APPLICATION OF SOUTHWESTERN PUBLIC SERVICE COMPANY TO AMEND A CERTIFICATE OF CONVENIENCE AND NECESSITYFOR A PROPOSED 115-KV TRANSMISSION LINE WITHIN YOAKUM AND GAINES COUNTIES (MUSTANG TO SEMINOLE)

DOCKET NO. 48724

Submit seven (7) copies of the application and all attachments supporting the application. If the application is being filed pursuant to 16 Tex. Admin. Code § 25.101(b)(3)(D) (TAC) or 16 TAC § 25.174, include in the application all direct testimony. The application and other necessary documents shall be submitted to:

Public Utility Commission of Texas
Attn: Filing Clerk
1701 N. Congress Ave.
Austin, Texas 78711-3326

Application of Southwestern Public Service Company to Amend a Certificate of Convenience and Necessity for a Proposed 115-kV Transmission Line Within Yoakum and Gaines Counties (Mustang to Seminole)

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1. **Applicant:** Southwestern Public Service Company

Certificate Number: 30153

Street Address: 790 South Buchanan Street

Mailing Address: Amarillo, TX 79101

2. **Please identify all entities that will hold an ownership interest or an investment interest in the proposed project but which are not subject to the Commission's jurisdiction.**

N/A

3. **Person to Contact:** James M. Bagley

Title/Position: Manager, Regulatory Administration

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Winstead PC

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Legal Counsel: Mark A. Walker

Title/Position: Assistant General Counsel

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Phone Number: 512-236-6926

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Email Address: mark.a.walker@xcelenergy.com

4. Project Description:

Name or Designation of Project:

SOUTHWESTERN PUBLIC SERVICE COMPANY'S APPLICATION TO AMEND A CERTIFICATE OF CONVENIENCE AND NECESSITY FOR A PROPOSED 115-kV TRANSMISSION LINE WITHIN YOAKUM AND GAINES COUNTIES (MUSTANG TO SEMINOLE).

Provide a general description of the project, including the design voltage rating (kV), the operating voltage (kV), the CREZ Zone(s) (if any) where the project is located (all or in part), any substations and/or substation reactive compensation constructed as part of the project, and any series elements such as sectionalizing switching devices, series line compensation, etc. For HVDC transmission lines, the converter stations should be considered to be project components and should be addressed in the project description.

Southwestern Public Service Company ("SPS"), a subsidiary of Xcel Energy Inc., is proposing to construct and operate a primarily single circuit, 115-kilovolt ("kV") electric transmission line between the existing Mustang Substation, located in Yoakum County, Texas and the existing Seminole Substation, located in Gaines County, Texas ("Proposed Project"). This application for the Proposed Project will hereinafter be referred to as the "Application."

The Proposed Project will involve the construction of a new, 115-kV transmission line, which will originate at the existing Mustang Substation, located approximately 0.65 mile northeast of the intersection of County Road ("CR") 390 and CR 355, approximately five miles east of Denver City, Texas in Yoakum County. The Proposed Project will terminate at the existing Seminole Substation, located southwest of the intersection of CR 205 and CR 208, 3.8 miles north-northwest of Seminole, Texas in Gaines County.

The Mustang Substation will have a new 115-kV terminal added to the south of the 115-kV bus for the new 115-kV line. The existing Seminole Substation will have a new 115-kV terminal added to the south of the 115-kV bus for the new 115-kV line.

The Proposed Project was identified by Southwest Power Pool ("SPP") as needed for reliability to address: (1) the overload issues of the Denver City Substation to San Andres Tap to Seminole Substation 115-kV line; and (2) the low voltages at the Flannagan 69-kV Substation; and the Amerada Hess, Doss, Oxy West-Seminole Tap, Roz, and Seminole 115-kV Substations. The SPP issued a Notification to Construct ("NTC") for this project on August 17, 2016, which included specific endpoints of the existing Mustang Substation and the existing Seminole Substation. Xcel Energy accepted the Notification to Construct on November 10, 2016.

SPS is proposing 10 routes for the Proposed Project. The segments that comprise each route are as follows:

Route	Segments	Route Length
A	1a-3-13-16-18-20-32-37-39-41-44-45-47-48-51-54-55	21.70
B	1a-3-13-16-18-25-33-36-40-41-44-45-47-48-49-52-54-55	19.32
C	1a-3-13-16-24-28-33-38-39-41-44-45-47-59-60-52-54-55	19.10
D	1a-3-13-16-18-25-33-36-57-43b-58-60-50-53-55	19.19

E	1a-3-13-16-24-27-30-43a-43b-58-60-50-53-55	17.30
F	1a-3-13-16-19-21-22-26-43a-43b-58-60-52-54-55	17.38
G	1a-3-13-17a-17b-21-22-26-43a-43b-58-60-52-54-55	17.34
H	1a-2a-4-6-12-22-26-43a-43b-43c-47-48-49-52-54-55	19.49
I	1a-2a-56-17b-21-22-26-43a-43b-58-60-50-53-55	17.36
J	1a-2a-4-6-12-22-26-43a-43b-58-60-52-54-55	17.48

Refer to Figure Nos. 2-2 (located in the map pockets), 2-4, and 6-1 (located in the map pockets) of the Mustang to Seminole 115-kV Transmission Line Project Environmental Assessment and Alternative Route Analysis, Yoakum and Gaines Counties, Texas ("EA/Routing Study"), Attachment 1, for the route maps, which show the 48 primary segments that comprise the 10 routes. There are an estimated 201 possible forward progressing route combinations with the proposed primary segments.

Refer to Attachment 8 for the segment descriptions for the proposed routes.

The proposed 115-kV transmission line will be constructed utilizing primarily single-circuit, single-pole steel structures, which require a smaller land surface area than H-frame structures and eliminate the need for guy wires for corner structures. The proposed transmission line will be constructed primarily on new right-of-way ("ROW") with a proposed easement width of 70 feet. In some circumstances, a wider easement may be necessary, but these locations and easement widths cannot be determined until a route is approved by the Public Utility Commission of Texas ("Commission") and surveyed.

Design Voltage Rating (kV): 115 kV
Operating Voltage Rating (kV): 115 kV
Normal Peak Operating Current Rating (A): 1383 amps

If the project will be owned by more than one party, briefly we ownership arrangements between the parties and provide a description of the portion(s) that will be owned by each party. Provide a description of the responsibilities of each party for implementing the project (design, Right-Of-Way acquisition, material procurement, construction, etc.).

SPS will own 100% of the Proposed Project.

If applicable, identify and explain any deviation in transmission project components from the original transmission specifications as previously approved by the Commission or recommended by a PURA §39.151 organization.

- Not applicable.

5. Conductor and Structures:
Conductor Size and Type:

The conductor will be 477 kcMIL, aluminum conductor steel supported ("ACSS"), 26/7 stranded, code name HAWK. One Optical Ground Wire will provide the static protection.

Number of conductors per phase: 1 (one)
Continuous Summer Static Current Rating (A): 1383 Amps
Continuous Summer Static Line Capacity at Operating Voltage (MVA): 275 MVA

Continuous Summer Static Line Capacity at Design Voltage (MVA): 275 MVA
Type and composition of Structures:

SPS proposes to construct the 115-kV transmission line using primarly single-circuit, self-supporting steel single pole structures within new ROW. SPS proposes to use direct embedment for tangent structures and drilled pier foundations for structures at dead-end and high angle locations. Typical heights are shown on the structure drawings (Attachment 2) and actual heights are dependent on the clearance requirements to be determined. Highway crossings will utilize structures with heights greater than the minimum heights required by the Texas Department of Transportation ("TxDOT") and/or the National Electric Safety Code ("NESC").

Height of Typical Structures:

The typical heights for these structures are between 80 and 140 feet.

Explain why these structures were selected; include such factors as landowner preference, engineering considerations, and costs comparisons to alternate structures that were considered. Provide dimensional drawings of the typical structures to be used in the project.

SPS proposes the use of single-pole steel structures as the standard structure type for the Proposed Project rather than H-frame structures for reasons including: the amount of oil and gas development and associated infrastructure in the area; irrigation pivots, existing water wells; existing electric distribution lines; existing steel surface lines; and existing electric transmission lines. Benefits of utilizing single-pole steel structures are that the structures require less space than H-frame structures and typically do not require guy wires, both of which result in smaller physical and visual footprints as well as reduce complications in routing through existing development. SPS may use double-circuit wood or steel H-frames for parts of the proposed routing where there is an existing circuit.

Refer to Attachment 2 for the following structure drawings:

- A typical 115-kV single-circuit steel single pole tangent direct embedded structure with davit arms is shown on drawing SD-T0-599A.
- A typical 115-kV single-circuit steel single pole tangent direct embedded structure with davit arms and struts is shown on drawing SD-T0-598A.
- A typical 115-kV single-circuit steel single pole 3°-30° angle structure is shown on drawing SD-T0-597.
- A typical 115-kV single-circuit steel single pole angle structure is shown on drawing SD-T0-605.
- A typical 115-kV single-circuit steel single pole corner structure is shown on drawing SD-T0-506.
- A typical 115-kV double-circuit wood H-frame tangent structure is shown on drawing SD-T0-174.B.
- A typical 115-kV double-circuit steel H-frame separation structure is shown on drawing SD-T0-440.
- A typical 115-kV double-circuit steel single pole tangent direct embedded structure is shown on drawing SD-T60-201.
- A typical 115-kV double-circuit steel single pole corner structure is shown on drawing SD-T0-412.

For joint applications, provide and separately identify the above-required information regarding structures for the portion(s) of the project owned by each applicant.

- Not applicable.

6. Right-of-way:

Miles of Right-of-Way:	Approximately 17 to 22 miles
Miles of Circuit:	Approximately 17 to 22 miles
Width of Right-of-Way:	70 feet; wider in some circumstances
Percent of Right-of-Way Acquired:	Approximately 7% (due to the use of approved and/or existing circuits)

In addition to the typical 70 foot easement, SPS will purchase a 30 foot easement for temporary work space adjacent to the permanent easement that will be used during construction to allow for a larger work area during construction. The 30 feet of temporary work space will be released after construction is complete. Additionally, where possible, SPS will purchase, on a temporary basis, an additional 100 ft. x 300 ft. temporary easement for each angle that is 45 degrees or more to ensure enough room for construction.

Provide a brief description of the area traversed by the transmission line. Include a description of the general land uses in the area and the type of terrain crossed by the line.

The study area is located within the Southern High Plains Physiographic Province. This province is located west of the North-Central Plains Province and is bounded to the south by the Edwards Plateau and Basin and Range provinces. This region is described as flat with playa lakes and local dune fields. Elevations within the Southern High Plains region range from 2,200 feet to 3,800 feet above mean sea level ("amsl") (BEG 1996). Within the study area, elevations typically range between 3,320 and 3,590 feet amsl with elevations increasing to the north and west (BEG 1974, 1976). The land use is predominantly rural, with numerous oil and gas fields, agricultural cropland with prominent pivot irrigation, extensive oil and gas developments and some residential and commercial/industrial developments.

7. Substations or Switching Stations:

List the name of all existing HVDC converter stations, substations or switching stations that will be associated with the new transmission line. Provide documentation showing that the owner(s) of the existing HVDC converter stations, substations and/or switching stations have agreed to the installation of the required project facilities.

- Mustang Substation.
  This substation is owned by SPS.
- Seminole Substation.
  This substation is owned by SPS.

For joint applications, provide and separately identify the above-required information for each route for the portion(s) of the project owned by each applicant.

- Not applicable.

List the name of all new HVDC converter stations, substations or switching stations that will be associated with the new transmission line. Provide documentation showing that the owner(s) of the new HVDC converter stations, substations and/or switching stations have agreed to the installation of the required project facilities.

- Not applicable.

8. Estimated Schedule:

Estimated Dates of:	**Start:**	**Completion:**
Right-of-way and Land Acquisition	Following CCN approval	12 months following CCN approval
Engineering and Design	Ongoing	8 weeks before construction
Material and Equipment Procurement	Following CCN approval	6 weeks before construction
Construction of Facilities	As ROW is acquired	9 months following ROW acquisition
Energize Facilities	Following completion of construction	Within 30 days of completion of construction

9. Counties:

For each route, list all counties in which the route is to be constructed.

The proposed route is located in Yoakum and Gaines Counties, Texas.

10. Municipalities:

For each route, list all municipalities in which the route is to be constructed.

The proposed route does not cross through any Texas municipality.

For each applicant, attach a copy of the franchise, permit or other evidence of the city's consent held by the utility, if necessary or applicable. If franchise, permit, or other evidence of the city's consent has been previously filed, provide only the docket number of the application in which the consent was filed. Each applicant should provide this information only for the portion(s) of the project which will be owned by the applicant.

Not applicable.

11. Affected Utilities:

Identify any other electric utility served by or connected to facilities in this application.

- Golden Spread Electric Cooperative, Inc. ("GSEC");
- Lyntegar Electric Cooperative Inc. ("LEC"); and,
- Lea County Electric Cooperative, Inc. ("LCEC").

Describe how any other electric utility will be affected and the extent of the other utilities' involvement in the construction of this project. Include any other electric utilities whose existing facilities will be utilized for the project (vacant circuit positions, ROW, substation sites and/or

equipment, etc.) and provide documentation showing that the owner(s) of the existing facilities have agreed to the installation of the required project facilities.

The addition of the proposed line will increase SPS's system reliability and capacity, which will in turn benefit GSEC because they will be able to serve additional load in their service area from their own generation resources. Because SPS owns the substation affected by the Proposed Project that is located adjacent to GSEC's property, GSEC will not be directly involved in the construction of facilities proposed under this Application. SPS will coordinate with GSEC as necessary during construction to minimize any impacts to the GSEC Mustang Plant adjacent to the Mustang Substation.

12. Financing:

Describe the method of financing this project. For each applicant that is to be reimbursed for all or a portion of this project, identify the source and amount of the reimbursement (actual amount if known, estimated amount otherwise) and the portion(s) of the project for which the reimbursement will be made.

The Proposed Project will be financed through internally generated funds.

13. Estimated Costs:

Provide cost estimates for each route of the proposed project using the following table. Provide a breakdown of "Other" costs by major cost category and amount. Provide the information for each route in an attachment to this application.

Refer to Attachment 3 for the estimated cost table, which details the costs for this project.

For joint applications, provide and separately identify the above-required information for the portion(s) of the project owned by each applicant.

- Not applicable.

14. Need for the Proposed Project:

For a standard application, describe the need for the construction and state how the proposed project will address the need. Describe the existing transmission system and conditions addressed by this application. For projects that are planned to accommodate load growth, provide historical load data and load projections for at least five years. For projects to accommodate load growth or to address reliability issues, provide a description of the steady state load flow analysis that justifies the project. For interconnection projects, provide any documentation from a transmission service customer, generator, transmission service provider, or other entity to establish that the proposed facilities are needed. For projects related to a Competitive Renewable Energy Zone, the foregoing requirements are not necessary; the applicant need only provide a specific reference to the pertinent portion(s) of an appropriate commission order specifying that the facilities are needed. For all projects, provide any documentation of the review and recommendation of a PURA §39.151 organization.

The Proposed Project was determined as needed for reliability by the SPP. SPS is a member of, and its entire transmission system is located within, the SPP. The SPP is a Regional Transmission Organization ("RTO") approved by the Federal Energy Regulatory Commission ("FERC") that meets the requirements of Public Utility Regulatory Act ("PURA") § 39.151 as an independent system operator. SPS does not operate in the Electric Reliability Council of Texas ("ERCOT") region, and ERCOT takes no position on SPS's transmission projects.

As a FERC-designated RTO, one of SPP's responsibilities is to create regional transmission expansion plans. With its members, regulators and stakeholders, SPP creates planning models and studies that determine what new transmission facilities are needed to meet the region's long- and near-term needs. This planning activity creates a cost-effective, flexible, and robust transmission network. The SPP undertakes its transmission planning through its Integrated Transmission Planning Process ("ITP") as outlined in Attachment O of the SPP Open Access Transmission Tariff. The ITP studies are an iterative three-year process that include 20-year, 10-year, and near-term assessments that focus on identifying regional transmission needs. The Near-Term Assessment (also referred to as the "ITPNT") is performed annually and assesses the system requirements and needed upgrades at all applicable voltage levels required in the near-term planning horizon (generally for the next one to five years). The 10-year assessment ("ITP10") focuses on reliability and economic needs on the transmission system for a 10-year planning horizon. The 20-year assessment evaluates long range policy and economic issues with less emphasis on reliability issues on the lower voltage networks. The ITPNT and ITP10 assessments can result in NTCs being issued by SPP to transmission owners to construct new facilities or revise existing facilities to meet the identified reliability or economic transmission needs.

In the 2016 ITPNT Assessment, SPP studied and analyzed local and regional reliability issues for the 2016-2020 planning horizon and identified the Proposed Project as a needed regional reliability upgrade in the SPS area. The study identified solutions to potential issues for system intact and single contingency (N-1)[1] conditions in compliance with the reliability standards of the North American Electric Reliability Corporation ("NERC"). The SPP determined the Proposed Project was the best solution to mitigate the time-sensitive thermal overload and voltage needs around the San Andreas and Denver City area in West Texas. The study process is described in Part I and the study findings are described in Part II of the 2016 ITPNT Assessment. Section 6.2 of the 2016 ITPNT Assessment identifies the Proposed Project as needed for reliability, which is shown on a project map in Section 7 (Appendix III) of the Assessment. Please refer to Attachment 5a for the 2016 ITPNT Assessment.

[1] "SPP designs and operates its transmission system to be capable of withstanding the next transmission outage that may occur; this is called N-1 planning and is in accordance with NERC planning standards." 2016 SPP ITPNT Report at 22.

Additionally, the SPP issued the 2016 ITPNT Short Term Reliability ("STR") Project Report, which identified the project as needed in the short term (i.e., within three years). The STR Project Report noted that, in the 2016 ITPNT Assessment, the SPP performed an N-1 AC Contingency Calculation analysis to determine reliability needs utilizing the models developed by SPP through its stakeholder process. That analysis identified the Proposed Project as needed to address time-sensitive thermal overload and voltage needs. The thermal reliability needs are the overload issues of the Denver City Substation to San Andres Tap to Seminole Substation 115-kV line, which could occur during an outage of the existing Mustang Substation-Seminole 230-kV line (an N-1 condition). The voltage reliability needs are low voltages at the Flannagan 69-kV Substation; and the Doss, Roz, Seminole, Oxy-West Seminole Tap, and Amerada Hess 115-kV Substations (an N-1 condition). The STR Project Report also indicated that load growth in the local area contributed to the low voltage conditions. Please refer to Attachment 5b for 2016 ITPNT STR Project Report.

Based on the needs analysis in the 2016 ITPNT Assessment, the SPP issued NTC-200407 to SPS in 2016 which directed SPS to build a 115-kV transmission line from the Mustang Substation to the Seminole Substation. SPS accepted the NTC on November 10, 2016. The Proposed Project will connect the existing Mustang Substation in Yoakum County, Texas, to the existing Seminole Substation in Gaines County, Texas.

