 feet, crossing CRs 25 and 26, before crossing a seasonal playa located along the southern boundary of Section 143. Segment Y continues east another 3,716 feet on the north side of CR F, paralleling the 66-kV transmission line before angling southeast for approximately 518 feet and crossing the transmission line and CR F. Segment Y continues east, paralleling the south side of CR F, along the northern boundary of the northeast corner of Section 1178 and the northern boundary of Section 1177 for approximately 4,957 feet before angling 420 feet northeast across CR F and the 66-kV

transmission line, approximately 806 feet west of CR 28. From this point, Segment Y continues east, paralleling the north side of CR F, the existing 66-kV transmission line and the southern boundary of Section 145 for approximately 439 feet before crossing CR 28. Segment Y continues east another 9,760 feet, paralleling the north side of CR F and the 66-kV transmission line, south of two center-pivot irrigation fields within Section 145. Segment Y parallels the southern boundaries of Sections 145 and 146 before crossing CR 30 and the 66-kV transmission line. Segment Y extends east another 2,515 feet along the southern boundary of Section 147 before terminating at the intersection of Segments Y, AF and AG on the north side of CR F, at approximately the midpoint along the southern boundary of Section 147. The total length of Segment Y is 33,573 feet (6.3 miles).

### ***Segment Z***

Segment Z originates at the intersection of Segments U, M and Z in the southwest corner of Section 1109, north of CR H and east of CR 24. Segment Z extends approximately 1,411 feet east, paralleling the north side of CR H before crossing a small unnamed stream. Segment Z extends approximately 4,020 feet east, paralleling the north side of CR H and the southern boundary of Sections 1109 and 1110 before crossing another small unnamed stream. Segment Z continues east along the southern boundary of Section 1110 before crossing two more tributaries to the unnamed stream at 2,514 feet and 1,233 feet, respectively. Segment Z continues east approximately 1,098 feet before crossing CR 26 and entering the southwest corner of Section 1111. From this point, Segment Z turns directly north, paralleling the east side of CR 26 and western boundary of Section 1111 for 5,229 feet before crossing CR G and entering the southwest corner of Section 1178. Segment Z extends about 10,359 feet east, paralleling the north side of CR G and the southern boundaries of Sections 1178 and 1177 before crossing CR 28. Segment Z crosses the county road, paralleling the southern boundary of Section 1176 and the north side of CR G for approximately 5,604 feet before crossing into the southwest corner of Section 1175. Segment Z continues east 5,274 feet, on the north side of CR G and southern boundary of Section 1175 before entering the southwest corner of Section 1174 and crossing CR 30. Segment Z continues east for 5,043 feet along the north side of CR G, the southern boundary of Section 1174, and on the southern edge of an existing center-pivot irrigation field. Segment Z crosses SH 23/RR 1265, entering the southwest corner of Section 1173. Segment Z continues east for approximately 4,497 feet before turning north approximately 782 feet west of the eastern boundary of Section 1173. Segment Z extends directly north, for approximately 5,338 feet before crossing Old Darrouzett Highway. Segment Z extends across the highway entering the southeast corner of Section 148. Segment Z continues north, paralleling the west side of CR 3 and the eastern boundary of Section 148 for approximately 3,099 feet before crossing an unnamed stream, and then another 1,922 feet before crossing another unnamed stream. Segment Z extends another 180 feet across CR E and enters the southeast corner of Section 117. Segment Z continues north paralleling the west side of CR 3 for 2,421 feet before crossing SH 15 at approximately the midpoint along the eastern boundary of Section 117. Segment Z extends another 267 feet north, crossing the highway and the railroad ROW (abandoned). At this point, Segment Z turns directly west, extending 5,204 feet through the middle of Section 117, on the south side of two center-pivot irrigation fields within Section 117, and paralleling the north side of SH 15 and the north side of the railroad ROW before crossing SH 23/RR 1265. Segment Z extends approximately 155 feet west across the highway before terminating at the intersection of Segments Z, AI and AH, north of SH 15, west of SH 23/RR 1265 and south of E. Santa Fe Lane, just inside the eastern boundary of Section 118. The total length of Segment Z is 64,868 feet (12 miles).

### ***Segment AA***

Segment AA originates at the intersection of Segments V, AA, AB and AC northwest of the intersection of CR D and CR 30, in the southeast corner of Section 58. Segment AA extends directly north for 2,592 feet, paralleling the eastern boundary of Section 58 and the west side of CR 30 before turning east, extending approximately 131 feet across CR 30, entering the midpoint of the western boundary of Section 59. Segment AA extends east approximately 3,441 feet through the midsection of Section 59 before crossing an unnamed stream. Segment AA extends another 1,791 feet before turning south on the west side of SH 23/RR 1265. Segment AA extends south, paralleling the west side of SH 23/RR 1265 and the eastern boundary of Section 59 for 2,558 feet before terminating at the intersection of Segments AA, AB and AD northwest of the intersection of SH 23/RR 1265 and CR D in the southeast corner of Section 59. The total length of Segment AA is 10,513 feet (2 miles).

### ***Segment AB***

Segment AB originates at the intersection of Segments V, AA, AB and AC northwest of the intersection of CR D and CR 30, in the southeast corner of Section 58. Segment AB extends east for approximately 130 feet, crossing CR 30 and entering the southwest corner of Section 59. Segment AB extends directly east for 3,095 feet, paralleling the north side of CR D and the southern boundary of Section 59 before crossing an unnamed stream. Segment AB extends another 2,134 feet east before terminating at the intersection of Segments AA, AB and AD northwest of the intersection of SH 23/RR 1265 and CR D in the southeast corner of Section 59. The total length of Segment AB is 5,359 feet.

### ***Segment AC***

Segment AC originates at the intersection of Segments W, X, AE and AC on the northeast corner of CR 30 and SH 15, at approximately the midpoint along the western boundary of Section 118. Segment AC extends north, paralleling the east side of CR 30 and the western boundary of Section 118 for approximately 1,923 feet before turning west. From this point, Segment AC extends approximately 150 feet crossing CR 30 and entering Section 119, before turning north. From this point, Segment AC extends directly north for about 706 feet, paralleling the west side of CR 30, the eastern boundary of Section 119 before crossing CR D. Segment AC continues north another 200 feet crossing the road before terminating at the intersection of Segments V, AA, AB and AC northwest of the intersection of CR D and CR 30, in the southeast corner of Section 58. The total length of Segment AC is 3,614 feet.

### ***Segment AD***

Segment AD originates at the intersection of Segments AA, AB and AD on the northwest corner of SH 23/RR 1265 and CR D in the southeast corner of Section 59. Segment AD extends approximately 100 feet south, crossing CR D before entering the northeast corner of Section 118. Segment AD extends south approximately 2,166 feet, paralleling the west side of SH 23/RR 1265 and the eastern boundary of Section 118 before turning west and extending another 100 feet and terminating within the new Lipscomb Substation site northwest of the intersection of E. Santa Fe Lane and SH 23/RR 1265. The total length of Segment AD is 2,366 feet.

### ***Segment AE***

Segment AE originates at the intersection of Segments W, X, AE and AC northeast of the intersection of CR 30 and SH 15, at approximately the midpoint along the western boundary of Section 118. Segment AE would be located within and follow the railroad ROW (abandoned rail line). Segment AE extends east along the railroad ROW through the midsection of Section 118 and south of W. Santa Fe Lane for approximately 1,614 feet before crossing an unnamed stream near the southwest corner of the Booker Golf Course property. Segment AE extends approximately 1,488 feet east along the railroad ROW, south of W. Santa Fe Lane and south of the Booker Golf Course and ball field before crossing N. Main Street. Segment AE extends another 1,752 feet east along the railroad ROW, between E. Santa Fe Lane and SH 15 before terminating at the intersection of Segments AE, AJ and AI northwest of the intersection of SH 15 and SH 23/RR 1265, within Section 118. The total length of Segment AE is 4,854 feet.

### ***Segment AF***

Segment AF originates at the intersection of Segments Y, AF and AG on the north side of CR F, at approximately the midpoint along the southern boundary of Section 147. Segment AF extends directly north approximately 4,170 feet through the middle of Section 147 before turning east. Segment AF extends approximately 2,573 feet east, on the north side of a center-pivot irrigation field, before crossing SH 23/RR 1265 at approximately 1,044 feet south of E. Mitchell Road. Segment AF extends about 85 feet east, crossing the highway and terminating at the intersection of Segments AF, AG and AH within Section 148. The total length of Segment AF is 6,828 feet.

### ***Segment AG***

Segment AG originates at the intersection of Segments AF, AG and AH, on the east side of SH 23/RR 1265, within Section 148 and approximately 1,052 feet south of CR E. Segment AG extends directly south, paralleling the east side of SH 23/RR 1265 and the western boundary of Section 148 for approximately 2,723 feet, before angling for approximately 1,512 feet to the southwest, crossing SH 23/RR 1265, and a dirt access road in two places before turning directly west. From this point, Segment AG extends west for approximately 2,395 feet, just north of an existing center-pivot irrigation field, before terminating at the intersection of Segments Y, AF and AG, at approximately the midpoint along the southern boundary of Section 147. The total length of Segment AG is 6,630 feet.

### ***Segment AH***

Segment AH originates at the intersection of Segments AF, AG and AH, on the east side of SH 23/RR 1265, within Section 148 and approximately 1,044 feet south of CR E. Segment AH extends directly north, paralleling the east side of the highway and the western boundary of Section 148 for 1,044 feet before crossing CR E and entering the southwest corner of Section 117. Segment AH continues along the east side of SH 23/RR 1265, within Section 117 for approximately 1,907 feet before angling to the northwest and extending another 200 feet crossing SE 1st Avenue and entering Section 118. Segment AH continues north, paralleling the west side of SH 23/RR 1265 and the eastern boundary of Section 118 for another 329 feet before crossing SH 15. Segment AH extends north for 236 more feet, crossing the railroad ROW (abandoned) where it terminates at the intersection of Segments Z, AI and AH, north of SH 15, west of SH 23/RR 1265, and south of E. Santa Fe Lane inside the eastern boundary of Section 118. The total length of Segment AH is 3,625 feet.



### ***Segment AI***

Segment AI originates at the intersection of Segments Z, AI and AH, north of SH 15 and the railroad ROW (abandoned), west of SH 23/RR 1265, and south of E. Santa Fe Lane inside the eastern boundary of Section 118. Segment AI extends west for 287 feet before terminating at the intersection of Segments AE, AJ and AI northwest of the intersection of SH 15 and SH 23/RR 1265, within Section 118.

### ***Segment AJ***

Segment AJ originates at the intersection of Segments AE, AJ and AI northwest of the intersection of SH 15 and SH 23/RR 1265, within Section 118. Segment AJ is a connecting segment to the proposed Lipscomb Substation site. Segment AJ extends approximately 165 feet north, leaving the railroad ROW and crossing E. Santa Fe Lane before terminating within the Lipscomb Substation site located northwest of the intersection of E. Santa Fe Lane and SH 23/RR 1265.

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## **CHAPTER 3**

### **EXISTING ENVIRONMENT**

#### **3.1 Physiography and Geology**

The project Study Area lies within the Great Plains physiographic province and is located within the Great Plains region of northern Texas, which is commonly known as the Texas High Plains or Panhandle Plains. The High Plains are characterized by a constructional topography formed on thick deposits of wind-blown materials that blanket the region.

The surface of this area is covered generally by loess deposits and interspersed playa deposits of the Pleistocene age. Loess deposits are composed of wind-blown silts. Playa deposits are primarily composed of clay and silt. Playa basins typically flood when rainfall is sufficient in frequency, duration, and intensity. The Pleistocene deposits are underlain by the Ogallala Formation of Miocene-Pliocene age. The U.S. Geological Survey (USGS) Mineral Resources describes the Ogallala Formation as comprised of sand, silt, clay, gravel, and caliche cemented together by silica that has been exposed by erosion along deeply incised stream channels.

The Texas Bureau of Economic Geology describes the Texas Panhandle, including the project Study Area, as having a base of Paleozoic and Mesozoic rocks with an overlay of alluvial material washed down from the Rocky Mountains. Paleozoic-era geology is composed of sandstones, shales, and limestones that are similar to sediments of present-day seas. Mesozoic-era geology is described as thick deposits of sea-floor origin.

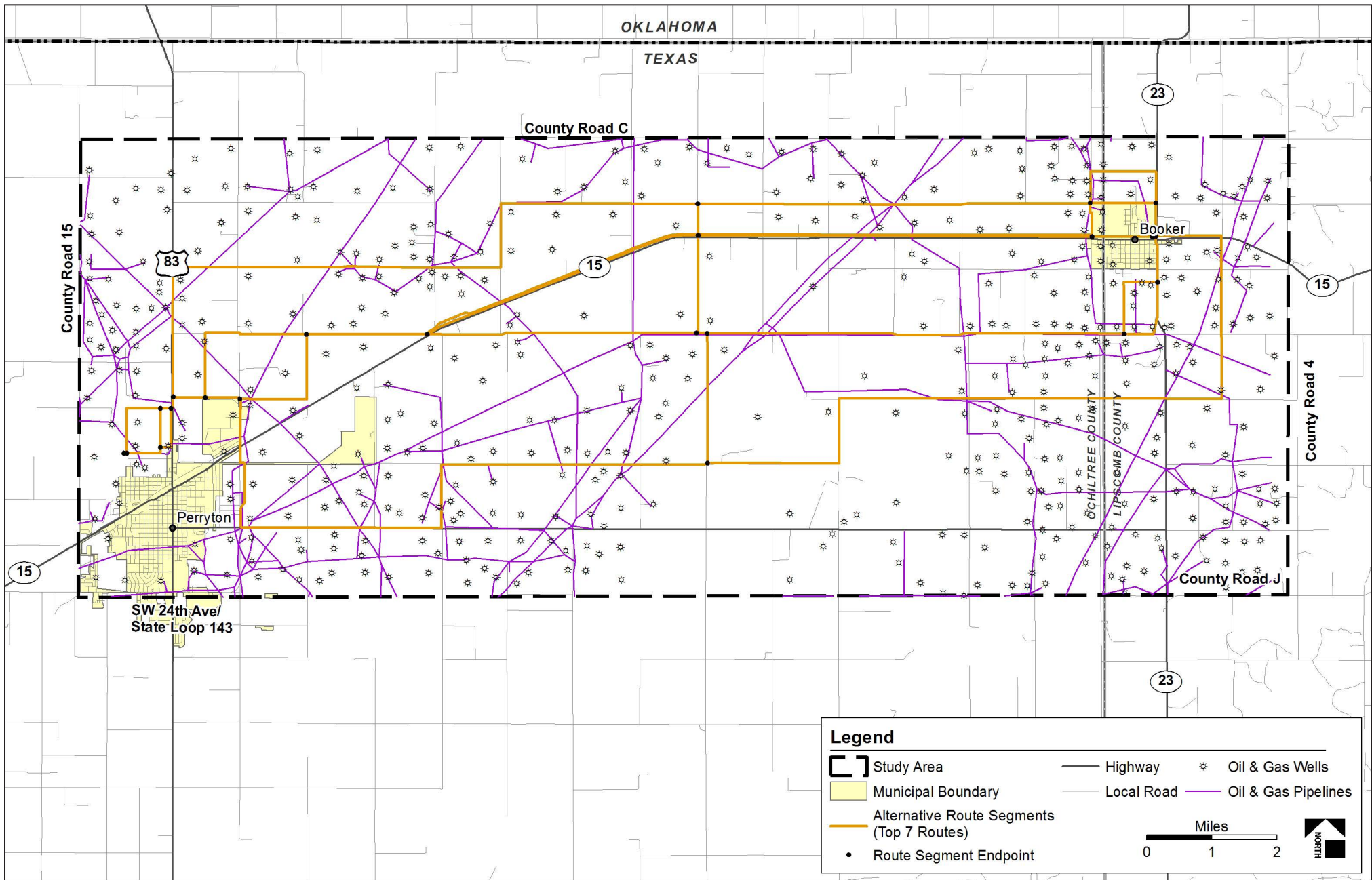
##### **3.1.1 Mineral and Energy Resources**

In 2000, the county economy primarily consisted of agribusiness, education, tourism, oil and gas production, and some manufacturing (Texas State Historical Commission 2011). A diversified economy centered around agriculture, oil, and gas.

Oil and gas production has deep roots in the project Study Area, as evidenced by leases filed starting from the early 1900s. Typically, oil and gas are found in basins, which are depressions in the Earth's surface that have layers of rock including limestone and sandstone. These basins provide reservoirs for both oil and natural gas. The project Study Area lies within the Anadarko producing basin. The Bureau of Economic Geology states that "Texas has produced more oil and natural gas than any other state and to date remains the largest daily producer." Some of the local service companies can produce up to 2,700 barrels of oil a day. As shown in Figure 3-1, there are numerous oil and gas wells and associated pipelines within the project Study Area. There are five natural gas mains in the study area ranging in pipeline diameter of 16- to 30-inches. None of these lines parallel proposed route segments but route segments cross the five mains.

Also a part of the energy resources within the project Study Area is potential wind energy.

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Source: ESRI Streetmap Data; RRC, 2012, Railroad Commission of Texas, 2012

# Oil & Gas Infrastructure

Ochiltree - Lipscomb 115-kV Transmission Line Project



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Figure 3-1

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## **3.2 Soils**

### **3.2.1 Soils within the Project Study Area**

The soil assessment for the proposed project is based on a review and analysis of the Soil Survey Geographic (SSURGO) database. Field mapping methods using national standards are used to construct the soil maps in the SSURGO database. SSURGO is the most detailed level of soil mapping done by the Natural Resources Conservation Service (NRCS). SSURGO digitizing duplicates the original soil survey maps. The map extent for a SSURGO dataset is a soil survey area, which may consist of a county, multiple counties, or parts of multiple counties (NRCS 2011).

In general, soils in this region are formed in loess and eolian materials. Soils have also formed in calcareous, clayey lacustrine deposits of Quaternary age. The soil series described below occur within the project Study Area. Refer to Figure 3-2 for a map showing the soils units within the project Study Area.

#### **Acuff Series**

The Acuff series consists of well-drained, nearly level to gently sloping, deep fine loamy soils. These soils formed in loamy eolian sediments. Runoff is low to negligible, permeability is moderate and the available water capacity is moderate. In a representative profile there is brown loam, reddish brown sandy clay loam, pink sandy clay loam and reddish yellow sandy clay loam.

Acuff soils are mainly used for crop production.

#### **Berda Series**

The Berda series consists of well-drained, gentle to steep, deep loamy soils on upland. These soils formed in calcareous loamy material. Runoff is medium to rapid, permeability is moderate, and the available water capacity is high. In a representative profile there is grayish brown loam, yellowish brown sandy clay loam and a light yellowish brown sandy clay loam. Berda soils are used mainly for rangelands but are suited to pasture and wildlife areas. In areas where minimal sloping occurs, Berda soils are suited for crops.

#### **Bippus Series**

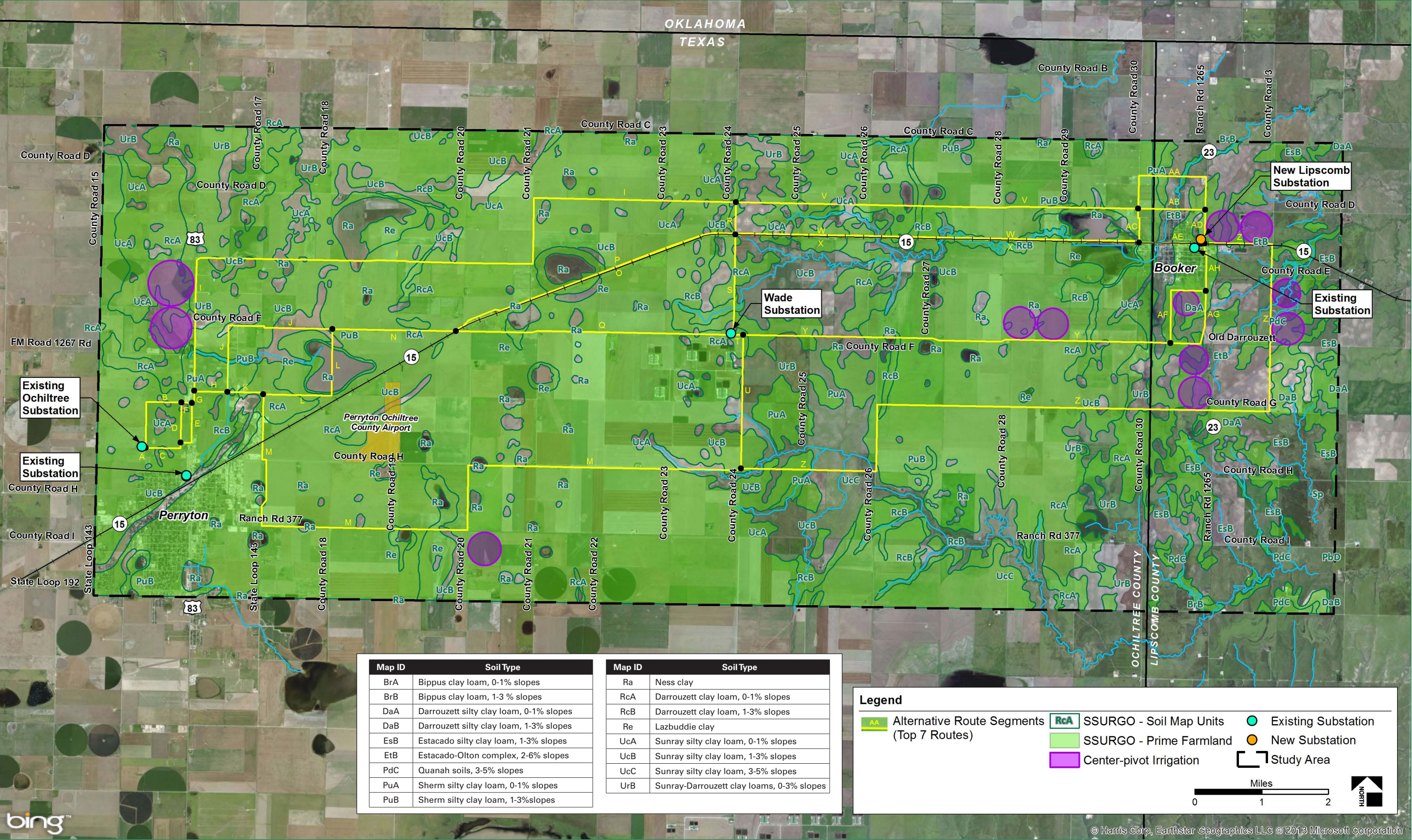
The Bippus series consists of well-drained, gently sloping, deep soil in valleys. These soils formed in loamy alluvium and colluvium. Runoff is slow to medium, permeability is moderate, and available water capacity is high. In a representative profile there is dark brown clay loam, stratified pale brown, dark grayish brown and reddish yellow sandy clay loam and clay loam. Soil-blowing is a moderate hazard. Bippus soils are mostly found in rangelands; this soil series is not typically cultivated for croplands.

#### **Conlen Series**

The Conlen series consist of well-drained, level to gently sloping, deep soils on upland. These soils formed in loamy material. In a representative profile there is brown clay loam, pale brown clay loam

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Source: Bing Maps Aerial; USDA, Soils Data, 2012

# Soils, Prime Farmlands and Center-Pivot Irrigation

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Figure 3-2



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and a reddish yellow clay loam. Soil blowing is a severe hazard. Conlen soils are suited to cultivation and sometimes seen in rangelands. High lime content causes chlorosis in some plants.

### **Darrouzett Series**

The Darrouzett series consists of well-drained, nearly level to gently sloping and very deep soil. These soils formed in thick calcareous eolian deposits. In a representative profile there is grayish silty clay loam, dark grayish brown silty clay loam, strong brown clay loam and pink silty clay loam. Permeability is moderately slow, runoff is low to medium, water capacity is moderate. Darrouzett soils are suited for crops.

### **Estacado Series**

The Estacado series consists of well-drained, nearly level to gently sloping, very deep soils. These soils formed in calcareous moderately fine textured alluvial and eolian sediments. In a representative profile there is dark grayish brown clay loam, brown clay loam, reddish yellow clay loam and pinkish white clay loam. Permeability is moderately slow, runoff is low, water capacity is moderate. Estacado soils are mainly used for crop production.

### **Lazbuddie Series**

The Lazbuddie series consists of moderately well-drained, nearly level, very deep soils. These soils formed in calcareous, clayey lacustrine deposits. In a representative profile there is dark grayish brown clay, and pale yellow clay. Permeability is slow, runoff is negligible, water capacity is high. This series is often found on playa steps in large playa basins. Lazbuddie soils are used mainly for livestock grazing.

### **Mansker Series**

The Mansker series consists of well-drained, nearly level, very deep soils. These soils formed in loamy, calcareous eolian deposits. In a representative profile there is brown clay loam, white loam, pink clay loam and yellowish red clay loam. Permeability is moderate, runoff is low, water capacity is moderate. Mansker soils are primarily used for rangeland, but also suited for crops when cultivated.

### **Ness Series**

The Ness series consist of medium to poorly drained, nearly level, deep soils. These soils formed in clayey lacustrine material. In a representative profile there is dark gray clay and gray clay. Permeability is very slow and available water capacity is high. These soils develop large cracks when dry and swell and expand when wet. Soil blowing is a hazard where the surface is barren due to previous vegetation killing from inundation. Ness soils are mostly found in rangelands and in some cases within small, farmed playas. This series is also suited for wildlife habitat.

### **Olton Series**

The Olton series consist of well-drained, nearly level to gently sloping, very deep soils. These soils formed in loam, calcareous eolian sediments. In a representative profile there is brown clay loam, reddish brown clay loam, pink clay loam and red clay loam. Permeability is moderately slow, runoff is very low, water capacity is moderate. Olton soils are mainly cultivated and irrigated.

### **Paloduro Series**

The Paloduro series consists of well-drained, nearly level to gently sloping, very deep soils. These soils formed in calcareous, loamy alluvium and colluvium. In a representative profile there is brown clay loam. Permeability is moderate, runoff is low to medium, and water capacity is high. Paloduro soils are primarily used for livestock grazing.

### **Quanah Series**

The Quanah series consists of well-drained, nearly level to gently sloping, very deep soils. These soils formed in loamy calcareous colluvium. In a representative profile there is brown silty clay loam, reddish brown silty clay loam and reddish yellow silty clay loam. Permeability is moderate, runoff is low, water capacity is high. Quanah soils are mostly used as rangeland. Some areas are cultivated.

### **Sherm Series**

The Sherm series consists of well-drained, nearly level, deep soils on upland. These soils formed in clayey and loamy eolian material. In a representative profile there is brown clay loam, brown clay, brown clay loam, and reddish yellow clay loam. Permeability is very slow, runoff is slow and water capacity is high. Soil-blowing is a moderate hazard. Sherm soils are well suited for crops, but typically it is irrigated. This series is also suited for rangeland.

### **Sunray Series**

The Sunray series consists of well-drained, nearly level to sloping, deep soils in smooth plain areas. These soils formed in calcareous loamy material. In a representative profile there is dark brown clay loam, pale brown clay loam, clay loam and reddish yellow clay loam. Permeability is moderate, runoff is slow to medium and water capacity is high. Soil blowing is a moderate hazard. Sunray soils are well suited for crops as well as rangeland.

### **Spur Series**

The Spur series consist of well-drained, nearly level, deep soils. These soils formed in loamy alluvium. In a representative profile there is dark brown and brown loam, light brown loam and a thin strata of material of other textures and colors. Permeability is moderate, runoff slow and water capacity is high. Soil blowing is a moderate hazard. Spur soils are well suited for crops and rangeland.

### **Veal Series**

The Veal series consist of well-drained, gently sloping to steep, deep soils. These soils formed in calcareous, slope alluvium and colluvium. In a representative profile there is dark brown and brown loam, brown gravelly fine sandy loam, pink gravelly loam, and light brown gravelly loam. Permeability is moderate, runoff slow to medium and water capacity is high. Soil blowing is a moderate hazard. Veal soils are well suited for livestock grazing with some mid and short grass vegetation harvesting.

## **3.3 Prime Farmland**

Prime farmland is characterized as the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops available for these uses. Farmland could be used

as cropland, pastureland, rangeland, or forest land. Cropland has a soil quality, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner when treated and managed, including water management, according to acceptable farming methods. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable levels of acidity or alkalinity, an acceptable content of salt and sodium, and few or no rocks. Prime farmland soils are permeable to water and air and are neither excessively erodible nor saturated with water for a long period of time. Prime farmland does not typically flood frequently, or it is protected from flooding (NRCS 2011); typically, playas are not included in prime-farmland mapping.

Prime farmlands within the project Study Area were identified through SSURGO data (NRCS 2011). Approximately 75 percent of the project Study Area is mapped as prime farmland, as shown in Figure 3-2, which is evidenced by the existing agricultural operations found throughout this region.

Refer to Section 3.8.1, Land Use, for a description of the agricultural setting in the project Study Area.

## 3.4 Water Resources

### 3.4.1 Surface Water

The project Study Area lies within the Canadian River Basin of the Red River Headwaters Subregion and Arkansas White-Red Region (U.S. EPA 2012). Refer to Table 3-1 for the hydrologic units in the project Study Area.

**Table 3-1. Hydrologic Units within Study Area**

Region	Subregion	Basin	Subbasin	Watershed	HUC 12 <sup>a</sup>
Arkansas-White-Red	Red River Headwaters	Canadian River Basin	North Canadian	Lower Beaver	11100201

Source: EPA, "Lower Beaver Watershed," *EPA Surf Your Watershed* (accessed online December 14, 2012).

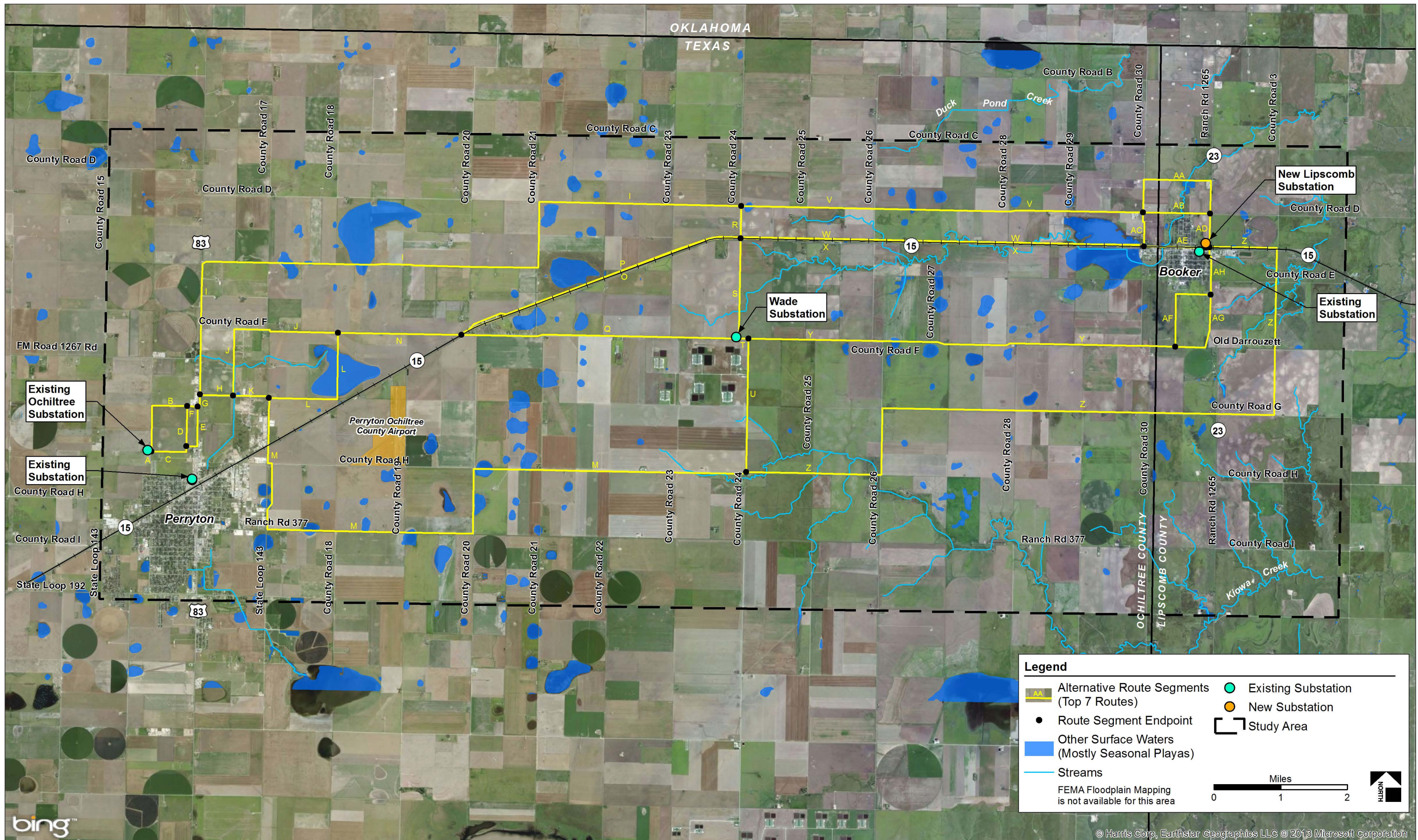
<sup>a</sup>HUC 12 = Hydrologic Unit Code 12.

Surface waterbodies within the project Study Area are defined as intermittent (USGS et al. 2010), with several perennial inundation areas. Natural waterbodies within the project Study Area consist of emergent wetlands; ephemeral creeks; or playas, which are natural depressions that flood seasonally from rain or irrigation runoff at depths of 2 to 3 feet. When flooded, water in the playas either evaporates or infiltrates into the soil to recharge the Ogallala aquifer. The individual area of the playas ranges from less than 0.2 acre to as much as 695 acres, with most of the playas being less than 40 acres in size. Refer to Figure 3-3 for surface water resources in the project Study Area.

The only surface water streams within the project Study Area are ephemeral streams that flow toward local playas or the Upper Kiowa Creek and North Fork Kiowa Creek. There is one fairly large improved (e.g., channelized) drainage present in the project Study Area, parallel to Segment J (USGS et al. 2010). The drainage swale is naturally vegetated (i.e., not concrete-lined), with a bottom width of

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Source: Bing Maps Aerial; Data from Xcel, NWI 10/12/2012 (data downloaded)

**Water Resources**

Ochiltree - Lipscomb 115-kV Transmission Line Project

**XcelEnergy** RESPONSIBLE BY NATURE® **Power by the Plains**

Figure 3-3



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approximately 30-feet and top width (i.e., top of slope) of approximately 90-feet. It extends for a length of approximately 2,300 feet, north from State Loop 143.

### **3.4.2 Floodplains**

A floodplain is defined as the low-lying area near a waterway or drainage that can be expected to be inundated by high flows in a given recurrence interval. The Federal Emergency Management Administration (FEMA) maintains and updates flood zones on floodplain maps through the National Flood Insurance Program. Currently, there is no existing FEMA data on floodplains within the project Study Area. LSD also made contact with local officials in an effort to obtain local floodplain mapping; no mapping was available. Typically, playas and their immediate surrounding areas are considered floodplains.

### **3.4.3 Groundwater**

The Ogallala aquifer, also known as the High Plains aquifer, dominates groundwater resources within the project Study Area as well as the entire region. It is the nation's most heavily used groundwater source and principal water source for agricultural, municipal, and industrial uses within the project Study Area. The Ogallala aquifer consists of sand, silt, clay, and gravel and is the largest aquifer in the United States. With more abundant fresh water in the north, the quality diminishes toward the south, especially south of the Canadian River. While irrigation is the primary use of the Ogallala aquifer, the quality is generally accepted for drinking water. Groundwater withdrawals in the project Study Area are used for irrigation, domestic water supply, livestock, and industrial uses. Depth of wells ranges from 230 to 750 feet below ground level, with an average depth to water in wells with measurements of approximately 490 feet (Ochiltree County Texas 2013).

## **3.5 Vegetation**

### **3.5.1 Regional Vegetation**

The project Study Area is located within the High Plains geographic subdivision, which consists of about 20 million acres of a relatively level high plateau separated from the Rolling Plains by the Caprock Escarpment. As the Canadian River cuts through the Texas Panhandle in a deep, narrow valley, the sandstone walls of the valley are known as the Breaks. The Canadian River Breaks divide this region into southern and northern sections. Elevation ranges from 3,000 to 4,500 feet, sloping gently toward the southeast (National Prairies Association of Texas [NPAT] 2012). Topographically, the High Plains vegetation area is a relatively level plateau characterized by shallow, surface depressional playas that individually can encompass up to 695 acres. Playas are ephemeral waterbodies that are periodically filled by seasonal thunderstorms. Average annual rainfall in the project region is 15 to 21 inches, and is lowest in winter and mid-summer and highest in April to May and September to October. Extended droughts have occurred within the region on several occasions during the twentieth century (NPAT 2012).

Native vegetation of the High Plains consists of short- and mixed-grass prairies. Typical native vegetation includes blue grama (*Bouteloua gracilis*), buffalograss (*Buchloe dactyloides*), and galleta (*Hilaria jamesii*), which were the principal plant species originally encountered in this region prior to widespread agricultural development. Historically, sandy loam soils of the region supported little

bluestem (*Schizachyrium scoparium*), western wheatgrass (*Elytrigia smithii*), sideoats grama (*Bouteloua curtipendula*), and sand dropseed (*Sporobolus cryptandrus*) (Hatch et al. 1990).

Historically, the High Plains in general were characteristically treeless and brush-free. Today, sand sagebrush (*Artemisia filifolia*), western honey mesquite (*Prosopis glandulosa* var. *torreyana*), pricklypear (*Opuntia* sp.), and yucca (*Yucca* sp.) have invaded many sandy and sandy loam sites (NPAT 2012). Currently, much of the High Plains is in irrigated cropland. Major crops produced in the High Plains include cotton, corn, sorghum, wheat, vegetables, and sugar beets (NPAT 2012). According to a Perryton-Ochiltree Chamber of Commerce publication, "the rich soil of Ochiltree County is made up of clay and loam, perfect for growing wheat, sorghum, corn and alfalfa. Among Texas counties, Ochiltree ranks third in wheat production and 16th in both grain sorghum and corn production" (CommunityLink 2012).

### **3.5.2 Vegetation Community Types in the Project Study Area**

Information on vegetation communities within the project Study Area was gathered from the National Land Cover Dataset (NLCD, <http://www.mrlc.gov/nlcd2006.php>), as shown on Figure 3-4, and then verified during a field reconnaissance conducted on September 18 and 19, 2012. The project Study Area vegetation is dominated by agricultural land, including grasslands used for livestock forage, hay production, and cultivated croplands. The majority of the project Study Area is not irrigated; however, some irrigated crops are present. Irrigation is primarily sprinkler irrigation using either center-pivot or lateral move (rolling) irrigation, but manual spraying by water truck is also conducted in this area.

### **3.5.3 Important Species**

Important species are defined as those that (a) are commercially or recreationally valuable, (b) are threatened or endangered or affect the well-being of threatened or endangered species, or (c) are critical to the structure and function of the ecological system.

#### **Commercially Valuable Species**

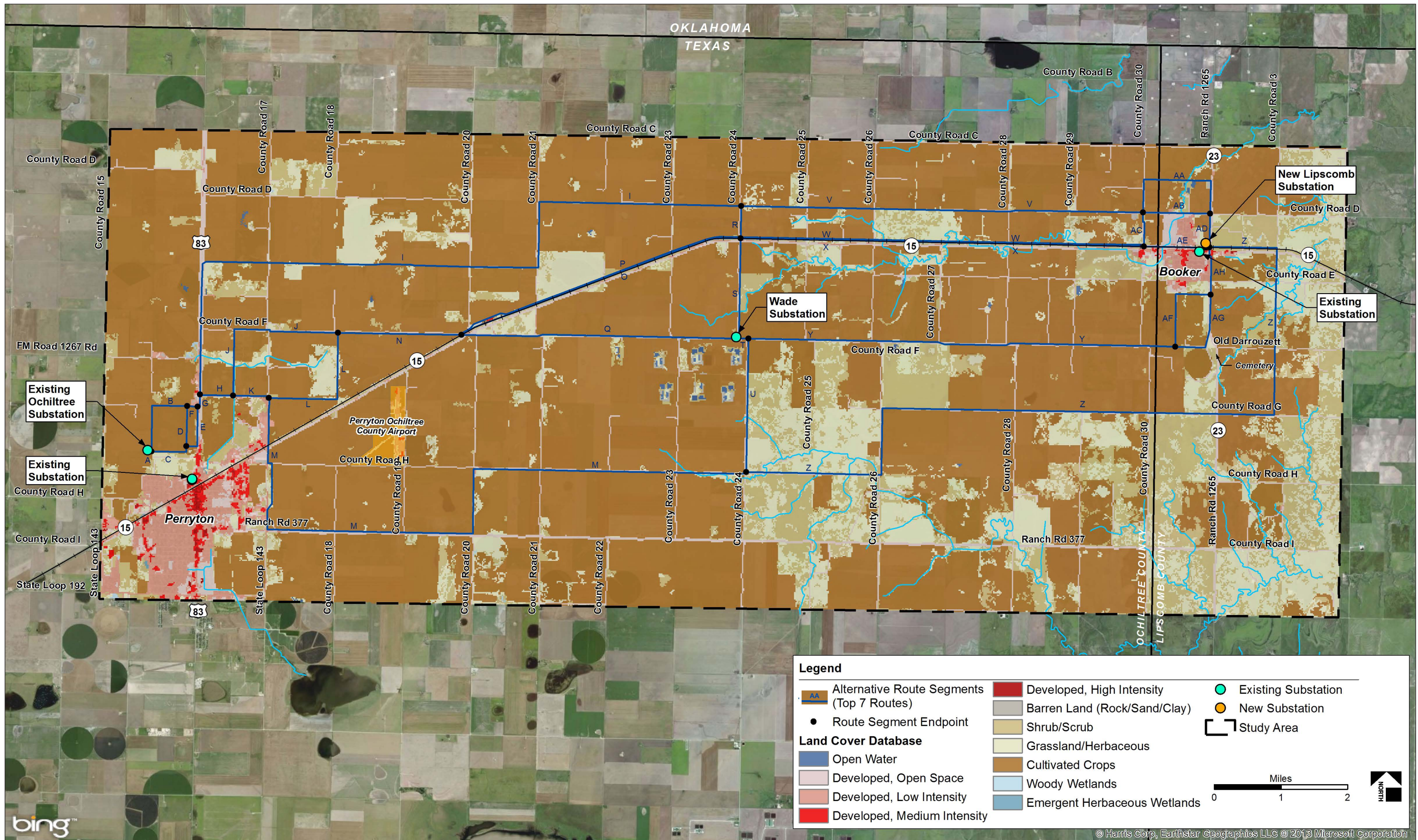
Commercially important plant species within the immediate vicinity of the project Study Area may include corn, cotton, wheat, sorghum, alfalfa, and soybeans, as well as hay crops and pasture.

#### **Threatened and Endangered Plant Species**

Threatened and endangered plant species are protected federally under the Endangered Species Act and locally by the State of Texas under Chapter 88 of the Texas Parks and Wildlife Code of the Texas Administrative Code. Multiple resources were used to determine whether there is suitable habitat for threatened or endangered plant species in the project Study Area. First, data were obtained on sensitive species habitats and occurrences from the TPWD TXNDD.

The data query extended 10 miles out from the project Study Area, and no threatened or endangered plant occurrences were identified. A field reconnaissance was also conducted on September 18 and 19, 2012 to verify habitat suitability from adjacent, existing public access roads. No suitable habitat for threatened or endangered plant species was identified during the field visits. County lists were also





Source: Bing Maps Aerial; USDA NLCD, 2006 (most recent data)

# Land Cover and Vegetation

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consulted to determine which plant species are listed in Lipscomb and Ochiltree Counties by both USFWS and TPWD. Currently, 32 plant species are listed by the USFWS as threatened or endangered in Texas; however, none are listed in Lipscomb and Ochiltree Counties (USFWS 2012a). TPWD was consulted through a project review request on November 27, 2012, and no plant species were identified on the TPWD Lipscomb and Ochiltree species lists (TPWD 2012).

### **Ecologically Sensitive Areas/Natural Plant Communities**

In general, an area may be considered ecologically sensitive if (a) it supports a rare plant or animal community or a rare, threatened, or endangered species; (b) it is valuable due to its maturity and the density and diversity of plants and animals it contains; or (c) it supports a community of plants adapted to flooding and/or saturated soil conditions and dominated by species considered to be wetland indicators by a regulatory agency (e.g., the U.S. Army Corps of Engineers). No sensitive plant communities have been identified in either the USFWS or TPWD data. The project Study Area supports streams and farmed wetlands, some of which may be considered jurisdictional. Within the project Study Area, these potential waters have been modified by agricultural practices; however, some wetland vegetation is present.

### **3.5.4 Waters of the United States, Including Wetlands**

The U.S. Army Corps of Engineers (USACE) regulates waters of the United States, including wetlands, under Section 404 of the Clean Water Act. Waters of the United States include, but are not limited to, territorial seas, lakes, rivers, streams, oceans, bays, ponds, and other special aquatic features, including wetlands. The USACE and the U.S. Environmental Protection Agency (EPA) jointly define wetlands as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. According to the USFWS's NWI database, over 80 isolated features are located throughout the project Study Area, in addition to numerous streams.

According to the NWI mapping, three types of wetland features are present in the project Study Area: Lake, Emergent Wetland and "Other." The NWI system further classifies features in the Study Area as "palustrine farmed" and "lacustrine littoral emergent seasonally-flooded" (L2EMC). Palustrine-farmed features in the project Study Area are non-tidal wetlands where the "soil surface has been mechanically or physically altered for production of crops, but water-dependent plants will become reestablished if farming is discontinued" (USFWS 1992). L2EMC wetlands in the project Study Area are "wetland habitat[s] situated in a topographic depression or dammed river channel where total surface area exceeds 20 acres" and are "characterized by erect, rooted, herbaceous hydrophytes (water-dependent plants) with vegetation present for most of the growing season in most years" (USFWS 1992). Surface water is present for extended periods, especially early in the growing season, but is absent by the end of the growing season in most years.

As verified during the field reconnaissance, the majority of wetland features within the project Study Area are closed basins, or playas, that contain seasonal surface waters within actively farmed, agricultural land. The features mapped as L2EMC represent larger features dominated by perennial vegetation, while palustrine-farmed features represent smaller farmed features whose vegetation has been altered by farming. One large feature mapped as L2EMC and located immediately west of Booker appears to be formed from water from a stream that has been impounded by SH 15 and water management. This feature is seasonally inundated and is currently being used to graze livestock. This

feature may have connectivity to jurisdictional waters. Some features in the project Study Area could be considered wetlands if the frequency and duration of flooding is such that it supports hydric soils and hydrophytic vegetation. The majority of the wetlands and drainages appear isolated with no nexus to jurisdictional waters or interstate commerce (Figure 3-5) and would not be considered USACE jurisdictional waters of the United States; however, streams in the eastern portion of the project Study Area appear to have connectivity to the Canadian River watershed and may be considered jurisdictional. A formal jurisdictional determination would be made if formal wetland delineations are required prior to construction (refer to Section 4.3.1 for further discussion regarding potential impacts to wetlands).

## **3.6 Wildlife**

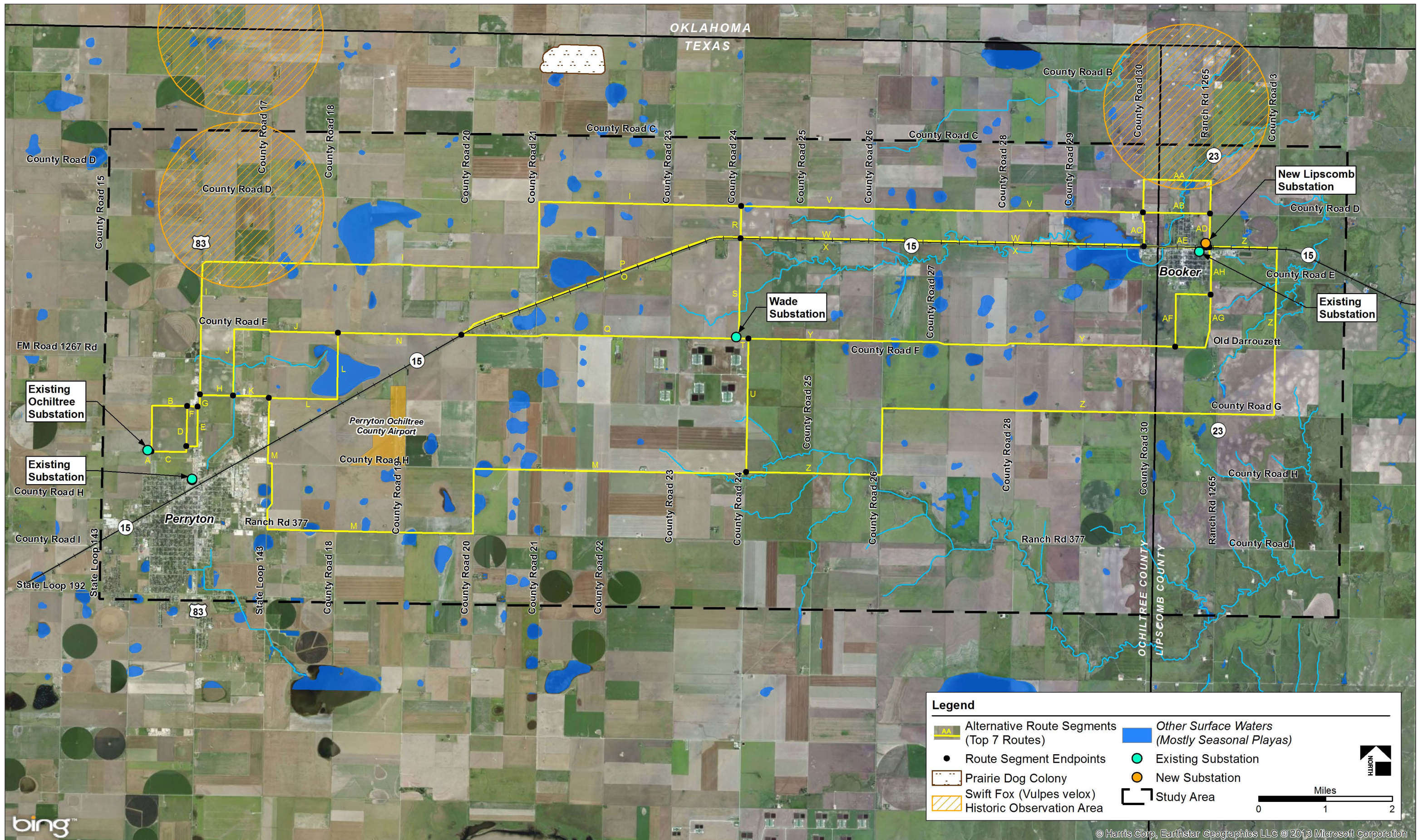
### **3.6.1 Wildlife Habitat and Species**

The project Study Area is located within the Kansan Biotic Province of Texas (Blair 1950). The Kansan Biotic Province in Texas includes the panhandle, and extends south and east from the Oklahoma and New Mexico borders, then transitions to the Chihuahuan, Balconian, and Texan biotic provinces in the central part of Texas. The Kansan Province includes three distinct biotic districts: the Mixed-grass Plains, Short-grass Plains, and Mesquite Plains districts. As described in Section 3.4, the project Study Area is within the Short-grass Plains. Characteristic wildlife species of this biotic province are discussed below. Because of the current land uses in the project Study Area, including cropland and grazing lands, there is very little native grassland habitat remaining. Much of the region has been altered by agriculture and ranching, or industrial uses such as oil and gas operations. Remaining natural plant communities are affected by fragmentation and direct loss due to crops, pasture, and overgrazing (TPWD 2012c). Lists of representative amphibian and reptile, bird, and mammal species that occur in the Kansan Biotic Province, and potentially occur in the project Study Area, are provided in Tables 3-2 through 3-4, respectively.

### **3.6.2 Amphibians and Reptiles**

At least 14 species of frogs and toads and only one species of salamander, the barred tiger salamander (*Ambystoma tigrinum mavortium*), likely occur within the Kansan biotic province. Representative frog and toad species that likely occur in the region include the Great Plains toad (*Bufo cognatus*), red-spotted toad (*Bufo punctatus*), plains leopard frog (*Rana blairi*), American bullfrog (*Rana catesbeiana*), and plains spadefoot (*Spea bombifrons*) (Amphibiaweb 2011; Blair 1950). At least 14 lizard species and 31 snake species have historically occurred in the Kansan biotic province (Blair 1950). Representative reptile species that may potentially occur in the project Study Area are listed in Table 3-2.







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**Table 3-2. Potential Reptile Species in Project Study Area**

Common Name	Scientific Name	Common Name	Scientific Name
<b>Lizards</b>			
Great plains skink	<i>Eumeces obsoletus</i>	Round-tailed horned lizard	<i>Phrynosoma modest urn</i>
Great plains earless lizard	<i>Holbrookia maculate maculata</i>	Southern prairie lizard	<i>Sceloporus undulatus consobrinus</i>
Texas horned lizard	<i>Phrynosoma comutum</i>	Texas spotted whiptail	<i>Cnemidophorus gularis gularis</i>
Eastern collared lizard	<i>Crotaphytus collans collans</i>	Prairie racerunner	<i>Cnemidophorus sexlineatus viridis</i>
<b>Snakes</b>			
Kansas glossy snake	<i>Arizona elegans elegans</i>	Western coachwhip	<i>Masticophis flagellum testaceus</i>
Western diamond-backed rattlesnake	<i>Crotalus atrox</i>	Bullsnake	<i>Pituophis catenifersayi</i>
Prairie rattlesnake	<i>Crotalus viridis viridis</i>	Texas long-nosed snake	<i>Rhinocheilus lecontei tessellatus</i>
Prairie ring-necked snake	<i>Diadophis punctatus amyi</i>	Variable groundsnake	<i>Sonora semiannulata semiannulata</i>
Great Plains ratsnake	<i>Elaphe guttata emoryi</i>	Desert massasauga	<i>Sistrurus catenatus edwardsii</i>
Plains hog-nosed snake	<i>Heterodon nasicus nasicus</i>	Western massasauga	<i>Sistrurus catenatus edwardsii</i>
Texas nightsnake	<i>Hypsiglena torquata jani</i>	Plains black-headed snake	<i>Tantilla nigriceps</i>
Desert kingsnake	<i>Lampropeltis getula splendida</i>	Marcy's checkered gartersnake	<i>Thamnophis marcianus marcianus</i>
Central plains milksnake	<i>Lampropeltis triangulum gentilis</i>	Arid land ribbonsnake	<i>Thamnophis marcianus marcianus</i>
New Mexico threadsnake	<i>Leptotyphlops dulcis dissectus</i>	Lined snake	<i>Tropidoclonion lineatum</i>

Source: NatureServe Explorer 2011.