SPP's NTC letter identifies Project ID number 31021 and Network Upgrade ID numbers 51478, 51479, and 51480, and directs SPS to build a 115-kV transmission line from the Mustang Substation to the Seminole Substation, and install necessary terminal equipment at both Mustang Substation and Seminole Substation. Please refer to Attachment 6 for a copy of the NTC letter.

As discussed above, the Proposed Project is needed to address reliability issues. However, for completeness of information, please refer to Attachment 4 for historical and projected load information.

Please refer to Attachment 5a for a copy of the 2016 ITPNT Assessment.

Please refer to Attachment 5b for the STR Project Report.

Please refer to Attachment 6 for a copy of the SPP NTC Letter.

Please refer to Attachment 6 for a copy of SPS's letter accepting the SPP NTC Letter.

Existing Transmission System

The existing transmission system in the SPS Yoakum-Gaines County Service Area consists of 118 miles of 230-kV transmission lines, 263 miles of 115-kV transmission lines, and 147 miles of 69-kV transmission lines. The SPS Yoakum-Gaines Co. Service Area is connected to the generating system, which in material part includes the gas-fired Hobbs Plant to the west (owned by Lea Power Partners), the gas-fired Mustang Plant to the south within Yoakum County (owned by GSEC), the gas-fired Plant X to the north, and the gas-fired Jones Plant to the east. The total 2018 Summer Capacity of the Hobbs, Plant-X, and the Jones Plants is approximately 1794 MW.

The Mustang Substation connects to GSEC's Mustang Plant, and to the Denver City 115-kV and Seagraves 115-kV Substations, and the Amoco Wasson, Seminole, and Yoakum 230-kV Substations. The Seminole 115-kV Substation connects to the Denver City 115-kV Substation and the Yoakum 115-kV Substation.

The Mustang, Seminole, Sundown and Yoakum Substations are interconnected by 230-kV transmission lines. The Mustang, Denver City, Gaines, Seminole, Legacy, Yoakum, Seagraves, Shell CO2, and Doss Substations are interconnected by looped 115-kV lines, which serve the customers in the Yoakum-Gaines County service area at both the 115- and 69-kV levels.

15. Alternatives to Project:

For a standard application, describe alternatives to the construction of this project (not routing options). Include an analysis of distribution alternatives, upgrading voltage or bundling of conductors of existing facilities, adding transformers, and for utilities that have not unbundled, distributed generation as alternatives to the project. Explain how the project overcomes the insufficiencies of the other options that were considered.

The NTC for the Proposed Project is the result of the annual SPP Integrated Transmission Near Term (ITPNT) reliability assessment. Therefore, no distribution voltage level solutions would be capable of meeting the requirements of the NTC.

SPP conducts studies to determine whether reliability issues exist within the transmission system and whether or not additional transmission lines or upgrades to existing transmission lines are needed. SPS also conducts studies to determine if firm transmission service can be sold on the system and if any reliability upgrades are needed to provide that service while maintaining or improving system reliability. In the process of conducting its analysis, SPP determines what projects will be included in NTCs issued to utilities. SPS and other Load Serving Entities provided SPP with load forecasts for use in the 2016 ITPNT study.

A result of SPP's analysis was that the Proposed Project was needed for reliability purposes to mitigate overloading conditions of the Denver City Substation to San Andres Tap to Seminole Substation 115-kV line which could occur during an outage of the Mustang Substation-Seminole 230-kV line and the low voltages at the Flannagan 69-kV Substation; and the Amerada Hess, Doss, Oxy West-Seminole, Roz, and Seminole 115-kV Substations. The analysis methodology is discussed in Section 5 of the ITPNT Report (Attachment 4) and the results are discussed in the STR Project Report. As discussed in the STR Project Report, SPP evaluated other potential solutions including: 1) constructing a new Mustang to Gaines 230-kV line, 2) constructing a new Seagraves-Seminole 115-kV line, 3) constructing a new substation, constructing a new Seminole-Denver City 230-kV line, and installing a new 230/115-kV transformer at the new substation, and 4) constructing a new Mustang-Gaines 230-kV line and installing a new 230/115-kV transformer at the Gaines Substation. The Proposed Project was determined to be the best solution based on the analysis.

Distribution alternatives were not considered because the Proposed Project is a transmission solution to the annual ITPNT transmission reliability process. Moreover, no other alternatives such as higher voltage projects, bundling of conductors of existing facilities, or adding

transformers were selected by SPP as meeting their requirements for the requested transmission service.

16. Schematic or Diagram:

For a standard application, provide a schematic or diagram of the applicant's transmission system in the proximate area of the project. Show the location and voltage of existing transmission lines and substations, and the location of the construction. Locate any taps, ties, meter points, or other facilities involving other utilities on the system schematic.

Refer to Attachment 7.

17. Routing Study:

Provide a brief summary of the routing study that includes a description of the process of selecting the study area, identifying routing constraints, selecting potential line segments, and the selection of the routes. Provide a copy of the complete routing study conducted by the utility or consultant. State which route the applicant believes best addresses the requirements of PURA and P.U.C. Substantive Rules.

The EA/Routing Study for this Proposed Project was prepared by Burns & McDonnell with input from SPS. SPS and Burns & McDonnell used a comprehensive transmission line routing and evaluation methodology to delineate and evaluate alternative transmission line routes. Methods used to locate and evaluate potential routes followed SPS's transmission line routing processes and criteria, in compliance with PURA § 37.056(c)(4)(A)-(D), 16 TEXAS ADMIN. CODE ("TAC") § 25.101(a)(4), and 16 TAC § 25.101(b)(3)(B), including the PUC's policy of prudent avoidance.

The first step in the routing study was to select a study area. This area needed to encompass the endpoints of the Proposed Project as set forth in SPP's NTC (the Mustang Substation and the Seminole Substation) and include a sufficiently large area in which feasible, geographically diverse, forward progressing alternative routes could be sought. Numerous land use constraints, particularly agricultural uses with mobile irrigation systems, and extensive oil and gas facilities, were considered as the Study Area boundaries were developed. This resulted in the establishment of a rectangular Study Area that is approximately 14.5 miles north to south and 9 miles east to west, that encompasses an area of approximately 130 square miles. The study area is shown in Figure Nos. 2-1, 2-2 and 6-1 of the EA/Routing Study, Attachment 1.

In an effort to minimize potential impacts to sensitive environmental and land-use features, a constraints mapping process was used to develop and refine potential routing options. The geographic locations of environmentally sensitive and other restrictive areas within the study area were identified and considered during route development. These constraints were mapped on aerial base maps. Environmental and land use data used by Burns & McDonnell were drawn from a variety of sources, including readily available Geographic Information System ("GIS") coverage with associated metadata; maps and published literature; information files and records from numerous federal, state, and local regulatory agencies; and reconnaissance surveys of the study area.

Utilizing the information described above, Burns & McDonnell identified numerous preliminary route segments, which were initially examined in the field by Burns & McDonnell in April 2018 and presented to SPS for review and comment. The principal criteria used to locate these preliminary segments were using or paralleling existing transmission lines, paralleling existing road rights-of-way, avoiding residential and commercial development, and paralleling property

lines. These preliminary route segments, which are shown on Figure 2–3 of the EA/Routing Study, Attachment 1, were presented to the public at an open-house meeting held in the Seminole, Texas on June 19, 2018.

Following the public open-house meeting, Burns & McDonnell and SPS performed additional reviews to look at areas of concern discussed at the public meeting; communicated with individual landowners, agencies, and officials; evaluated the public comments; and considered revisions to the preliminary route segments. In response to public and engineering concerns, Burns & McDonnell and SPS added, deleted, and modified segments to reduce potential impacts to habitable structures, agricultural use, oil and gas facilities, and other constraints to the greatest extent practicable, and identified the primary alternative routes to be evaluated in this document. This modified route network is shown on Figure 2-4 of the EA/Routing Study, Attachment 1.

Next, the environmental evaluation of the 10 primary alternative routes was performed by Burns & McDonnell. Based upon this evaluation as discussed in Sections 4 and 6 of the EA/Routing Study, Attachment 1, Burns & McDonnell recommended a route from an environmental and land use perspective. The consensus opinion of Burns & McDonnell evaluators was to recommend Route J as the route that best meets the requirements of PURA and Commission Substantive Rules. Burns & McDonnell's selection of Route J was based primarily on the following evaluation criteria. Route J:

- is one of three routes with the fewest habitable structures (2) within 300 feet of its centerline;
- ranks as the fifth-shortest route (approximately 975 feet longer than the shortest alternative);
- utilizes and parallels existing transmission lines, other compatible ROW, and property lines for approximately 15.76 miles (approximately 90.2 percent of its total length);
- is one of three routes with just one stream crossing;
- does not cross potential wetlands or playa lakes; and
- crosses the least amount of High Probability Area for cultural resources (0.58 miles) (tied with H).

SPS also analyzed the proposed routes based on considerations including reliability, constructability, operation, maintenance, and the cost to construct each alternative route. SPS selected Route J as the route best meeting PURA and PUC Substative Rules. This is based on the reasons discussed above; the fact that it is a relatively direct path between the end points; the reasonableness of the cost when compared to all of the proposed routes; and, because it accommodates landowner preferences that were voiced during the public outreach for this project that Segment 53 be avoided if possible. While Route J is not the least expensive route, it is the third least expensive route. The added cost is largely due to double circuiting part of the routing, which while more expensive, tends to be preferred by landowners, is necessary on that route due to the constraints in the area (oil wells), and reduces the environmental impact of the route.

While all proposed alternative routes and combinations of proposed segments are viable and constructible, SPS and Burns & McDonnell believe that Route J best addresses the requirements of PURA and PUC Substantive Rules.

18. Public Meeting or Public Open House:

Provide the date and location for each public meeting or public open house that was held in accordance with 16 TAC § 22.52. Provide a summary of each public meeting or public open house including the approximate number of attendants, and a copy of any survey provided to attendants and a summary of the responses received. For each public meeting or public open house provide a description of the method of notice, a copy of any notices, and the number of notices that were mailed and/or published.

A public open-house meeting was held by SPS for the proposed Mustang to Seminole 115-kV transmission line project at the Seminole Community Center, 801 N. Main Street, in Seminole, Texas, on June 19, 2018, from 5:00 to 7:00 PM, to solicit comments from landowners, public officials, and other interested residents and persons regarding the preliminary alternative segments. Direct mail notice of the open-house meeting was sent by first class mail to approximately 147 landowners listed on the current county tax rolls as an owner of land located within 300 feet of the preliminary route segments. The notice included a map of the project, a questionnaire, a copy of The State of Texas *Landowner's Bill of Rights*, and a survey permission form. It also included a pre-addressed, pre-paid envelope for landowners to send completed questionnaires and forms to SPS. Additionally, local officials and the DoD Siting Clearinghouse were also mailed written notice of the meeting. A copy of the landowner notice is included in Appendix B of the EA/Routing Study, Attachment 1. A copy of the notice sent to the DoD is included in Appendix A of the EA/Routing Study, Attachment 1.

A total of ten (10) individuals attended the public open house meeting, with 5 submitting questionnaire responses at the meeting and another 2 submitting responses or comments by mail or email. A copy of the questionnaire is included in Appendix B of the EA/Routing Study, Attachment 1. The comments are summarized in Section 5.2 of the EA/Routing Study, Attachement 1. The DoD responded to the notice by mail. A copy of the DoD's response is included in Appendix A of the EA/Routing Study, Attachment 1.

As discussed in Section 5.2 of the EA/Routing Study, Attachment 1, after the public open house meeting, all comments from landowners and engineering were reviewed and adjustments were made to various segments.

SPS mailed out 31 additional notices on July 31, 2018 to landowners that were directly affected by the segment revisions, inviting the landowners to contact SPS with any questions. Five out of the 31 landowners noticed were new landowners and the remaining 26 landowners had revisions made to the original segments presented at the Public Meeting. The notice included a map showing the the modified and newly added segments, a questionnaire, a copy of *The State of Texas Landowner's Bill of Rights*, and a survey permission form. It also included a pre-addressed pre-paid envelope for landowners to send completed questionnaires and forms to SPS. A copy of this additional notice is included in Appendix B of the EA/Routing Study, Attachment 1. Four landowners contacted SPS by phone in response to the additional notice letter. Three questionairres were received in response to the additional notice letter.

19. Routing Maps:

Base maps should be a full scale (one inch = not more than one mile) highway map of the county or counties involved, or other maps of comparable scale denoting sufficient cultural and natural

features to permit location of all routes in the field. Provide a map (or maps) showing the study area, routing constraints, and all routes or line segments that were considered prior to the selection of the routes. Identify the routes and any existing facilities to be interconnected or coordinated with the project. Identify any taps, ties, meter points, or other facilities involving other utilities on the routing map. Show all existing transmission facilities located in the study area. Include the locations of radio transmitters and other electronic installations, airstrips, irrigated pasture or cropland, parks and recreational areas, historical and archeological sites (subject to the instructions in Question 27), and any environmentally sensitive areas (subject to the instructions in Question 29).

Routing maps are provided in the EA/Routing Study, Attachment 1 to this Application. Figure 2-2 (located in a map pocket of the EA/Routing Study) is an aerial photograph based map with a scale of 1 inch = 2,000 feet that shows the Study Area, all routing segments, routing constraints and other environmental land use features, and existing transmission lines. Figure 6-1 (located in a map pocket of the EA/Routing Study) is an aerial-photograph based map with a scale of 1 inch = 2,000 feet that shows the Study Area, all route segments, existing transmission lines, and habitable structure locations within 300 feet of the centerline of the route segments. Figure 2-3 of the EA/Routing Study, Attachment 1, shows the preliminary alternative route segments that were presented at the open-house meeting, and Figure 2-4 of the EA/Routing Study, Attachment 1, shows the primary alternative route segments after they were modified following the open-house meeting.

Provide aerial photographs of the study area displaying the date that the photographs were taken or maps that show (1) the location of each route with each route segment identified, (2) the locations of all major public roads including, as a minimum, all federal and state roadways, (3) the locations of all known habitable structures or groups of habitable structures (see Question 19 below) on properties directly affected by any route, and (4) the boundaries (approximate or estimated according to best available information if required) of all properties directly affected by any route.

Figure 6-1 (located in a map pocket of the EA) is an aerial-photograph based map with a scale of 1 inch = 2,000 feet that shows the Study Area, all routing segments, existing transmission lines, habitable structure locations within 300 feet of the route centerlines, and the approximate boundaries of all properties that are directly affected by all routes according to the best information available from county tax appraisal district records.

For each route, cross-reference each habitable structure (or group of habitable structures) and directly affected property identified on the maps or photographs with a list of corresponding landowner names and addresses and indicate which route segment affects each structure/group or property.

Please refer to Figure No. 6-1 of the EA/Routing Study, Attachment 1, for the Alternative Route Map depicting the 10 alternative routes for Proposed Project. Refer to Tables 6-3 through 6-12 of the EA/Routing Study, Attachment 1, for the habitable structures list (by route and distance) and Attachment 8, for a list of the landowner names and addresses cross-referenced to the transmission line route segment that affects each structure and property.

20. Permits:

List any and all permits and/or approvals required by other governmental agencies for the construction of the proposed project. Indicate whether each permit has been obtained.

SPS will coordinate with appropriate local, state, and federal agencies with jurisdiction regarding the construction of the transmission facilities associated with this project. SPS and/or Burns & McDonnell have initiated contact with and provided information about the project to various agencies. Some input from these agencies has been incorporated in this Application; however, requests for permits and/or approvals will not be submitted to the appropriate agencies until the Commission approves a route. None of the following potential permits, approvals, requirements, easements, or clearances has been obtained.

- Notification to the Federal Aviation Administration ("FAA") might be required depending on the alignment of the approved route, structure locations, and structure designs. Requirements to alter the design of the structures or potential requirements to mark and/or illuminate the line will be coordinated with the FAA.
- Permits or other requirements associated with possible impacts to waters of the U.S. under the jurisdiction of the U.S. Army Corps of Engineers ("USACE") will be coordinated with USACE as necessary.
- Permits or other other requirements associated with possible impacts to endangered/threatened species will be coordinated with the U.S. Fish and Wildlife Service as necessary.
- Coordination with local floodplain administrators will be completed as necessary.
- Coordination with Texas Parks & Wildlife Department ("TPWD") might be necessary to determine the need for any surveys, and to avoid or minimize any potential adverse impacts to sensitive habitats, threatened or endangered species, and other fish and wildlife resources along the approved route.
- A Storm Water Pollution Prevention Plan ("SWPPP") might be required by the Texas Commission on Environmental Quality ("TCEQ"). SPS or its contractor will submit a Notice of Intent to the TCEQ under the Texas Pollutant Discharge Elimination System General Permit at least 48 hours prior to the beginning of construction; and will have the SWPPP on site at the initiation of clearing and construction activities.
- Texas Department of Transportation ("TxDOT") permit(s) will be obtained for crossing state-maintained roadways or using TxDOT ROW as necessary.
- Cultural resources clearance will be obtained from the Texas Historical Commission for the Proposed Project if necessary.
- A miscellaneous Easement from the General Land Office will be obtained as necessary for any right-of-way that crosses a state-owned riverbed or navigable stream.
- Depending on the location of structures, road crossing permits might be required by Gaines and Yoakum Counties.

21. Habitable structures:

For each route list all single-family and multi-family dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures,

churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline if the proposed project will be constructed for operation at 230-kV or less, or within 500 feet of the centerline if the proposed project will be constructed for operation at greater than 230-kV. Provide a general description of each habitable structure and its distance from the centerline of the route. In cities, towns or rural subdivisions, houses can be identified in groups. Provide the number of habitable structures in each group and list the distance from the centerline of the route to the closest and the farthest habitable structure in the group. Locate all listed habitable structures or groups of structures on the routing map.

The number of habitable structures located within 300 feet of the centerlines of the ten alternative routes ranges from a low of two (2) for Routes C, H, and J to seven (7) for Route E. Table 6-1 of the EA/Routing Study, Attachment 1, identifies by route, the number of habitable structures located within 300 feet of the centerline of each alternative route. Tables 6-3 through 6-12 of the EA/Routing Study, Attachment 1, provide a general description of the habitable structures located within 300 feet and their distance and direction from the centerline of each alternative route. The locations of habitable structures or groups of structures listed in Tables 6-3 through 6-12 are shown on Figure 6-1 (located in a map pocket of the EA).

22. Electronic Installations:

For each route, list all commercial AM radio transmitters located within 10,000 feet of the center line of the route, and all FM radio transmitters, microwave relay stations, or other similar electronic installations located within 2,000 of the center line of the route. Provide a general description of each installation and its distance from the center line of the route. Locate all listed installations on a routing map.

As shown in Table 6-1 in the EA/Routing Study, Attachment 1, no commercial AM radio transmitter was determined to be located within 10,000 feet of the centerlines of any of the ten primary alternative routes. Additionally, no FM radio transmitter, microwave tower, or other electronic communications tower was determined to be located within 2,000 feet of the centerlines of any of the ten primary alternative routes.