### 3.6.3 Birds

Avian species that may occur in the project Study Area include year-round residents and many migratory species. The Texas Panhandle is located within the Central Flyway, a migration route that generally follows the Great Plains states. The grassland habitats of the project Study Area contain nesting and stop-over habitat for a number of upland migratory birds. Grassland species associated with short- and mixed-grass prairies are the most common in the general area throughout most of the year. Waterfowl and shorebirds utilize the playa waterbodies in the project Study Area, particularly during migrations in the spring, when the playas contain surface waters. A representative list of bird species of potential occurrence in the project Study Area is included in Table 3-3.

**Table 3-3. Potential Avian Species in Project Study Area**

Common Name	Scientific Name	Common Name	Scientific Name
American crow	<i>Corvus brachyrhynchos</i>	Northern shoveler	<i>Anas clypeata</i>
American kestrel	<i>Falco sparverius</i>	Painted bunting	<i>Passerina ciris</i>
American wigeon	<i>Anas americana</i>	Red-tailed hawk	<i>Buteo jamaicensis</i>
Blue jay	<i>Cyanocitta cristata</i>	Ring-necked pheasant	<i>Phasianus colchicus</i>
Brewer's blackbird	<i>Euphagus cyanocephalus</i>	Scaled quail	<i>Callipepla squamata</i>
Brown-headed cowbird	<i>Molothrus ater</i>	Spotted towhee	<i>Pipilo maculatus</i>
Bullock's oriole	<i>Icterus bullockii</i>	Swainson's hawk	<i>Buteo swainsoni</i>

**Table 3-3. Potential Avian Species in Project Study Area**

Common Name	Scientific Name	Common Name	Scientific Name
Canada goose	<i>Branta canadensis</i>	Turkey vulture	<i>Cathartes aura</i>
Cassin's sparrow	<i>Aimophila cassinii</i>	Vesper sparrow	<i>Pooecetes gramineus</i>
Common grackle	<i>Quiscalus guiscula</i>	Western meadowlark	<i>Stumella neglecta</i>
Common nighthawk	<i>Chordeiles minor</i>	Wild turkey	<i>Meleagris gallopavo</i>
Eastern meadowlark	<i>Stumella magna</i>	Yellow-rumped warbler	<i>Dendroica coronata</i>
Gadwall	<i>Anas strepera</i>	Pied-billed grebe	<i>Podilymbus podiceps</i>
Green-winged teal	<i>Anas crecca</i>	American white pelican	<i>Pelecanus erythrorhynchos</i>
Horned lark	<i>Eremophila alpestris</i>	Double-crested cormorant	<i>Phalacrocorax auritus</i>
House finch	<i>Carpodacus mexicanus</i>	American bittern	<i>Botaurus lentiginosus</i>
Mallard	<i>Anas platyrhynchos</i>	Great blue heron	<i>Ardea herodias</i>
Mississippi kite	<i>Ictinia mississippiensis</i>	Black-crowned night-heron	<i>Nycticorax nycticorax</i>
Mourning dove	<i>Fulica americana</i>	Snow goose	<i>Chen caerulescens</i>
Northern cardinal	<i>Cardinalis cardinalis</i>	Green-winged teal	<i>Anas carolinensis</i>
Northern flicker	<i>Colaptes auratus</i>	Killdeer	<i>Charadrius vociferus</i>
Northern harrier	<i>Circus cyaneus</i>		
Northern pintail	<i>Anas acuta</i>		

Source: NatureServe Explorer 2011; TPWD (2011c).

### 3.6.4 Mammals

At least 59 mammalian species occur or have occurred in the Kansan biotic province, which includes Ochiltree and Lipscomb Counties (Blair 1950). Mammal species in the project Study Area are those associated with short-grass and mixed-grass ecosystems of the Great Plains. A representative list of common mammals known to occur in the Kansan biotic province and that likely occur in the project Study Area is presented in Table 3-4.

**Table 3-4. Potential Mammal Species in project Study Area**

Common Name	Scientific Name	Common Name	Scientific Name
Nine-banded armadillo	<i>Dasypus novemcinctus</i>	Porcupine	<i>Erethizon dorsatum</i>
Eastern cottontail	<i>Sylvilagus floridanus</i>	Coyote	<i>Canis latrans</i>
Black-tailed jackrabbit	<i>Lepus californicus</i>	Common gray fox	<i>Urocyon cinereoargenteus</i>
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>	Swift fox	<i>Vulpus velox</i>
Plains pocket gopher	<i>Geomys bursarius</i>	Northern raccoon	<i>Procyon lotor</i>
Plains pocket mouse	<i>Perognathus flavescens</i>	American badger	<i>Taxidea taxus</i>
Western harvest mouse	<i>Reithrodontomys megalotis</i>	Striped skunk	<i>Mephitis mephitis</i>
Deer mouse	<i>Peromyscus maniculatus</i>	Bobcat	<i>Lynx rufus</i>
Northern pygmy mouse	<i>Baiomys taylori</i>	Mule deer	<i>Odocoileus hemionus</i>
Hispid cotton rat	<i>Sigmodon hispidus</i>		

Source: NatureServe Explorer 2012.

### 3.6.5 Important Species

As mentioned in Section 3.5.3, a species is considered important if one or more of the following criteria applies: (a) it is commercially or recreationally valuable, (b) it is threatened or endangered or affects the

well-being of threatened or endangered species, or (c) it is critical to the structure and function of the ecological system.

### Recreationally and Commercially Valuable Species

No recreational public hunting grounds have been identified in the project Study Area; however, public and private hunting areas are located within Lipscomb County or Ochiltree County that allow hunting of dove, quail, pheasant, waterfowl, wild turkey, white-tailed deer, and mule deer. All of these species that are hunted for recreation may occur in the project Study Area. Non-consumptive recreation, such as wildlife viewing and birdwatching, is rare in the Study Area. Because most land in the Study Area is private and is used for agriculture or oil and gas production, it is not considered a high quality recreation, viewing, or birding area. The nearest fishing area is located approximately 11 miles south of the project Study Area at Lake Fryer.

### Threatened, Endangered, and Important Wildlife Species

Multiple resources were used to determine whether there is suitable habitat for threatened or endangered wildlife species in the project Study Area. First, data were obtained on sensitive species habitats and occurrences from the TPWD TXNND (TPWD 2012a and 2012b). The data query extended 10 miles out from the project Study Area. During the field reconnaissance, habitat suitability for threatened and endangered wildlife species was evaluated from existing public roads. County lists were also consulted to determine which species are listed in Lipscomb and Ochiltree Counties by both USFWS and TPWD.

The TXNDD includes mapped documentation of one species within the project Study Area: Swift fox (*Vulpes velox*). The Swift fox currently has no state or federal listing status—it was removed from federal listing as a candidate species in 2001. The Swift fox has been documented on the edges of the project Study Area, as seen in Figure 3-5.

Species that are listed as potentially occurring in Lipscomb and Ochiltree Counties by TXNND or USFWS are listed in Table 3-5. Only species currently federally or state listed as endangered or threatened are discussed further below.

**Table 3-5. Species Occurring on TXNND and USFWS Species Lists  
for Lipscomb and Ochiltree Counties**

Common Name	Scientific Name	Federal/State Listing Status <sup>a</sup>
<b>Birds</b>		
American peregrine falcon	<i>Falco peregrines anatum</i>	DL / T
Arctic peregrine falcon	<i>Falco peregrines tundrius</i>	DL / Not listed
Baird's sparrow	<i>Ammodramus bairdii</i>	Not listed / Not listed
Bald eagle	<i>Haliaeetus leucocphalus</i>	DL / T
Ferruginous hawk	<i>Buteo regalis</i>	Not listed / Not listed
Interior least tern	<i>Sterna antillarum athalassos</i>	E / E
Lesser prairie chicken	<i>Tympanuchus pallidicinctus</i>	PT / Not listed
Mountain plover	<i>Charadruis montanus</i>	Not listed / Not listed
Western burrowing owl	<i>Athene cunicularia</i>	Not listed / Not listed
Whooping crane	<i>Grus americana</i>	FE / Not listed

**Table 3-5. Species Occurring on TXNND and USFWS Species Lists  
for Lipscomb and Ochiltree Counties**

Common Name	Scientific Name	Federal/State Listing Status <sup>a</sup>
<b>Mammals</b>		
Black-footed ferret	<i>Mustela nigripes</i>	E / Not listed
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>	Not listed / Not listed
Cave myotis bat	<i>Myotis velifer</i>	Not listed / Not listed
Pale Townsend's big eared bat	<i>Corynorhinus townsendii pallescens</i>	Not listed / Not listed
Plains spotted skunk	<i>Spilogale putorius interrupta</i>	Not listed / Not listed
Prairie vole	<i>Microtus ochrogaster taylori</i>	Not listed / Not listed
Swift fox	<i>Vulpes velox</i>	Not listed / Not listed
<b>Reptiles</b>		
Texas horned lizard	<i>Phrynosoma cornutum</i>	Not listed / T

Source: TPWD 2012a and 2012b, USFWS 2012a.

<sup>a</sup> DL = delisted; E = endangered; PT = proposed threatened; and T = threatened.

The American peregrine falcon is a year-round resident and local breeder in western Texas. This species nests in tall cliffs and buildings. Bald eagles are found primarily near rivers and large lakes and nests in tall trees or on cliffs near water. The Interior least turn nests and forages in sand and gravel along sand and gravel bars within braided streams and rivers but can also nest on man-made structures such as inland beaches and wastewater treatment plants. Given the lack of suitable habitat and known occurrences in the project Study Area, it is unlikely any of these species occur in the Study Area.

The preferred habitat of the lesser prairie chicken (LEPC) is native short- and mixed-grass prairies dominated by sand sagebrush (*Artemisia filifolia*) or shinnery oak (*Quercus havardii*) (USFWS, 2012d). According to the USFWS, landscapes supporting less than 63 percent native rangeland appear incapable of supporting self-sustaining LEPC populations (USFWS 2012d). A LEPC habitat assessment tool, the Southern Great Plains Crucial Habitat Assessment Tool (SGP CHAT), has been developed in coordination with a three-year Western Governors' Association (WGA) Wildlife Council project, led by the Oklahoma Department of Wildlife Conservation and the Kansas Department of Wildlife, Parks and Tourism with the cooperation of Texas Parks and Wildlife (among other agencies). According to the SGP CHAT, approximately half of the project Study Area is located within the current range of LEPC. The SGP CHAT further classifies land by its relative value as LEPC habitat, according to WGA-defined categories. The project Study Area is all located within land classified as "Category 5 (Common)" habitat which is defined as "habitat which is relatively common, generally less limiting to LEPC populations or metapopulations, and generally better suited for land use conversion." Given the location of the project Study Area within the range of LEPC, this species should be considered in project planning.

The Whooping crane (*Grus americana*) is a federally listed endangered species with suitable habitat in the project Study Area. The whooping crane species breeds, migrates, winters, and forages in a variety of wetland habitats. In the project Study Area, wetlands, including playas, may provide suitable migratory habitat for this species (USFWS 2012c). The range for this species was not mapped on the Constraints and Opportunities map (see Figure 5-1 in Chapter 5), due to the breadth of its migratory path and because the exact route taken may vary season to season. Whooping cranes follow a broad annual

migratory path between Canada and central Mexico. The migration route historically covered a wide swath through the center of the United States, between Arizona to the west and east to the eastern seaboard. The current range includes several populations of whooping crane, including the extant, wild whooping crane population and the reintroduced whooping crane migration routes further east. The Aransas/Wood Buffalo population route encompasses central Texas at the western limits, eastward almost to Louisiana.

The Black-footed ferret is considered extirpated in Texas. Black-footed ferret are closely tied to black-tailed prairie dog, preying on black-tailed prairie dog and using their burrows as retreats. One black-tailed prairie dog colony is mapped adjacent to the project Study Area (see Figure 3-5). Prairie dogs are considered an indicator species for black-footed ferret (*Mustela nigripes*). However, no prairie dog colonies were mapped by TXNDD or observed within the Study Area during field surveys. Given that no prairie dog colonies occur within the Study Area and the TXNDD lists black-footed ferret as considered extirpated in Texas, it is unlikely that black-footed ferret occur in the project Study Area.

The Texas horned lizard occurs in open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees on soils varying in texture from sandy to rocky. Based on field reconnaissance in September 2012, the majority of the project Study Area is managed agricultural land that would not be considered suitable habitat for this species, but there are some relatively undisturbed grassland areas that may provide suitable habitat for Texas horned lizard.

### **Ecological Systems and Critical Habitat**

According to TPWD the black-tailed prairie dog is a keystone species. A keystone species is a species that other species depend upon for survival. Their digging aerates and promotes soil formation, they clip back brush maintaining the short-grass prairie and they are a keystone species providing food and shelter for as many as 170 different animals (TPWD 2012d). Historically, millions of acres of Texas grassland were covered by black-tailed prairie dog colonies. Prairie dog colonies in Texas now occupy less than one percent of their historic range (TPWD 2011d). One prairie dog colony has been mapped north of the project Study Area by TPWD (see Figure 3-5); however, no active colonies were identified during the field reconnaissance in September 2012.

No critical habitat is identified in the project Study Area according to data from TPWD (TPWD 2011b) and the USFWS's Critical Habitat Mapper (USFWS 2011d).

## **3.7 Aquatic Ecology**

No surface waters that would support aquatic species occur in the project Study Area.

## **3.8 Socioeconomics**

The study area for the socioeconomic analysis includes both Lipscomb and Ochiltree Counties in the Panhandle region of Texas. It is anticipated that most of the proposed transmission line labor force would be Xcel employees or local contractors that currently reside in Potter or Randall counties to the south, so work crews are expected to temporarily reside in the project Study Area. The number of workers at any one time will vary over the construction phase depending upon the task at hand. The City of Perryton would experience the most effects, if any, to housing, public, and other community services during the construction phase because of its location within the project Study Area and the size

of the city. As such, Perryton demographic and socioeconomic data was reviewed. In addition, Booker population and labor force data is also provided since it is the second largest population center in the project Study Area, and marks the eastern terminus of the proposed transmission line. Demographic data for Booker, Perryton, Lipscomb County, Ochiltree County, and the state of Texas are included to set the proposed project in a regional context.

### **3.8.1 Population**

Ochiltree County is located in the northeast portion of the Texas Panhandle near the Oklahoma border. Perryton is the Ochiltree County seat and is located seven miles south of the Oklahoma state line. The City of Perryton is the largest population center in Ochiltree County. The project Study Area extends into Lipscomb County, which is located east of Ochiltree County, also on the Oklahoma border. The Lipscomb County seat is located in Lipscomb, approximately 20 miles southeast of the project Study Area; however, Booker is within the project Study Area and is the largest population center in Lipscomb County.

According to the U.S. Census Bureau, the 2011 population estimates for project Study Area are as follows: City of Perryton, 9,065; Ochiltree County, 10,030; and Lipscomb County, 3,327 (Census Bureau 2012). The population of Booker is approximately 1,527 according to City Data statistics (City Data 2012).

Census data show that Ochiltree County has experienced 13.2 percent growth and Lipscomb County has experienced 15.3 percent growth since 2000 (City Data 2012). In contrast to both Lipscomb and Ochiltree Counties, the State of Texas population grew at a substantially higher rate at 20.59 percent from 2000 to 2010 (U.S. Census 2010). The Census Bureau estimates an approximate 3.0 percent projected annual growth rate for Ochiltree County and 0.8 percent for Lipscomb County. The Census Bureau estimates Texas in general to grow annually at an approximate 2.1 percent growth rate.

The populations of Lipscomb and Ochiltree Counties are less diverse in racial composition compared to Texas in general. Slightly more than 96.1 percent of Ochiltree County and 93.7 percent of Lipscomb County population is white (including persons of Hispanic or Latino origin) compared to an average of 80.9 percent for Texas. Persons of other races (including American Indian, Asian, black, Native Hawaiian or Pacific Islanders or persons reporting more than two races) make up approximately 6.3 percent of the population in Lipscomb County and 4.1 percent in Ochiltree County compared to 19.1 percent for Texas. Persons of Hispanic or Latino origin make up approximately 49.7 percent of the population in Ochiltree County and approximately 31.6 percent of the population in Lipscomb County (CommunityLink 2012).

### **3.8.2 Economy and Employment**

As indicated by Ochiltree County's slogan of "Wheatheart of the Nation," agriculture is a major part of the local economy. Ochiltree County is ranked 20th out of the 254 Texas counties with an estimated direct impact on the local economy of \$324 million (CommunityLink 2012). Locally important agricultural crops are corn, cotton, wheat, alfalfa, sorghum, and soybeans as well as hay crops; along with raising of livestock, particularly pigs and cattle. The estimated number of livestock units raised, fed, and/or slaughtered in the county is: 10,000 cows; 240,000 hogs and pigs; 10,000 sows; and 100,000 head of stocker and fat cattle sold per year (City of Perryton 2012). In addition to agriculture, oil and gas energy production is an important local industry. Oil-related business makes up a large portion of

the local employers. According to the *Perryton Community Profile and Resource Guide*, “Oil-related businesses make up a large portion of employers in the area, with four of the top 10 employers in the county in the oil and gas industry.” (CommunityLink 2012).

Employment data for the City of Perryton was gathered from the City Data website (City Data 2012). The largest employment sectors for Perryton are mining/quarrying and gas extraction (21.5 percent), agriculture (12.7 percent), education (8.0 percent), health care (7.5 percent), and construction (5.6 percent). In August 2012, the unemployment rates in Perryton (3.5 percent) and Booker (3.7 percent) were considerably lower than both the Texas (7.1 percent) and national unemployment rate of 8.1 percent (Bureau of Labor Statistics 2012).

In 2009, the estimated median household income in Perryton (\$44,313) was slightly lower than the State of Texas (\$48,259). The 2009 estimated median household income in Booker (\$52,961) is higher than the Texas average. According to 2009 data, 18.7 percent of individuals in Perryton have incomes that place them below the poverty level and 21.5 percent in Booker (City Data 2012).

### **3.8.3 Community Services**

The City of Perryton Fire/Emergency Medical Service (EMS) department is staffed by nine employees. The EMS department is the primary responder for all of Ochiltree County. The Perryton Police Department employs ten uniformed officers and provides dispatching services for the city’s EMS department (City of Perryton 2012). Ochiltree County law enforcement is provided by the Ochiltree County Sheriff’s Department, which consists of eight employees. Ochiltree County’s communication center dispatches officers from the Texas Department of Public Safety as well as Texas Parks and Wildlife Game Wardens and local officers.

The Lipscomb County Sheriff’s office provides dispatch services for the City of Booker and Lipscomb County. The City of Booker employs one full-time police officer (Karen Haddon, City of Booker, personal communication, 01/31/2013) that handles local calls and maintains a volunteer fire department that handles local fire emergencies.

The City of Perryton has one general hospital, Ochiltree General Hospital, that provides 24-hour emergency services, home health, hospice, laboratory services, and other general practice medical services (CommunityLink, 2012). Other hospitals near the project Study Area include the following: Beaver County Memorial Hospital in Beaver, Oklahoma; Hansford County Hospital in Spearman, Texas; Memorial Hospital of Texas County in Guymon, Oklahoma; Newman Memorial Hospital in Shattuck, Oklahoma, and Hemphill County Hospital in Canadian, Texas. These hospitals range from approximately 20 to 45 miles from the project Study Area (City Data 2012).

Public services in the City of Perryton include a country club, 38 civic clubs, a museum, one library, five parks, one movie theater, a city pool, a golf course, an activity center, and a senior citizen center (City of Perryton 2012). The City of Booker has two parks, a baseball field, a country club with a golf course, and a public library.

The project Study Area is within the Perryton Independent School District and the City of Booker Independent School District in Booker. The City of Perryton has: two elementary schools; one junior high school; one high school; and one private school (City of Perryton 2012). The City of Booker has one elementary school and one high school. The only schools in the project Study Area located within

proximity to an alternative route segment are Booker Junior High/High Schools which are co-located on one campus, south of CR E and west of SH 23/RR 1265. However, the school buildings are not located within 300 feet of a proposed centerline.

Perryton currently has five motels with 250 rooms along SH 15 (City of Perryton 2012). There is currently a shortage of short-term housing in Perryton because local oil field workers occupy much of the short-term housing in and around Perryton (personal communication, Sheryl Hardy, director of Economic Development, Perryton Community Development Corporation, 2012). Two motels are planned for construction within the next three years and the City of Perryton has incentives in place to encourage new home construction (personal communication, Sheryl Hardy, 2012). The City of Booker has one motel, the Santa Fe motel, also located along SH 15.

### **3.8.4 Community Values**

The Cities of Booker and Perryton do not currently have city general plans available that state specific community value goals. According to the City of Perryton Chamber of Commerce, the local community is committed to quality education and to working diligently on economic development to diversify their local economy. Further, they state that “Ochiltree County’s continued growth and prosperity reflects its evolution from a strictly ranching economy to a vibrant mixed economy” (CommunityLink 2012). The community character in the project Study Area is a mix of agricultural and oil and gas operations outside the boundaries of the Cities of Perryton and Booker, and rural and suburban land uses within city boundaries. Within the project Study Area, traditional western values of independence and hard work and a strong sense of place based on the regional history of farming, cattle ranching, and oil and gas exploration are evident in the suburban/rural setting of the project Study Area.

## **3.9 Land Use, Aesthetics, Recreation, Transportation, and Communication**

### **3.9.1 Land Use**

#### **Existing Land Use**

Figure 3-4 shows that the vast majority of the project Study Area between the cities of Perryton and Booker consists of cultivated crops, based on data obtained from the U.S. Department of Agriculture NLCD (2006). This category of land use includes both irrigated and non-irrigated cropland, as well as rangelands and livestock operations. A large hog farm is located in the center of the project Study Area, southwest of the Wade Substation. The mapping obtained from the Department of Agriculture is consistent with field observations and photo documentation conducted by LSD in September and October 2012. In addition to agriculture and livestock operations, the project Study Area also has a high density of oil and gas apparatus and infrastructure (see Figure 3-1). The oil and gas industry and the agriculture industry are the two primary industries in this portion of the Texas Panhandle. Interspersed throughout the cultivated cropland, are grasslands, scrub, and shrubs (Figure 3-4). Residential and retail development is concentrated mostly on the west and east



*Grain Silos along north side of SH 15, between Segments P and O, in Section 137*



ends of the project Study Area, around the two incorporated cities; however, rural residences are also found throughout the area, along county roads and highways, associated mostly with ranch lands and agriculture. Commercial, retail and industrial land uses are also concentrated mostly in the two cities; however, some business and industrial operations are found along the SH 15 corridor, including grain silos and processing facilities, as well as agriculture support services.

Croplands with center-pivot and rolling irrigation systems are also found throughout the study area. As shown previously in Figure 3-2, there are a few center-pivot systems in proximity to some of the alternative routes. These irrigation systems are found primarily near Perryton and Booker. Based on information gathered during the public open-house meeting and from questionnaire forms received from the public, a number of agricultural fields in the study area are manually irrigated by using water trucks. The trucks include 120-foot-wide booms/sprayers which need to maneuver around fence lines and other infrastructure.



*Rolling Irrigation*

All seven routes are located in proximity to a number of oil and gas operations (pipelines, tanks, rigs, etc.). The high density of oil and gas infrastructure is shown visually in Figure 3-1. There are only five natural gas transmission lines in the study area that would be crossed by any of the seven transmission line alternatives. None of the routes parallel a main gas line.

### **Planned Land Use**

As noted previously, the project Study Area is located in the northeast corner of the Texas Panhandle, within Ochiltree and Lipscomb counties. These two counties are members of the Panhandle Regional Planning Commission (PRPC), a 26-county area that includes 60 incorporated cities. Both Perryton and Booker are included in the PRPC. The PRPC provides planning services and economic development activities to support local government. The PRPC does not, however, include planning and guidance for high-voltage transmission line projects.

In an effort to determine the project's compatibility with communities within the project Study Area, county and city departments were contacted to obtain information on existing and planned land uses.

Ochiltree County offices are located in the town of Perryton. The County does not have a planning department but defers to the PRPC or the Perryton Community Development Corporation for planned land use and development. A county general plan is not available for Ochiltree County. To determine the potential for future development in the project Study Area, LSD met with the director of Economic Development at the Perryton Community Development Corporation, in September 2012. According to the director, there are no planned development activities (residential, commercial, or industrial) in proximity to the preliminary route segments (see Figure 5-1 in Chapter 5) (personal communication, Sheryl Hardy, 2012).

Lipscomb County offices are located in the town of Lipscomb. The County does not have a planning department but defers to the PRPC for planned land use and development. Because only a small portion of the project Study Area falls within Lipscomb County, and that area is composed mostly of the city of

Booker, LSD contacted the city for information on planned development in and around Booker. In addition, the city manager was consulted for information about the country club and associated park and ball field located in proximity to the preliminary route segments. No future development plans (residential, commercial, industrial) were identified by the city for lands in proximity to the preliminary route alternatives. (Refer to the Recreation section below for information on future park plans.)

### **3.9.2 Aesthetic Values**

Aesthetic value is a measure of the visual appeal of a landscape. Key factors that determine visual appeal include landform, vegetation, water, color, scarcity, and cultural modifications. Areas with little variety in vegetation and topography, and that contain features that detract from the natural setting have a low aesthetic value. The evaluation of the characteristic aesthetic quality, or scenic quality, is done in relationship to the natural landscape.

The visual study area differs from the Project Study Area in that it includes the preliminary transmission line segment alternatives and the surrounding area from which an alternative route would be visible which may be near or far depending on topography and intervening vegetation or development. As noted in Section 3.4, the project Study Area is located in the High Plains geographic subdivision which is comprised of relatively treeless high plains and grasslands. It is a relatively level plateau, with elevation ranging from 3,000 to 4,500 feet above mean sea level (amsl), and sloping gently toward the southeast. Some drainages and minor depressions are found within the Study Area; however, the playas and streams do not dominate the view due to the shallow nature of these water features. Ornamental trees in the project Study Area are found mostly within and around the population centers of Perryton and Booker, with few natural tree species found in the central, agricultural and rangeland areas. There is little topographic relief, with the exception of a few grain silos and elevators that are visible from several miles away. Silos along SH 15 (in Twichell) are approximately 180–185 feet high, and the silos in Booker are approximately 175 feet high. Colors in the natural landscape are primarily tans and seasonal greens. Figures 3-6a and 3-6b show typical views of the landscape setting in the project Study Area.



**Photo 1:** View looking east along CR F, Segment Q. Existing Wade Substation, 66 kV Transmission Line (north of road) and distribution line (south of road) are visible.