23. Airstrips:

For each route, list all known private airstrips within 10,000 feet of the center line of the project. List all airports registered with the Federal Aviation Administration (FAA) with at least one runway more than 3,200 feet in length that are located within 20,000 feet of the center line of any route. For each such airport, indicate whether any transmission structures will exceed a 100:1 horizontal slope (one foot in height for each 100 feet in distance) from the closest point of the closest runway. List all listed airports registered with the FAA having no runway more than 3,200 feet in length that are located within 10,000 feet of the center line of any route. For each such airport, indicate whether any transmission structures will exceed a 50:1 horizontal slope from the closest point of the closest runway. List all heliports located within 5,000 feet of the center line of any route. For each such heliport, indicate whether any transmission structures will exceed a 25:1 horizontal slope from the closest point of the closest landing and takeoff area of the heliport. Provide a general description of each listed private airstrip, registered airport, and heliport; and state the distance of each from the center line of each route. Locate and identify all listed airstrips, airports, and heliports on a routing map.

There is no known private airstrip located within 10,000 feet of the centerlines of the ten primary alternative routes.

There is no airport registered with the FAA with at least one runway more than 3,200 feet in length located within 20,000 feet of the centerlines of the ten primary alternative routes.

There is no airport registered with the FAA having no runway more than 3,200 feet in length located within 10,000 feet of the centerlines of the ten primary alternative routes.

There is no heliport located within 5,000 feet of the centerlines of the ten primary alternative routes.

24. Irrigation Systems:

For each route identify any pasture or cropland irrigated by traveling irrigation systems (rolling or pivot type) that will be traversed by the route. Provide a description of the irrigated land and state how it will be affected by each route (number and type of structures etc.). Locate any such irrigated pasture or cropland on a routing map.

Each of the ten primary alternative routes cross pasture or cropland irrigated by traveling irrigation systems (rolling or pivot type). The total length of pasture or cropland irrigated by traveling irrigation systems traversed by the ten alternative routes ranges from a low of 0.87 mile (Routes G and I) to high of 1.73 miles (Route H). However, the alternative routes were developed to have a minimal impact on center-pivot mobile irrigation systems by locating the routes along field edges in order to span the traveling arc of the mobile systems, and thereby minimizing any potential impact. All pasture and cropland irrigated by traveling irrigation systems (rolling or pivot type) that will be traversed by the primary alternative routes are shown on Figure 2-2 (located in a map pocket of the EA/Routing Study), and the length of such land crossed by each route is listed in Table 6-1 of the EA/Routing Study, Attachment 1.

25. Notice:

Notice is to be provided in accordance with 16 TAC § 22.52.

A. *Provide a copy of the written direct notice to owners of directly affected land. Attach a list of the names and addresses of the owners of directly affected land receiving notice.*

Refer to Attachment 8 for: (1) a sample copy of the notice letter; (2) the Alternative Segment Descriptions with attached map; PUCT Landowner Brochure, Comments Form, and Intervener Form, and Landowner Bill of Rights, all of which were included with each notice packet; and (3) the list of landowners to whom notice was sent.

B. *Provide a copy of the written notice to utilities that are located within five miles of the routes.)*

Refer to Attachment 9 for a copy of the notice letters and a list of utilities to which notice was sent. Also, refer to Attachment 8, for the Alternative Segment descriptions and map included with each notice.

C. *Provide a copy of the written notice to county and municipal authorities, and the Department of Defense Siting Clearinghouse. Notice to the DoD siting Clearinghouse should be provided at the email address found at http://www.acq.osd.mil/dodsc/.*

Refer to Attachment 10 for a copy of the notice letters sent to county and municipal authorities and Attachment 14 for the Department of Defense Siting Clearinghouse letter sent to the required email address. The Department of Defense Siting Clearinghouse is also being mailed this notice, consistent with 16 TAC § 22.52. Also, refer to Attachment 8, for the Alternative Segment descriptions and map included with each notice.

D. *Provide a copy of the notice that is to be published in newspapers of general circulation in the counties in which the facilities are to be constructed. Attach a list of the newspapers that will publish the notice for this application. After the notice is published, provide the publisher's affidavits and tear sheets.*

Refer to Attachment 11 for a copy of the newspaper notices, Alternative Segment descriptions, and newspapers that will publish the notices. Also, refer to Attachment 8, for a copy of the map used for the newspaper notices.

E. *Provide a copy of the written notice to Texas Parks and Wildlife Department*
Refer to Attachment 12 for a copy of the notice letter. TWPD will also receive a complete copy of the Application.

F. *Provide a copy of the written notice to Office of Public Utility Counsel*
Refer to Attachment 13 for a copy of the notice letter.

For a CREZ application, in addition to the requirements of 16 TAC 22.52 the applicant shall, not less than twenty-one (21) days before the filing of the application, submit to the Commission staff a "generic" copy of each type of alternative published and written notice for review. Staff's comments, if any, regarding the alternative notices will be provided to the applicant not later than seven days after receipt by Staff of the alternative notice. Applicant may take into consideration any comments made by Commission staff before the notices are published or sent by mail.

- Not applicable.

26. Parks and Recreation Areas:

For each route, list all parks and recreational areas owned by a governmental body or an organized group, club, or church and located within 1,000 feet of the center line of the route. Provide a general description of each area and its distance from the center line. Identify the owner of the park or recreational area (public agency, church, club, etc.). List the sources used to identify the parks and recreational areas. Locate the listed sites on a routing map.

Burns & McDonnell performed a review of federal and state databases, county and local maps, and recent aerial imagery to identify parks and/or recreational areas within the Study Area. Reconnaissance surveys were also conducted to identify any additional park or recreational areas that are located within the Study Area.

No park or recreational area is crossed by any of the primary alternative routes. Additionally, no park or recreation area is located within 1,000 feet of a centerline of a primary alternatives route.

27. Historical and Archeological Sites:

For each route, list all historical and archeological sites known to be within 1,000 feet of the center line of the route. Include a description of each site and its distance from the center line. List the sources (national, state or local commission or societies) used to identify the sites. Locate

all historical sites on a routing map. For the protection of the sites, archeological sites need not be shown on maps.

Burns & McDonnell conducted a literature review and records search at the Texas Historical Commission and The Texas Archeological Research Laboratory at the University of Texas at Austin to identify known historical and archeological sites located within the Study Area.

No known cultural resource site is crossed by, or within 1,000 feet of the centerlines of the ten primary alternative routes.

There is no National Register of Historic Places-listed or determined-eligible site crossed by or within 1,000 feet of the centerlines of the primary alternative routes.

28. Coastal Management Program:

For each route, indicate whether the route is located, either in whole or in part, within the coastal management program boundary as defined in 31 T.A.C. §503.1. If any route is, either in whole or in part, within the coastal management program boundary, indicate whether any part of the route is seaward of the Coastal Facilities Designation Line as defined in 31 T.A.C. §19.2(a)(21). Using the designations in 31 T.A.C. §501.3(b), identify the type(s) of Coastal Natural Resource Area(s) impacted by any part of the route and/or facilities.

The proposed route is not located within the coastal management program boundary as defined in 31 TAC § 503.l.

29. Environmental Impact:

Provide copies of any and all environmental impact studies and/or assessments of the project. If no formal study was conducted for this project, explain how the routing and construction of this project will impact the environment. List the sources used to identify the existence or absence of sensitive environmental areas. Locate any environmentally sensitive areas on a routing map. In some instances, the location of the environmentally sensitive areas or the location of protected or endangered species should not be included on maps to ensure preservation of the areas or species.

Refer to Attachment 1 for the Mustang Substation to Seminole Substation 115-kV Transmission Line Proposed Project Environmental Assessment and Route Analysis, Yoakum and Gaines Counties, Texas.

Within seven days after filing the application for the project, provide a copy of each environmental impact study and/or assessment to the Texas Parks and Wildlife Department ("TPWD") for its review at the address below. Include with this application a copy of the letter of transmittal with which the studies/assessments were or will be sent to the TPWD.

Wildlife Habitat Assessment Program
Wildlife Division
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, Texas 78744

The applicant shall file an affidavit confirming that the letter of transmittal and studies/assessments were sent to TPWD.

A copy of the application, including the EA/Routing Study, Attachment 1, was sent to TPWD on the day of the filing of this application. Refer to Attachment 12 for a copy of the transmittal letter.

At the request of the Office of Public Utility Counsel ("OPUC"), only copies of the segment descriptions and map were sent to OPUC on the day of the filing of this application. Refer to Attachment 13 for a copy of the transmittal letter.

Application of Southwestern Public Service Company to Amend a Certificate of Convenience and Necessity for a Proposed 115-kV Transmission Line Within Yoakum and Gaines Counties (Mustang to Seminole)

AFFIDAVIT

STATE OF TEXAS

COUNTY OF POTTER

I, James M. Bagley, after first being duly sworn state the following: I am filing this application as Manager, Regulatory Administration for Southwestern Public Service Company. I am over 18 years of age, of sound mind and capable of making this affidavit. I am qualified and authorized to file and verify this application, and am personally familiar with the information supplied in this application; and to the best of my knowledge, all information provided, statements made, and matters set forth in this application and attachments are true and correct; and all requirements for the filing of this application have been satisfied. I further state that this application is made in good faith and that this application does not duplicate any filing presently before the commission.

James M. Bagley

AFFIANT James M. Bagley

SUBSCRIBED AND SWORN TO BEFORE ME, a Notary Public in and for the state of Texas, this 18th day of October 2018.

SEAL

CINDY BAEZA
Notary Public, State of Texas
Notary ID #13078365-0
My Commission Expires 10-06-2020

Cindy Baeza

Notary Public

My Commission Expires: 10-06-2020

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Attachment 1
Docket No. 48724

Environmental Assessment and Alternative Route Analysis

Southwestern Public Service Company

Proposed Mustang to Seminole
115-kV Transmission Line Project

Project No. 106783

October 2018

Docket No. 48724

Environmental Assessment and Alternative Route Analysis

prepared for

Southwestern Public Service Company

Proposed Mustang to Seminole
115-kV Transmission Line Project
Yoakum and Gaines Counties, Texas

Project No. 106783

October 2018

prepared by

Burns & McDonnell Engineering Company, Inc.
Austin, Texas

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LIST OF ABBREVIATIONS

Abbreviation	Term/Phrase/Name
APE	Area of Potential Effects
APLIC	Avian Power Line Interaction Committee
AWBP	Aransas–Wood Buffalo population
BEG	Bureau of Economic Geology
BGEPA	Bald and Golden Eagle Protection Act
BLS	U.S. Bureau of Labor Statistics
BMP	best management practice
Burns & McDonnell	Burns & McDonnell Engineering Company, Inc.
CCN	Certificate of Convenience and Necessity
CFR	Code of Federal Regulations
CR	County Road
CRP	Conservation Reserve Program
CWA	Clean Water Act
CWCTP	Cooperative Whooping Crane Tracking Project
CWS	Canadian Wildlife Service
EA	Environmental Assessment and Alternative Routing Analysis
EMST	Ecological Mapping Systems of Texas
EPA	U.S. Environmental Protection Agency
ERCOT	Electric Reliability Council of Texas
ESA	Endangered Species Act
FAA	Federal Aviation Administration

Abbreviation	Term/Phrase/Name
FAR	Federal Aviation Regulations
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FM	Farm-to-Market Road
FPPA	Farm Protection Policy Act
ft	foot/feet
FVZ	foreground visual zone
GLO	General Land Office
HPA	high probability area
IH	Interstate Highway
IPaC	Information, Planning, and Conservation
ISD	Independent School District
ITPNT	Integrated Transmission Plan Near Term
kV	kilovolt
MBTA	Migratory Bird Treaty Act
ME	Miscellaneous Easement
MOA	Military Operations Area
msl	mean sea level
NAIP	National Agriculture Imagery Program
NASS	National Agricultural Statistics Service
NDD	TPWD's Natural Diversity Database
NEPA	National Environmental Protection Act

Abbreviation	Term/Phrase/Name
NESC	National Electric Safety Code
NOI	Notice of Intent
NOT	Notice of Termination
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTC	Notice To Construct
NWI	National Wetlands Inventory
NWP	Nationwide Permit
NWR	National Wildlife Refuge
OTHM	Official Texas Historical Marker
PBRPC	Permian Basin Regional Planning Commission
PUC	Public Utility Commission of Texas
PURA	Public Utility Regulatory Act
RM	Ranch-to-Market Road
ROW	right-of-way
RTHL	Recorded Texas Historic Landmarks
RTO	Regional Transmission Organization
RRC	Railroad Commission of Texas
SAL	State Antiquities Landmark
SCS	Soil Conservation Service
SH	State Highway

Abbreviation	Term/Phrase/Name
SHPO	State Historic Preservation Office (r)
SPAG	South Plains Association of Governments
SPP	Southwest Power Pool
SPS	Southwestern Public Service Company
SWPPP	Storm Water Pollution Prevention Plan
TAC	Texas Administrative Code
TARC	Texas Association of Regional Councils
TARL	Texas Archeological Research Laboratory
TASA	Texas Archaeological Sites Atlas
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
TOP	Texas Orthoimagery Program
TORP	Texas Outdoor Recreation Plan
TPDES	Texas Pollution Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
TWC	Texas Workforce Commission
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
US	U.S. Highway
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service

Abbreviation	Term/Phrase/Name
USGS	U.S. Geological Survey

1.0 DESCRIPTION OF THE PROPOSED PROJECT

1.1 Scope of Project

Southwestern Public Service Company (SPS), a subsidiary of Xcel Energy Inc., is proposing to design and construct a new primarily single-circuit 115-kilovolt (kV) transmission line in portions of Gaines and Yoakum Counties, Texas. The proposed line will originate at the existing Mustang Substation, located approximately 0.65 mile northeast of the County Road (CR) 355 and CR 390 intersection in Yoakum County, and terminate at the existing Seminole Substation, located southwest of the CR 205 and CR 208 intersection in Gaines County. The proposed transmission line will be constructed within a typical 70-foot wide right-of-way (ROW), and will be approximately 17.3 to 21.7 miles in length depending on the route selected. Figure 1-1 shows the Project location. The Study Area is described in Section 2.3.1 and shown on Figure 2-1.

SPS contracted with Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell), to select and evaluate alternative routes and to prepare an Environmental Assessment (EA) and Alternative Routing Analysis in support of the application to amend SPS's Certificate of Convenience and Necessity (CCN) to be submitted to the Public Utility Commission of Texas (PUC). This document is intended to provide information and address requirements of Section 37.056(c)(4)(A-D) of the Texas Utilities Code, the PUC's application form, 16 Tex. Admin. Code (TAC) § 25.101, and the PUC's policy of "prudent avoidance." This EA and Alternative Routing Analysis document also provides the basis for SPS to identify an alternative route that best addresses the requirements under the Public Utility Regulatory Act (PURA) and 16 TAC § 25.101. SPS provided information in this section and Sections 1.2, 1.3, 1.4, and 1.5 concerning the purpose and need for the project, proposed design, construction methods, easements, clearing, cleanup, and maintenance. This document is intended to provide information and address issues concerning the natural, human, and cultural environment within the Study Area. This document may also be used in support of any local, State, or Federal permitting activities that may be required for the proposed Project.

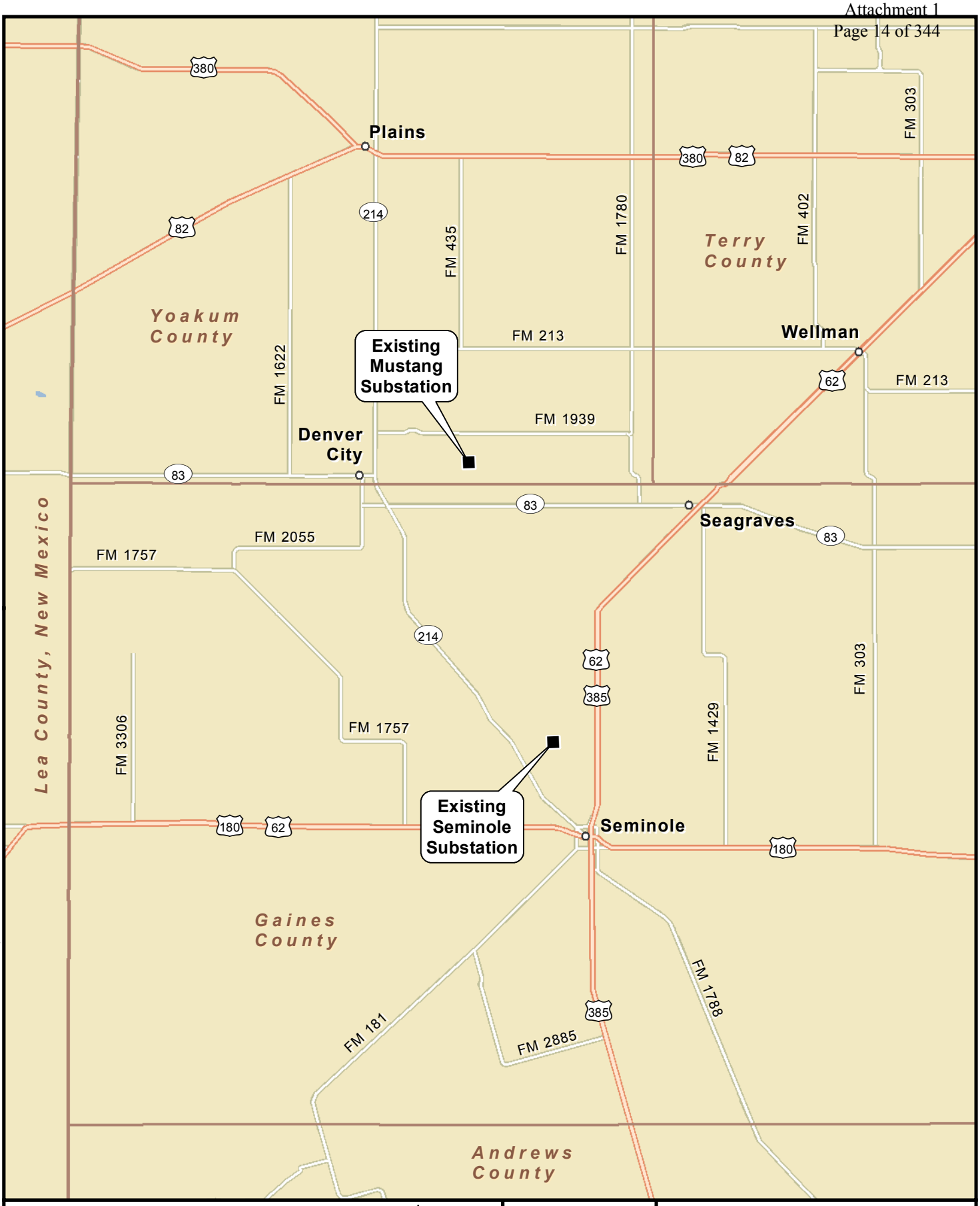


Figure 1-1
Project Location
Mustang to Seminole
115-kV Transmission Line Project
Yoakum & Gaines Counties, Texas

Path: T:\ESP\Xcel\Mustang to Seminole 115-kV Project\Geospatial\DataFiles\ArcDocs\Figure_1_1_ProjectLocation.mxd gacox 10/17/2018

Source: ESRI; Burns & McDonnell Engineering Company, Inc

Issued: 10/17/2018

1.2 Purpose and Need

SPS is a member of, and its entire transmission system is located within, the Southwest Power Pool (SPP). The SPP, an independent system operator, is an organization that meets the requirements of PURA § 39.151 as an independent organization. SPS does not operate in the Electric Reliability Council of Texas (ERCOT) region, and ERCOT takes no position on SPS's transmission projects.

The proposed transmission line will connect the existing Mustang Substation in Yoakum County, Texas, to the existing Seminole Substation, in Gaines County, Texas. The proposed transmission line was identified by SPP as needed for reliability to address the overload issues of the Denver City Substation to San Andres Tap to Seminole Substation 115-kV line, which could occur during an outage of the existing Mustang Substation-Seminole 230-kV line, and the low voltages at the Flanagan (69-kV bus), Amerada Hess, Doss, Oxy West-Seminole, Roz, and Seminole 115kV buses. In the 2016 SPP Integrated Transmission Plan Near-Term Assessment Report (ITPNT), which is part of the annual Regional Transmission Organization (RTO) Reliability Assessment, SPP studied and analyzed reliability issues in the region and identified the proposed transmission line as a needed regional reliability upgrade.

SPP issued a Notice to Construct (NTC) letter to SPS based on the results of the study performed for the 2016 ITPNT. The NTC letter identifies Project ID number 31021 and Network Upgrade ID numbers 51478, 51479, and 51480, which directs SPS to build a 115-kV transmission line from the Mustang Substation to the Seminole Substation, and install necessary terminal equipment at both Mustang Substation and Seminole Substation.

1.3 Description of Proposed Design and Construction

The following information presents the proposed design and construction of facilities for the 115-kV transmission line.

1.3.1 Easements

SPS's new single-circuit 115-kV transmission line will be constructed primarily on new ROW of 70 feet. In some circumstances, a wider easement may be necessary, but these locations and easement widths cannot be determined until a route is approved and surveyed. SPS will purchase an additional 30-feet easement for temporary work space adjacent to the typical 70-feet easement that will be used during construction to allow for a larger work area during the construction phase. The 30 feet of temporary work space will be released after construction is complete. Additionally, where possible, SPS will purchase an additional 100 feet x 300 feet temporary easement for each angle that is 45 degrees or more to ensure enough room for construction.

1.3.2 Structures

The proposed 115-kV single-circuit transmission line will be constructed utilizing primarily steel single-pole self-supporting structures, which require a smaller land surface than H-frame structures and typically eliminate the need for guy wires for corner structures. The geometries of the proposed typical structures are shown on Figure 1-2 through Figure 1-4. Additional structures that may be used for this project are included in SPS's Application. The height of these structures will vary from 80 to 140 feet depending on topography, structure location, and span length. The spans between structures will range between 500 and 800 feet depending on factors including the terrain and other engineering constraints. Geotechnical considerations will include soil borings and in situ soil testing to provide parameters for foundation design and embedment depth of the structures. SPS may use double-circuit wood or steel H-frames for parts of the proposed routing where an existing circuit occurs.

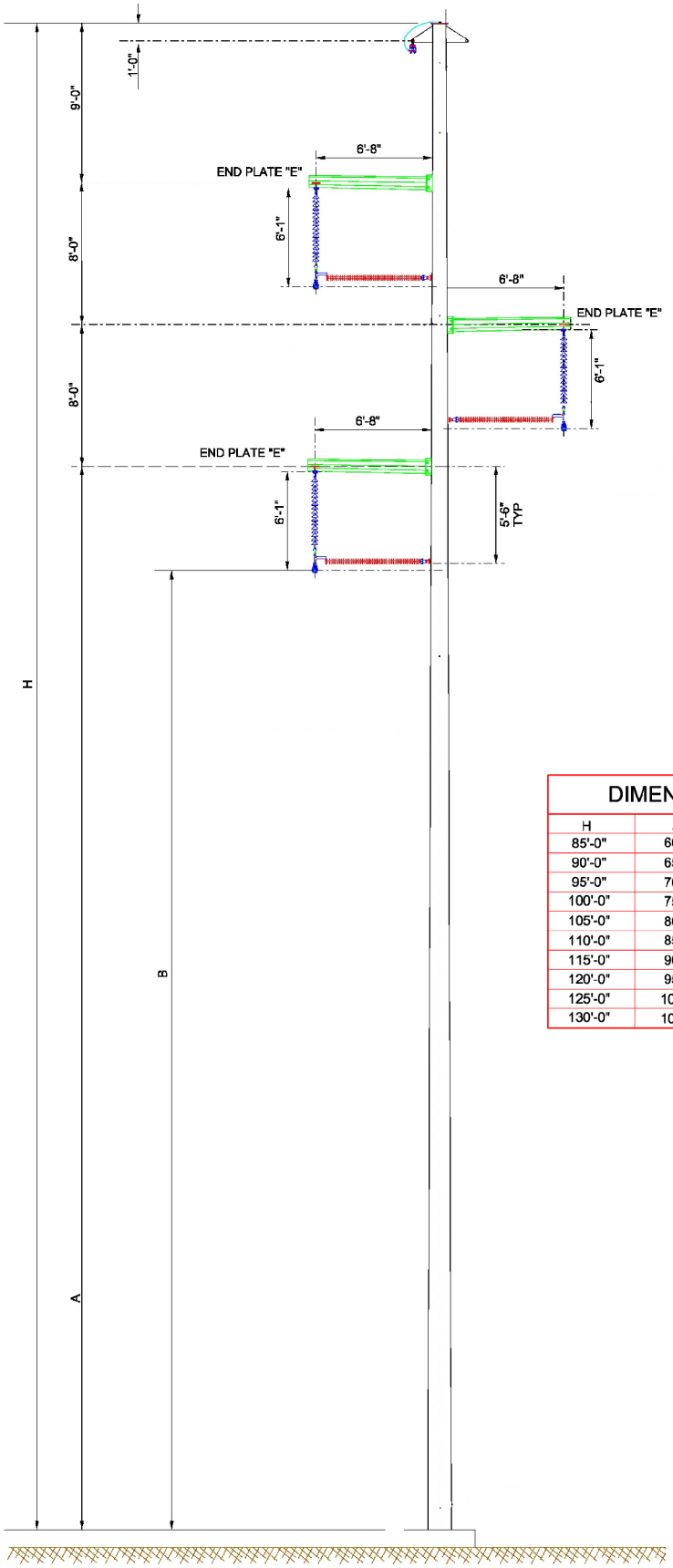
1.3.3 Design Considerations

The Project will be designed and constructed to meet or exceed the standards set forth in the appropriate edition of the National Electric Safety Code (NESC) and comply with all applicable State and Federal statutes and regulations. The configuration of the conductor and shield wire will provide adequate clearance for operation at 115-kV considering weather conditions of the Study Area, such as icing and extreme wind.

1.3.4 Substations

The Project will involve the construction of a new 115-kV transmission line, which will originate at the existing Mustang Substation, located 0.65 mile northeast of the CR 355 and CR 390 intersection, approximately 5 miles east of Denver City, Texas, in Yoakum County. The line will terminate at the existing Seminole Substation, located southwest of the CR 205 and CR 208 intersection, and 3.8 miles north-northwest of Seminole, Texas, in Gaines County.

The existing Mustang Substation will have a new 115-kV terminal added to the south of the 115-kV bus for the new 115-kV line. The existing Seminole Substation will have a new 115-kV terminal added to the south of the 115-kV bus for the new 115-kV line.



DIMENSIONS		
H	A	B
85'-0"	60'-0"	53'-6"
90'-0"	65'-0"	58'-6"
95'-0"	70'-0"	63'-6"
100'-0"	75'-0"	68'-6"
105'-0"	80'-0"	73'-6"
110'-0"	85'-0"	78'-6"
115'-0"	90'-0"	83'-6"
120'-0"	95'-0"	88'-6"
125'-0"	100'-0"	93'-6"
130'-0"	105'-0"	98'-6"

Figure 1-2
Typical Single-Circuit
Tangent Monopole Structure
Mustang to Seminole
115-kV Transmission Line Project

Source: Xcel Energy; Burns & McDonnell Engineering Company, Inc.

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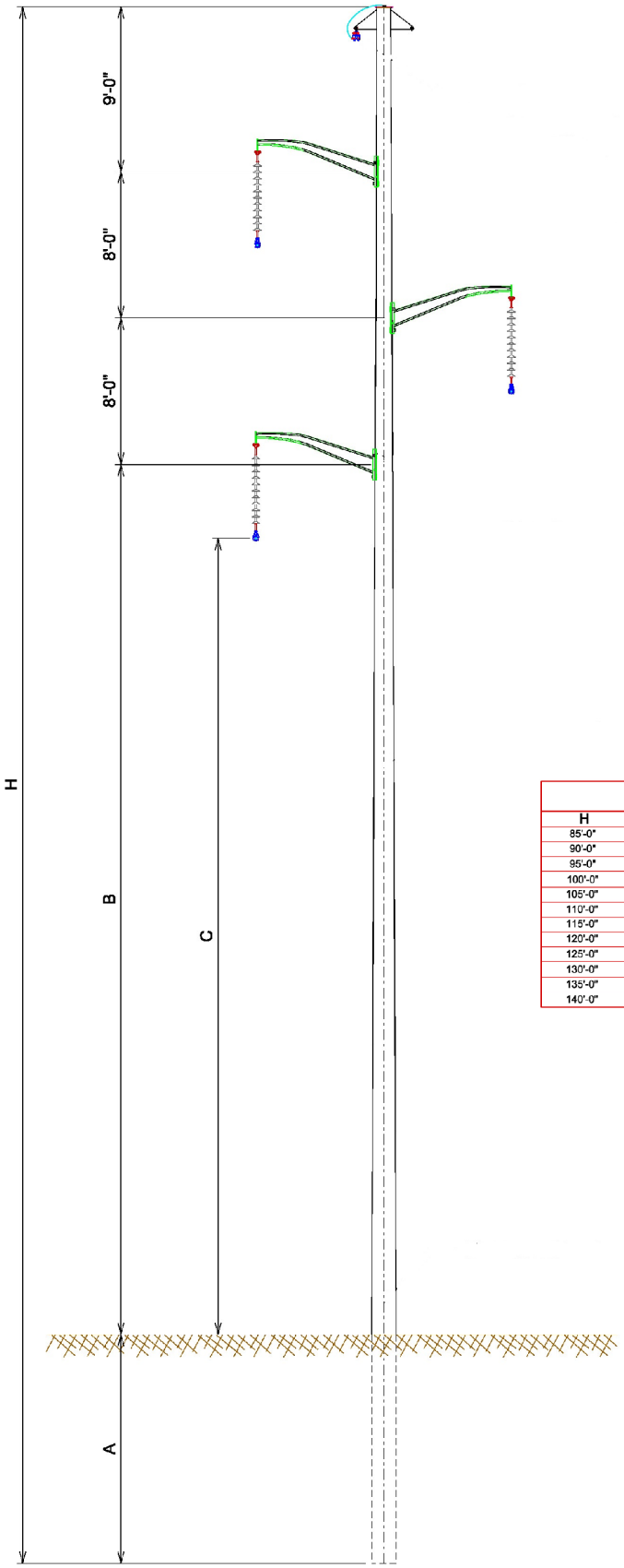

DIMENSIONS			
H	A	B	C
85'-0"	12'-6"	47'-6"	43'-3"
90'-0"	13'-0"	52'-0"	47'-9"
95'-0"	13'-6"	56'-6"	52'-3"
100'-0"	14'-0"	61'-0"	56'-9"
105'-0"	14'-6"	65'-6"	61'-3"
110'-0"	15'-0"	70'-0"	65'-9"
115'-0"	15'-6"	74'-6"	70'-3"
120'-0"	16'-0"	79'-0"	74'-9"
125'-0"	16'-6"	83'-6"	79'-3"
130'-0"	17'-0"	88'-0"	83'-9"
135'-0"	17'-6"	92'-6"	88'-3"
140'-0"	18'-0"	97'-0"	92'-9"

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Figure 1-3
Typical Single-Circuit Direct Embedded
Tangent Monopole Structure
Mustang to Seminole
115-kV Transmission Line Project

Source: Xcel Energy; Burns & McDonnell Engineering Company, Inc.

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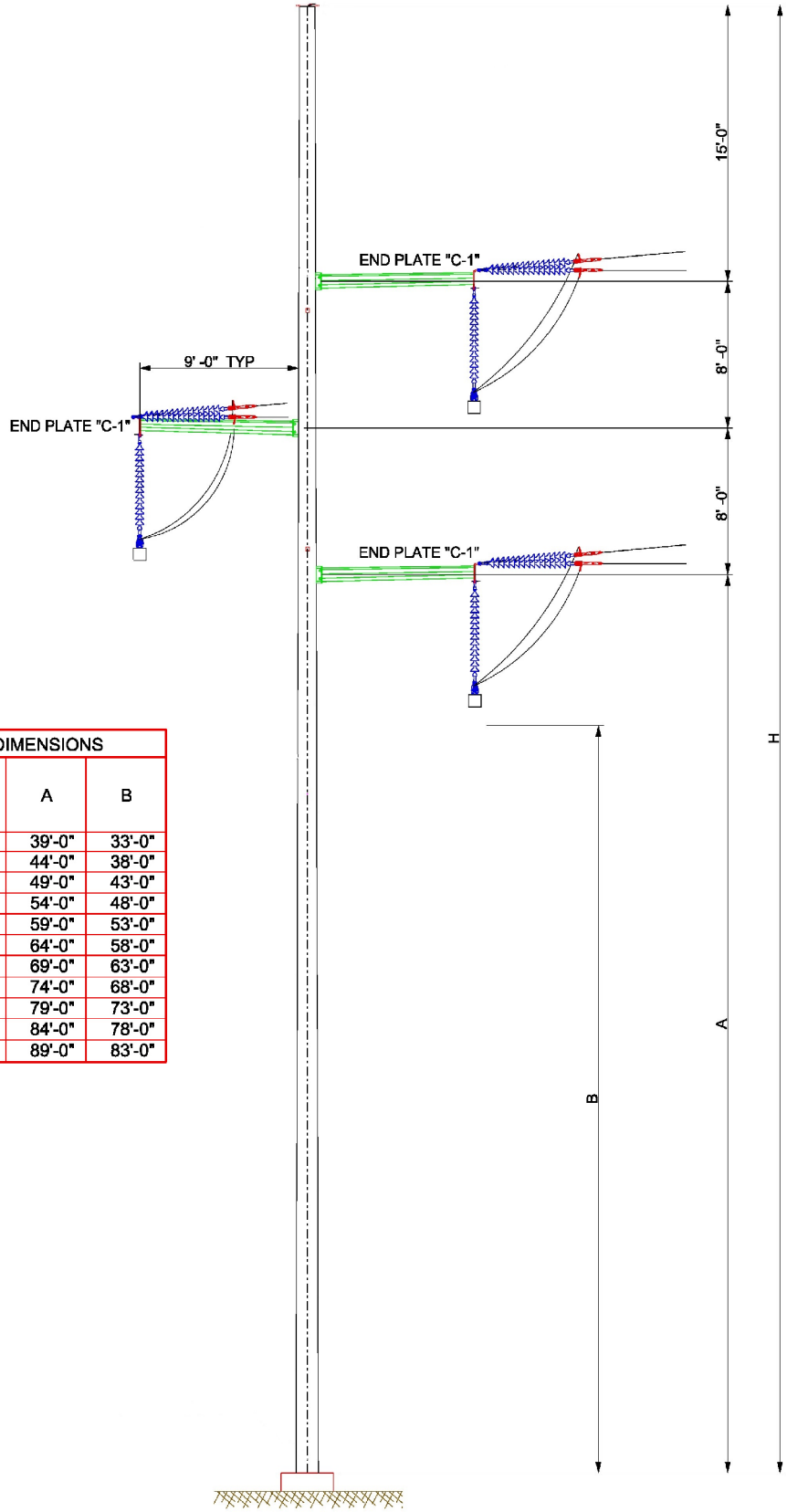


DIMENSIONS		
H	A	B
70'-0"	39'-0"	33'-0"
75'-0"	44'-0"	38'-0"
80'-0"	49'-0"	43'-0"
85'-0"	54'-0"	48'-0"
90'-0"	59'-0"	53'-0"
95'-0"	64'-0"	58'-0"
100'-0"	69'-0"	63'-0"
105'-0"	74'-0"	68'-0"
110'-0"	79'-0"	73'-0"
115'-0"	84'-0"	78'-0"
120'-0"	89'-0"	83'-0"

ELEVATION

BURNS McDONNELL

Figure 1-4
Typical Monopole
Corner Structure
Mustang to Seminole
115-kV Transmission Line Project

Source: Xcel Energy; Burns & McDonnell Engineering Company, Inc.

1.4 Construction Considerations

A project of this type requires clearing, excavation for installation of structure foundations, structure assembly and erection, conductor and shield wire installation, and cleanup when the Project is completed. The following criteria will be taken into consideration:

1. SPS will inspect the right-of-way during and after construction to identify problem erosion areas and will take special precautions to minimize vehicular traffic. SPS will also exercise special care when clearing near waterways.
2. Clearing and grading of construction areas such as storage areas, setup sites, etc. will be minimized to the extent practicable. These areas will be graded to minimize erosion and conform to the natural topography.
3. Soil that has been excavated during construction and not used will be evenly backfilled onto a cleared area or removed from the site. The backfilled soil will be sloped gradually to conform to the terrain and adjacent land. SPS will re-seed disturbed areas according to TCEQ requirements.
4. Erosion control devices will be constructed where necessary to prevent soil erosion related to transmission line construction activity.
5. Roads will be provided with side drainage ditches and culverts to prevent soil or road erosion, as required.
6. Roads will not be constructed on unstable slopes. Where feasible, service and access roads will be constructed jointly.
7. Clearing and construction activities in the vicinity of stream beds will be performed in a manner to minimize damage to the natural condition of the area.
8. Every effort will be made to avoid spills and other types of pollution, particularly while performing work in the vicinity of streams, lakes, and reservoirs.
9. Every precaution will be taken to prevent accidental range or forest fires. Full compliance with fire laws and regulations is a necessity.
10. When possible, construction will be performed during seasons of low wildlife occurrence, such as between periods of peak waterfowl migrations (generally spring and fall) and during the nonbreeding season (species-dependent).
11. Soil disturbance during construction will be kept to a minimum.
12. The Project will comply with the Texas Commission on Environmental Quality (TCEQ) Construction General Permit (TX150000) for stormwater discharges.
13. Construction of temporary or permanent access roads that affect waters of the U.S. will comply with U.S. Army Corps of Engineers (USACE) Nationwide Permit (NWP) 12.

14. If any archeological materials are uncovered during construction, construction will cease in the immediate area of the discovery and the discovery will be evaluated.

These criteria are subject to adjustment befitting the rules and judgments of any public agencies whose lands may be crossed by the proposed line.