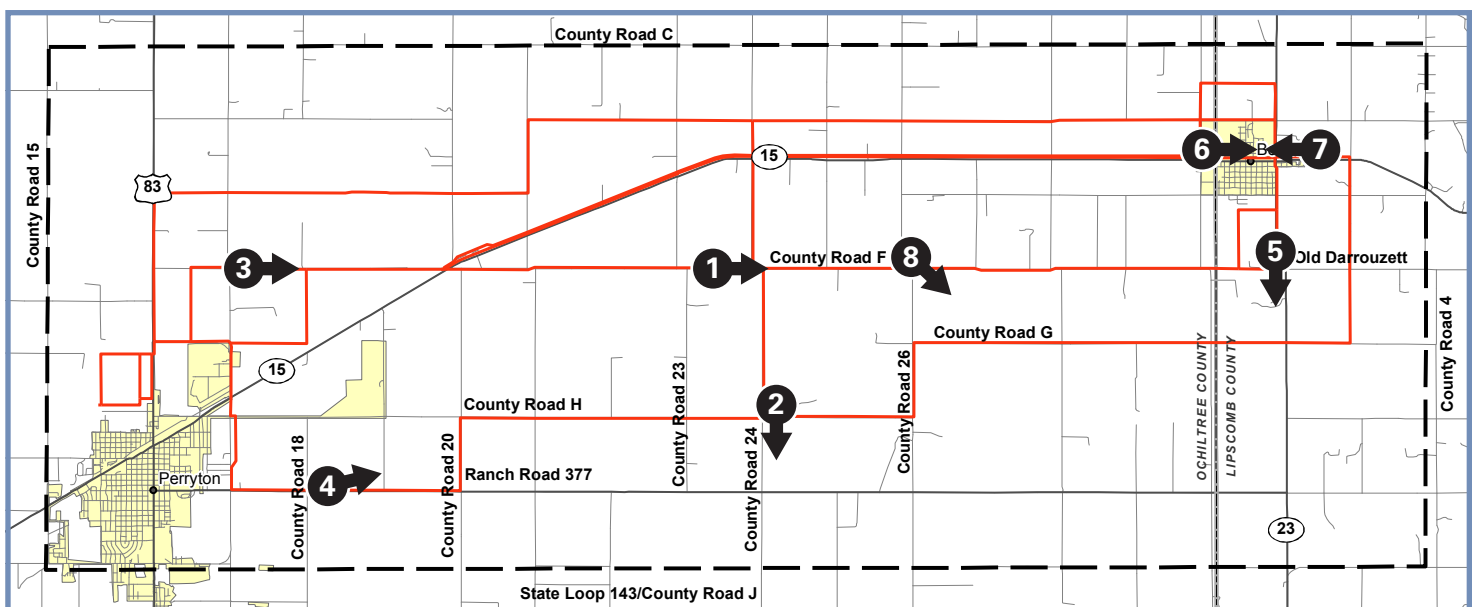
**Photo 2:** Residence, corner of CR H and CR 24 at intersection of Segments M, U and Z.



**Photo 3:** View looking east along CR F, east of CR 17, Segment J. Open field and residences.



**Photo 4:** View along RR 377, east of CR 18, Segment M. Recently installed oil and gas facility.



## Landscape Setting in the Study Area (Typical Views)

Ochiltree - Lipscomb 115-kV Transmission Line Project



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Figure 3-6a

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**Photo 5:** View looking south along SH 23, north of Old Darrouzett Highway, Segment AG. Heart Cemetery is off in the distance to the left.



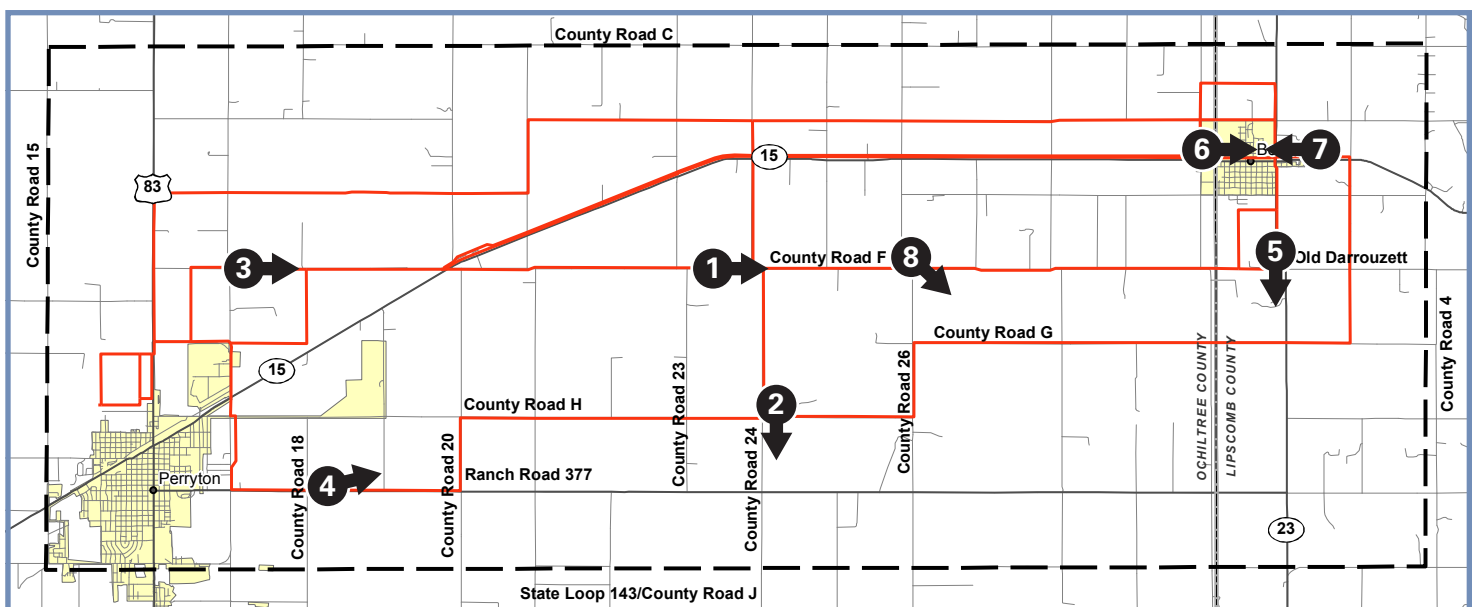
**Photo 6:** View looking east from intersection of N. Main Street and E. Santa Fe Lane in Booker, Segment AE. Multi-family residential to the left, railroad ROW and grain silos to the right.



**Photo 7:** View looking west from East Santa Fe Lane, west of SH 23, Segment AE. Grain silos and railroad ROW to the left.



**Photo 8:** View looking southeast from CR F, east of CR 26, Segment Y. View of playa depression and agriculture field.



## Landscape Setting in the Study Area (Typical Views)

Ochiltree - Lipscomb 115-kV Transmission Line Project



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Figure 3-6b

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Development, farming and grazing in undeveloped areas have modified the natural vegetation, so that the project Study Area retains little evidence of the original natural character. Considerable modification of the natural setting is found in and around the urban cities of Perryton and Booker. Development is concentrated along State Highways and County Roads intersecting within the cities, with limited development outside the city core.

The primary views within the project Study Area are from roadways and residences. The largest numbers of people with views of the project Study Area are along SH 15, State Loop 143, U.S. 83, and SH 23/RR 1265, the primary regional transportation routes into and out of this area. Viewers on local and county roadways are primarily local residents or business employees from the two cities and smaller communities in the region. Views of the preliminary route segments from recreation facilities are limited to the Booker Country Club golf course and the associated park and ball field (near Segments AB and AE), and the horse race track and grandstand in Perryton (near Segments J and K).

The Texas Heritage Trails Program is based around 10 scenic driving trails originally created by TxDOT. The project Study Area is located within the Plains Trail Region (Texas Historical Commission 2013). No heritage trails are identified within the project Study Area; however, the Museum of the Plains is identified as a tourist destination and is located along Segment E. The attractions at this museum are located indoors and do not rely on viewsheds around the museum property.

The list of Scenic Overlooks and Rest Areas in Texas, published by Texas Highways, revealed no designated scenic highways or scenic overlooks within the project Study Area (Texas Highways 2013). No other scenic byways, highways or other roads, or designated viewing areas managed under any other entity, provide views of the project Study Area. In addition, no areas or features managed for scenic quality are located within the project Study Area.

### 3.9.3 Recreational and Park Areas

Recreational uses and parks are fairly limited within the project Study Area and only two recreation areas are found within 1,000 feet of the alternative route centerlines. In Perryton, a horse race track and associated grandstand is located north of State Loop 143 and east of U.S. 83 near Segments J and L. This facility is privately run. The racetrack is approximately 200 feet from Segment J and 60 feet from Segment L. The grandstand is 150 feet from Segment J and 920 feet from Segment L. All other outdoor parks and recreation areas in and around Perryton are outside the 1,000 foot buffer zone.

In Booker, the Booker Country Club, local baseball field and a small park are all located within 1,000 feet from Segment AE and the north end of the country club is within 1,000 feet of Segment AB. The Booker Country Club is a public nine-hole golf course that is open year-round. The nearest green is approximately 165 feet south of Segment AB and 250 feet north of Segment AE. The City of Booker owns the land but leases the course to Booker Golf Inc. In addition, the City owns and operates the adjacent baseball field and recreation area. The ball field is approximately 175 feet north of Segment CA and the playground is approximately 500 feet north of



*Booker Country Club Golf Course, view from CR D looking south, Segment AB*

Segment CA, north of the ball field. According to the Booker City Manager, an estimated 400 visitors per year use the golf course, with approximately 35 members that pay annual dues. The ball field is used very infrequently but the recreation park does get frequent use. The City plans to improve the park with new facilities but would not expand the current boundaries (personal communication, Don Kerns, city manager, City of Booker, November 8 and December 2, 2012). There are no other recreational areas known within 1,000 feet of the alternative route centerlines.



*Booker Baseball Field, north of Segment AE*

### 3.9.4 Transportation/Aviation/Communication

#### Facilities

The project Study Area is approximately 120 miles to the north of Amarillo, which is the economic and transportation hub for the Texas Panhandle. A major north-south transportation corridor connecting Amarillo to Perryton is U.S. 83, which intersects with SH 15, an east-west, two-lane highway that connects Perryton to Booker. SH 15 bisects the project Study Area. The other major roads crossing the project Study Area include SH 23/RR 1265, a north-south road that passes through Booker, and State Loop 43 that circles a portion of Perryton. The remaining vehicle transportation system in the project Study Area consists of county roads, city streets in Perryton and Booker, and dirt roads that generally follow a grid pattern. Refer to Figure 2-3 (enclosed in map pocket) for the highways and local and county roads in the project Study Area.

As noted previously, the project Study Area is located within the PRPC region. In 2009, the PRPC Board of Directors passed a resolution creating the Panhandle Rural Transportation Planning Organization for the 17 Panhandle counties included in the Amarillo TxDOT District. This Panhandle planning organization serves as a forum for local input into decisions ranging from long- and short-range project prioritization in the region, to regional road closure procedures during inclement weather. According to the Perryton-Ochiltree Chamber of Commerce website, “Perryton is the largest Panhandle community on U.S. 83 with an estimated 8,700 vehicles passing through town each day” (Perryton-Ochiltree Chamber of Commerce 2013).

In 2012, the Amarillo TxDOT District scheduled over \$43 million in rebuilds, repairs, resurfacing, and enchantment projects for Ochiltree County, and another \$22 million for similar projects in Lipscomb County. The projects that were identified in the Amarillo District that would be located within the project Study Area are summarized in Table 3-6.

**Table 3-6. Amarillo TxDOT District Road Improvement Projects in the Project Study Area**

Facility	Project Description
U.S. 83 from 6th Avenue to 13th Avenue	Enhancement project. This improvement area is not located in proximity to any of the preliminary route segments.
SH 15, from U.S. 83 to Lipscomb county line	Rebuild project. [Specifics were unavailable from TxDOT.]
SH 23, from FM 377 to 11 miles north of U.S. 83	Widen and rehabilitate roadway. [Specifics were unavailable from TxDOT.]



In addition to local streets, county roads, and state and U.S. highways, an abandoned railroad ROW connects Perryton and Booker, paralleling the north side of SH 15.

In 1887, the Southern Kansas Railway Company of Texas, a Santa Fe subsidiary, built a line from Kansas through Oklahoma into the Panhandle via Canadian, Texas. This line passed through Lipscomb County, 30–40 miles east of Ochiltree. At the time, citizens of Ochiltree County were only one or two days' travel from the railroad. Proximity to the railroad brought an influx of settlers into Ochiltree County, especially after 1900, and the ranching economy evolved into a stock-farming system.

The construction of the North Texas and Santa Fe Railway, a Santa Fe subsidiary, from Shattuck, Oklahoma, to Spearman, Texas, in 1919 altered the county permanently. The rail line, which ran across the Texas Panhandle, tapped the newly emerging wheat market. The post-World War I demand, coupled with access to rail transportation, made wheat farming profitable.

As the population and economy grew, other changes occurred. Ochiltree, 15 miles south of the railroad, found itself at a distinct disadvantage when a new town, Perryton, was laid out on the railroad in 1919; Perryton was immediately made the county seat. During the next year, the entire town of Ochiltree was moved to Perryton, and by 1920 Ochiltree had disappeared completely. (<http://www.tshaonline.org/handbook/online/articles/hco01>)

In 1990, the Southwestern Railroad Company (SWRR) acquired the rail line from Atchison, Topeka and Santa Fe Railway Company (ATSF). A fire in 2006 destroyed a bridge at the east end of the line, isolating five active shippers on the line from the interstate rail network.

On August 2, 2007 SWRR petitioned the Surface Transportation Board of the Department of Transportation to grant an Abandonment Exemption for the rail line in Lipscomb and Ochiltree Counties. On November 16, 2007, the SWRR petition for exemption was granted, with the requirement that the ROW be subject to trail use and public use. (<http://www.stb.dot.gov/decisions/readingroom>, 2013)

SWRR abandoned the railroad ROW in 2008 and the ROW was purchased by the Top of Texas Rural Rail Transportation District (Top of Texas RRTD) on December 31, 2008. Rural Rail Transportation Districts (RRTDs) in Texas were formed to prevent the loss of rural rail lines that have been abandoned by rail companies, or to maintain the former rail ROW for future transportation uses. The Top of Texas RRTD has considered various uses of the ROW, including restoring the railroad as a short-track line or granting utility company easements to transmit electricity associated with future wind power projects.

A review of the Texas State Airport Directory identified Perryton-Ochiltree County Airport (PYX) as the sole airport located within 20,000 feet of an alternative route centerline. This is the only airport in the project Study Area as seen in Figure 2-3 (enclosed in map pocket) and Figure 3-7. As shown in Table 3-7, the Perryton-Ochiltree County Airport is an FAA-registered public airport with runways greater than 3,200 feet and within 20,000 feet of a route centerline. The primary paved runway, Runway



*View looking east from SH 23, north of SH 15, toward abandoned railroad ROW, Segment Z*

17/35, is 5,700 feet in length and 75 feet wide and is oriented in a north-south direction. Runway 17/35 is classified as utility runway. An additional cross-wind grass runway, Runway 4/22, is also located on the airport property, oriented in a southwest to northeast direction (Figure 3-7). The grass runway is 3,280 feet in length and 144 feet wide. Aircraft operations for a 12-month period ending June 20, 2012 averaged 27 flights per day; 60 percent was for local general aviation and 40 percent was for transient general aviation.

**Table 3-7. Aviation Facility—CCN Distance Zones**

Airport	Type	Runway Length (feet)	Routes Distance to Nearest Point (Linear Feet)						
			1	2	3	4	5	6	7
PYX	Public	5,700, paved runway 3,280, grass runway	4,250	4,250	4,250	4,250	9,800	9,800	5,200

Figure 2-3 (enclosed in map pocket) and Figure 3-7 also show FCC registered communication facilities located within the project Study Area in relation to the proposed seven routes. Table 3-8 lists the communication towers and their location relative to each alternative route. Pursuant to CCN application criteria, Figure 2-3 and Table 3-8 include all AM towers within 10,000 feet of a route centerline and all FM/other communication towers (including microwave and cell towers) within 2,000 feet of a route centerline.

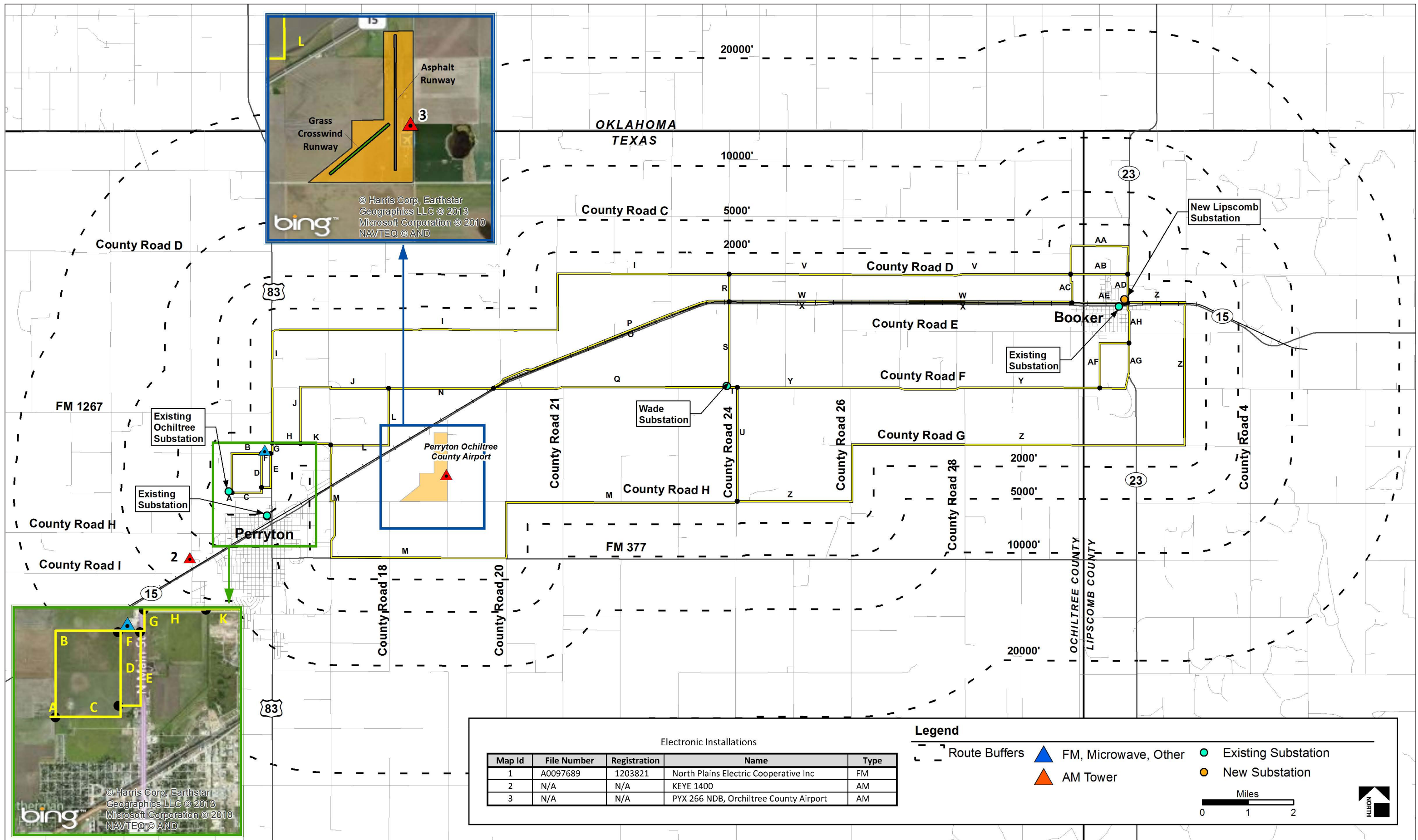
**Table 3-8. Transmitters/Communication Facilities in Proximity to Alternative Routes**

Route	Closest Transmitter to Route Alternative	Distance from Centerline (feet)	Structure Number (on Figure 2-3)
1	NPEC – FM/OTHER	404 feet- Segment B	1
	NPEC– FM/OTHER	285 feet – Segment F	1
	NPEC – FM/OTHER	617 feet – Segment G	1
	NPEC – FM/OTHER	976 feet – Segment H	1
	KEYE – AM 1400	7,039 feet – Segment A	2
	KEYE – AM 1400	7,206 feet – Segment B	2
	PYX – AM Tower at Airport	7,999 feet – Segment N	3
	PYX – AM Tower at Airport	9,128 feet – Segment O	3
2	NPEC – FM/OTHER	285 feet – Segment F	1
	NPEC – FM/OTHER	404 feet – Segment D	1
	NPEC – FM/OTHER	617 fee – Segment G	1
	NPEC – FM/OTHER	976 feet – Segment H	1
	KEYE – AM 1400	7,039 feet – Segment A	2
	KEYE – AM 1400	7,206 feet – Segment C	2
	KEYE – AM 1400	9,300 feet – Segment D	2
	PYX – AM Tower at Airport	7,999 feet – Segment N	3
	PYX – AM Tower at Airport	9,035 feet – Segment P	3
3	NPEC – FM/OTHER	617 feet – Segment E	1
	NPEC – FM/OTHER	617 feet – Segment G	1

**Table 3-8. Transmitters/Communication Facilities in Proximity to Alternative Routes**

<b>Route</b>	<b>Closest Transmitter to Route Alternative</b>	<b>Distance from Centerline (feet)</b>	<b>Structure Number (on Figure 2-3)</b>
	NPEC – FM/OTHER	976 feet – Segment H	1
	KEYE – AM 1400	7,039 feet – Segment A	2
	KEYE – AM 1400	7,206 feet – Segment C	2
	KEYE – AM 1400	9,300 feet – Segment E	2
	PYX – AM Tower at Airport	7,999 feet – Segment N	3
	PYX – AM Tower at Airport	9,035 feet – Segment Q	3
4	NPEC – FM/OTHER	285 feet – Segment F	1
	NPEC – FM/OTHER	617 feet – Segment G	1
	NPEC – FM/OTHER	976 feet – Segment H	1
	KEYE – AM 1400	7,039 feet – Segment A	2
	KEYE – AM 1400	7,206 feet – Segment C	2
	KEYE – AM 1400	9,300 feet – Segment D	2
	PYX – AM Tower at Airport	7,999 feet – Segment N	3
	PYX – AM Tower at Airport	9,035 feet – Segment Q	3
5	NPEC – FM/OTHER	404 feet – Segment B	1
	NPEC – FM/OTHER	617 feet – Segment G	1
	NPEC – FM/OTHER	285 feet – Segment F	1
	NPEC – FM/OTHER	976 feet – Segment I	1
	KEYE – AM 1400	7,039 feet – Segment A	2
	KEYE – AM 1400	7,206 feet – Segment C	2
6	NPEC – FM/OTHER	617 feet – Segment E	1
	NPEC – FM/OTHER	617 feet – Segment G	1
	KEYE – AM 1400	7,039 feet – Segment A	2
	KEYE – AM 1400	7,206 feet – Segment C	2
	KEYE – AM 1400	9,300 feet – Segment E	2
7	NPEC – FM/OTHER	404 feet – Segment B	1
	NPEC – FM/OTHER	285 feet – Segment F	1
	NPEC – FM/OTHER	617 feet – Segment G	1
	NPEC – FM/OTHER	976 feet – Segment H	1
	KEYE – AM 1400	7,039 feet – Segment A	2
	KEYE – AM 1400	7,206 feet – Segment B	2

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Source: Bing Maps Aerial; FCC, ASR Registration, 2012

# Existing Communication Facilities and Airports

Ochiltree - Lipscomb 115-kV Transmission Line Project

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### **3.10 Cultural Resources**

The project Study Area is located in the Great Plains physical region, which is composed of relatively treeless high plains and grasslands. The Great Plains region is one of four natural geographical regions; the Interior Lowlands are to the east/southeast, the Gulf Coastal Plains are to the southeast, and the Basin and Range province is to the southwest.

#### **3.10.1 Prehistoric Overview**

Evidence found at the Alibates Flint Quarries, located along the Canadian River south of the project Study Area, indicates that pre-Columbian people inhabited parts of the Texas Panhandle region as early as 13,000 years before the present (National Park Service 2012). The Plains Village Indians—thought to be the ancestors of the Wichita, Pawnee, and Caddo tribes—inhabited large, permanent villages with smaller farming areas on the outskirts of the villages. The largest and probably best-known village, approximately 15 miles from the project Study Area, is termed the Buried City and is listed in the NRHP (Anderson 2013a). It is thought that a combination of severe drought and raiding from neighboring tribes caused the inhabitants to leave the area by the end of the fifteenth century.

#### **3.10.2 Historic Overview**

The Texas Panhandle was home to the Comanche and associated tribes prior to the mid-1870s. According to a Perryton-Ochiltree Chamber of Commerce publication, *Born on the North Texas Prairie* (CommunityLink 2012), the Red River War, a campaign by the U.S. military to remove all Native Americans from the area, caused the Comanche to leave their territory in 1875. Shortly thereafter, Euro-American settlement of the area began. The first recorded ranch in Ochiltree County was established in 1878. The town of Ochiltree was formed in 1885 and was the county seat from 1889 to 1919. A planned railroad spur that would have reached Ochiltree was never built. However, the railroad was built approximately eight miles to the north. The town of Ochiltree survived by moving its buildings and population to the railroad in 1920. This new town, Perryton, is now the largest community in the Panhandle.

Like Ochiltree, the town of Booker had its origins elsewhere. The town was originally founded in Oklahoma and called La Kemp. The extension of the railroad offered more opportunities for the residents and business people of La Kemp, and the town moved across the border to Texas in 1919. It was then renamed after one of the railroad civil engineers, B. F. Booker (Anderson 2013b).

#### **3.10.3 Previous Investigations**

A Class I database search of the project Study Area, including a one-half mile buffer around the preliminary route segments perimeter, did not reveal the presence of previous cultural resource investigations within the area. Had previous surveys and investigations been conducted in the area, they would be reported through the Texas Historical Commission (THC). The THC did record a Neighborhood Survey and site assessments for two prehistoric sites within the project Study Area.

### **3.10.4 Results of Literature/Records Review**

A Class I database search was carried out by LSD in October 2012 to identify the presence or absence of any known cultural resources within the project Study Area. The search included all lands within a one-half-mile buffer around the outer route segments perimeter (cultural resources study area). Records were assessed through the Texas Archeological Sites Atlas that is maintained by the THC in Austin, Texas. The Atlas contains archaeological site data from the Texas Archeological Research Laboratory, University of Texas at Austin, and historic building, cemetery, and historic marker data from THC agency files. The National Register Information System, which catalogs cultural resources listed in the NRHP, was also reviewed. General Land Office maps kept by the Bureau of Land Management were reviewed electronically as well; none were available for the project Study Area. The records search covered parts of the Booker, Huntoon, and Perryton USGS 7.5' topographic quadrangles.

As noted above, the records and literature review included all lands within the cultural resources study area defined above, with the potential for direct impacts focused on the area of potential effect. The area of potential effect for this project is defined as the 70-foot-wide transmission line ROW, the two existing substations, and the new substation site. In addition, pursuant to PUC CCN application requirements, all historical and archaeological sites known to be within 1,000 feet of the route centerlines were also identified.

Results of the records searches are documented in a letter report prepared by LSD (Appendix B) and summarized below and in Section 4.7.

Based on the Class I survey, three historic structures, two prehistoric sites, two historic markers, and one historic cemetery are identified within the cultural resources study area. One prehistoric site is within 1,000 feet of Segments J, L and N (Routes 1-4), one historic structure is within 1,000 feet of Segment AE (Route 1), the two historic markers are within 1,000 feet of Segments AE, AJ, AI, AH and Z (Routes 1, 3, 4 and 7). The historic cemetery is located within 1,000 feet of Segment AG (Route 3). The other two historic structures and prehistoric site are not located within 1,000 feet of the seven route alternative centerlines, and none of the resources are located within the area of potential effect.

One of the previously recorded historic structures, the Plainview Hardware Company Building, is listed in the NRHP under Criterion C for local significance. The other two historic structures, a historic gas station and Masonic lodge (currently the Kiowa Drug Store), were identified during a local neighborhood survey. These structures are not recommended eligible for inclusion in the NRHP. Neither of the two prehistoric sites, a lithic scatter and a camp site, has been recommended eligible for inclusion in the NRHP. The two recorded historic markers, consisting of one that commemorates the route of the Jones and Plummer Trail and one marking the site of the town of Booker, are not NRHP eligible. Lastly, the Heart Cemetery is listed in the THC's Historic Cemetery database; however, it does not have an associated NRHP eligibility recommendation.



## CHAPTER 4

### ENVIRONMENTAL IMPACTS OF THE ALTERNATIVE ROUTES

#### 4.1 Impacts on Physiography/Geology/Soils/Prime Farmland

The proposed Project would not significantly impact physiography or geology of the area.

The soil map units that would be affected by the proposed alternative routes are listed in Table 4-1. Impact assessments were based on a broad range of physical and chemical soil characteristics. The primary impacts caused by construction activities are discussed in greater detail below.

**Table 4-1. Soil Map Units Crossed by Project Alternatives**

Soil Map Unit <sup>a</sup>	Alternative Routes (linear feet crossed)						
	1	2	3	4	5	6	7
BrA							485.04
BrB						390.45	
DaA	2466.77	3551.22	9538.06	11930.24	3551.22	5239.97	7509.15
DaB							1025.28
EsB							2089.34
EtB	1350.27	2139.7	2952.97	819.44	2139.7	3260.73	14858.91
PdC							1842.13
PuA	59782.23	56495.18	69867.92	69474.25	82167.62	83884.65	83612.85
PuB	399.61	375.45	346.15	346.15	2115.09	2115.09	703.69
Ra	2605.37	5662.08	908.72	908.72	3911.18	3911.18	5949.22
RcA	8804.47	12654.11	4230.93	4230.93	7225.07	7225.07	3960.17
RcB	8687.07	8351.53	371.93	371.93	3258.43	3258.43	428.54
Re	7270.87	10193.64	1397.88	1397.88			1446.21
UcA	2730.25	3394.97	2897.28	3283.95	4877.74	5146.95	2024.14
UcB	6329.48	3415.85	4191.04	4191.04	2844.66	2844.66	12008.16
UcC					716.42	716.42	439.93
UrB	2661.81	2740.22	5575.87	5575.87	4245.43	4245.43	6486.57

a. Refer to figure 3-2 for soil types associated with these unit references.

Transmission line construction impacts would generally be temporary. Existing roads that parallel the proposed transmission line corridors would be utilized for construction access; otherwise, overland travel would be necessary where required. Construction traffic within the ROW would cause temporary disturbances, as well as temporary staging areas and work areas around each structure. Soft soils in these areas are prone to rutting and compaction when in moist or wet conditions. Long-term impacts could be expected at each structure site, primarily where concrete foundations are required for corner and angle structures.

Generally, soil disturbance and associated impacts would occur along disturbed terrain such as dirt roadways and existing section lines. Construction of Alternative Route 1, the route with the least structures, would result in the loss of 0.11 acre of soils while the remaining routes would result in the

highest loss of acreage at 0.13 to 0.17 acre. An estimation of the total acres of permanent impacts to soils for each route is shown in Table 4-2.

**Table 4-2. Permanent Soil Impact Acres by Route**

Route	Foundations (angle/corner/tap)		Direct Embed Tangent		Total Permanent Impact Area (acres)
	No. of Structures	Area (acres) <sup>a</sup>	No. of Structures	Area (acres) <sup>b</sup>	
1	22	0.10	141	0.01	0.11
2	29	0.13	146	0.01	0.14
3	30	0.14	137	0.01	0.15
4	29	0.13	137	0.01	0.14
5	26	0.12	161	0.01	0.13
6	29	0.13	166	0.01	0.14
7	35	0.16	198	0.01	0.17

<sup>a</sup> Acreage estimates based on a worst-case foundation area of 10 feet x 20 feet for foundations (angle/corner structures).

<sup>b</sup> Acreage estimates based on a 4-foot-diameter footprint for augured tangent structures.

#### 4.1.1 Corrosion Potential

Corrosion potential reacts differently depending on material elements. Factors such as soil moisture, particle-size distribution, acidity, electrical conductivity of soil, sulfate and sodium content, and textures of soil have an effect that can weaken or corrode certain elements. Common elements found in transmission line construction are concrete and steel. Treated or untreated, these elements have different rates at which corrosion will occur and would require on-site specific examination if severe hazards of corrosion are found.

#### 4.1.2 Wind and Water Erosion Potential

The potential to erode soil through the process of detachment, transport, and deposition is known as wind erosion. The soil wind erosion potential is the interaction between soil surface features that cause susceptibility of soil to wind erosion and those features that resist the wind erosion process. Soils with low wind erosion potential are those soils with favorable surface particle size, higher organic matter content or armoring coarse fragments. Sandy particle size surface layers, low organic content, or no coarse fragment protection are the soils with high wind erosion probability (Soil Erosion on Cropland 2007, 2013).

Wind erosion is a big concern in the Texas Panhandle due to the amount of agriculture and associated tilling, grazing, and other disturbance activities. The Panhandle has also suffered from substantial drought over the past two plus years which also compounds the wind erosion potential (National Public Radio, Dried Out, 2013). Each of the proposed route alternatives are susceptible to some sort of wind erosion due to disturbance of soil surfaces. Wind erosion potential can be reduced through appropriate best management practices (BMPs) and minimizing disturbance of vegetative cover. While some wind erosion is expected where construction activities occur, no substantive effect is expected under any alternative route due to the minimal footprint and disturbance caused by pole construction.

The soil's water erosion potential is based on existing soils attributes, or a combination of attributes, and landscape runoff characteristics that have low resistance to the erosion process. Some of the attributes that contribute to high water erosion are soil particle size, permeability, and high runoff landscapes. The

types of attributes that help resist the effect water has on soils are low runoff landscapes that contain high organic matter. The proposed routes all have potential for low water erosion due to the relatively level topography which helps to minimize the amount of runoff.

Construction activities can cause accelerated wind and water soil erosion due to surface disturbances and increase depending on the level of disturbance. Erosion can be reduced through BMPs and stabilizing methods, such as vegetative ground cover, mulch, and fabric. Recommended construction measure S4, listed in Section 4.1.1, is recommended to reduce impacts to erodible soils. No substantial effect is expected under any of the proposed route alternatives.

#### **4.1.3 Rutting and Compaction Prone Soils**

Soil compaction occurs when soil particles are pressed together, or compacted, and the pore spaces between particles are reduced creating higher bulk density. Compaction causes a decrease in infiltration and an increase in runoff and erosion. Moist, fine textured soils are most susceptible to compactions.

Rutting occurs when soil strength is not sufficient to support the load applied to the surface by a particular object. This can cause harm to the surface hydrology of a site as well as damage the rooting environment. The rutting process physically severs roots and reduces the aeration and infiltration of the soil, degrading the rooting environment. Surface hydrological flows are disrupted and cause increased soil saturation or accelerated erosion. Rutting is most likely to occur on moist or wet fine texture soils due to low soil strength.

Soil compaction and rutting could be the result of heavy construction vehicles movement in the ROW, at temporary staging sites and access roads. Severity of compaction would depend on the soil textures and moisture content of the soil at the time of construction. The worst conditions of compaction would occur where heavy equipment operates on moist to wet soils with high clay content. Compaction can also occur on soils of various textures and moisture contents if multiple passes are made by high ground-weight equipment.

The majority of the existing soils types have some form of clay throughout the soils structure and are therefore prone to compaction when moist or wet. Scheduling construction activities during dry period would help to reduce compaction to soils. Construction measures S1 and S3, listed in Section 4.1.1, are recommended to reduce impacts to compaction prone and wet soils.

#### **4.1.4 Prime Farmlands**

Impacts to prime farmlands would be similar to the impacts described above for much of the project Study Area. Potential soil mixing could occur at pole auguring sites, causing fertile top soils to be combined with calcareous sub soils. This could result in reduction of soil productivity in these locations; however, the proposed structure locations are generally at the edge of active agriculture fields and not within the active farming areas. Construction measures S2 and S5, listed in Section 4.1.6, are recommended to reduce the potential for impacts to cropland soils. In addition to auguring, equipment traffic across the landscape during wet or moist soil conditions could also result in the loss of soil productivity and quality.

Based on an average structure spacing of 750 feet, construction of the transmission line would result in small areas of localized long-term disturbance associated with the direct embedding of tangent structures

and the foundations associated with angle and corner structures. As noted in Section 1.4, the project would result in between 163 and 231 structures depending on the route selected. Permanent impacts to prime farmland would result in the loss of surface lands where poles or foundations are placed due to routes crossing locations. Prime farmland makes up approximately 75 percent of land within the project Study Area boundary (62,447 acres out of 83,644 acres). Since the transmission poles are generally proposed to be located along parcel and property boundaries which primarily follow existing roads and other utilities, the new structures would not prevent the long-term use of prime farmland soils for active crop cultivation.

As shown on Figure 2-3 (enclosed in map pocket) and in Figure 3-2, there are several center-pivot irrigation systems in the project Study Area. Most are located on the other side of a dirt road from the proposed route centerline and would not be impacted. A few are on the same side and would require strategic placement of transmission line structures in order to span the widest edge of the irrigation circle. Below is a summary of the irrigation systems that would require consideration during design for structure placement:

- Two center-pivot systems are located north of Segment Y (Routes 3 and 4), between CRs 28 and 29; potential conflicts between the transmission line and irrigation system can be avoided by strategic placement of monopoles away from the widest edge of the irrigation circle. Proposed spans of up to 900 feet would avoid potential conflict.
- Three center-pivot systems are located along Segment Z, one within Section 1174 just north of County Road G and two north of SH 15 and the railroad ROW (Route 7); potential conflicts between the transmission line and irrigation system can be avoided by strategic placement of monopoles away from the widest edge of the irrigation circle. Proposed spans of up to 900 feet would avoid potential conflict.

As noted previously in Section 2.3.3, a number of local farmers expressed concern over placing power line structures inside active croplands, regardless of whether there is center-pivot or rolling irrigation apparatus, because manual spraying and watering by using trucks with booms can result in the same type of operations conflict. Based on information gathered during the public open-house meeting and from questionnaire forms received from the public, a number of agricultural fields in the project Study Area are manually irrigated by using water trucks. The trucks include 120-foot-wide booms/sprayers which need to maneuver around fence lines and other infrastructure. An inventory of which agriculture fields use this manual form of watering throughout the project Study Area is not available; however, it is known to occur along CRs H, 21, and 24 and Ranch Road 377 (Route 7, Segments M and U), based on comments received from landowners at the public meeting and in returned questionnaires. As such, a potential conflict may occur between transmission line structures and watering operations along Alternative Route 7, and potentially in other areas where this method of watering is used. Measure F1, in Section 4.1.6 is proposed to minimize this potential conflict.

#### **4.1.5 Substations**

The existing Ochiltree Substation would be upgraded in association with the selected route construction. Improvements would be contained within the existing disturbed site and new impacts to soils would be minimal. Upgrades to the existing Wade Substation would require limited clearing and grading for foundations and equipment purposes. The proposed expansion is an estimated one acre, to a total of two acres, and the site is currently surrounded by fallow agriculture.

The new Lipscomb Substation would require clearing and grading within the substation footprint only, including removal of several trees on the southern end of the site. While the full five acre site would be needed for managing the termination and dead-end structures, the majority of the property would not need to be cleared of vegetation since it is cultivated farmland. Implementation of standard BMPs prior to and during disturbance is recommended to minimize impacts to soils and erosion potential (Measure S4).

#### **4.1.6 Recommended Construction Measures**

The following measures are recommended to minimize potential short-term construction impacts to soils, as well as one measure to minimize long-term conflicts with on-going farming and agricultural operations.

**Measure S1** Equipment should only be operated when soils are dry (below the plastic/malleability limit to a depth of 6 to 8 inches or more). If rutting over 3 inches of depth occurs, construction should be stopped until soil conditions are dry.

This measure will help to reduce soil compaction and soil mixing. It will reduce the potential for a reduction in soil productivity on prime farmland soils.

**Measure S2** Soil should be returned to any excavated area in the order it was removed. Excess subsoil that is excavated for foundations beyond 10 inches in depth, should be disposed of as construction debris, and should not be spread on the soil surface.

This measure would ensure that nutrient and biologically rich topsoil would be maintained at the surface, and if calcareous subsoils are present they would remain below the rooting zone. In addition, it would help to maintain soil productivity in prime farmland soils.

**Measure S3** Where possible, permanent structures should not be placed in map unit “Re” (Lazbuddie clay) soil; this typically represents soils associated with playas.

Playa soils are typically low spots in the landscape that pond water due to the thick clay layers and low permeability. If the clay lining is penetrated it can cause these ponds to no longer hold water. These areas are typically valuable for wildlife so impacts should be avoided. Should structures be located within or on the periphery of a playa, special foundations may be necessary due to cyclical inundation.

**Measure S4** Erosion control BMPs should be applied in areas that are heavily disturbed by construction. Practices may include, but are not limited to erosion control blankets, waddles, silt fences, and re-vegetation.

The soil surrounding each structure is susceptible to erosion. The likelihood of erosion depends on the existing structure, organic matter, and permeability; however, the existing terrain is relatively flat which helps reduce the potential for water erosion. BMPs are recommended to reduce the wind and water erosion that may occur to prime farmland soils in the project Study Area.

**Measure S5** BMPs should be applied to ROW access selection and staging areas to help reduce the amount of surface soils exposed to construction activities.

By using existing ROWs and disturbed roads and parcels (staging area), soil disturbance would be minimized.

**Measure F1** SPS should coordinate with agriculture operators during the ROW acquisition stage to determine the best location for pole placement to limit interference with the ability of manual water trucks with booms to maneuver in and out of the fields, where applicable.

## **4.2 Impacts on Water Resources**

### **4.2.1 Surface Water**

Several ephemeral streams and playas are crossed by the proposed routes. The estimated span length between structures is 600–900 feet. The majority of playas in the area are small and can be spanned by the proposed transmission line. There are three large playas in the study area that would be crossed by Alternative Routes 1 and 2 and may require special foundations and pre-construction geotechnical surveys.

Segment X (Route 1) would cross through the middle of the largest playa in the study area, with a maximum width of 4,600 feet at that crossing. However, Route 1 follows the existing railroad ROW and assumes the centerline would be located at the top of the berm where the old rail line was located. The berm is elevated above the playa by approximately five feet. Special foundations would not be expected to be necessary for Route 1.

Alternative Route 2 would cross two seasonal playas, along Segment L (3,800 feet) and Segment W (4,600 feet), and would therefore require pre-construction geotechnical evaluations and possibly the use of special foundations within the inundation area. Segment L crosses a playa but is located on the edge of an active agriculture area that appears to have less saturation and inundation. Segment W parallels the north side of the railroad ROW and is therefore not located on top of the berm like Route 1. Segment W structures would likely be located within the inundation area of this playa. According to SPS engineers, foundations located within playas would need to be designed to rise at least one foot above the high water line. If the geotechnical investigation concludes that a water table exists, vibratory caissons may be needed and the use of a special “shell” to vibrate into the saturated soils. Special precautions would also be required for construction access to the foundation site. One option to limit impacts and avoid vehicle sinking includes using special “mats.” Foundations located within playas will increase construction costs by as much as \$100,000 per foundation.

Construction would be suspended during extreme wet conditions to help minimize ground disturbance and potential sediment transportation. All construction activities would take place using existing roads, disturbed ROW and farm trails to the maximum extent possible.

For all alternative routes, siltation of receiving waters during storm events would be minimized through implementation of standard BMPs, including construction of temporary silt barriers and prompt post-construction re-vegetation to restore disturbed surfaces. A storm water pollution prevention plan (SWPPP) would be implemented as part of project construction in accordance with the Texas

Commission on Environmental Quality (TCEQ) requirements. The plan would identify the most effective locations for silt barriers and maintenance of such barriers until disturbed grounds become stabilized. The use of straw or similar materials to cover disturbed soils is not practical due to windy conditions; however, other measures, such as temporary fabric covers, may be used if warranted.

A spill prevention, control, and countermeasures plan shall be available to prevent the release of hazardous materials into storm drains during project construction. Construction vehicles should not be maintained or refueled in the field, thereby further reducing the potential for a hazardous materials spills and water resource effects. No effect to water resources is expected from any alternative route.

No playas or streams are located within the limits of the Wade Substation expansion area or the new Lipscomb Substation site. Standard BMPs and preparation of a SWPPP would apply to construction and operation of the substation sites as well.

#### **4.2.2 Floodplains**

FEMA floodplain mapping for the project Study Area is not available. As noted previously, there are a number of playas in the project Study Area and some of the routes cross through or are adjacent to playas which are typically included in floodplains and have the potential to flood when an abundance of water falls for a lengthy duration of time.

Playa areas would be spanned to the extent practicable; therefore, impacts to potential floodplains would be minimized. Impacts would also be further reduced through use of silt barriers and prompt re-vegetation after construction.

#### **4.2.3 Groundwater**

Impacts to the Ogallala aquifer are not anticipated due to the depth of water table in the project Study Area, which averages more than 200 feet. Boring for structure installation would be limited to 26 feet or less. No impact to groundwater is expected for any of the alternative routes.

### **4.3 Impacts on Terrestrial Ecosystems**

#### **4.3.1 Vegetation**

The project Study Area is dominated mostly by herbaceous vegetation including grassland and cropland. Individual trees and stands of trees occur in some locations within the project Study Area. Impacts to vegetation resulting from the construction and operation of transmission lines are primarily associated with the minimal removal of existing woody vegetation within the transmission line ROW, the expanded site for the Wade Substation, and on the new Lipscomb Substation site. Only minimal clearing of vegetation would be necessary across agricultural lands. Construction of the facility within the ROW would be performed in a manner that would minimize adverse impacts to vegetation and retain existing ground cover whenever practicable. Clearing would occur only where necessary to provide access and working space and to protect conductors. Excess soil removed as a result of boring for installation of tangent structures, or as a result of excavation for corner and angle structure foundations, would either be disposed of off-site, spread around the site, or used as fill material elsewhere. Options for handling excess soil would be at the discretion of the landowner. Where necessary, soil conservation practices

would be undertaken to protect local vegetation and ensure a successful restoration program for areas disturbed during construction.

Playas that contain wetland vegetation are associated with all seven routes. Based on an average structure spacing of 600 to 900 feet, construction of the transmission line would result in small areas of localized long-term removal of wetland vegetation where playas cannot be spanned by the route. Most playas can be spanned by the project; however, Route 2 crosses two playas that cannot fully be spanned (along Segments L and W), as discussed previously in Section 4.2.1. Transmission structures for Route 1 are expected to be located on an upland berm north of SH 15 and would avoid impacts to wetland vegetation. Alternative Routes 3, 4, 5, and 6 cross playas as well, but the playas are narrow enough to be easily spanned. With appropriate design and pole placement, it is not anticipated that project construction will occur in wetland vegetation associated with any of the routes except possibly Alternative Route 2.

Construction of Route 2 would require work within the boundaries of two large playas and may result in removal of wetland vegetation for construction of temporary access roads and placement of concrete pole foundations. The removal of vegetation would be permanent for placement of the foundations and potentially temporary impacts from access to the foundation sites. Access to Segment W would be from the disturbed railroad ROW that abuts this segment, minimizing impacts from new disturbance in the playa area. Access to Segment L would likely be from the east side of the proposed ROW where the land is actively farmed and experiences regular disturbance. Vegetation removal for construction access would be temporary and wetland vegetation would re-establish following removal of temporary access roads and restoration of native cover. The concrete foundations would vary in size and range from 6 feet x 12 feet to 10 feet x 20 feet, depending on the soil conditions, load specifications and results from geotechnical studies of the playa soils and groundwater table. Assuming no more than nine foundations would be required within both Segments L and W (Route 2), at a maximum size of 10 feet x 20 feet, the total acreage of wetland vegetation permanently removed would be approximately 1,800 square feet (0.04 acre).

Impacts to wetland vegetation would be considered minor due to the small square-footage of vegetation affected and lack of special-status plant species in the project Study Area. However, it should be noted that some playas within the project Study Area, particularly the playa located west of Booker (Segment W), may be regulated under Section 404 of the Clean Water Act (Section 404). A formal jurisdictional determination should be made if Alternative Route 2 is selected as the recommended route and if construction activities result in discharge of temporary or permanent fill materials within the boundaries of that playa. The term “fill material” includes, but is not limited to, placement of any materials such as rock, sand, concrete or dirt or other activities such as construction of temporary or permanent access roads, placement of concrete foundations or any other facilities. Coordination with the USACE may be required for any impacts to jurisdictional waters.

### **Recommended Mitigation**

If discharge of fill material is required within the boundaries of playas identified on the constraints map, a jurisdictional determination would be required. If no jurisdictional waters are present, no further mitigation would be required. If discharge into jurisdictional waters is required, an application to the USACE for a Clean Water Act Section 404 permit should be prepared and submitted for the project. No work should occur within jurisdictional Waters of the United States until the appropriate Clean Water



Act Sections 401 and 404 permits are obtained. Avoidance, mitigation and/or compensation for loss of jurisdictional waters may be required under Section 404.

### **4.3.2 Endangered and Threatened Plant Species**

No plants currently listed as threatened or endangered by USFWS or TPWD are known to occur along the seven proposed transmission line routes, or on substation sites. No impacts to any federally or state-protected plant species are expected to result from this project.

### **4.3.3 Wildlife**

Impacts to common wildlife species (Section 3.5) as a result of project construction are expected to include: minor, short-term adverse impacts; possible minor, long-term adverse impacts; and minor long-term beneficial impacts. These impacts include short-term adverse impacts related to construction activities including ground-clearing, movement of vehicles and construction equipment and presence of construction workers. Long-term effects to wildlife could result from the presence of new transmission lines, poles and maintenance of the new facilities.

Construction activities would temporarily increase human presence, increase noise and movement of vehicles and equipment, and would also require ground-disturbance for placement of temporary access roads and proposed facilities. As a result, many mammalian and avian species may be temporarily disturbed and displaced during construction activities. However, disturbances are expected to be minimal because area wildlife are accustomed to low-level disturbances in this area, including general residential activity, noise and traffic from nearby roads, oil and gas operations, and mowing and tractor noise on grazing and agricultural lands. It is possible that some individuals of smaller, low mobility species (e.g., small reptiles or small mammals) may be injured or killed by construction equipment; however, most animals are mobile and would avoid the construction area during active work periods. This type of impact is anticipated to be rare and minor.

Wildlife in the immediate area may experience a minor loss of browse or forage material during construction; however, the prevalence of similar habitats in adjacent areas and regrowth of vegetation in the ROW following construction would minimize the effects of this loss.

After construction is completed, vegetation within the ROW would re-establish within one to three growing seasons, and habitat for wildlife is anticipated to return to preconstruction conditions. Agricultural practices are expected to continue within the project ROW where the ROW crosses the edge of active agriculture fields. Once construction is completed and the vegetation has recovered, wildlife would move back into the ROW and general wildlife use of the project Study Area would be similar to pre-construction.

Impacts on birds from electric transmission lines can have both adverse and beneficial effects. Much of the published information comes from the Avian Power Line Interaction Committee (APLIC), a collaboration of the USFWS and power companies to address issues of avian protection and electric power reliability. Positive impacts of transmission lines and structures on avian species, particularly raptors, include additional nesting and roosting sites and resting and hunting perches, particularly in open, treeless habitats (APLIC 2006). Perching on power lines and utility structures can give raptors a wide view of the surrounding area while they hunt for prey. Many species of raptors have been documented nesting and roosting on transmission structures and poles including American kestrel, red-

tailed hawk, and rough legged-hawk. Transmission lines have also been documented to provide nesting habitat for other common avian species. In fact, it is believed that transmission lines have significantly contributed to increased raptor populations in several areas of the United States (APLIC 2006). Minor, adverse impacts to prey species would be anticipated with any increase in avian predator species in the area. The project Study area currently has a number of existing transmission and distribution lines that presently provide these perching opportunities. The project would incrementally add to the number of available perch sites.

Adverse impacts to avian species from electric transmission lines range from conductor, ground wire, and structure interactions (electrocution and/or collision), to habitat loss and fragmentation from ROW construction and maintenance. Typically, electrocution is not a threat from electric transmission lines greater than 69-kV, as the distance between conductors or conductor and structure or ground wire is greater than the wingspan of most birds (i.e., greater than six feet) (APLIC 2006).

Collision hazards are greatest near habitat magnets such as wetlands or riparian areas. Collision hazards are also greatest for migratory or juvenile birds, because over time, resident species typically learn the location of transmission lines and become less susceptible to wire strikes (APLIC 2006). Habitat attractions are associated with the playas identified along all of the alternative routes. These routes all cross through, or are located immediately adjacent to, playas that provide habitat for migratory birds. However, because of the frequency of playas within the entire study area, the potential for collision hazards is similar for all routes. USFWS should be consulted on how to avoid impacts to migrating avian species in habitat areas.

#### **4.3.4 Endangered and Threatened Wildlife**

Based on data obtained on habitat and species occurrences from the TPWD, NWI, and from the LSD October 2012 field reconnaissance, suitable habitat was identified within the project Study Area for one proposed federally threatened species (lesser prairie chicken), one federally listed endangered species (whooping crane) and one state-listed threatened species (Texas horned lizard). No critical habitat for any listed species is located within the project Study Area.

##### **Whooping Crane**

The whooping crane was originally listed as an endangered species on March 11 1967, following establishment of the Endangered Species Preservation Act on October 15, 1966 and is currently listed as endangered under the Endangered Species Act of 1973, as amended. Reasons for decline of the species and its listing include: hunting and specimen collection; human disturbance; and conversion of the primary nesting habitat to hay, pastureland, and grain production. The whooping crane is still vulnerable to extinction in the wild with current threats including limited genetics of the population, loss and degradation of migration stopover habitat, construction of additional power lines, degradation of coastal ecosystems, and the threat of chemical spills in Texas (USFWS 2006).

Whooping cranes return repeatedly to ancestral breeding areas, migration routes, and wintering grounds; therefore, existing wild populations can be expected to continue using their present habitats with little likelihood of expansion, except locally (Erickson and Derrickson 1981). During migration, whooping cranes use a variety of habitats including croplands and wetlands, with most sites being less than nine acres in size. Heavily vegetated wetlands are not generally used; however, when vegetated wetlands are used, family groups appear to select more heavily vegetated wetlands than non-families (CWS and

USFWS 2007). Significant portions of the whooping crane migratory corridor have been adversely affected by development, conversion to non-compatible land uses, or on-going land management that have resulted in habitat loss along with degradation and fragmentation of habitat caused by draining of wetlands for conversion to croplands; urbanization; construction of roads and power lines; and construction of wind farms (USFWS 2012e).