1.4.1 Clearing and ROW Preparation

Clearing plans, methods, and practices are extremely important to minimize the potential adverse effects of transmission lines on the environment. Trees and vegetation that may interfere with the construction, operation, and maintenance of the transmission line will be removed. Available methods of tree and brush disposal are mulching and salvaging. Landowners' preferences will be considered. The selection of the disposal method will conform with applicable regulations, which often require that cleared brush and trees be stacked and left for wildlife use.

1.4.2 Structure Assembly and Erection

Survey crews will stake or otherwise mark structure locations. Construction crews will install structures by excavating holes and directly burying structures or installing a reinforced concrete foundation. After the concrete foundations have cured sufficiently, crews will set the structures and install the conductor and shield wire suspension assemblies. Vehicular traffic will occur during this operation and construction crews will take care to minimize impacts to the ROW by minimizing the number of pathways traveled.

1.4.3 Conductor and Shield Wire Installation

The conductors and shield wires are installed via a tensioning system. A rope is first threaded through the stringing blocks or dollies for each conductor and shield wire. Conductor and shield wires are then pulled by the ropes and held tight by a tensioner to keep the wires from coming in contact with the ground and other objects that could be damaging to the wire. In addition, guard structures (temporary wood-pole structures) will be installed where the transmission line crosses overhead electric power lines, overhead telephone lines, roadways, or other areas requiring an additional margin of safety during wire installation. When the wire is tensioned to the required sag, the wire is taken out of the blocks and placed in the suspension and dead-end clamps for permanent attachment.

1.5 Maintenance Considerations

SPS will periodically inspect the ROW, structures, and line to provide safe and reliable facilities. The major maintenance item will be the removal or trimming of trees that pose a potential danger to the conductors or structures. Preservation and conservation of environmental and natural resources are factors

designed and built into transmission system siting that requires a thoughtful, comprehensive program for maintaining the facility. The following factors are incorporated into SPS's program for this Project.

1. Native vegetation, particularly that of value to fish and wildlife, that has been saved through the construction process and that does not have the potential to grow close enough to the transmission line that it poses a hazard to the safe operation and maintenance of the transmission line will be allowed to grow in selected parts of the ROW. Likewise, if ecologically appropriate, native grass cover and low-growing shrubs will be left in the areas immediately adjacent to transmission structures. Where grading is necessary, access roads will be graded to the proper slope to prevent soil erosion.
2. Once a cover of vegetation has been established, it will be maintained to assure public safety and a reliable, functioning transmission system.
3. If used, U.S. Environmental Protection Agency (EPA)-approved herbicides will be carefully selected to have a minimal effect on desirable indigenous plant life, and selective application will be used whenever appropriate.
4. Maintenance inspection intervals will be established by SPS, and routine maintenance will be encouraged when access roads are firm or dry.
5. Aerial and ground maintenance inspection activities of the transmission line facility will include observation of any soil erosion problems, fallen timber, and conditions of the vegetation that require attention. Where necessary, on the basis of erosion control, native shrubs or grasses may be planted.
6. Public acceptance of ROW is generally broadened when compatible multiple use of the ROW is allowed. Transmission line ROW can be made available for appropriate types of multiple-use concepts, such as farming and cattle grazing, as long as the activity does not impact public safety or inhibit the safe operation and maintenance of the electrical system. Landowners should coordinate with the SPS if another use of the ROW is being considered.
7. The recommendations within the natural and cultural resources assessments will be followed as necessary during maintenance of the ROW, unless these recommendations create an unsafe condition.

1.6 Agency Actions

Numerous Federal, State, and local regulatory agencies and organizations have promulgated rules and regulations regarding the routing and potential impacts associated with the proposed transmission line Project. This section lists the major regulatory agencies that are involved in project planning and permitting of transmission lines in Texas, and describes the permits or approvals required. Burns &

McDonnell solicited comments from various regulatory agencies and officials during the development of this document. A summary of agency responses is provided in Section 5.1 (Correspondence with Agencies/Officials) and copies of the responses received are included in Appendix A (Agency Correspondence). Construction documents and specifications will indicate any special construction measures needed to comply with the regulatory requirements. In addition, depending upon the location of the transmission line structures, floodplain development permits and road crossing permits may be required by Gaines and Yoakum Counties.

1.6.1 Public Utility Commission

SPS's proposed transmission line Project will require SPS to file an application to amend its CCN with the PUC. This EA has been prepared by Burns & McDonnell in support of SPS's application for the CCN on this Project. This document is intended to provide information on certain environmental and land use factors contained in PURA § 37.056(c)(4), and PUC's Substantive Rule 16 TAC § 25.101(b)(3)(B), as well as to address relevant questions in the PUC's CCN application. This report may also be used in support of any local, State or Federal permitting requirements, if necessary. SPS will obtain PUC approval of its CCN application prior to beginning construction of the Project.

1.6.2 Federal Aviation Administration

According to Federal Aviation Administration (FAA) regulations (FAR), Part 77, the construction of a transmission line requires FAA notification if structure heights exceed 200 feet or the height of an imaginary surface extending outward and upward at one of the following slopes (FAA, 2010):

- A 100:1 slope for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of a public or military airport having at least one runway longer than 3,200 feet;
- A 50:1 slope for a horizontal distance of 10,000 feet from the nearest runway of a public or military airport where no runway is longer than 3,200 feet; and
- A 25:1 slope for a horizontal distance of 5,000 feet for heliports.

Based on these guidelines, SPS will make a final determination of the need for FAA notification based on the alignment of the approved route, structure locations, and structure designs. If necessary, SPS will file a "Notice of Proposed Construction or Alteration" (Form 7460-1) with the FAA at least 30 days prior to construction. The result of this notification, and the subsequent coordination with the FAA, could include changes in the design or potential requirements to mark or illuminate portions of the line.

1.6.3 U.S. Army Corps of Engineers

Under Section 404 of the Clean Water Act (CWA), activities in waters of the U.S., including wetlands, can be regulated by the USACE, in conjunction with the EPA. Certain construction activities that potentially impact waters of the U.S. may be authorized by one of the USACE's NWPs. Permits that may apply to placement of support structures and associated activities are NWP 25 (Structural Discharges) and NWP 12 (Utility Line Activities). NWP 25 generally authorizes the discharge of concrete, sand, rock, etc., into tightly sealed forms or cells where the material is used as a structural member for standard pile-supported structures (linear projects, not buildings or other structures).

NWP 12 generally authorizes discharges associated with the construction of utility lines and substations within waters of the U.S. and additional activities affecting waters of the U.S., such as those associated with the construction and maintenance of utility line substations; foundations for overhead utility line towers, poles, and anchors; and access roads for the construction and maintenance of utility lines. Construction of this transmission line Project will likely meet the criteria of NWP 12. However, if the impacts of the Project exceed the criteria established under General Condition 13 or other regional conditions listed under the NWP 12, then a Regional General Permit may be required. An Individual Permit, however, is not anticipated for this Project. If necessary, SPS will coordinate with the USACE prior to clearing and construction to ensure compliance with the appropriate regulations associated with construction-related impacts to waterbodies and wetland features.

Under Section 10 of the Rivers and Harbors Act of 1899, 33 U.S.C. § 403, the USACE is directed by Congress to regulate all work and structures in, or affecting the course, condition, or capacity of navigable waters of the U.S., including tidal waters. According to the USACE, no navigable waters occur within the Study Area that would require permitting under this Act.

1.6.4 U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) enforces Federal wildlife laws and provides comments on proposed projects under the jurisdiction of the Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and Bald and Golden Eagle Protection Act (BGEPA). Additionally, USFWS oversight includes review of projects with a Federal nexus under the National Environmental Policy Act (NEPA).

Upon PUC approval of the proposed Project, a pedestrian survey may be necessary to identify any potential suitable habitat for federally protected species. If suitable habitat is noted, then informal

consultation with the USFWS may be conducted to determine if permitting or other requirements associated with possible impacts to protected species under the ESA, MBTA, or BGEPA is necessary.

1.6.5 Federal Emergency Management Agency

Because Gaines and Yoakum Counties do not participate in the Federal Emergency Management Agency (FEMA) program, floodplain information for the Study Area is not available. However, floodplains are likely associated with Wardswell and McKenzie Draws, as well as low-lying areas within the Study Area. The Project should have no significant impact on the function of the existing floodplains. Coordination with the local floodplain administrators will be completed as necessary.

1.6.6 Texas Parks and Wildlife Department

The Texas Parks and Wildlife Department (TPWD) is the State agency with the primary responsibility of protecting the State's fish and wildlife resources in accordance with the Texas Parks and Wildlife Code Section 12.0011(b). Burns & McDonnell solicited comments from the TPWD during the scoping phase of the Project and a copy of this EA will be submitted to TPWD when the CCN application is filed with the PUC. Once the PUC approves a route, additional coordination with TPWD may be necessary to determine the need for any additional surveys, and to avoid or minimize any potential adverse impacts to sensitive habitats, threatened or endangered species, and other fish and wildlife resources.

1.6.7 Texas Commission on Environmental Quality

The Project may require a Texas Pollution Discharge Elimination System (TPDES) General Construction Permit (TX150000) as implemented by the TCEQ under the provisions of Section 402 of the CWA and Chapter 26 of the Texas Water Code. The TCEQ has developed a three-tiered approach for implementing this permit that is dependent on the acreage of disturbance. No permitting is required for land disturbances of less than 1 acre (Tier I). Disturbance of more than 1 acre, but less than 5 acres, would require implementation of a Storm Water Pollution Prevention Plan (SWPPP) (Tier II). If more than 5 acres of land are disturbed, the requirements mentioned above for Tier II are necessary and the submittal of a Notice of Intent (NOI) and Notice of Termination (NOT) to the TCEQ is also required (Tier III). Once a route is approved by the PUC, SPS will determine the amount of ground disturbance and the appropriate tier and conditions of the TX150000 permit.

1.6.8 Texas Department of Transportation

Permits and approvals will be obtained from the Texas Department of Transportation (TxDOT) for any crossing of, or access from, a State-maintained roadway. Best management practices (BMPs) will be used, as required, to minimize erosion and sedimentation resulting from the construction. Revegetation

will occur as required under the "Revegetation Special Provisions" and contained in TxDOT form 1023 (Rev. 9-93).

1.6.9 Texas Historical Commission

Cultural resources are protected by Federal and State laws if they have some level of significance under the criteria of the National Register of Historic Places (NRHP) (36 Code of Federal Regulations [CFR] Part 60) or under State guidance TAC, Title 13, Part 2, Chapter 26, §§ 26.7-8. Burns & McDonnell contacted the Texas Historical Commission (THC) and the agency recommended that the PUC-selected route be surveyed by a professional archeologist prior to initiating any ground disturbance. SPS will coordinate with THC as necessary with regard to requirements concerning historic and prehistoric cultural resources. If artifacts are discovered during construction, activities will cease and SPS will notify the State Historic Preservation Office (SHPO) for additional consultation.

1.6.10 General Land Office

The Texas General Land Office (GLO) requires a Miscellaneous Easement (ME) for any ROW crossing a State-owned riverbed, navigable stream, or tidally influenced waters. If any such waters are crossed, the necessary ME will be obtained.

1.6.11 Gaines and Yoakum Counties

Permits or approvals will be obtained from Gaines and Yoakum Counties for county road crossings as necessary.

2.0 DEVELOPMENT AND EVALUATION OF ALTERNATIVE TRANSMISSION LINE ROUTES

2.1 Objective of Study

The objective of this study was to develop and evaluate several alternative transmission line routes that are feasible from economic, engineering, and environmental standpoints and ultimately identify the route that best addresses the requirements of PURA and PUC Substantive Rules for the proposed single-circuit 115-kV transmission line. SPS and Burns & McDonnell utilized a comprehensive transmission line routing and evaluation methodology to delineate and evaluate alternative transmission line routes. Methods used to locate and evaluate potential routes were governed by SPS's transmission line routing processes and criteria, and in compliance with PURA § 37.056(c)(4)(A)-(D), 16 TAC § 25.101, and 16 TAC § 25.101(b)(3)(B), including the PUC's policy of prudent avoidance. The following sections provide a description of the process used in the development, evaluation, and selection of alternative transmission line routes.

2.2 Data Collection

Data used by Burns & McDonnell in the development and evaluation of alternative routes were drawn from a variety of sources, including published literature (documents, reports, maps, aerial imagery, etc.) and information from local, State, and Federal agencies. Recent aerial imagery (2015 ESRI DigitalGlobe WorldView-2 Satellite imagery; 2015 Texas Orthoimagery Program [TOP]; 2016 U.S. Department of Agriculture [USDA] National Agriculture Imagery Program [NAIP]; Google Earth), Google Maps, U.S. Geological Survey (USGS) topographic maps (1:24,000), USFWS National Wetlands Inventory (NWI) maps, USFWS Information, Planning, and Conservation (IPaC) system, TPWD's Natural Diversity Database (NDD), TPWD's Ecological Mapping Systems of Texas (EMST), FEMA maps, and ground reconnaissance surveys were used throughout the development and evaluation of alternative routes. Ground reconnaissance of the Study Area and computer-based evaluation of digital aerial imagery were utilized for both refinement and evaluation of alternative routes. The data collection effort, although concentrated in the early stages of the Project, was an ongoing process that continued until final route selection.

2.3 Delineation of Alternative Routes

2.3.1 Study Area Delineation

The first step in the development of the alternative routes was to select a Study Area. The Study Area needed to encompass the endpoints for the proposed project (the existing Mustang and Seminole

Substations) and include an area large enough in which an adequate number of geographically diverse, forward-progressing alternative routes could be located. The boundaries of this area were dictated by the location of existing facilities and other physical and cultural features. Numerous land use constraints, particularly agricultural uses with mobile irrigation systems, and extensive oil and gas facilities, were considered as the Study Area boundaries were developed. This resulted in the establishment of a rectangular Study Area approximately 14.5 miles north to south and 9 miles east to west, that encompasses an area of approximately 130 square miles in Gaines and Yoakum Counties (Figure 2-1).

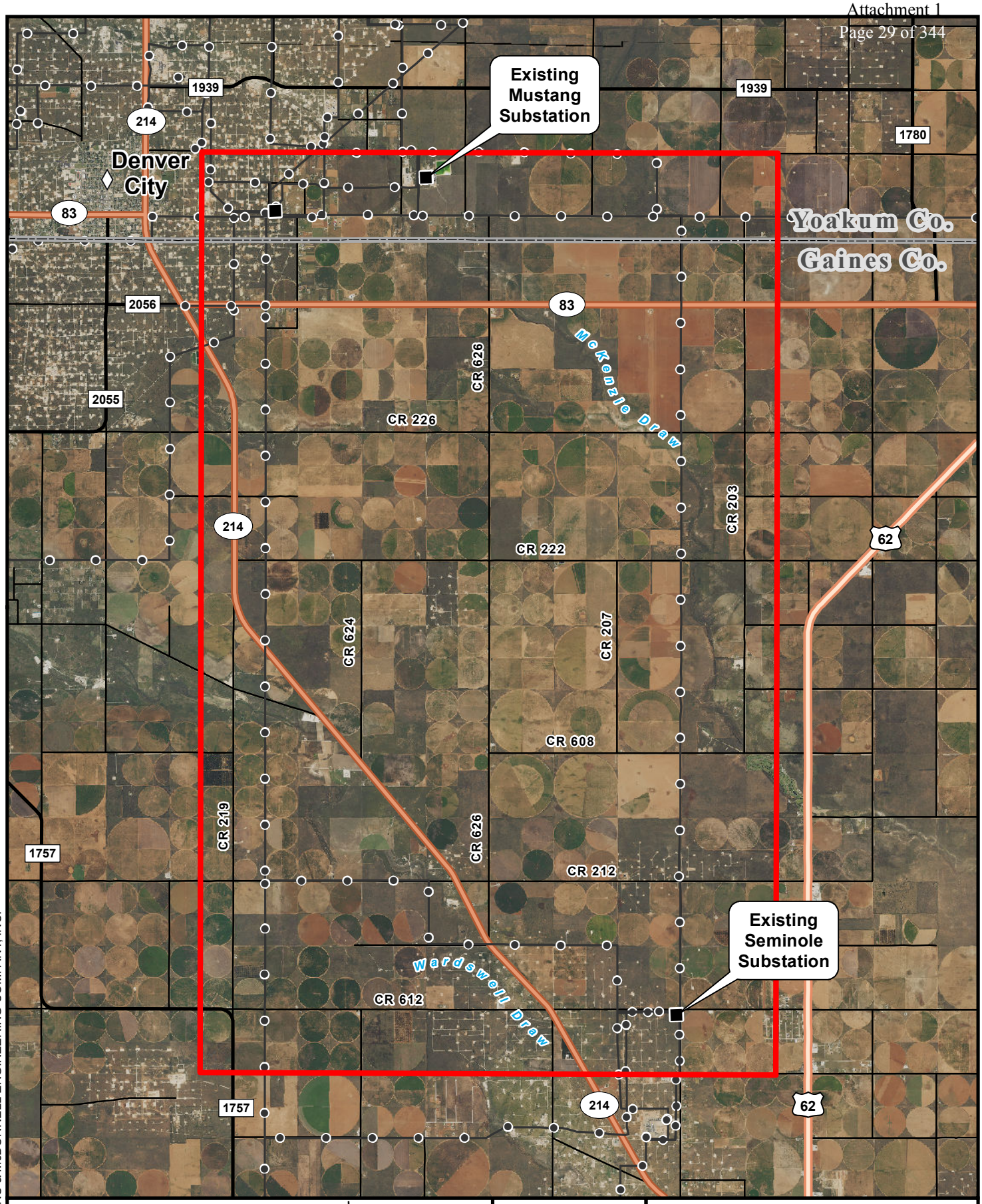
2.3.2 Constraints Mapping

In an effort to minimize impacts to sensitive environmental and land use features, a constraints mapping process was used in the development and refinement of potential alternative routes. The geographic location of environmentally sensitive and other restrictive areas within the Study Area were located and considered during alternative route delineation. These constraints were mapped onto an aerial base map (Figure 2-2, located in a map pocket at the end of this document) created using 2016 NAIP imagery. The overall impact of the alternative routes presented in this report has been greatly reduced by avoiding, to the greatest extent practicable, such constraints as agricultural use (including circle-pivot irrigation systems), oil and gas wells, pipelines, storage facilities, related infrastructure, habitable structures, community facilities, cemeteries, wetland areas, parks, churches, and schools; by utilizing or paralleling existing transmission lines and other existing compatible ROW; and by paralleling approximate property lines where possible.

2.3.3 Preliminary Alternative Route Segments

Utilizing the information described above, Burns & McDonnell identified numerous preliminary route segments, which were initially examined in the field by Burns & McDonnell in April 2018 and presented to SPS for review and comment. SPS conducted desktop and field reviews of the preliminary route segments, taking into consideration the additional factors of engineering, cost, and ROW constraints. The Project team incorporated numerous revisions, which included adding, deleting, or modifying individual segments. The resulting 57 preliminary route segments, which are shown on Figure 2-3, were presented to the public at an open-house meeting held in Seminole, Texas, on June 19, 2018.