Collisions with power lines are a substantial cause of whooping crane mortality in migration. The APLIC, composed of nine investor-owned electric utilities and the USFWS, was established in 1989 to address the issue of whooping crane collisions. In 1994, the APLIC provided voluntary guidelines to the industry on avoiding power line strikes (APLIC 1994). The guidelines were subsequently updated in 2006 (APLIC 2006) and again in 2012 with *Reducing Avian Collisions with Power Lines: State of the Art in 2012* (APLIC and USFWS 2012). Tests of line marking devices, using sandhill cranes as surrogate research species, have identified techniques effective in reducing power line collisions by cranes. Techniques include marking lines in areas frequently used by cranes and avoiding placement of new line corridors around wetlands or other crane use areas (USFWS 2006).

Wetland and palustrine habitat are associated within the playas identified throughout the project Study Area and all seven alternative routes cross directly through both small and large playas. Whooping cranes may use these playas as areas to stop-over and feed and rest. The construction and maintenance of the transmission line is not anticipated to alter current land uses since the proposed routes primarily follow existing roads, utility or railroad ROWs or property lines, therefore, the main concern to the whooping crane is the potential for collisions with transmission lines and poles. In addition, Alternative Route 2 may result in removal of small areas of wetland habitat (Segments L and W) for placement of the transmission line foundations.

### **Lesser Prairie Chicken**

The eastern half of the project Study Area is located within the range of LEPC, including portions of all proposed routes. As discussed in Chapter 3, the habitat within the study area is classified as Category 5 (Common) habitat by the SGP CHAT. This category is defined as “habitat which is relatively common, generally less limiting to LEPC populations or meta-populations, and generally better suited for land use conversion.”

In the “Candidate Notice of Review,” in the December 10, 2008, *Federal Register* (73 FR 75176), the “magnitude of threats” categorization for LEPC was changed from moderate to high. Development of wind energy and placement of associated transmission lines throughout the occupied range of LEPC was given as the primary factor for the change in level of threat (73 FR 75176). Transmission lines can create zones that LEPC avoid, resulting in habitat fragmentation. Power lines and unmarked wire fences are known to cause LEPC injury and mortality, although the specific range-wide impact on LEPC is largely unquantified. LEPC exhibit strong avoidance of tall vertical features such as utility transmission lines. In typical LEPC habitat where vegetation is low and the terrain is relatively flat, power lines and power poles provide attractive hunting and roosting perches for many species of raptors (73 FR 75176). To avoid actions that may adversely affect LEPC, coordination with USFWS and TPWD would be required to implement and coordinate conservation measures within the ROW and on adjacent private lands. Typical conservation measures include native plant restoration, control of exotic vegetation, prescribed burning, selective brush management, and prescribed grazing.

## **Texas Horned-Lizard**

The project Study Area is within the range of Texas horned lizard, and potential habitat for this species occurs throughout the project Study Area. As noted in Section 3.6, the Texas horned lizard is a state-listed threatened species. Texas horned lizard could be potentially disturbed, displaced, or killed during construction activities by earth-moving equipment and construction vehicles. Impacts to this species could be avoided with implementation of mitigation measures such as preconstruction surveys and monitoring during construction if lizards are present. Long-term management of the transmission lines would involve intermittent vehicle travel along access roads to monitor and maintain lines and vehicle trips to access poles and lines for repair. If Texas horned-lizard populations occur along the transmission lines, individual lizards could be disturbed, displaced, or killed by vehicles. TPWD should be consulted on how to avoid impacts on the Texas horned lizard during construction and long-term maintenance of the lines. With implementation of mitigation measures, short- and long-term impacts on Texas horned lizard would be considered minor.

## **Suggested Mitigation**

### ***Whooping Crane***

Consultation with USFWS would be required on how to avoid impacts to whooping crane during migration periods. USFWS may request incorporation of design guidelines for poles and transmission lines to minimize the potential for whooping crane collisions. On December 20, 2012, APLIC and the FWS released their updated state-of-the-art guidance document *Reducing Avian Collisions with Power Lines: State of the Art in 2012* (APLIC and USFWS 2012). This best-practices document offers electric utilities and cooperatives, federal power administrations, wildlife agencies, and other stakeholders specific guidance for reducing bird collisions with power lines based on the most current published science and technical information. Possible mitigation could include design features such as marking or removing the shield wire. Studies suggest that most bird collisions occur with the shield wire, which is the smallest diameter and highest wire on a transmission line. Many studies of lines with high collision rates indicate that collision risk can be lowered by 50 to 80 percent when these lines are marked, though the most recent study published at this writing demonstrated only a 9.6 percent reduction (APLIC 2012). However, recommendations for which device is the most effective and standard spacing are not possible due to differences in study designs and site-specific conditions. As a result of these differences, reduction rates may not be replicable from one line or study to another. Since 1994, line marking devices have been further developed in North America, Europe, and South Africa. Advances in aerial marker spheres, spirals, and suspended devices include changes to design, colors, attachments, and materials in an effort to improve effectiveness and durability and to reduce possible damage to lines.

### ***Lesser Prairie Chicken***

While the project Study area is not considered a critical habitat area by the SGP CHAT, LEPC presence cannot be entirely ruled out. The USFWS was consulted to ensure that impacts to LEPC are avoided. In a letter dated March 6, 2013 (Appendix H), the USFWS indicated that while a large portion of the study area occurs within the LEPC's estimated occupied range, the majority of the study area appears to be highly fragmented by agriculture, oil and gas exploration, and other activities. LEPC surveys were not requested; however, the USFWS noted that there are two parcels of land south of Booker that are managed by landowners who have partnered with the USFWS to restore habitat for LEPC. TPWD has entered into a candidate conservation agreement with assurances (CCAA) with the USFWS, with the

goal of encouraging protection and improvement of suitable habitat on non-federal lands by offering private landowners incentives to implement voluntary conservation measures and to provide to the cooperating landowner regulatory assurance concerning land use restrictions that might otherwise apply should the LEPC become listed. In 2009 the Texas CCAA covered 50 counties with 22 private landowners controlling 255,044 acres. The USFWS recommends that the preferred transmission line route avoid lands to the south of Booker where these conservation measures apply on two parcels and could potentially impact the viability of a route. Alternative Route 7 could potentially encroach into areas protected by a landowner CCAA agreement; the location of these lands is confidential so this cannot be confirmed. Disclosure of existing landowner CCAA agreements would be made by USFWS if the preferred route encroaches into these areas (i.e., Route 7, if selected).

## **4.4 Impacts on Aquatic Ecosystems**

No perennial surface waters occur in the project Study Area. No impacts are anticipated to aquatic ecosystems.

### **4.4.1 Endangered and Threatened Aquatic Species**

No endangered or threatened aquatic species are listed in Lipscomb and Ochiltree Counties and no perennial surface waters occur in the project Study Area. Therefore, no impacts are anticipated to endangered and threatened aquatic species.

## **4.5 Socioeconomic Impacts**

The construction and operation of the proposed 115-kV transmission line under all seven alternatives would contribute to the economy of Lipscomb and Ochiltree Counties through payroll earnings over the life of the project, which would be spent on items such as housing, food, goods, and services. In addition, economic benefits would occur because of the construction expenditures on equipment and supplies from local area vendors. The impacts are the same for all seven alternatives.

The project is not anticipated to have any direct growth-inducing effects.. Indirect growth-inducing effects could occur because the reliability of electrical service in Lipscomb and Ochiltree Counties would be improved, which could, in turn, enhance the ability of the county and local communities to attract new businesses.

### **4.5.1 Population**

Construction of the new transmission line would require a fairly small labor pool of up to 35 people at any given time, depending on the stage of construction. SPS anticipates using staff from its existing workforce; however, it may need to hire private contractors if the construction schedule conflicts with other staffing requirements. It is not anticipated that the project would require a substantial influx of new employees into the region; therefore, there would be no local or regional population impacts and no demand for new permanent housing. Temporary lodging is fairly limited in Perryton due to high demand from oil and gas contractors. Temporary lodging in Booker is even more limited and Perryton is expected to be the hub of construction operations. Given the relatively low number of construction crew at any one time, local accommodations would be available with advanced reservation and the

project is not expected to create a long-term demand for temporary lodging. Crews coming from outside the area would stay in Perryton only intermittently.

#### **4.5.2 Economy and Employment**

Construction of the new transmission line would require a fairly small labor pool. Construction and operation of the transmission lines is expected to have minimal influence on the local economy. In terms of payroll earnings and construction expenditures, the economic benefit from the project would be small relative to the local economy.

#### **4.5.3 Community Services**

The proposed action would have an indirect long-term benefit to the provision of electric service in Lipscomb and Ochiltree Counties. Existing residents and businesses would benefit from the increased availability and reliability of power in the area. The project would ensure a reliable source of power, removing the potential for power surges sometimes experienced from the 66-kV transmission line supply.

Solid waste would be generated primarily by construction. A private local service provides disposal of industrial and commercial wastes at the City of Perryton's arid-exempt municipal landfill (exempt from liners and groundwater monitoring requirements). There would be no substantive effect to the City of Perryton municipal solid waste facilities from wastes generated from construction and operation of the proposed project.

Since a substantial influx of in-migrating employees is not anticipated for the project (short or long term), no adverse effects are expected to public utilities or to community services such as fire protection, medical and emergency services, and police protection. This is true for the cities of Booker and Perryton and both Lipscomb and Ochiltree Counties. Local schools are not expected to experience any increases in enrollment from construction workers' children due to the short-term duration of the construction phase. Permanent relocation to the project Study Area is not expected for the long-term maintenance of this transmission line or the substations.

#### **4.5.4 Community Values**

The proposed project would enhance the reliability of power in the project Study Area, contributing to the appeal of the area for potential residential development, as well as commercial and industrial enterprise. The improved reliability of electricity may also indirectly spur revitalization of neighborhoods. There would be no adverse impact from the proposed project to the existing rural and suburban character, given that transmission lines of equal and higher voltage (115-kV and 230-kV), as well as other infrastructure such as oil and gas pipelines and wells, are already an existing feature of the developed and undeveloped landscapes in the project Study Area. The project Study Area would continue to provide an expansive setting for a western lifestyle that values agriculture and traditional values.

## **4.6 Impacts on Land Use, Aesthetics, Recreation, Transportation, Aviation, and Communication Facilities**

### **4.6.1 Land Use**

The proposed transmission line could affect existing land uses and private interests within the 70-foot-wide transmission line ROW. Although agricultural activities could continue within the ROW, buildings would be prohibited and the establishment of trees limited. Proposed construction activities to install the transmission lines and substations could cause temporary inconvenience or disruption to existing land uses along all route alternatives and by both substation sites during construction activities over a period of 3-4 months. Impacts to land uses would be potentially significant if they eliminated existing or planned land uses, or if they were in conflict with land management controls such as zoning districts or conservation easements. The proposed project would not conflict with local zoning and does not cross into designated preserves or conservation easements.

As noted previously in Sections 2.3.3 and 4.1.4, a number of local farmers expressed concern over placing power line poles inside active croplands regardless of whether there are center-pivot or rolling irrigation apparatus since manual spraying and watering by using trucks with booms can result in the same type of operations conflict. Based on information gathered during the public open-house meeting and from questionnaire forms received from the public, a number of agricultural fields in the study area are “manually” irrigated by using water trucks. The trucks include 120-foot wide booms/sprayers which need to maneuver around fence lines and other infrastructure. An inventory of which agriculture fields use this manual form of watering throughout the study area is not available; however, it is known to occur along CRs H, 21, 24 and Ranch Road 377 (Route 7), based on input from landowners at the public open house and from returned questionnaires. As such, a potential conflict may occur between transmission line structures and watering operations along Alternative Route 7, and potentially in other areas where this method of watering is used. Measure F1 in Section 4.1 is recommended to minimize this potential conflict. That measure recommends that SPS coordinate with agriculture operators during the ROW acquisition stage to determine the best location for pole placement to ensure manual water trucks with booms can maneuver in and out of the fields.

Also addressed in Section 4.1.4, potential conflicts with existing center-pivot irrigation systems are not expected due to the location of the proposed centerline for all alternatives. Center-pivot systems located along Segment Y (Routes 3 and 4) and Segment Z (Route 7) would be avoided by strategically placing the transmission line poles away from the widest edge of the irrigation system. The proposed spans of up to 900 feet would minimize this potential conflict to current agricultural operations. Table 4-3 summarizes the routes that have ROWs crossing irrigated cropland.

The proposed 115-kV transmission line is not expected to substantially alter existing farming or ranching operations. The impacts to agriculture would consist of the loss of grazing and cropland for each single-pole steel structure. The acres removed by single-pole steel structures would be very small relative to the total land acres available for grazing; poles are proposed to be located as close to property lines as possible, minimizing the encroachment into fields. The remainder of the ROW would continue to be available for livestock grazing and crop production. The exclusion of shrubs and trees from the ROW would not affect other uses of the land. Facilities related to agricultural land uses include center-pivot irrigation systems. Consequently, the proposed project would not impact the local economy that is based heavily on the agriculture industry. Table 4-3 summarizes the length that proposed routes would

cross the edge of cultivated cropland. As noted above, care will be given to pole placement in order to avoid impacting irrigation systems (in-place center-pivot as well as manual watering trucks).

As discussed previously in Chapter 3, all seven routes cross oil and gas transmission pipelines but do not parallel any of the main lines. All routes are also located in proximity to a number of oil and gas operations (tanks, rigs, etc.). The majority of the oil and gas lines in the study area are small feeder lines, with only five large natural gas transmission lines in the study area, ranging in size between 16- and 30-inches in diameter. None of the seven routes parallel these lines, however all routes would cross these five natural gas transmission lines. It is possible that minor adjustments will be required during final route design to avoid potential conflicts with the oil and gas infrastructure. An inventory of pipelines will occur after a final route is selected and design modifications will be made where necessary.

As shown in Table 4-3, there would be between 25 and 71 habitable structures located within 300 feet of alternative route centerlines, including residential, commercial and industrial structures. Table 4-4 provides a more detailed list of habitable structures by route, listing each structure and its distance from the segment centerline. The entrances of the majority of the habitable structures face towards the transmission line centerline. Habitable structures beyond the 300-foot distance generally do not have a direct line of sight because of the presence of intervening structures and vegetation. Occupants of the affected habitable structures would experience sights and sounds of construction activity, including the presence of materials, construction workers, and equipment during transmission line construction. These disturbances decrease with increasing distance from the centerline. In addition, access to residential, commercial and industrial areas could be temporarily disrupted at some locations. Impacts to habitable structures from construction activities would be short-term and temporary, and not considered adverse.

Community and public facilities located near the alternative routes include a few parks and recreation facilities and two schools. Parks and recreation facilities are addressed further below under Section 4.6.3. Booker Junior High/High Schools are located on the same campus in Booker, south of W. and E. Mitchell Road and west of SH 23/RR 1265. Segment AF (Route 4) is located south of the school property and their athletic fields but the route segment is not located within 300 feet of any school buildings. None of the school facilities would be displaced or otherwise affected by the construction and operation of Route 4.

**Table 4-3. Land Uses Affected by Proposed Transmission Line, by Route**

	<b>Route 1</b>	<b>Route 2</b>	<b>Route 3</b>	<b>Route 4</b>	<b>Route 5</b>	<b>Route 6</b>	<b>Route 7</b>
Route length (miles)	19.51	20.57	19.24	19.29	22.12	23.13	27.34
Habitable structures within 300 feet of centerline	66	25	71	64	32	36	60
Length of ROW crossing edge of cultivated crops (miles)	6.1	11.1	13.9	14.7	14.8	15.5	14.5
Length of ROW crossing edge of cultivated crops (% of total length)	30%	54%	72%	76%	67%	67%	53%
Number of center pivots within ROW	0	0	2	2	0	0	3



**Table 4-4. Habitable Structures within 300 Feet of Centerline**

Structure ID Number (on Figure 2-3)	Segment	Distance to Centerline (feet)	Type of Structure <sup>a</sup>
<b>Alternative Route 1 ( 66 Structures)<sup>b</sup></b>			
6 (2) <sup>c</sup>	F	262	Commercial
6 (2) <sup>c</sup>	G	277	Commercial
7	G	287	Commercial
8	G	277	Commercial
27	J	159	Commercial
28	J	65	Commercial
29	J	71	Commercial
30	J	217	Commercial
31	J	51	Commercial
32	J	55	Commercial
33	J	110	Commercial
34	J	1	Commercial (small shed)
35	J	245	Residential
36	J	245	Residential
37	J	223	Residential
38	J	155	Residential
39	J	186	Commercial
40	J	238	Residential
63	O	280	Residential
64	O	257	Residential
66	O	300	Commercial
67	O	266	Residential
68	O	151	Commercial
69	O	236	Residential
70	O	281	Residential
71	O	287	Residential
72	O	290	Residential
94	X	168	Commercial
95	X	134	Commercial
153	X	171	Commercial
130	AE	210	Hotel
131	AE	171	Commercial
132	AE	142	Commercial

<sup>a</sup> Commercial = commercial, industrial, retail (nonresidential and non-hotel or non-motel).

<sup>b</sup> Total number per route and excludes double counts if a structure is near two or more segments.

<sup>c</sup> ( ) Indicates where there is more than one structure per ID.

**Table 4-4. Habitable Structures within 300 Feet of Centerline**

Structure ID Number (on Figure 2-3)	Segment	Distance to Centerline (feet)	Type of Structure <sup>a</sup>
133 (4) <sup>c</sup>	AE	140	Commercial
134	AE	198	Residential
135	AE	209	Residential
136	AE	253	Residential
137	AE	221	Residential
138	AE	219	Residential
139	AE	219	Residential
140	AE	221	Residential
141	AE	219	Residential
142	AE	242	Residential
143	AE	208	Residential
144	AE	162	Residential
145	AE	247	Commercial
146 (4) <sup>c</sup>	AE	203	Commercial
147	AE	147	Commercial
148 (2) <sup>c</sup>	AE	163	Commercial
149	AE	156	Commercial
150	AE	155	Commercial
151	AE	127	Commercial
152 (3) <sup>c</sup>	AE	286	Commercial
153	AE	128	Commercial
154	AE	127	Commercial
155	AE	110	Commercial
156	AE	110	Commercial
157	AE	221	Commercial
<b>Alternative Route 2 (25 Structures)<sup>b</sup></b>			
6 (2) <sup>c</sup>	F	262	Commercial
6 (2) <sup>c</sup>	G	277	Commercial
7	G	287	Commercial
8	G	277	Commercial
25	K	121	Commercial
26	K	296	Commercial
41	L	215	Residential
42	L	300	Commercial

<sup>a</sup> Commercial = commercial, industrial, retail (nonresidential and non-hotel or non-motel).

<sup>b</sup> Total number per route and excludes double counts if a structure is near two or more segments.

<sup>c</sup> ( ) Indicates where there is more than one structure per ID.

**Table 4-4 Habitable Structures within 300 Feet of Centerline**

Structure ID Number (on Figure 2-3)	Segment	Distance to Centerline (feet)	Type of Structure <sup>a</sup>
68	P	133	Commercial
94	W	268	Commercial
95	W	234	Commercial
153	W	253	Commercial
153	AC	171	Commercial
154	AC	290	Commercial
154	W	290	Commercial
158 (2) <sup>c</sup>	AC	265	Commercial
159	AC	177	Residential
160	AC	256	Commercial
162	AC	187	Commercial
163	AB	244	Residential
164	AB	107	Residential
165	AB	279	Residential
166	AB	35	Residential
167	AB	225	Residential
168	AB	135	Residential
169	AB	145	Commercial
<b>Alternative Route 3 (71 Structures)<sup>b</sup></b>			
1 (2) <sup>c</sup>	E	267	Commercial
2	E	215	Commercial
3	E	213	Commercial
4 (2) <sup>c</sup>	E	297	Commercial
5	E	234	Residential
6 (2) <sup>c</sup>	G	277	Commercial
7	G	287	Commercial
8	G	277	Commercial
27	J	159	Commercial
28	J	65	Commercial
29	J	71	Commercial
30	J	217	Commercial
31	J	51	Commercial
32	J	55	Commercial
33	J	110	Commercial

<sup>a</sup> Commercial = commercial, industrial, retail (nonresidential and non-hotel or non-motel).

<sup>b</sup> Total number per route and excludes double counts if a structure is near two or more segments.

<sup>c</sup> ( ) Indicates where there is more than one structure per ID.

**Table 4-4. Habitable Structures within 300 Feet of Centerline**

Structure ID Number (on Figure 2-3)	Segment	Distance to Centerline (feet)	Type of Structure <sup>a</sup>
34	J	1	Commercial (small shed)
35	J	245	Residential
36	J	282	Residential
37	J	223	Residential
38	J	155	Residential
39	J	186	Commercial
40	J	238	Residential
63	Q	214	Residential
65	Q	171	Commercial
73	Q	204	Residential
74	Q	145	Residential
75	Q	238	Residential
76	Q	229	Commercial
77	Q	225	Residential
78	Q	229	Residential
79	Q	240	Residential
80	Q	266	Residential
81	Q	242	Residential
82 (2) <sup>c</sup>	Q	162	Commercial
83 (2) <sup>c</sup>	Q	290	Commercial
84	Q	223	Residential
85	Q	258	Residential
86	Q	273	Residential
100	Y	98	Commercial
106	AH	227	Residential
107	AH	214	Residential
108	AH	226	Residential
109	AH	225	Residential
110	AH	221	Residential
111	AH	214	Residential
112	AH	220	Residential
113	AH	218	Residential
114	AH	224	Residential
115	AH	209	Residential

<sup>a</sup> Commercial = commercial, industrial, retail (nonresidential and non-hotel or non-motel).

<sup>b</sup> Total number per route and excludes double counts if a structure is near two or more segments.

<sup>c</sup> ( ) Indicates where there is more than one structure per ID.

**Table 4-4. Habitable Structures within 300 Feet of Centerline**

Structure ID Number (on Figure 2-3)	Segment	Distance to Centerline (feet)	Type of Structure <sup>a</sup>
116	AH	189	Residential
117	AH	212	Residential
118	AH	203	Residential
119	AH	123	Commercial
120	AH	94	Commercial
121	AH	187	Commercial
122	AH	109	Commercial
123	AH	128	Commercial
124	AH	136	Commercial
125	AH	39	Commercial
126	AH	190	Motel
127	AH	184	Commercial
128	AH	239	Residential
129	AH	274	Residential
130	AH	149	Hotel
130	AI	170	Hotel
130	AJ	210	Hotel
131	AH	295	Commercial
131	AI	171	Commercial
131	AJ	171	Commercial
132	AI	240	Commercial
132	AJ	239	Commercial
<b>Alternative Route 4 (64 Structures)<sup>b</sup></b>			
6 (2) <sup>c</sup>	F	262	Commercial
6 (2) <sup>c</sup>	G	277	Commercial
7	G	287	Commercial
8	G	277	Commercial
27	J	159	Commercial
28	J	65	Commercial
29	J	71	Commercial
30	J	217	Commercial
31	J	51	Commercial
32	J	55	Commercial
33	J	110	Commercial

<sup>a</sup> Commercial = commercial, industrial, retail (nonresidential and non-hotel or non-motel).

<sup>b</sup> Total number per route and excludes double counts if a structure is near two or more segments.

<sup>c</sup> ( ) Indicates where there is more than one structure per ID.

**Table 4-4. Habitable Structures within 300 Feet of Centerline**

Structure ID Number (on Figure 2-3)	Segment	Distance to Centerline (feet)	Type of Structure <sup>a</sup>
34	J	1	Commercial (small shed)
35	J	245	Residential
36	J	245	Residential
37	J	223	Residential
38	J	155	Residential
39	J	186	Commercial
40	J	238	Residential
63	Q	214	Residential
65	Q	171	Commercial
73	Q	204	Residential
74	Q	145	Residential
75	Q	238	Residential
76	Q	229	Commercial
77	Q	225	Residential
78	Q	229	Residential
79	Q	240	Residential
80	Q	266	Residential
81	Q	242	Residential
82 (2) <sup>c</sup>	Q	162	Commercial
83 (2) <sup>c</sup>	Q	290	Commercial
84	Q	223	Residential
85	Q	258	Residential
86	Q	273	Residential
100	Y	98	Commercial
106	AH	227	Residential
107	AH	214	Residential
108	AH	226	Residential
109	AH	225	Residential
110	AH	221	Residential
111	AH	214	Residential
112	AH	220	Residential
113	AH	218	Residential
114	AH	224	Residential
115	AH	209	Residential

<sup>a</sup> Commercial = commercial, industrial, retail (nonresidential and non-hotel or non-motel).

<sup>b</sup> Total number per route and excludes double counts if a structure is near two or more segments.

<sup>c</sup> ( ) Indicates where there is more than one structure per ID.

**Table 4-4. Habitable Structures within 300 Feet of Centerline**

Structure ID Number (on Figure 2-3)	Segment	Distance to Centerline (feet)	Type of Structure <sup>a</sup>
116	AH	189	Residential
117	AH	212	Residential
118	AH	203	Residential
119	AH	123	Commercial
120	AH	94	Commercial
121	AH	187	Commercial
122	AH	109	Commercial
123	AH	128	Commercial
124	AH	136	Commercial
125	AH	39	Commercial
126	AH	190	Motel
127	AH	184	Commercial
128	AH	239	Residential
129	AH	274	Residential
130	AH	149	Hotel
130	AI	170	Hotel
130	AJ	210	Hotel
131	AH	295	Commercial
131	AI	171	Commercial
131	AJ	171	Commercial
132	AI	240	Commercial
132	AJ	239	Commercial
<b>Alternative Route 5 (32 Structures)<sup>b</sup></b>			
6 (2) <sup>c</sup>	F	262	Commercial
6 (2) <sup>c</sup>	G	277	Commercial
7	G	287	Commercial
8	G	277	Commercial
9	I	251	Commercial
10	I	264	Commercial
11	I	183	Residential
12	I	181	Commercial
13	I	223	Commercial
14	I	181	Commercial
15	I	234	Residential

<sup>a</sup> Commercial = commercial, industrial, retail (nonresidential and non-hotel or non-motel).

<sup>b</sup> Total number per route and excludes double counts if a structure is near two or more segments.

<sup>c</sup> ( ) Indicates where there is more than one structure per ID.



**Table 4-4. Habitable Structures within 300 Feet of Centerline**

Structure ID Number (on Figure 2-3)	Segment	Distance to Centerline (feet)	Type of Structure <sup>a</sup>
16	I	207	Residential
17	I	275	Commercial
18	I	184	Commercial
19	I	157	Residential
20	I	184	Commercial
21	I	158	Commercial
22	I	120	Commercial
23	I	212	Commercial
24	I	235	Commercial
97	V	116	Residential
98	V	123	Commercial
99	V	205	Residential
161	V	269	Commercial
162	V	150	Commercial
163	AB	244	Residential
164	AB	107	Residential
165	AB	279	Residential
166	AB	35	Residential
167	AB	225	Residential
168	AB	135	Residential
169	AB	145	Commercial
<b>Alternative Route 6 (36 Structures)<sup>b</sup></b>			
1 (2) <sup>c</sup>	E	267	Commercial
2	E	215	Commercial
3	E	213	Commercial
4 (2) <sup>c</sup>	E	247	Commercial
5	E	234	Residential
6 (2) <sup>c</sup>	G	277	Commercial
7	G	287	Commercial
8	G	277	Commercial
9	I	251	Commercial
10	I	264	Commercial
11	I	183	Residential
12	I	181	Commercial

<sup>a</sup> Commercial = commercial, industrial, retail (nonresidential and non-hotel or non-motel).

<sup>b</sup> Total number per route and excludes double counts if a structure is near two or more segments.

<sup>c</sup> ( ) Indicates where there is more than one structure per ID.