Following the public meeting, Burns & McDonnell and SPS performed additional reviews to look at areas of concern discussed at the public meeting; communicated with individual landowners, agencies, and officials; evaluated the public comments; and considered revisions to the preliminary route segments. In response to public and engineering concerns, Burns & McDonnell and SPS added, deleted, and modified segments to reduce potential impacts to habitable structures, agricultural use, oil and gas facilities, and



Project Endpoint
Existing Transmission Line
Study Area

NORTH

0 1 2 4
Miles

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Figure 2-1
Study Area Location
Mustang to Seminole
115-kV Transmission Line Project
Yoakum and Gaines
Counties, Texas

Path: T:\ESP\Xcel\Mustang to Seminole 115-kV Project\Geospatial\DataFiles\ArcDocs\Figure_2_1_StudyArea.mxd gacox 10/17/2018

Source: ESRI; USDA NAIP "Texas" (2016); Burns & McDonnell Engineering Company, Inc

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other constraints to the greatest extent practicable. The specific changes that were made to the preliminary route segments after the public meeting included:

Deleted Segments

- Segment 1b was removed when Segment 2b was eliminated.
- Segment 2b was removed due to numerous engineering and construction constraints.
- Segment 5 was removed when Segment 11 was deleted.
- Segment 7 was removed due to construction and engineering constraints associated with a tall communication tower and oil and gas facilities.
- Segment 8 was eliminated when Segment 3 was modified.
- Segment 9 was removed due to access and construction constraints.
- Segment 10 was removed when Segment 11 was deleted.
- Segment 11 was removed due to engineering and construction constraints associated with paralleling the existing 230-kV transmission line. Additional studies conducted by SPS Planning and Engineering groups determined this was not a viable option.
- Segment 14 was eliminated when Segment 15 was removed.
- Segment 15 was removed due to construction and engineering constraints.
- Segment 23 was removed due to construction and maintenance access constraints.
- Segment 29 was removed due to engineering constraints.
- Segment 31 was removed due to engineering and construction constraints associated with paralleling the existing 230-kV transmission line. Additional studies conducted by SPS Planning and Engineering groups determined this was not a viable option.
- Segment 34 was removed due to engineering, construction, and maintenance constraints.
- Segment 35 was removed because it offered no advantage over Segment 37.
- Segment 42 was removed due to engineering constraints.
- Segment 46 was removed based on landowner input received at the public meeting.

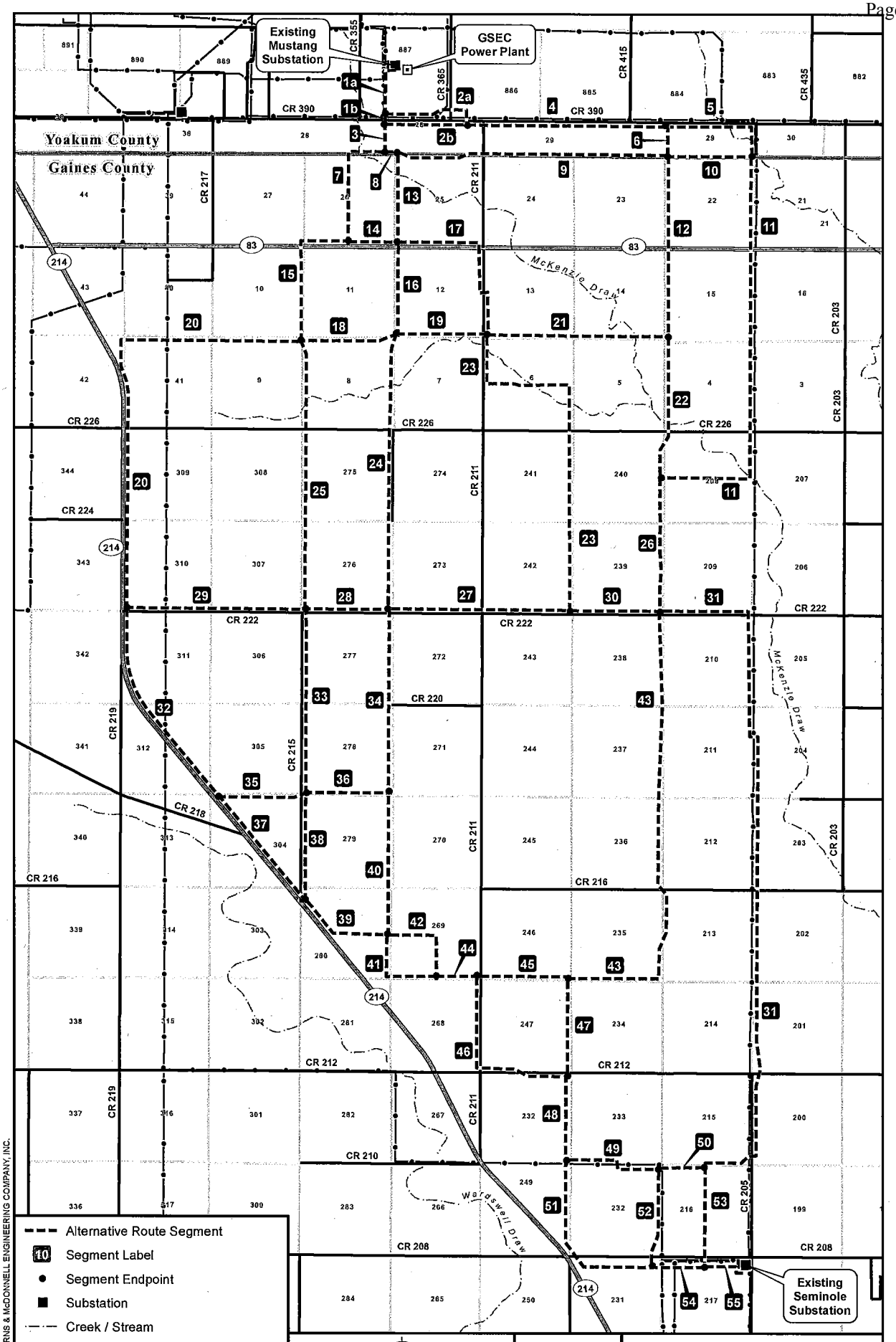

Figure 2-3
Preliminary Alternative Route Segments
Mustang to Seminole
115-kV Transmission Line Project
Yoakum and Gaines Counties, Texas

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Source: ESRI; TxDOT; GLO; USGS NHD; Xcel Energy; Burns & McDonnell Engineering Company, Inc

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Added Segments

- Segment 56 was added to provide an additional north/south alternative.
- Segment 57 was added to provide an additional east/west alternative.
- Segment 58 was added to provide an additional north/south alternative.
- Segment 59 was added to provide an additional east/west alternative.
- Segment 60 was added to provide an additional north/south alternative.

Modified Segments

- Segment 1a was modified by extending its termination point approximately 600 feet to the east to meet the modified alignment of Segment 3.
- Segment 2a was modified by moving its origination point approximately 600 feet to the west to meet the modified alignment of Segment 3. The eastern portion of Segment 2a was also extended to intersect Segment 56.
- Segment 3 was moved east to be closer to the property line per landowner request.
- Segment 17 was divided into Segments 17a and 17b after Segment 56 was added. The CR 211 crossing was also adjusted to better avoid engineering constraints.
- Segment 43 was divided into Segments 43a, 43b, and 43c after Segments 57, 58, and 59 were added.
- Segment 48 was shortened by approximately 580 feet due to the realignment of Segment 51.
- Segment 49 was modified to remain north of an existing transmission line along the southern boundary of Section 233.
- Segment 50 was modified to realign its western point of termination with Segments 49, 52, and 60.
- Segment 51 was modified to better avoid oil and gas wells along its north to south alignment along the eastern boundary of Section 249.
- Segment 52 was modified to align at its point of intersection with Segments 49 and 50. It was also moved slightly east to be constructed as a double-circuit line, rather than parallel west of an existing transmission line in the eastern portion of Section 232.
- Segment 54 originally paralleled south of an existing transmission line, but it was moved north and will be installed as a second circuit on an existing transmission line.
- Segment 55 also originally paralleled the south side of an existing transmission line, but it was moved north and will also be installed as a second circuit on the existing transmission line.

2.3.4 Primary Alternative Routes

Subsequent to the preliminary segment modifications, the resulting 48 individual segments were combined to form a total of 201 possible forward-progressing routes. Ultimately, 10 primary alternative routes were selected that were then specifically studied and evaluated by Burns & McDonnell. The results of Burns & McDonnell's efforts are presented in this EA in Sections 4.0 and 6.0. The primary alternative route segments are shown on Figure 2-2 (map pocket), Figure 2-4, and Figure 6-1 (map pocket). The primary routes constitute, for the purposes of this analysis, the only alternative routes addressed in this report. Table 2-1 presents the composition of these routes by segment, as well as their approximate length in miles.

Table 2-1: Primary Alternative Route Composition and Length

Route	Route Composition	Length (miles)
A	1a-3-13-16-18-20-32-37-39-41-44-45-47-48-51-54-55	21.70
B	1a-3-13-16-18-25-33-36-40-41-44-45-47-48-49-52-54-55	19.32
C	1a-3-13-16-24-28-33-38-39-41-44-45-47-59-60-52-54-55	19.10
D	1a-3-13-16-18-25-33-36-57-43b-58-60-50-53-55	19.19
E	1a-3-13-16-24-27-30-43a-43b-58-60-50-53-55	17.30
F	1a-3-13-16-19-21-22-26-43a-43b-58-60-52-54-55	17.38
G	1a-3-13-17a-17b-21-22-26-43a-43b-58-60-52-54-55	17.34
H	1a-2a-4-6-12-22-26-43a-43b-43c-47-48-49-52-54-55	19.49
I	1a-2a-56-17b-21-22-26-43a-43b-58-60-50-53-55	17.36
J	1a-2a-4-6-12-22-26-43a-43b-58-60-52-54-55	17.48

Note: For primary route locations, see Figure 2-2 (map pocket), Figure 2-4, and Figure 6-1 (map pocket).

2.4 Evaluation of Primary Alternative Routes

The evaluation of the primary alternative routes for the Project involved studying a variety of environmental factors. Each of the alternative routes was examined in the field at various times during 2018. This field evaluation was conducted from publicly accessible areas. In evaluating the alternative routes, 41 environmental criteria were considered. These criteria are presented in Table 2-2. The goal of this evaluation was to select a recommended route from an environmental perspective and several alternate transmission line routes between the existing Mustang Substation and the existing Seminole Substation. Burns & McDonnell's recommendations are discussed in Section 6.1.

The analysis of each route involved inventorying and tabulating the number or quantity of each environmental criterion located along the centerline of each route (e.g., number of habitable structures

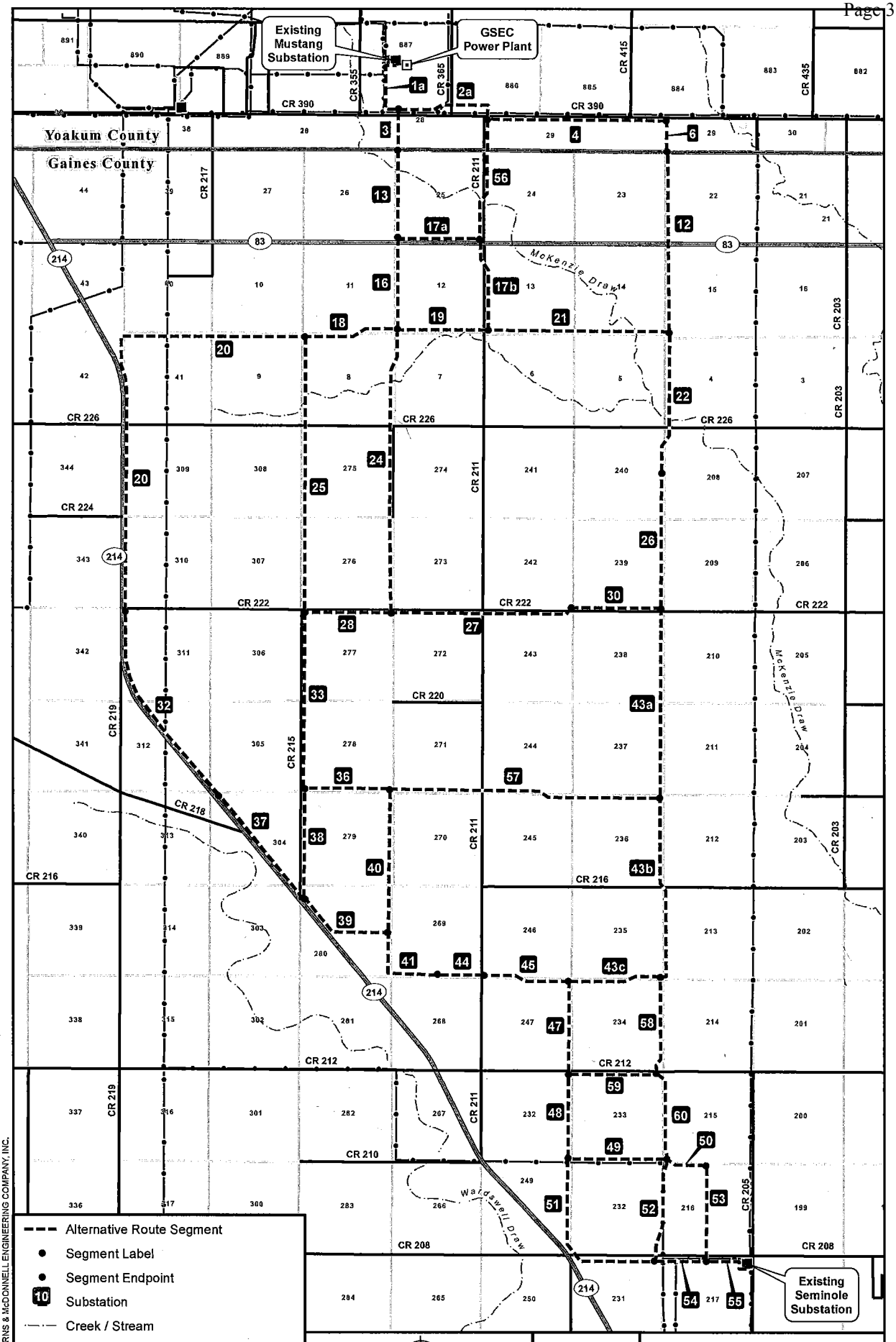

Figure 2-4
Primary Alternative Route Segments
Mustang to Seminole
115-kV Transmission Line Project
Yoakum and Gaines Counties, Texas

Path: T:\ESP\Xcel\Mustang to Seminole 115-kV Project\Geospatial\DataFiles\ArcDocs\Figure_2-4_Primary_Segments.mxd gacox 10/17/2018

Source: ESRI; TxDOT; GLO; USGS NHD; Xcel Energy, Burns & McDonnell Engineering Company, Inc

Issued: 10/17/2018

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within 300 feet of the centerline, the length paralleling existing compatible ROW, etc.). The number or amount of each criterion was determined by reviewing recent color aerial imagery (2016 NAIP and Google Maps); various maps such as USGS topographic maps, highway maps, FEMA maps, and NWI maps; and, where possible, by field verification. The environmental advantages and disadvantages of each alternative route were then evaluated. Potential environmental impacts of the primary alternative routes are addressed in Section 4.0 of this document.

After Burns & McDonnell reached its consensus on which route best met the PUC's criteria, SPS undertook a further evaluation in which Burns & McDonnell's environmental evaluations were considered in conjunction with SPS's assessment of the reliability, constructability, maintenance, operation, future projects, and cost to construct each alternative.

Table 2-2: Environmental Criteria for Alternative Route Evaluation

No.	Environmental Criteria
Land Use	
1	Length of Alternative Route
2	Number of habitable structures[a] within 300 ft of ROW centerline
3	Length of ROW utilizing existing transmission line ROW
4	Length of ROW parallel to existing transmission line ROW
5	Length of ROW parallel to other existing compatible ROW (roads, highways, etc. - excluding pipelines)
6	Length of ROW parallel to approximate property lines (not following existing ROW)[b]
7	Combined total length of ROW utilizing/parallel to existing transmission line ROW, other compatible ROW, and approximate property lines
8	Percent of combined total length of ROW utilizing/parallel to existing transmission line ROW, other compatible ROW, and approximate property lines
9	Length of ROW across parks/recreational areas[c]
10	Number of additional parks/recreational areas[c] within 1,000 ft of ROW centerline
11	Length of ROW across cropland
12	Length of ROW across pastureland/rangeland
13	Length of ROW across cropland or pastureland with mobile irrigation systems
14	Number of pipeline crossings
15	Number of transmission line crossings
16	Number of U.S. and State highway crossings
17	Number of FM/RM road crossings
18	Number of FAA-registered airfields within 20,000 ft of ROW centerline (with runway >3,200 ft)
19	Number of FAA-registered airfields within 10,000 ft of ROW centerline (with runway <3,200 ft)
20	Number of private airstrips within 10,000 ft of ROW centerline

No.	Environmental Criteria
21	Number of heliports within 5,000 ft of ROW centerline
22	Number of commercial AM radio transmitters within 10,000 ft of ROW centerline
23	Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 ft of ROW centerline
24	Number of water wells within ROW
Aesthetics	
25	Estimated length of ROW within foreground visual zone[d] of U.S. and State highways
26	Estimated length of ROW within foreground visual zone[d] of FM/RM roads
27	Estimated length of ROW within foreground visual zone[d] of parks/recreational areas[c]
Ecology	
28	Length of ROW through upland woodland/brushland
29	Length of ROW through bottomland/riparian woodland
30	Length of ROW across potential wetlands[e]
31	Length of ROW across known habitat of endangered or threatened species
32	Number of stream crossings
33	Length of ROW parallel to (within 100 ft) streams
34	Length of ROW across open water (ponds, playa lakes[f] etc.)
35	Number of playa lake[f] crossings
36	Length of ROW across 100-year floodplains[g]
Cultural Resources	
37	Number of recorded cultural resource sites crossed by ROW
38	Number of additional recorded cultural resource sites within 1,000 ft of ROW centerline
39	Number of National Register of Historic Places (NRHP)-listed or determined-eligible sites crossed by ROW
40	Number of additional NRHP-listed or determined-eligible sites within 1,000 ft of ROW centerline
41	Length of ROW crossing areas of high archeological/historical site potential

(a) Single-family and multi-family dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis
(b) Property lines created by existing road, highways, or railroad ROW are not "double-counted" in the "length of route parallel to approximate property lines" criterion
(c) Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church
(d) One-half mile, unobstructed
(e) As mapped by the USFWS NWI
(f) As mapped by the Texas Tech University Playa Lakes Digital Database for the Texas Portion of the Playa Lakes Joint Venture Region
(g) Gaines and Yoakum Counties do not participate in the FEMA program, therefore 100-year floodplains are not mapped within the Study Area

3.0 Existing Environment

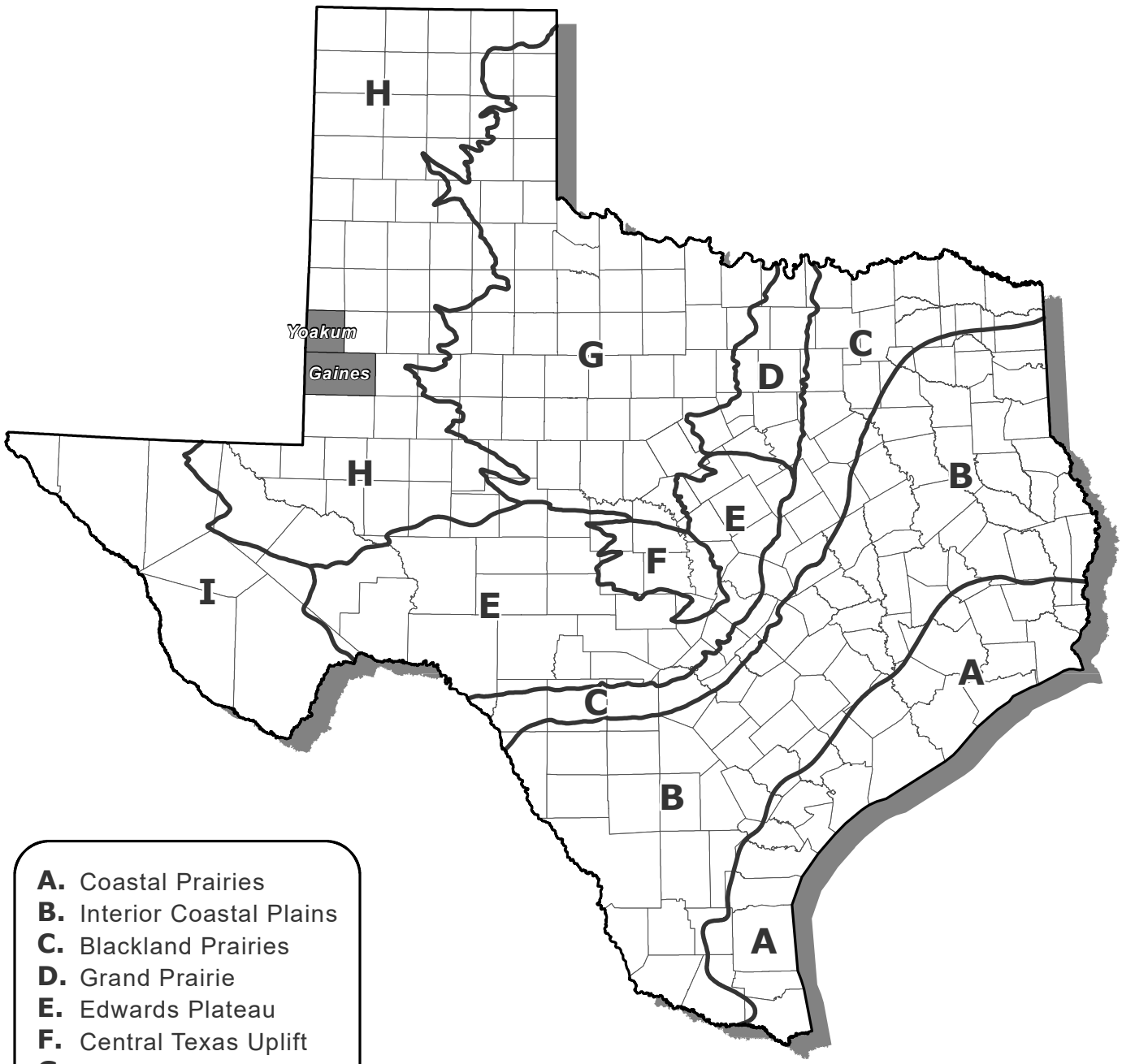
3.1 Physiography

As shown on Figure 3-1, Gaines and Yoakum Counties are located within the High Plains Physiographic Province (Bureau of Economic Geology [BEG], 1996). In Texas, the High Plains is divided into (from north to south) the Central High Plains, the Canadian Breaks, and the Southern High Plains. The Study Area is located within the Southern High Plains, which occur westward from the boundary between the Texas Panhandle and New Mexico, north to the Canadian Breaks, east to the North Central Plains, and south to the Edwards Plateau and Basin and Range Provinces.

The Southern High Plains of Texas form a nearly flat plateau ranging from 2,200 to 3,800 feet in elevation above mean sea level (msl). This area has also historically been referred to as the Llano Estacado, or palisaded plains. This plateau is underlain by extensive stream deposits of sand and gravel, which form the Ogallala Aquifer (BEG, 1996). The relatively flat surface of this region is abundantly pitted by sinks and depressions (playas) that were formed by processes causing the carbonation of limestone beds and deflation by wind of the remaining insoluble particles. Many of these dissolution-deflation depressions are aligned in parallel or perpendicular sets, indicating underlying joint fracturing within the Ogallala Formation. On the surface, windblown sands and silts form thick, rich soils and caliche. Numerous playa lakes are scattered across the predominantly treeless plains. Drainage on the High Plains is dominated by widespread, small, intermittent streams. At its eastern boundary, a westward-retreating escarpment occurs, capped by hard caliche. Study area elevations range from a high of approximately 3,589 feet msl in the northwestern corner of the Study Area to a low of 3,320 feet msl in the southeastern portion of the Study Area.

3.2 Geology

According to BEG (1976a), the Study Area includes the following geologic units (from youngest to oldest): Quaternary-aged windblown sand, fluviatile terrace deposits, windblown cover sand, and Ogallala Formation. Windblown sand, which is located throughout the majority of the Study Area, consists of sand and silt in sheets, and locally includes cover sand, and dune and dune ridges. Fluviatile terrace deposits, which are associated with portions of Wardswell Draw and McKenzie Draw, consist of gravel, sand, and silt, and commonly contain pebbles and cobbles of limestone, sandstone, and chert. Windblown cover sand is also associated with Wardswell Draw and McKenzie Draw within the Study Area. It consists of fine- to medium-grained quartz, with silty, calcareous, caliche nodules being common, a distinct soil profile and a thickness up to 10 feet.



A. Coastal Prairies
B. Interior Coastal Plains
C. Blackland Prairies
D. Grand Prairie
E. Edwards Plateau
F. Central Texas Uplift
G. North-Central Plains
H. High Plains
I. Trans-Pecos Basin and Range

NORTH

100 50 0 100

Miles

BURNS McDONNELL

Figure 3-1
Location of the Study Area Counties in Relation to the Physiographic Provinces of Texas
Mustang to Seminole
115-kV Transmission Line Project

Source: BEG (1996)

3.3 Soils

The Study Area occurs within north-central Gaines County and southeastern Yoakum County. The general soil map of Gaines County, published by the Soil Conservation Service (SCS) in 1965, and the general soil map of Yoakum County, published by the SCS in 1964, were referenced for the following descriptions of the general soil map units within the Study Area

3.3.1 Soil Associations

The SCS, now renamed as the Natural Resources Conservation Service (NRCS), defines a soil association as "a group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit." A soil association typically consists of one or more major soils, for which it is named, and some minor soils. Soils making up one unit can also occur in other units in a different pattern. According to the Gaines and Yoakum soil maps (SCS, 1965, 1964), four soil associations occur within the Study Area.

3.3.1.1 Brownfield Association

The Brownfield association, which comprises the majority of the Study Area, is characterized by deep, moderately permeable, sandy soils that are gently sloping or nearly level. They are mainly fine sands, but some are loamy sands, which encompasses more than 60 percent of Gaines County. Brownfield fine sand is the main soil and has a thin surface of fine sand, 10 to 18 inches thick and its subsoil is red, non-calcareous sandy clay loam. Springer loamy fine sand and Amarillo loamy fine sand are also in the association. Approximately 35 percent of the association is cultivated and the rest is rangeland, with the main cash crops being grain sorghum and cotton (SCS, 1965).

3.3.1.2 Brownfield-Amarillo Association

The Brownfield-Amarillo association, which comprises all of the Yoakum County portion of the Study Area, consists of gently or nearly level to undulating, deep fine sands and loamy fine sands, and encompasses approximately 60 percent of the county. The Brownfield soils are the most extensive and are less brown and have a sandier surface layer than the Amarillo soils. Both soils have a reddish, non-calcareous sandy clay loam subsoil that is moderately permeable. Approximately 60 percent of the association is cultivated and the rest is in rangeland. The main cash crops are grain sorghum and cotton (SCS, 1964).

3.3.1.3 Amarillo-Arvana Association

The Amarillo-Arvana association, which is located along portions of the Wardswell and McKenzie Draws within the Study Area, consist of deep and moderately deep, loamy soils, that occupy nearly level to

gently sloping plains. This association consists mainly of Amarillo fine sandy loam and Arvana fine sandy loam and have a surface layer of fine sandy loam and a subsoil of reddish, non-calcareous sandy clay loam. Approximately 90 percent of the association is irrigated cropland and the rest is in rangeland, with the main cash crops being grain sorghum and cotton (SCS, 1964).

3.3.1.4 Simona-Kimbrough-Potter Association

The Simona-Kimbrough-Potter association, which is located along portions of the Wardswell and McKenzie Draws within the Study Area, consists of shallow or very shallow, loamy soils over hard caliche. Most of the acreage is native range, but a few small areas are used for cotton and grain sorghum (SCS, 1964).

3.3.2 Prime Farmland Soils

The Secretary of Agriculture, in 7 USC § 4201(c)(1)(A), defines prime farmland as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion, as determined by the Secretary. Additional potential prime farmlands are those soils that meet most of the requirements of prime farmland but fail because they lack sufficient natural moisture or they lack the installation of water management facilities. Such soils would be considered prime farmland if these practices were implemented.

According to the NRCS (2013, 2016), no prime farmland soils occur within the Study Area (83,207 acres), although 3 acres are included as prime farmland soils if irrigated. Gaines County encompasses 961,354 acres, none of which are considered prime farmland soils, although less than 1 percent (610 acres) is included as prime farmland soils if irrigated. Yoakum County encompasses 512,083 acres, none of which are considered prime farmland soils, although an additional 0.9 percent (4,769 acres) is included as prime farmland soils if irrigated.

3.4 Mineral and Energy Resources

Mineral resources mapped as occurring within the Study Area include caliche, which is associated with sand or gravel deposits suitable for aggregate (BEG, 1979). Within the Study Area, this mineral resource is associated with Wardswell Draw and its tributaries (BEG, 1979). Additionally, the USGS Mineral Data Resource System reports one operation occurring within the Study Area. The Vulcan Materials Salt Plant is located along the northwestern boundary of the Study Area in Yoakum County (USGS, 2011).

Several major energy resources, including petroleum and natural gas, are mapped throughout the Study Area, with higher concentrations in the southeast and northwest portions (BEG, 1976b). According to

Railroad Commission of Texas (RRC) records, 1,142 oil or gas wells are documented as occurring within the Study Area (RRC, 2018). Additionally, oil and gas exploration activity is visible on aerial photography and was observed during the field reconnaissance survey.

3.5 Water Resources

3.5.1 Surface Water

For surface water planning purposes, Gaines and Yoakum Counties lie within the Colorado River Basin, which is the third-largest by area in Texas, draining a total area of approximately 42,318 square miles of which 39,428 square miles are within Texas. The Colorado River, the second-longest river in Texas, flows from Dawson County to Matagorda Bay and the Gulf of Mexico. The Colorado River is only the sixth-largest river by average flow volume, with a large portion of the basin being located within relatively arid regions, resulting in a low average watershed yield (Texas water Development Board [TWDB], 2012).

Named surface water features (e.g., streams, ponds, canals, lakes, etc.) mapped within the Study Area, according to USGS topographic maps and the National Hydrography Dataset, include Wardswell and McKenzie Draws. Wardswell Draw flows northwest to southeast through the southern portion of the Study Area. McKenzie Draw and one of its tributaries flow southeasterly through the northeastern portion of the Study Area. Average rainfall within the Study Area ranges from approximately 15 to 20 inches annually (TWDB, 2012).

To assist regional water planning groups in identifying sensitive stream segments under 31 TAC § 357.8, TPWD has identified ecologically significant stream segments throughout the State based on criteria pertaining to biological function, hydrological function, riparian conservation areas, water quality, aquatic life, aesthetic value, and the presence of threatened or endangered species or unique communities. No stream segments within the Study Area are designated as ecologically significant streams (TPWD, 2018a).

3.5.2 Floodplains

At the time of this report, Gaines and Yoakum Counties do not participate in the FEMA program; therefore, floodplain information for the Study Area is not available. Although detailed floodplain analyses for Gaines and Yoakum Counties are not available, floodplains are likely associated with Wardswell and McKenzie Draws, as well as low-lying areas within the Study Area (see Figure 2-2, map pocket).

3.5.3 Groundwater

According to the TWDB, 9 major aquifers (aquifers that produce large amounts of water over large areas) and 21 minor aquifers (aquifers that produce minor amounts of water over large areas or large amounts of water over small areas) are recognized within Texas. These major and minor aquifers can produce groundwater for household, municipal, industrial, and agricultural uses and supply over 59 percent of the water used in Texas (TWDB, 2007).

The entire Study Area overlies the Ogallala Aquifer, one of the largest aquifers in the world, covering the more than 35,000 square miles of the Texas High Plains (TWDB, 1984). The Ogallala is the principal geologic formation in what is known as the High Plains Aquifer System, which underlies about 174,000 square miles of eight states. Additionally, subcrops of the smaller Edwards-Trinity (High Plains) Aquifer and Dockum Aquifer also underlie the Study Area.

The Ogallala, which consists of unconsolidated clay, silt, sand, and gravel, with groundwater filling pore spaces between grains below the water table, is an unconfined aquifer where recharge occurs primarily from infiltration of rainfall and snowmelt. Aquifer recharge rates fluctuate by the amount of precipitation, soil composition, and vegetation cover. Because rainfall and infiltration are low and evaporation is high, only about 1 inch of recharge reaches the water table annually, with the highest recharge occurring in playa lake basins and in outcrops of sandy soils. Regional groundwater flow in the aquifer is generally to the east-southeast, and most local communities use the Ogallala Aquifer as their sole source of drinking water (TWDB, 1997). The Llano Estacado Region relies on the Ogallala as its primary water source, with 97 percent of the region's water supply coming from tis source. In 2010, approximately 2 percent of the State's total population resided in the Panhandle Region, but by 2060, the population is projected to increase 12 percent to 551,758. The region's total water demands, however, are projected to decrease, due to a decline in agricultural irrigation, which uses the largest amount of water in the region (TWDB, 2012).

The Edwards-Trinity (High Plains) Aquifer consists of sandstone in the Antlers Formation (Trinity Group) and limestone in the Comanche Peak and Edwards formations. Water in the aquifer is fresh to moderately saline, and typically contains more total dissolved solids than the overlying Ogallala Aquifer. Groundwater is used for irrigation, and water level declines have occurred in some irrigated areas (TWDB, 2007).

The Dockum Aquifer consists of gravel, sandstone, siltstone, mudstone, shale, and conglomerate. Water quality is generally poor, with brine in the western subsurface portions of the aquifer and naturally occurring radioactivity from uranium exceeding the State's primary drinking water standard.

Groundwater is used for irrigation, municipal water supply, and oil field water flooding operations, especially in the southern High Plains (TWDB, 2011).

3.6 Vegetation

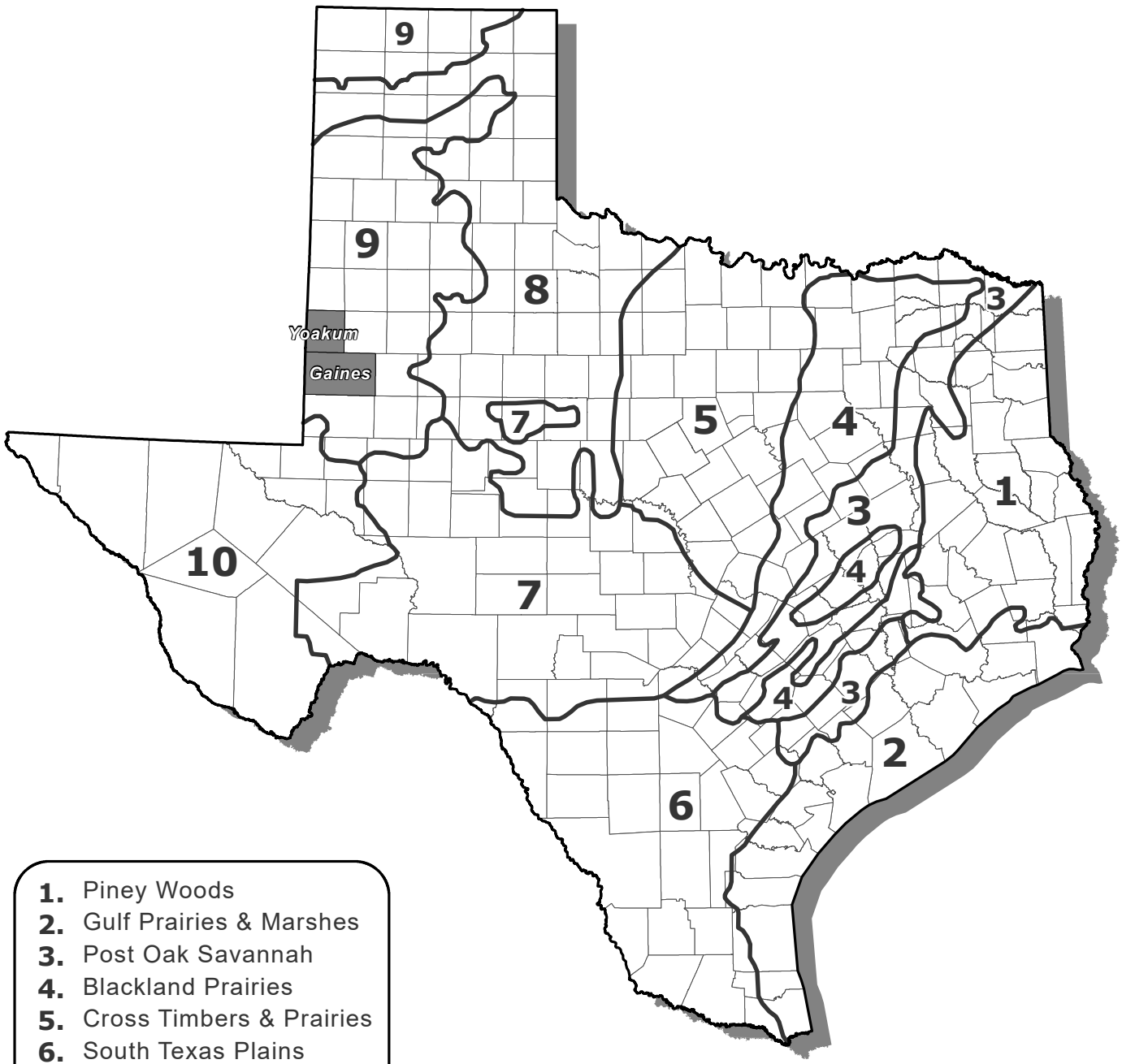
3.6.1 Regional Vegetation

As shown on Figure 3-2, Gaines and Yoakum Counties fall within the High Plains Vegetational Area, which was delineated by Gould et al. (1960) and characterized by Hatch et al. (1990). This region is the southern extension of the North America Great Plains and is separated from the Rolling Plains to the east by the Llano Estacado Escarpment. Topographically, the High Plains Vegetational Area is a relatively level plateau characterized by shallow, surface depressional playa lakes, which individually can encompass up to 40 acres. These ephemeral waterbodies are periodically filled by seasonal precipitation.