**Table 4-4. Habitable Structures within 300 Feet of Centerline**

Structure ID Number (on Figure 2-3)	Segment	Distance to Centerline (feet)	Type of Structure <sup>a</sup>
13	I	223	Commercial
14	I	181	Commercial
15	I	234	Residential
16	I	207	Residential
17	I	275	Commercial
18	I	184	Commercial
19	I	157	Residential
20	I	184	Commercial
21	I	158	Commercial
22	I	120	Commercial
23	I	212	Commercial
24	I	235	Commercial
97	V	116	Residential
98	V	123	Commercial
99	V	205	Residential
161	V	269	Commercial
162	V	150	Commercial
170	AA	247	Commercial
171	AA	83	Commercial
172	AA	292	Commercial
173	AA	266	Residential
<b>Alternative Route 7 (60 Structures)<sup>b</sup></b>			
6 (2) <sup>c</sup>	F	262	Commercial
6 (2) <sup>c</sup>	G	277	Commercial
7	G	287	Commercial
8	G	277	Commercial
25	K	121	Commercial
26	K	296	Commercial
41	K	284	Residential
42	M	3	Commercial (small trailer)
43 (7) <sup>c</sup>	M	166	Mobile Homes
44	M	216	Residential
45	M	221	Residential
46	M	136	Commercial

<sup>a</sup> Commercial = commercial, industrial, retail (nonresidential and non-hotel or non-motel).

<sup>b</sup> Total number per route and excludes double counts if a structure is near two or more segments.

<sup>c</sup> ( ) Indicates where there is more than one structure per ID.

**Table 4-4. Habitable Structures within 300 Feet of Centerline**

Structure ID Number (on Figure 2-3)	Segment	Distance to Centerline (feet)	Type of Structure <sup>a</sup>
47 (2) <sup>c</sup>	M	259	Commercial
48	M	281	Commercial
49	M	220	Commercial
50	M	242	Commercial
51	M	64	Residential
52	M	162	Residential
53 (3) <sup>c</sup>	M	161	Commercial
54 (not counted in total; minor route shift during final routing phase moved it outside 300-foot buffer)	M	492 (excluded from total count but shown on map)	Commercial
55	M	236	Commercial
56 (2) <sup>c</sup>	M	272	Commercial
57	M	252	Commercial
58	M	226	Commercial
59	M	188	Residential
60	M	234	Commercial
61	M	275	Commercial
62	M	68	Commercial
87	M	208	Commercial
88	M	282	Residential
89	M	234	Commercial
90 (4) <sup>c</sup>	M	190	Commercial
91	M	227	Residential
91	U	241	Residential
91	Z	241	Residential
92 (3) <sup>c</sup>	Z	230	Commercial
93	U	200	Commercial
96	Z	165	Commercial
101	Z	225	Residential
102	Z	288	Residential
103	Z	257	Residential
104 (2) <sup>c</sup>	Z	293	Commercial
105 (2) <sup>c</sup>	Z	161	Commercial
130	Z	235	Hotel
130	AI	170	Hotel

<sup>a</sup> Commercial = commercial, industrial, retail (nonresidential and non-hotel or non-motel).

<sup>b</sup> Total number per route and excludes double counts if a structure is near two or more segments.

<sup>c</sup> ( ) Indicates where there is more than one structure per ID.

**Table 4-4. Habitable Structures within 300 Feet of Centerline**

Structure ID Number (on Figure 2-3)	Segment	Distance to Centerline (feet)	Type of Structure <sup>a</sup>
130	AJ	210	Hotel
131	AI	239	Commercial
131	AJ	171	Commercial
132	AI	239	Commercial
132	AJ	239	Commercial

<sup>a</sup> Commercial = commercial, industrial, retail (nonresidential and non-hotel or non-motel).

<sup>b</sup> Total number per route and excludes double counts if a structure is near two or more segments.

<sup>c</sup> ( ) Indicates where there is more than one structure per ID.

The proposed Lipscomb Substation would be located on land that has been farmed and is surrounded by open space to the west, commercial and industrial land uses to the south (hotel, retail and grain silos), SH 23/RR 1265 and agricultural fields to the east. Approximately five acres of farmland would be lost as a result of the substation development. A significant impact to prime farmland is not expected given how small the site is in comparison to the large inventory of actively farmed lands in this region. Agriculture would likely continue north of the substation site, on the west side of SH 23/RR 1265, south of CR D. The nearest residential uses to the substation site are located approximately 600 feet south, across E. Santa Fe Lane and SH 15, on the other side of the commercial and industrial land uses north of the highway. The next nearest residential community to the substation site is located approximately 640 feet to the west, on the west side of Kiowa Street, north of E. Santa Fe Lane. The residences to the west are buffered from the site by open space dotted with trees. No adverse effect to existing land uses would be generated by construction of the new substation, with the exception of potential visual effects discussed further below under Section 4.6.2.

The Wade Substation would be expanded from one acre to two acres in size. The existing substation is currently located on the northwest corner of the intersection of CR 24 and CR F. The site is surrounded by the two roads, active farmland to the west, north and east, and a large hog farm to the south of CR F. The nearest residence is located approximately 3,770 feet to the west; a home located on the hog farm property. Expansion of the substation to two acres would not result in adverse land use impacts. A one-acre loss in fallow farmland is not expected to result in a significant effect on the agriculture industry given how small the loss is in comparison to the large inventory of actively farmed lands in this region.

No planned development projects were identified in proximity to the alignments. All route alternatives are generally compatible with existing land uses in the project Study Area and the proposed 115-kV transmission line would replace an old inefficient system currently serving the region. A number of transmission and distribution lines cross the study area so the project would not be introducing infrastructure to a region that does not already have power lines and poles. The proposed route alternatives, which are primarily located along existing roads and other linear facilities, would not preclude the future development of residential, commercial, or other suburban or urban land uses in the project Study Area. LSD contacted the Perryton Community Development Corporation and the Booker City Hall to determine if there is any planned development along any of the alternative routes. No development is planned in proximity to any of the route alternatives. The impact to planned and future land uses from the operation of the proposed facilities in all route alternatives would be negligible.

Maintenance and monitoring activities would consist of periodic inspection of the transmission line and the substations. There would be no impact to existing or planned land uses from maintenance and monitoring activities. Since land use impacts from all route alternatives are anticipated to be minor, no mitigation measures are recommended.

#### **4.6.2 Aesthetic Values**

Potential impacts to aesthetic values would result from the construction and operation of the proposed project. Characteristic impacts to the scenic quality of the project Study Area from the construction activities occur only over the construction phase of proposed activities; operation of transmission lines and substations are usually direct and long-term. Impacts to aesthetic values would be significant if strong contrasts between proposed activities and the existing landscape setting result, or if proposed activities changed the existing character of the landscape setting.

#### **Analysis Method**

The degree to which construction and operation of the proposed project affects the scenic quality of a landscape depends on the visual contrast created between the project and the existing landscape. The contrast can be measured by comparing the project features with the major features in the existing landscape. The basic design elements of form, line, color, and texture are used to make this comparison and to describe the visual contrast created by the project. The construction and operation of the proposed transmission lines and substations would create different levels of contrast. A strong contrast rating would occur when the project dominates the landscape. Examples of strong contrasts are proposed facilities in a landscape that currently does not contain existing transmission lines or substation facilities, and long-term removal of substantial tree canopy or shrub vegetation.

A moderate contrast rating would occur when the project begins to attract attention and dominate the characteristic landscape. Examples of moderate contrasts include construction of a proposed transmission line along an adjacent but smaller existing line or substantial removal of existing vertical vegetation (trees, shrubs, etc.).

A weak to no contrast rating would occur when the project is seen but does not attract attention, or is not visible at all. Examples of weak contrasts include construction of proposed transmission line along an existing transmission line with structures of similar type and scale, temporary removal of low vegetation, or proposed facilities beyond one mile from observers.

#### **Construction**

Visible construction activities include ground surface disturbance, facility and structure assembly and construction. Occupants of habitable structures and motorists on highways and local roadways would experience sights and sounds of construction activity, including the presence of materials, staging areas, construction workers, and equipment during the installation of the transmission line and construction of substation improvements. The largest numbers of viewers would be motorists on SH 15 and SH23, State Loop 143, and U.S. 83 due to the higher volume of traffic on these routes; however, motorists would view construction activities for a relatively short time before they move out of the affected viewshed. Potential short-term visual impacts are not considered significant because they would be temporary in nature.

## Operations

### *Transmission Line*

Operation-related impacts would result from the physical presence of transmission structures and conductors. Scenic resources could be potentially affected by the long-term presence of a transmission line. All proposed transmission line monopoles would be between 80 and 140 feet in height and appear as large-scale, permanent infrastructure in both urban and rural landscape settings. The dimensions and appearance of each structure type are depicted in Figures 1-2a and 1-2b. The span between structures would be between 600 and 900 feet. Single-pole structures introduce strong, straight, and vertical line, form, and color elements that may contrast with existing landscape elements, unless they are located near other transmission or distribution lines or structures of greater height, such as the grain silos and elevators found in the project Study Area, which are between 175 and 185 feet high. Color and textural contrasts would also be evident in areas where the natural and human-made landscape is interrupted by vegetation removal. Adverse effects would also occur when structures are visible in scenic landscapes, or when structures are skylined. The transmission lines would be a noticeable introduction into the landscape within the viewshed of residences and travelways. Contrasts would be strong for transmission structures located within the immediate foreground distance zone for those viewpoints with unobstructed views of the transmission line for all route alternatives.

Corner transition structures would be larger in scale than the single-pole tangent steel structures, and would be more intrusive than the single-pole steel structures. The width, vertical form, and straight lines of the transition structure would provide a strong contrast with the flat terrain and irregular textures of natural and landscaped vegetation.

The transmission line in all route alternatives would be most visible to occupants of structures facing towards the construction ROW and within 300 feet of the centerline; however, the majority of the habitable structures within 300 feet of the centerline (listed in Table 4-4) are facing toward internal access roads or driveways and not directly facing the road along which the transmission line is proposed. In some instances, the structures are facing the street that the transmission line is paralleling; however, the structures are typically set back from the road and buffered by landscaping. The greatest impact in terms of the number of habitable structures with route segments within 300 feet of the centerline would be Alternative Routes 1 and 3, which would have 66 and 71 structures, respectively. These residences are found primarily along Segments Q and AE. It should also be noted that while Segment AE has a count of 27 total habitable structures (Route 1), a number of these structures are multifamily dwellings with between two and eight units per structure, thus increasing the number of potential viewers of that route. Alternative Routes 2 and 5 would have the smallest number of structures within 300 feet of the centerline (25 and 32), resulting in the least potential impact to occupants of habitable structures. Viewers would be able to distinguish the details of transmission line components, including the texture and color of a pole. The contrasts or proposed structures would be strong, as they would be large in scale relative to the other human modifications and natural features in the foreground. Occupants of habitable structures may perceive the project as permanently degrading the scenic quality of the existing landscape.

Impacts to scenic quality are also a consideration from the vantage point of motorists on highways and local roads in the project Study Area, primarily for those roads with high volumes of viewers. Of particular interest are those locations where transmission lines would be visible in the immediate foreground from roads, or where lines cross roads. Table 4-5 in Section 4.6.4 summarizes the number of

road crossings, including local county roads, state loops and highways and U.S. highway crossings, by alternative route. In addition, Table 2-2 in Chapter 2 provides the length of route within the foreground (1/2-mile) of U.S. and state highways for Routes 1-7. The highest volume of viewers would be on SH 15, which is a major east-west highway through this region of the panhandle. As shown in Figure 2-3 (enclosed in map pocket), Alternative Routes 1 and 2 (Segments O, P, W, X, and AE), and to a lesser degree Route 7 (Segment Z), would be within the immediate foreground distance zone of SH 15 for a greater distance than other alternative routes. Traffic volumes along U.S. 83 and SH 23/RR 1265 are less than on SH 15 but would also offer motorists views of the proposed project from all seven alternative routes. All route alternatives also cross U.S. 83 to get to the Ochiltree Substation. At typical highway driving speeds, the transmission line within the immediate foreground distance zone of a highway would be within the viewshed of motorists for a brief period of time. Speed limits on local collector and arterial roads would be slower, so that viewer duration would be longer for motorists. As shown in Figure 2-3, a large percentage of the transmission lines, for any of the route alternatives, would be within 1,000 feet of local roads or highways; however, a majority of the local county roads, particularly in the middle of the study area outside Perryton and Booker, consist of dirt roads and are traveled at relatively low volumes by local residents, farmers or oil and gas operators. While Routes 1 and 2 have the greatest length of route within the foreground of highways (primarily from SH 15), the visual impacts to motorists are not expected to be significant since this route through the middle of the study area is bound primarily by agricultural fields and industrial land uses, including oil and gas operations and tall structures associated with grain facilities, as well as a number of electric distribution lines that follow this transportation corridor. There are currently no sensitive viewsheds for motorists driving this highway that would be impacted by the construction of a new 115-kV transmission line.

Alternative Route 1 (Segment AE), and Routes 2 and 5 (Segment AB) would be visible to visitors at the Booker Country Club Golf Course, a public golf course located in Booker. The nearest green to Alternative Routes 1, 2 and 5 is approximately 244 feet north of Segment AE and is partially obscured by mature trees and vegetation within the golf course. Alternative Routes 2 and 5 would be visible from the north side of the golf course, with one of the greens located approximately 100 feet south of the route centerline, on the other side of CR D. This particular green faces west, where golf play parallels the south side of the road. The transmission line for Routes 2 and 5 could potentially detract from the golfing experience by introducing a new urban element in the golfers' field of vision for the play that parallels the road. Shrubs that front the south side of CR D help obscure the road and land uses to the north (e.g., a new transmission line) but not completely. Alternative Route 1 (Segment AE) would also be visible to anyone using the baseball field next to the golf course. The ball field is approximately 175 feet north of Segment AE. According to the Booker City Manager, this field is only used on a limited basis for club or competitive events. Lastly, Alternative Routes 1, 2, 3, 4 and 7 are located in proximity to a horse track and stadium (Segments H, J and K), located northeast of Perryton. The race track is privately run and used on a regular basis (Marilyn Reiswig, president, Perryton-Ochiltree Chamber of Commerce, September 18, 2012). Visitors to the racetrack would be able to see the transmission line, although Segments H and J would be behind the visitors in the grandstand and not in the direction of their view of the racetrack. Segment K would be visible from the grandstand but is located approximately 930 feet south of the grandstand and not between viewers and the racetrack.

Table 2-2 provides information on the length each route is within the foreground (1/2-mile) of the parks and recreation facilities mentioned above. Routes 1 and 2 have the greatest length since they pass by the golf course and ball field. Impacts to golf course visitors and people using the ball field would be minimal as discussed above. The other recreation facility within the foreground of route alternatives is



the racetrack near Perryton. It is within 1/2-mile of all seven routes. As noted above, impacts to visitors to the racetrack would be minimal.

The proposed transmission lines under any alternative route would not degrade existing scenic landscapes or affect aesthetic values in designated scenic areas, as scenic landscapes and sites or areas with a scenic designation were not identified in or near the project Study Area and the surrounding viewshed.

The natural setting of the project Study Area has been significantly modified by agriculture, oil and gas operations, and urban and suburban land uses, including existing utility lines, roads, and development. Contrasts of the transmission line with the surrounding landscape would be strong, as viewed within the immediate foreground distance zone of residential and road viewing locations. The contrasts would be weak as viewed from most of the project Study Area, because the views of the facilities would be either partially blocked by intervening structures and vegetation, or because proposed facilities would repeat the line, form, textures, and colors of existing structures and would not change the character of the landscape. Impacts to aesthetic values would be adverse where strong contrasts occur in the immediate foreground distance zone. Mitigation measures would reduce strong contrasts to the extent feasible; however, there would still be strong contrasts of proposed facilities with the surrounding landscape once mitigation measures are implemented for each alternative route.

### ***Substations***

The proposed project under any alternative route would connect the existing Ochiltree Substation to the existing Wade Substation and new Lipscomb Substation. The proposed modifications to the Ochiltree Substation would not be discernible to any sensitive viewpoints near that facility. The Wade Substation expansion would be minor and there are no sensitive views in proximity to that site. The new Lipscomb Substation would change the view for motorists on SH 23/RR 1265 from agriculture to an industrial site. This site is located next to existing commercial and industrial land uses, including a large grain operation with silos and grain elevators reaching as high as 175 feet. The substation site would be obscured from view to motorists on SH 15, west of SH 23/RR 1265, due to the commercial and retail land uses and mature trees. The substation site is visible from SH 15, east of SH 23/RR 1265 for motorists traveling in a western direction. The view would be intermittent and partially obscured by mature trees. The residential land uses to the west of the substation site would possibly be able to see portions of the substation but views are distant (over 300 yards away) with intervening trees. No significant visual impacts are projected with improvements at the existing substations and the development of a new substation in Booker.

### **Suggested Mitigation**

Standard BMPs for aesthetic values minimize or prevent potential visual impacts resulting from construction, operation, and maintenance of the proposed project under any alternative route. The BMPs would be implemented for all proposed facilities, regardless of any regulatory oversight. In addition, BMPs implemented for erosion control would also mitigate effects to the visual setting. Additional measures are recommended to mitigate adverse effects to scenic resources. These measures include the following practices typically recommended to reduce or eliminate the visual impact of electric transmission lines:

- Crossings with other linear features or structures, such as roads, should be designed to minimize their visual impact by (1) making crossings at a right angle where possible; (2) setting structures as far back from the crossing as possible; (3) using existing tree and shrub cover, if possible, to screen the ROW and structures from the crossing area.
- Self-weathering or dulled metal finishes on transmission structures and non-specular conductors should be considered to minimize glint and sheen of metal surfaces.
- The spacing of proposed transmission poles should match existing transmission structures where the proposed line parallels existing transmission or distribution lines, where feasible, to minimize visual effects of clutter.
- Transmission line structures should not be installed directly in front of residences or in direct line-of-sight from a residence, where feasible.
- Transmission structure siting should utilize existing landform and vegetation features to screen the facilities from nearby residences, to the extent practicable.
- Landscaping around the new Lipscomb Substation would help soften views for motorists on adjacent highways.

#### **4.6.3 Recreation**

The impacts to recreation from the construction and operation of the proposed transmission line and substations would be considered adverse if they eliminated existing recreation facilities, removed land from recreation use, or affected the quality of a recreation activity.

As noted above under Land Use, Alternative Route 1 (Segment AE), and Routes 2 and 5 (Segment AB) are located within 1,000 feet of the Booker Country Club Golf Course, a public golf course located in Booker. The nearest green to Alternative Routes 1, 2 and 5 is approximately 244 feet north of Segment AE, on the other side of club facility structures and landscaping. Two more greens are located at approximately 251 and 288 feet north of Segment AE. The proposed transmission line for Route 1 would not remove land from active recreation and is not expected to impact the visual quality of the golfing experience given the buffer between the greens and the ROW and the fact that the play for the three greens noted above is toward the north, away from the transmission line. Routes 2 and 5 include Segment AB which is approximately 100 feet north of a golf course green located south of CR D. Another green is also located south of CR D (Segment AB), at a distance of approximately 160 feet. In both cases, the green is on the south side of the road and the transmission line is on the north side of the road. The play for one of the greens is to the south, away from the road and transmission line; however, one of the greens faces west, where the play parallels the south side of the road. Shrubs that front the south side of CR D help obscure the road and land uses to the north (e.g., a new transmission line), but not completely. Routes 2 and 5 would not directly impact the golfing activities or remove any active course, but could indirectly impact the golfing experience.

Alternative Route 1 (Segment AE) is also located approximately 175 feet south a baseball field. As noted previously in the visual analysis, the field is used on a very limited basis. Route 1 would not remove any land from active recreation at the ball field and is not expected to detract from the recreation activity since it is an activity based on baseball and is not a passive recreation area where viewsheds might enhance the experience.

Alternative Routes 1, 2, 3, 4 and 7 are all located in proximity to a horse track and stadium (Segments H, J and K), on the outskirts of Perryton. The race track is privately run and used on a regular basis. Visitors to the racetrack and race participants would not be impacted by any of these routes. It is expected that visitors to the racetrack are there to watch the horses race and are not there to enjoy the views of surrounding areas. Routes 1, 2, 3, 4 and 7 would not impact this recreational activity.

Construction and operation of the transmission line in any alternative route would not reduce the opportunities for local types of dispersed activities such as walking and running.

There would be no significant short- or long-term impacts to recreation activities in the project Study Area from the construction and operation of the transmission line or substations, under any alternative route. There is a chance that an indirect impact could occur to golfers at the Booker Country Club when golfing on the northern-most green, in proximity to Routes 2 and 5 (Segment AB), based on the visual intrusion of a transmission line and associated impact to the golfing experience. This impact is not considered significant, however, so no mitigation measures are recommended.

#### **4.6.4 Transportation/Aviation/Communication Facilities**

The analysis area for evaluating impacts to transportation, aviation, and communication facilities varies according to the potential effect to the specific resource and PUC criteria. The analysis area for transportation is anywhere within the project Study Area that a proposed route parallels or crosses a road or highway. Impacts to the roads and traffic levels could be adverse if construction and operation of proposed facilities interfered with public uses, management of the affected transportation network, or planned road improvement projects that alter existing ROWs.

The analysis area for aviation impacts is based on PUC criteria: FAA-registered airports with a runway longer than 3,200 feet and within 20,000 feet of transmission line centerline; private airstrips and FAA-registered airports with runways shorter than 3,200 feet and within 10,000 feet of centerline; and heliports within 5,000 feet of centerline. Impacts to aviation operations could be adverse if the proposed project constituted an obstruction to navigation.

Like aviation facilities, the analysis area for impacts to communication facilities is based on PUC criteria: AM towers within 10,000 feet of centerline and FM/microwave or other electronic installations within 2,000 feet of centerline. Impacts to communication facilities could be adverse if proposed transmission structures or substations interfered with the broadcasting capability of FCC-registered facilities. Table 4-5 provides quantitative data, by route, for transportation, communication, and aviation facilities.

#### **Transportation Impacts**

Potential impacts to transportation include temporary disruption of traffic and potential conflicts with proposed roadway improvements during construction of the proposed project. Impacts on transportation from construction activities would be short term in duration. Traffic on roads adjacent to the transmission line in any alternative route, and roads that would be crossed by the transmission line may be temporarily obstructed to permit installation of pole structures and the stringing of conductors. Table 4-5 provides the number of roadway crossings for all route alternatives. Most of the local and county road crossings occur over dirt roads, primarily those crossing through the agricultural area in the

center of the project. State highway, loop, and U.S. highway crossings occur primarily in and around the two urban centers of Perryton and Booker.

**Table 4-5. Transportation, Aviation, and Communication Facilities  
Affected by Proposed Transmission Lines, by Route**

Facility Type	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6	Route 7
<b>Transportation Facilities</b>							
Number of county and local road crossings	13	13	14	14	13	13	16
Number of U.S. or State highway crossings	3	3	6	6	3	3	6
<b>Communication and Utility Facilities</b>							
AM Towers (within 10,000 feet of centerline)	2	2	2	2	1	1	2
FM, Microwave, Cell and Other Electronic Installations (within 2,000 feet of centerline)	1	1	1	1	1	1	1
Length paralleling existing transmission lines	27,037	12,588	71,747	71,747	3,586	3,006	4,469
Number of transmission lines crossed by ROW	2	2	2	2	0	0	2
<b>Aviation Facilities</b>							
FAA-registered airport with runway >3,200 feet (within 20,000 feet of centerline)	1	1	1	1	1	1	1

Potential disruption of traffic would be minimized through standard Traffic Control measures. The transport of heavy equipment and materials would temporarily interfere with normal traffic, primarily as trucks transporting heavy materials turn from arterial roads into the transmission line ROW or substation sites. Currently, the most regular use of affected local and county roads is by residents and employees of commercial and industrial businesses. The state highways, loops, and U.S. highways are used by local residents and businesses, as well as by inter- and intra-state trucking companies. Speeds along the state and U.S. highways, particularly on SH 15 between Perryton and Booker, reach up to 70 miles per hour, creating more difficulty for construction traffic to exit and enter the highway, and increasing the risk for motorists on the highway. Traffic Control Measures would minimize the safety risk from construction traffic.

Other construction impacts to traffic would include daily commuting by construction employees and other construction-related delivery traffic. Activities typically take place on weekdays, five days a week. It is expected that the majority of these construction workers would commute to the transmission line site via SH 15, which provides access to most of the route segments in the project Study Area. The increase in traffic levels during peak periods is anticipated to be small relative to existing average daily traffic levels on the highway. Employee-generated traffic is not expected to cause traffic delays or diminished levels of service. Parking would be available in designated areas at substation sites and potentially along road shoulders within the transmission line corridors. Effects on roads and traffic from construction activities under any alternative route would cause temporary, minor disruptions to existing traffic flows, and small increases in traffic levels on highways, collector and county roads that would not affect traffic flows. These effects are short-term and negligible.

As noted in Section 3.9.4, road improvements are planned by TxDOT for both U.S. 83 and SH 15. Specific road improvement characteristics and schedules were not available from TxDOT. SPS would

need to coordinate with TxDOT to ensure that construction schedules, access and short-term traffic control plans between the highway improvements and transmission line construction do not conflict.

Effects to traffic from operation and maintenance activities would consist of periodic trips made to substations and the transmission line route, and are expected to be negligible. There would be no short- or long-term impact to transportation resources from the operation of the transmission line under any alternative route.

### **Aviation Impacts**

As noted previously in Section 3.9.4, the PYX, an FAA-registered public airport is located within 20,000 feet of centerline for all seven alternative routes. The airport has two runways longer than 3,200 feet. Alternative Routes 1-4 are all located within approximately 4,250 feet of the closest runway, Routes 5 and 6 are approximately 9,800 feet away, and Route 7 is approximately 5,200 feet away. A number of segments were eliminated early in the routing process due to their proximity to the airport.

Removal of the segments in proximity to the airport minimized potential conflict; however, the project will require coordination with the FAA for any of the seven alternatives, including submittal of notice to the FAA, Form 7460-1 Notice of Proposed Construction or Alteration, and associated compliance with FAA Part 77. Federal Aviation Regulation (FAR) Part 77 Subpart B states:

§77.13(a)(2) - A notice is required for any proposed construction or alteration that would be of greater height than an imaginary surface extending outward and upward at the following slope:

(iii) 25 to 1 for a horizontal distance of 5,000 feet from the nearest landing and takeoff area of each heliport, available for public use listed in the Airport/Facility Directory or in either the Alaska or Pacific Chart Supplement; is under construction and is the subject of a notice of proposal on file with the FAA and except for military heliports, it is clearly indicated that heliport will be available for public use, or operated by a Federal Military agency.

According to FAR Part 77, the airspace and clear zone of airports shall be protected from encroachment by buildings, towers and other structures. All routes include transmission line poles with a height of 80-140 feet and would therefore require an FAA determination. Segments on the east end of the project Study Area (generally east of CR 23) would not fall within this buffer imaginary surface defined by the FAA.

### **Electronic Installation/Communication Impacts**

Transmission lines operating in proximity to FM broadcast station transmitters, microwave towers, and other broadcast facilities, or AM radio towers can interfere with broadcast transmissions. The number of broadcast facilities within 2,000 feet (FM, microwave, other) and 10,000 feet (AM towers) to alternative route segments is listed in Table 3-8; these broadcast facilities are summarized by route in Table 4-5 and are also shown on Figure 2-3 (enclosed in map pocket) and Figure 3-7. The FM tower (owned by NPEC) is approximately 497 feet from Segment G, which is a segment included in all seven alternative routes. The closest AM tower to an alternative route is the KEYE AM tower, located approximately 7,039 feet from Segment A, which is a segment included in all seven routes. If

necessary, power line detuning can diminish the impact of the transmission line in the vicinity of a broadcast antenna to meet FCC tolerances. With mitigation, long-term radio interference from the proposed project would be negligible.

## **4.7 Cultural Resources Impacts**

Impacts to cultural resource sites could occur during the construction phase of the proposed transmission line or substation sites that would result in destruction or alteration of archeological or historic resources. Such direct impacts are typically a result of heavy equipment operations and land disturbance along the ROW or on the substation parcel. Vehicular traffic could damage surficial or shallow buried sites, while pedestrian traffic could result in vandalism. Historic buildings, landscapes, and historic districts could also be potentially altered, damaged, or destroyed during construction, or result in a separation of historic resources from their environmental setting or historic context. However, based on the results of the Class I records and literature search, no direct or indirect effects are expected. The THC was notified about the project on October 15, 2012. The THC's "Antiquities Code of Texas Review" indicated that no survey was required for the proposed project. Refer to Appendix B for the Class I inventory report and the conclusion from THC.

The potential for direct effects to unknown/undocumented resources is uncertain due to the lack of surveys completed in this area. Unknown and undiscovered archaeological or historic resources may be impacted as a result of project construction; however, the severity of such impacts can be reduced through appropriate measures. Such measures include implementing a construction monitoring plan and plan of action in the event resources are discovered during construction. If archaeological or historic resources are found during construction and cannot be avoided, a determination regarding their significance would be made.

## **CHAPTER 5**

### **AGENCY AND PUBLIC INVOLVEMENT ACTIVITIES**

#### **5.1 Correspondence with Agencies/Officials**

The following state and local agencies and officials were notified by letter, dated October 12, 2012, about the proposed project and the public open-house meeting held on October 30, 2012. The letter was sent to solicit comments, concerns, and information regarding potential environmental impacts, permits, or approvals for the construction of the 115-kV transmission line between Perryton and Booker. A map of the preliminary transmission route segments and a routing questionnaire were also included with each letter. A copy of the agency letter and questionnaire are included in Appendix C. In addition, Xcel sent a letter to TPWD and the USFWS on February 14, 2013 to solicit input on threatened and endangered species and sensitive species or habitat of concern. Refer to Appendix H for the correspondence with these two agencies.

##### **Federal**

- U.S. Fish and Wildlife Service

##### **State**

- Texas Historical Commission
- Texas Department of Transportation
- Texas Commission on Environmental Quality
- Texas Parks and Wildlife Department

##### **Local**

- City of Perryton, Director of Economic Development
- City of Perryton, Mayor
- City of Perryton, City Manager
- City of Booker, City Manager
- City of Perryton, Chamber of Commerce
- Lipscomb County, County Judge
- Lipscomb County, County Commissioners, Precincts 1-4
- Lipscomb County Farm Bureau
- Ochiltree County, County Judge
- Ochiltree County, County Commissioners, Precincts 1-4
- Ochiltree County Farm Bureau
- Perryton-Ochiltree County Airport



- NPEC
- Golden Spread Electric Cooperative, Inc.

## **5.2 Agency Actions**

The proposed project is subject to numerous state and local rules, regulations and recommendations as discussed below.

### **5.2.1 Public Utility Commission**

SPS's proposed transmission line will require approval of SPS's CCN application by the PUC. This environmental assessment and alternative route analysis is intended to provide environmental and land use constraint information, pursuant to PURA § 37.056(c)(4), P.U.C. SUBST. R. 25.101(b)(3)(B), as well as to address any potential concerns or questions raised regarding SPS's CCN application. In addition to supporting the CCN application, the information in this study can be used for purposes of other local, state, or federal permitting requirements. SPS will not start construction until the PUC has approved the CCN application.

### **5.2.2 U.S. Army Corps of Engineers**

Neither individual nor nationwide permits pursuant to Section 404 of the Clean Water Act are expected for any of the alternative routes, except potentially for Alternative Route 2, which would cross a fairly large playa that appears to have connectivity to a natural drainage. Consultation with the USACE is recommended to determine whether there is potential impact to jurisdictional waters.

### **5.2.3 Texas Commission on Environmental Quality**

The proposed transmission line is expected to result in more than one acre of disturbance (grading and clearing) for direct embedded tangent structures and foundations for angle and corner structures, when considering the structure impacts, along with the proposed staging area and construction access. As a result, a General Construction Permit would be required by the TCEQ. In addition, construction of the new Lipscomb Substation and expansion of the Wade Substation would result in approximately six acres of clearing and grading, also requiring a General Construction Permit. As such, SPS would be required to prepare a SWPPP and submit a Notice of Intent to the TCEQ prior to clearing and construction activities.

### **5.2.4 General Land Office**

The General Land Office requires a Miscellaneous Easement for any ROW crossing a state-owned riverbed or navigable stream. As noted in Sections 3.3 (Water) and 3.4 (Vegetation), there are no state-owned riverbeds or navigable streams in the project Study Area.

### **5.2.5 Texas Historical Commission**

As noted in Section 4.7, the THC has recommended no further study or surveys for the proposed project.

### **5.2.6 Texas Department of Transportation**

Permits from TxDOT are required for any crossing of state-maintained roadways, or for any use of a state-maintained ROW for purposes of access. All of the alternative routes cross one or more state highways, loops, or U.S. highways, thereby requiring a permit from TxDOT.

### **5.2.7 Cities of Perryton and Booker**

SPS has a franchise agreement with the Cities of Perryton and Booker. All seven alternatives cross through a portion of Perryton to reach the Ochiltrie Substation, and all seven alternatives cross through a portion of Booker to reach the new Lipscomb Substation site. The Lipscomb Substation is located within the municipal boundary of Booker. The cities may require a building permit which would be obtained by SPS prior to construction.

## **5.3 Public Meetings**

A public open-house meeting was held for this project on October 30, 2012, at the Museum of the Plains in Perryton, Texas, between 5:00 and 7:00 p.m. Manning Land, LLC, consultant to SPS, mailed 267 individual written notices of the meeting to all landowners located within 300 feet of the centerline along the preliminary alternative route segments, as delineated at the time of the public open-house meeting. The mailed notification also included a map of the preliminary route segments, a Landowner Questionnaire, a Landowner Bill of Rights, Landowners and Transmission Line Cases at the PUC, and a Survey Permission Form. Refer to Figure 2-1 (enclosed in map pocket) for the preliminary route segments distributed to the public in the notice letter and presented at the public open house. Refer to Appendix D for a copy of the landowner letter, information packet, and mailing list. Additionally, LSD mailed notice letters to 32 agencies and other organizations, as discussed previously. Refer to Appendix C for the agency letter and mailing list.

The meeting was held to promote a better understanding of the alternative transmission line route alternatives, to present the purpose and need of the project and the potential benefits and impacts, and to obtain input from the public to help SPS in its routing analysis.

The meeting was held in an open-house format, allowing attendees to move from station to station to look at maps and talk with representatives from SPS and SPS's consultants. Aerial photographs of the project study area were provided on large display boards, in addition to oversized sheet maps, and handouts. These presentation and handout materials identified the preliminary route segment locations, substations, existing parcel boundaries, preliminary constraints, and key project characteristics (transmission pole heights, ROW requirements, engineering information, etc.). Refer to Appendix E for the handouts provided at the open-house meeting, as well as the sign-in sheet.

A total of 44 people signed in at the open-house meeting. All of the participants were encouraged to fill out a questionnaire and return it at the meeting or by mail at a later date. A copy of the questionnaire is included in Appendix D. A total of seven questionnaires were completed and returned at the meeting, and another eight questionnaires were either e-mailed or mailed to SPS subsequent to the public open-house meeting. In addition, Xcel received three phone calls prior to the open-house meeting. Appendix F contains a copy of returned questionnaires and a composite table summarizing concerns from the questionnaires and the phone calls.

The landowner questionnaire is designed to identify issues and key concerns that the public may have in order to include these issues in the route selection process. The majority of the questionnaire responses indicated that the landowner would like to (1) minimize the length of the line through cultivated fields, (2) minimize the total length of the line, and (3) minimize the number of businesses near the line. The key concerns are summarized in the list below (route segment references noted below are to the original segment labels), as shown on Figure 2-1 (enclosed in map pocket):

- Concern about impacts to cultivation of crops for fields along CR H.
- Segment AX would remove land from cultivation and impact farming operations.
- Segments AJ, AK, AY, AG, and AX would impact the ability to water fields. A few individuals noted that watering is performed using water trucks with 120-foot-long sprayers/booms; therefore, placement of transmission line poles could impact their ability to maneuver their trucks to water fields. The same constraint is possible with grain cutters and planters.
- Several requests for the poles to be placed on, rather than 35 feet inside of, the property line.
- Concern about devaluation of agriculture fields associated with the constraints the poles have on farming operations.
- Several requests for the transmission line to follow the railroad ROW.
- Request for maintenance of the ROW by making sure it remains mowed and weeded.
- Concern about the cost of the project and the impact on rate payers.
- Concern about the potential effect to oil and gas operations.
- Concern about proximity of lines to the airport and safety issues.
- Request to minimize the number of residences along a route.
- Request that if the line follows CR F, the line be located on the south side of the road.

Representatives from the Ochiltree-Perryton County Airport attended the open-house meeting and expressed concern over the proximity of some of the preliminary route segments to the airport. SPS and LSD subsequently corresponded with the manager of the airport and the airport's consultant to discuss the preliminary siting issues and compatibility with FAA Part 77. As a result, several segments were removed from further consideration as discussed previously in Sections 2.3.4 and 3.8.4.







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## **CHAPTER 6**

### **ROUTE SELECTION**

#### **6.1 Overview**

As described in Chapter 2, the routing process began with an initial set of route segments presented by SPS to LSD that included route segments between the three connecting points of Ochiltree Substation, Wade Substation, and the new Lipscomb Substation. LSD conducted field surveys and research and gathered data to identify other potential route segments for consideration. The preliminary route segments (Figure 2-1, enclosed in map pocket) were assessed by addressing opportunities and constraints, by engaging the public (landowners, agencies, and other organizations) through letters and an open-house meeting and requesting comments and feedback on questionnaires, and by evaluating the route segments against PUC and other routing criteria. The routing process generated an initial set of 14 end-to-end routes, comprising 67 segments.

The initial 14 routes and associated segments were evaluated in a comparative matrix, scoring the quantitative data against the routing criteria and determining “best,” “moderate,” and “worst” scores. The top seven routes were carried forward for further evaluation with respect to the PUC criteria and other routing criteria, as well as construction and ROW costs and engineering factors. The top seven routes were also evaluated for potential environmental effects, as described in Chapters 3 and 4.

SPS reviewed all seven alternative routes in consultation with LSD, taking into consideration input from the public (both written and verbal) and reviewing and assessing engineering and cost factors. SPS believes that the 36 segments evaluated in this routing analysis provided a broad range of alternatives to construct the 115-kV line between the existing Ochiltree Substation, the Wade Substation, and the new Lipscomb Substation. Every effort was made to locate the alternative routes along existing linear corridors (roads, ROWs, other utilities) and to minimize the conflicts with land use and environmental constraints.

#### **6.2 Summary of Environmental Evaluation and Conclusions**

Chapters 3 and 4 provide an analysis of the existing setting and potential environmental effects from construction and operation of the proposed 115-kV transmission line and substations. A summary of the environmental effects, which were considered during the final route selection, is provided below.

##### **Physiography/Geology/Soils**

Impacts to geology and soils are similar for all seven routes. Standard BMPs (Measures S1–S5) are recommended to minimize wind and water erosion associated with construction operations and would also apply to improvements at the Wade Substation and Lipscomb Substation sites.

##### **Prime Farmlands and Agriculture**

All routes would result in minimal reduction in prime farmland soils due to pole installation; the reduction is estimated between 0.10 and 0.14 acre for all poles. Another six acres of agriculture would be lost as a result of both the one-acre expansion at the Wade Substation and the five acres needed for the Lipscomb Substation. Over 75 percent of the study area is categorized as prime farmland and is

close to the amount of land that is actively farmed or grazed; therefore, the loss of six acres out of approximately 62,447 acres is considered a minimal impact. Routes 3 and 4 (Segment Y) and Route 7 (Segment Z) skirt the edge of existing center-pivot irrigation systems and the transmission line ROW is expected to cross into the limits of irrigated farmland. These three routes would require strategic placement of transmission line poles to avoid the widest point of the system pivots. Proposed spans of 600–900 feet would avoid direct conflicts with proper design and placement. Some of the cropland in the study area is irrigated with water trucks and spray booms. An inventory of which fields along the seven routes are irrigated via the water-truck method is not available; however, public comments received indicated that this occurs along Route 7 (Segments M and U), at a minimum. This potential impact could occur along any of the routes where this method is used; Measure F1, discussed in Section 4.1.6, is proposed to minimize conflicts with agriculture operations.

## **Water Resources**

Several ephemeral streams cross through the project study area and can easily be spanned by the proposed transmission line poles that have an average span length of 750 feet. The Texas Panhandle, like much of the farmland in Texas, is dotted with playas. Playas are typically shallow inundations that seasonally fill up with water, since the soils are primarily composed of clay and silt. Playa basins typically flood when rainfall is sufficient in frequency, duration, and intensity. Numerous playas exist within the project Study Area, with the two largest playas located along Route 1 (Segment X) and Route 2 (Segments L and W). These playas are approximately 3,800 feet (Segment L) and 4,600 feet (Segments W and X) wide at the point where the route centerline is located. Route 1 is located within the railroad ROW that is on a berm above the Segment W playa and would therefore not require special treatment of foundations. Route 2 (Segments L and W) would, however, be located within the limits of the inundation area and would therefore require special attention to foundation design since the two playas cannot be spanned. Preconstruction geotechnical evaluation of soils, groundwater, and the projected high water line would be needed for final design of foundations associated with Route 2. Construction costs would likely be higher for Route 2 at these crossings. No playas or streams are located within the limits of the Wade Substation expansion area or the new Lipscomb Substation site. All other potential impacts to surface waters would be similar for all seven routes and all routes would require standard BMPs and a SWPPP to minimize impacts.

## **Biological Resources**

Playas that contain wetland vegetation are associated with all seven routes; however, most playas can be spanned, with the exception of two playas crossed by Segments L and W (Route 2). A maximum of nine foundations would be needed within these two playas, impacting an estimated 0.04 acre. Impacts to wetland vegetation would be considered minor due to the small amount of area affected and the lack of special-status plant species in this area. However, the playa associated with Segment W may be regulated under Section 404 of the Clean Water Act. A formal jurisdictional determination would be necessary for Alternative Route 2, if construction activities result in discharge of temporary or permanent fill materials within the boundaries of that playa. No adverse effects to sensitive plants or habitat are anticipated for any of the seven alternatives.

Potential impacts to wildlife are limited to the following: (1) avian impacts from collisions with power lines and (2) potential impacts to the federally listed endangered whooping crane, the federally listed proposed threatened LEPC, and the state-listed threatened Texas horned lizard. Potential impacts for these issues would be similar for all seven alternatives.



Avian collision hazards are greatest near habitat magnets, such as wetlands or riparian areas, and for migratory or juvenile birds, because over time resident species typically learn the location of transmission lines and become less susceptible to wire strikes. Habitat attractions are associated with the playas identified along all of the alternative routes; the playas provide habitat for migratory birds. The USFWS should be consulted on how to avoid impacts to migrating avian species in these habitat areas. Suitable habitat is present in the project Study Area for the whooping crane, including the playas that dot the region. Whooping cranes follow a broad annual migratory path between Canada and central Mexico. The migration route historically covered a wide swath through the center of the United States, between Arizona to the west and east to the eastern seaboard, including the Panhandle of Texas. Collisions with power lines are a substantial cause of whooping crane mortality in migration. This potential impact can be reduced by implementing design measures such as installing line-marking devices. Consultation with USFWS is recommended to determine whether measures should be incorporated into the transmission line design for the selected route, particularly where lines are in proximity to playas.

While the project Study Area is not considered a critical habitat area by the SGP CHAT for the LEPC, presence cannot be entirely ruled out. Transmission lines can create zones that LEPC avoid, resulting in habitat fragmentation. Power lines and unmarked wire fences have also been known to cause LEPC injury and mortality, although the specific rangewide impact on LEPC is largely unquantified. LEPC typically avoid tall vertical features such as utility transmission lines, where predatory raptors may perch. The USFWS indicated that while a large portion of the study area occurs within the LEPC's estimated occupied range, the majority of the study area appears to be highly fragmented by agriculture, oil and gas exploration and other activities. LEPC surveys were not requested; however, the USFWS noted that there are two parcels of land south of Booker that are managed by landowners who have partnered with the USFWS to restore habitat for LEPC. The USFWS recommended that the preferred transmission line route avoid lands to the south of Booker where these conservation measures apply on two parcels and could potentially impact the viability of a route. Alternative Route 7 could potentially encroach into areas protected by a landowner CCAA agreement; the location of these lands is confidential so this cannot be confirmed. Disclosure of existing landowner CCAA agreements would be made by USFWS if the preferred route encroaches into these areas (i.e., Route 7, if selected).

The project Study Area is within the range of Texas horned lizard; the potential habitat for this species occurs throughout the Panhandle region. Texas horned lizard could be potentially disturbed, displaced, or killed during construction activities by earth-moving equipment and construction vehicles; however, impacts could be avoided with preconstruction surveys of the selected route and with monitoring during construction if lizards are present.

### **Socioeconomic Impacts**

No significant effect is anticipated from any of the seven alternative routes. All routes would have similar effects on population, employment, local economy, community services, and community values.

### **Land Use**

No adverse direct, long-term effect to existing or planned land use is expected beyond the potential effects to agriculture operations addressed previously under Prime Farmlands above. Potential conflicts with oil and gas infrastructure can be avoided during final design; minor modifications to the route location (i.e., side of road) may be required after in-field inventories are completed. Between 25 and 71

habitable structures are located within 300 feet of the seven alternative route centerlines. Alternative Routes 2 and 5 have the least number of residences within 300 feet of the centerline (25 and 32 structures, respectively), reducing the potential conflicts associated with construction impacts (noise, dust, access, etc.), and long-term changes to the immediate visual setting. Alternative Routes 1 and 3 have the largest number of habitable structures within 300 feet of centerline, 66 and 71 structures, respectively. Alternative Route 1 would follow an existing, abandoned railroad ROW for a majority of its length, minimizing the number parcels crossed and potential encroachment into local farming operations. Route 1 has the greatest length of its route paralleling other linear ROWs, including railroad, roads, highways, transmission lines, and distribution lines. Approximately 97 percent of this route parallels these linear facilities in the Study Area.

## **Aesthetics**

Visual impacts from project construction would be short term and temporary. This effect would be the same for all seven routes. Long-term visual effects would be greatest for the routes having the greatest number of residences fronting the transmission line and for routes abutting the Booker Golf Course. As noted above, Routes 1 and 3 would have the greatest number of habitable structures within 300 feet of the centerline (66 and 71 structures, respectively), increasing the potential for long-term visual effects on structure occupants. Routes 1 and 2 have the greatest length of route within the foreground (1/2-mile) of U.S. and state highways; however, as discussed in Chapter 4, the majority of this length is associated with proximity of these routes to SH 15 and visual impacts to motorists along this route are considered not to be significant due to the existing land use setting and lack of sensitive visual resources along this corridor. Alternative Routes 2 and 5 would have the fewest habitable structures within 300 feet of the centerline, reducing the potential for visual conflicts. Alternative Route 1 crosses by the southern boundary of the Booker Golf Course; however, the greens are set back from the route by over 244 feet and would be obscured by mature trees and vegetation. Alternative Routes 2 and 5 (Segment AB) pass along the northern side of the golf course, with one of the greens located approximately 100 feet south of the route centerline, on the other side of CR D. This particular green faces west, where golf play parallels the south side of the road. The transmission line for Routes 2 and 5 could potentially detract from the golfing experience by introducing a new urban element in the golfers' field of vision for the play that parallels the road. Shrubs that front the south side of CR D help obscure the road and land uses to the north (e.g., a new transmission line) but not completely. No significant visual effects are projected as a result of the substations; however, landscaping around the perimeter of the substation site would soften the view for residences located west of the Lipscomb Substation and for motorists on SH 15 and SH 23/RR 1265. Measures are also proposed in Section 4.6.2 to minimize visual effects to residents and visitors to the golf course.

## **Recreation**

No significant impact to recreation uses is expected under any of the seven alternative routes. An indirect impact could potentially occur to golfers at the Booker Country Club when they are playing on the northernmost green, in proximity to Routes 2 and 5 (Segment AB), based on the visual intrusion of a transmission line and associated impact to the golfing experience. This impact is not considered significant, however, so no mitigation measures are recommended.

## **Transportation**

Several highway improvements are expected along SH 15 and U.S. 83 within proximity to all seven route alternatives. Coordination with TxDOT will be required in order to improve traffic safety during construction, should the transmission line construction period overlap with TxDOT construction schedules on these two highways. Alternative Routes 3, 4, and 7 have six crossings and Alternative Routes 1, 2, 5, and 6 have three crossings. All seven routes would cross state and/or U.S. highways, prompting the need for permits with TxDOT. Both TxDOT and county permits would apply to all seven routes, with no major distinction between the routes.

## **Aviation Impacts**

PYX, an FAA-registered public airport, is located within 20,000 feet of the centerline for all seven alternative routes. The airport has two runways longer than 3,200 feet. Alternative Routes 1–4 are all located within approximately 4,250 feet of the closest runway; Routes 5 and 6 are approximately 9,800 feet away; and Route 7 is approximately 5,200 feet away. The project will require coordination with the FAA for any of the seven alternatives, including submittal of FAA Form 7460-1 (Notice of Proposed Construction or Alteration) and associated compliance with FAA Part 77. All routes include transmission line poles with a height of 80–140 feet and would therefore require an FAA determination. Segments on the east end of the project Study Area (generally east of CR 23) would not fall within this buffer.

## **Electronic Installations**

Only three communication towers are located within the PUC distance criteria to the seven alternative routes: one FM tower and two AM towers. The FM tower (owned by NPEC) is approximately 497 feet from Segment G, which is a segment included in all seven alternative routes. The closest AM tower to an alternative route is the KEYE AM tower, located approximately 7,039 feet from Segment A, which is a segment included in all seven routes. If necessary, power line detuning can diminish the impact of transmission line in the vicinity of a broadcast antenna to meet FCC tolerances.

## **Cultural Resources**

Based on the results of the Class I study, three historic structures, two prehistoric sites, two historic markers, and one historic cemetery were identified within the overall cultural resources study area for the project, which encompassed up to 0.5 mile around the outer edge of all route segments. Of those, one prehistoric site is within 1,000 feet of Segments J, L, and N (Routes 1–4), one historic structure is within 1,000 feet of Segment AE (Route 1), and the two historic markers are within 1,000 feet of Segments AE, AJ, AI, AH, and Z (Routes 1, 3, 4, and 7). The historic cemetery is located within 1,000 feet of Segment AG (Route 3). The other two historic structures and prehistoric site are not located within 1,000 feet of the seven route alternative centerlines, and none of the resources are located within the 70-foot-wide ROW of any of the seven alternatives. None of the resources within 1,000 feet are eligible for listing on the NRHP; no direct or indirect effects are expected. The THC was notified about the project on October 15, 2012. The THC's *Antiquities Code of Texas Review* indicated that no survey was required for the proposed project.

### 6.3 Summary of Route Selection

As described in Section 2.3.5 and shown visually in Table 2-2, the seven routes were compared for key routing criteria before evaluating each route further in Chapters 3 and 4 for environmental effects. Before applying the results of the environmental assessment, Alternative Routes 1 and 6 had the best overall scores, followed closely by Route 5. At that stage, Route 1 was deemed superior to Route 6 since it utilizes an existing abandoned ROW, parallels more existing linear ROWs, is approximately 3.5 miles shorter in length than Route 6, and costs substantially less than Route 6.

After considering potential environmental effects associated with the seven routes, Routes 1 and 6 were deemed to have the least environmental effects and the least conflicts with existing land uses. Alternative Routes 2, 3, 4, and 7 were determined to result in greater environmental effects and land use conflicts than Alternatives 1 and 6 for the following reasons:

- Route 2 would cross through two large playas, requiring special foundations and potential impacts to wetlands; a wetland delineation would be required for Segment W.
- Route 2 may have a potential visual impact to golfers on the north side of the Booker Golf Course (Segment AB).
- Routes 3, 4, and 7 have some of the highest numbers of habitable structures within 300 feet of centerline with little benefit offered in terms of utilizing an existing ROW and avoiding potential encroachment into active croplands.
- Routes 3, 4, and 7 cross close to center-pivot irrigation systems, requiring strategic placement of poles near the outer limits of the irrigation pivot.
- Route 7 is anticipated to impact the greatest number of croplands where trucks and booms are used for watering fields. The greatest number of returned questionnaires indicated opposition to Segments M and U along Route 7.

Route 5 would have fewer environmental effects than Routes 2, 3, 4, and 7, with the exception of potential visual impacts where it would have similar visual impacts to golfers near Segment AB as Route 2.

After combining the results of the initial routing phase and quantification of PUC criteria with the results of the environmental assessment, Alternative Route 1 was determined to be the best route of all seven, followed by Route 6. Route 5 was ranked third, having fewer environmental effects than Route 2 which is ranked fourth. Alternative Routes 3, 4, and 7 were determined to have the greatest constraints, both with respect to the PUC criteria and environmental effects, and are not recommended for selection. Accordingly, LSD selected Alternative Route 1 as the route that best addresses the needs of SPS and the requirements of PURA and the P.U.C. Substantive Rules. Factors supporting this selection include:

- Approximately 59% of this route would be located within an abandoned railroad ROW that parallels SH 15, a major transportation corridor in the study area, resulting in a route that follows existing linear features and ROWs for a majority of its length.
- Approximately 97% of Route 1 parallels other linear ROW, including roads, railroad, transmission lines, and distribution lines.

- It has the least impact to farming and agricultural operations, crossing the least cultivated crops, impacting no center-pivot irrigation systems and avoiding croplands irrigated by manual water trucks and booms.
- The ROW would avoid most playas, with the possible exception of one playa along Segment X; this playa may be avoided by locating the transmission line structures on the railroad ROW berm, outside the inundation area.
- It is tied for the fewest county, local, U.S., and state highway crossings.
- It is the shortest route and is also the least expensive route.
- Does not result in any significant environmental effects.

## **6.4 SPS Recommended Route**

After balancing the information provided in this environmental assessment and routing analysis against the project need, engineering and transmission planning considerations, maintenance and construction considerations, public input, estimated costs, and community values, SPS has selected Alternative Route 1 as the route that best addresses the requirements of PURA and the PUC Substantive Rules. Alternative Route 1 extends from the existing Ochiltrie Substation approximately 19.5 miles northeast to the new Lipscomb Substation, and includes Segments A, B, F, G, H, J, N, O, S, X, AE, and AJ. Factors supporting SPS's choice of Alternative Route 1 include those factors listed in Section 6.3 and estimated costs. Although SPS has selected Alternative Route 1, it can construct and operate any of the routes proposed in this application.

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## CHAPTER 7

### LIST OF PREPARERS

This Environmental Assessment/Alternative Route Analysis was prepared for SPS by LSD. Primary authors of this application and their areas of expertise are provided in the table below.

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## CHAPTER 8

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