The historic vegetation of the High Plains region is described as predominantly mixed prairie and shortgrass prairie with tallgrass prairie occurring on deep, sandy soils. Typical native vegetation occurring on clay and clay loam sites include blue grama (*Bouteloua gracilis*), buffalograss (*Buchloe dactyloides*), and galleta (*Pleuraphis jamesii*), which were the principal plant species 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*). While the High Plains area in general was characteristically treeless and brush free, today, sand sagebrush (*Artemisia filifolia*), honey mesquite (*Prosopis glandulosa*), pricklypears (*Opuntia* spp.), and yuccas (*Yucca* spp.) have invaded many sandy and sandy loam sites (Hatch et al., 1990). Currently, most of the High Plains is in irrigated cropland. Major crops produced in the High Plains include cotton, corn, sorghum, wheat, vegetables, and sugar beets.

3.6.2 Vegetation Community Types in the Study Area

According to TPWD's EMST vegetation cover types, approximately 61 percent of the Study Area consists of Row Crops, 26 percent as Conservation Reserve Program (CRP)/Other Improved Grassland, 4.1 percent as Rolling Plains: Mixedgrass Prairie, and 3.7 percent as High Plains: Sand Prairie. The remaining 5 percent consists of 15 other vegetation cover types (TPWD, 2018b).



1. Piney Woods
2. Gulf Prairies & Marshes
3. Post Oak Savannah
4. Blackland Prairies
5. Cross Timbers & Prairies
6. South Texas Plains
7. Edwards Plateau
8. Rolling Plains
9. High Plains
10. Trans-Pecos

NORTH

100 50 0 100

Miles

BURNS McDONNELL

Figure 3-2
Location of the Study Area Counties in Relation to the Vegetational Areas of Texas
Mustang to Seminole
115-kV Transmission Line Project

Source: Hatch et al (1990)

The Row Crops vegetation type includes all cropland where fields are fallow for some portion of the year. Some fields may rotate into and out of cultivation frequently, and year-round cover crops and tame hay fields are generally mapped as grassland (TPWD, 2018b).

CRP/Other Improved Grassland consists of a variety of restored grasslands with seed mixes that may contain native or non-native species and that have either been seeded on former cropland or have been improved for domestic livestock by application of NRCS management practices. This cover type is sometimes dominated by non-native grasses such as bermudagrass (*Cynodon dactylon*), Johnsongrass (*Sorghum halepense*), and kleingrass (*Panicum coloratum*) (TPWD, 2018b).

The Rolling Plains: Mixedgrass Prairie consists of a variety of grasslands on loam, clay loams, or sandy loams. Texas wintergrass (*Nassella leucotricha*), composite dropseed (Sporobolus compositus), sideoats grama, little bluestem, silver bluestem (*Bothriochloa laguroides* sspp. *torreyana*), and western wheatgrass are common in areas that are better watered or less grazed. Tobosagrass (*Pleuraphis mutica*), burrograss (*Scleropogon brevifolius*), curly mesquite (*Hilaria belangeri*), purple threeawn (*Aristida purpurea*), blue grama, red grama (*Bouteloua trifida*), and buffalograss are common in less well-watered or more heavily grazed areas. Honey mesquite, Berlandier's wolfberry (*Lycium berlandieri*), redberry juniper (*Juniperus pinchotii*), *Opuntia* species, and *Yucca* species are common components (TPWD, 2018b).

The High Plains: Sand Prairie is mapped on soils that range from deep sand to shallower sandy loams under a variety of management regimes, and hence are quite variable. Common grasses include sand dropseed, sandbur (*Cenchrus* sp.), giant dropseed (*Sporobolus giganteus*), sand bluestem (*Andropogon hallii*), silver bluestem, little bluestem, thin paspalum (*Paspalum setaceum*), and field brome (*Bromus arvensis*). Havard oak (*Quercus havardii*), honey mesquite, and sand sagebrush (*Artemisia filifolia*) are common woody components (TPWD, 2018b).

3.6.3 Waters of the U.S., Including Wetlands

Waters of the U.S. include, but are not limited to, territorial seas, lakes, rivers, streams, oceans, bays, ponds, and other special aquatic features, including wetlands. The USACE regulates waters of the U.S., including wetlands, under Section 404 of the CWA. The USACE and EPA jointly define wetlands as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include bogs, seeps, marshes, swamps, forested bottomland wetlands, and other similar areas (40 CFR 230.3[t]). Wetlands are defined in a broad

sense as transitional areas (ecotones) between terrestrial and aquatic systems where the water table is usually at or near the ground surface, or where shallow water covers the land (Cowardin et al., 1979).

USFWS NWI maps indicate the presence of wetland and open-water habitat features throughout the Study Area. Features in the Study Area are classified as palustrine systems, which include vegetated, freshwater wetlands and small (less than 20 acres), non-vegetated freshwater wetlands that are both shallow (deepest point less than 6.6 feet at low water) and lack an active wave-formed or bedrock shoreline (Cowardin et al., 1979). Freshwater emergent wetlands, freshwater ponds, riverine, and a lake have been mapped within the Study Area.

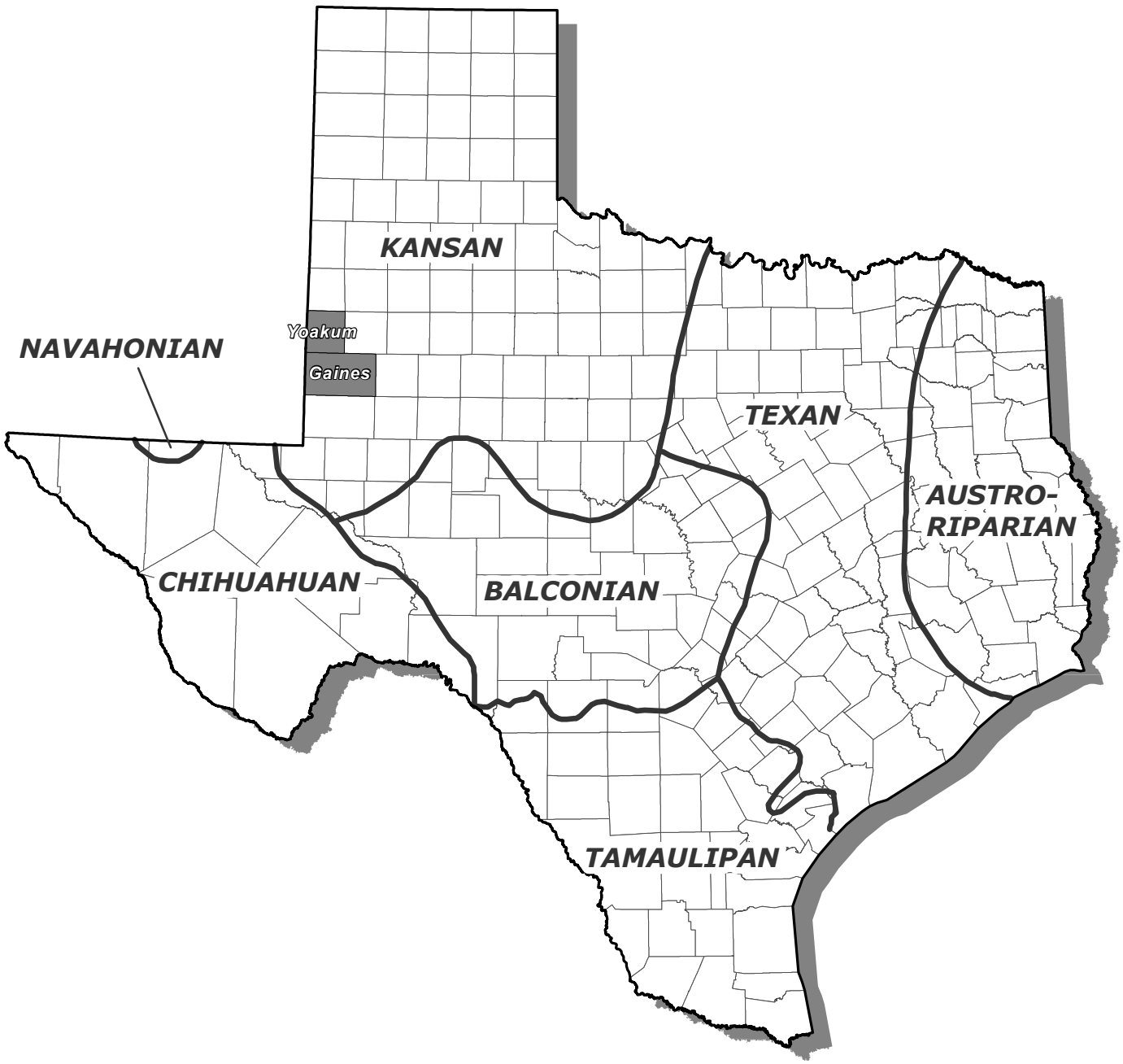
Hydric and aquatic habitats may be considered regulatory wetlands by the USACE. Construction activities resulting in the discharge of dredged or fill materials within waters of the U.S. are subject to the regulations and restrictions outlined in Section 404 of the CWA and may require coordination with the USACE to ensure compliance.

3.7 Fish and Wildlife

3.7.1 Fish and Wildlife Habitats and Species

Blair (1950) delineated seven biotic provinces within Texas. As shown on Figure 3-3, Gaines and Yoakum Counties occur within the Kansan Biotic Province. The Kansan Biotic Province in Texas extends south and east from the Oklahoma and New Mexico borders, eventually transitioning to the Chihuahuan, Balconian, and Texan Biotic Provinces. The Kansan Biotic Province includes three distinct biotic districts, the Mixed-grass Plains, Short-grass Plains, and Mesquite Plains Districts. The Study Area lies within the Short-grass Plains District. Within this district, buffalograss is the principal vegetational constituent and is the most important plant association. Various species of grama grasses are also important to this area (Blair, 1950). Characteristic faunal species of the area are discussed below. A result of extensive agricultural development in the area includes very little remaining native grassland habitats. Wildlife species that occur include species that have historically occurred in the area, as well as others that are particularly adapted to this agricultural environment.

Aquatic habitats within the Study Area are minimal and include Wardswell and McKenzie Draws, wetlands, and ponds. Aquatic vegetation is limited by the ephemeral nature of these features. No streams designated by the TPWD as ecologically significant or stream features in general occur within the Study Area.



NORTH

100 50 0 100

Miles

BURNS McDONNELL

Figure 3-3
Location of the Study Area Counties
in Relation to the
Biotic Provinces of Texas
Mustang to Seminole
115-kV Transmission Line Project

Source: Blair (1950)

3.7.2 Fish

Fish species in the Study Area are restricted due to the limited abundance of waterbodies with permanent inundation. Fish species that may occur in streams or ponds in the Study Area include the American gizzard shad (*Dorosoma cepedianum*), common carp (*Cyprinus carpio*), black bullhead (*Ameiurus melas*), green sunfish (*Lepomis cyanellus*), orangespotted sunfish (*Lepomis humilis*), bluegill (*Lepomismacrochirus*), white crappie (*Pomoxis annularis*), channel catfish (*Ictalurus punctatus*), flathead catfish (*Pylodictis olivaris*), and largemouth bass (*Micropterus salmoides*) (Thomas et al., 2007).

3.7.3 Amphibians and Reptiles

A representative list of amphibian and reptile species of potential occurrence in the Study Area is included as Table 3-1.

Table 3-1: Representative List of Reptile and Amphibian Species of Potential Occurrence[a] in the Study Area

Common Name[b]	Scientific Name[b]
Frogs and Toads	
Couch's spadefoot	*Scaphiopus couchii*
Great Plains toad	*Anaxyrus cognatus*
Plains leopard frog	*Lithobates blairi*
Plains spadefoot	*Spea bombifrons*
Texas toad	*Anaxyrus speciosus*
Lizards	
Common side-blotched lizard	*Uta stansburiana*
Great Plains earless lizard	*Holbrookia maculata*
Great Plains skink	*Plestiodon obsoletus*
Prairie racerunner	*Aspidoscelis sexlineata viridis*
Southwestern fence lizard	*Sceloporus cowlesi*
Texas horned lizard	*Phrynosoma cornutum*
Texas spotted whiptail	*Aspidoscelis gularis*
Salamanders	
Barred tiger salamander	*Ambystoma mavortium*
Snakes	
Bullsnake	*Pituophis catenifer sayi*
Central plains milksnake	*Lampropeltis triangulum gentilis*
Checkered gartersnake	*Thamnophis marcianus*
Desert kingsnake	*Lampropeltis splendida*
Kansas glossy snake	*Arizona elegans*

Common Name[b]	Scientific Name[b]
Long-nosed snake	*Rhinocheilus lecontei*
Prairie rattlesnake	*Crotalus viridis*
Plains black-headed snake	*Tantilla nigriceps*
Plains hog-nosed snake	*Heterodon nasicus*
Variable groundsnake	*Sonora semiannulata*
Western coachwhip	*Coluber flagellum testaceus*
Turtles	
Plains box turtle	*Terrapene ornata*
Red-eared slider	*Trachemys scripta elegans*
Yellow mud turtle	*Kinosternon flavescens*

(a) According to Werler and Dixon (2000) and Dixon (2013)
(b) Nomenclature follows Crother et al. (2012)

3.7.4 Birds

Avian species of potential occurrence in the Study Area include many year-round residents, migrants/summer residents, and migrants/winter residents. Grassland species associated with agricultural lands are likely the most common in the Study Area. A representative list of bird species of potential occurrence in the Study Area is included as Table 3-2.

Table 3-2: Representative List of Avian Species of Potential Occurrence[a] in the Study Area

Common Name	Scientific Name[b]	Likely Seasonal Occurrence[a, c]
American avocet	*Recurvirostra americana*	M, SR
American coot	*Fulica americana*	R
American crow	*Corvus brachyrhynchos*	M, WR
American robin	*Turdus migratorius*	M, WR
American wigeon	*Anas americana*	M, WR
Ash-throated flycatcher	*Myiarchus cinerascens*	M, SR
Black-chinned hummingbird	*Archilochus alexandri*	M
Brewer's blackbird	*Euphagus cyanocephalus*	M, WR
Brown-headed cowbird	*Molothrus ater*	R
Bullock’s oriole	*Icterus bullockii*	M, SR
Canada goose	*Branta canadensis*	M, WR
Cattle egret	*Bubulcus ibis*	M, SR
Cedar waxwing	*Bombycilla cedrorum*	M, WR
Chihuahuan raven	*Corvus cryptoleucus*	R
Cliff swallow	*Petrochelidon pyrrhonota*	M, SR
Common nighthawk	*Chordeiles minor*	M, SR

Common Name	Scientific Name[b]	Likely Seasonal Occurrence[a, c]
Cooper's hawk	*Accipiter cooperii*	M, SR
Curve-billed thrasher	*Toxostoma curvirostre*	R
Dickcissel	*Spiza americana*	M, SR
European starling	*Sturnus vulgaris*	R
Franklin's gull	*Leucophaeus pipixcan*	M
Gadwall	*Anas strepera*	M, WR
Great blue heron	*Ardea herodias*	R
Great horned owl	*Bubo virginianus*	R
Greater roadrunner	*Geococcyx californianus*	R
Great-tailed grackle	*Quiscalus mexicanus*	R
Green heron	*Butorides virescens*	M, SR
Green-winged teal	*Anas crecca*	M, WR
Horned lark	*Eremophila alpestris*	R
House finch	*Haemorhous mexicanus*	R
House sparrow	*Passer domesticus*	R
Killdeer	*Charadrius vociferus*	R
Ladder-backed woodpecker	*Picoides scalaris*	R
Lark bunting	*Calamospiza melanocorys*	M, WR
Least sandpiper	*Calidris minutilla*	M, WR
Loggerhead shrike	*Lanius ludovicianus*	R
McCown's longspur	*Rhynchophanes mccownii*	M, WR
Mississippi kite	*Ictinia mississippiensis*	M, SR
Mourning dove	*Zenaida macroura*	R
Northern bobwhite	*Colinus virginianus*	R
Northern cardinal	*Cardinalis*	R
Northern flicker	*Colaptes auratus*	M, WR
Northern harrier	*Circus cyaneus*	M, WR
Northern mockingbird	*Mimus polyglottos*	R
Northern pintail	*Anas acuta*	R
Northern shoveler	*Anas clypeata*	M, WR
Pied-billed grebe	*Podilymbus podiceps*	M, WR
Redhead	*Aythya americana*	M, WR
Red-tailed hawk	*Buteo jamaicensis*	R
Red-winged blackbird	*Agelaius phoeniceus*	M, R
Ring-necked pheasant	*Phasianus colchicus*	R
Rock pigeon	*Columba livia*	R

Common Name	Scientific Name[b]	Likely Seasonal Occurrence[a, c]
Rock wren	*Salpinctes obsoletus*	R
Ruby-crowned kinglet	*Regulus calendula*	M, WR
Rufous-crowned sparrow	*Aimophila ruficeps*	R
Sandhill crane	*Antigone canadensis*	M, WR
Savannah sparrow	*Passerculus sandwichensis*	M, WR
Scissor-tailed flycatcher	*Tyrannus forficatus*	M, SR
Scaled quail	*Callipepla squamata*	R
Swainson's hawk	*Buteo swainsoni*	M, SR
Turkey vulture	*Cathartes aura*	M, SR
Upland sandpiper	*Bartramia longicauda*	M
Western kingbird	*Tyrannus verticalis*	M, SR
Western meadowlark	*Sturnella neglecta*	R
White-crowned sparrow	*Zonotrichia leucophrys*	M, WR
White-winged dove	*Zenaida asiatica*	R
Wilson's phalarope	*Phalaropus tricolor*	M
Yellow-billed cuckoo	*Coccyzus americanus*	M, SR
Yellow-rumped warbler	*Setophaga coronata*	M, WR

(a) According to Lockwood and Freeman (2014)
(b) Nomenclature follows Chesser et al. (2018)
(c) R – Resident: Occurring regularly in the same general area throughout the year-implies breeding
SR – Summer Resident: Implies breeding but may include nonbreeders
WR – Winter Resident: Occurring during winter season
M – Migrant: Occurs as a transient passing through the area either in spring or fall or both

3.7.5 Mammals

A representative list of mammals that may occur in the Study Area is included as Table 3-3.

Table 3-3: Representative List of Mammalian Species of Potential Occurrence[a] in the Study Area

Common Name[b]	Scientific Name[b]
Xenarthrans	
Nine-banded armadillo	*Dasypus novemcinctus*
Chiroptera	
Big brown bat	*Eptesicus fuscus*
Brazilian free-tailed bat	*Tadarida brasiliensis*
Hoary bat	*Lasiurus cinereus*
Carnivores	
American badger	*Taxidea taxus*
Bobcat	*Lynx rufus*
Common gray fox	*Urocyon cinereoargenteus*
Coyote	*Canis latrans*

Common Name[b]	Scientific Name[b]
Northern raccoon	*Procyon lotor*
Striped skunk	*Mephitis*
Artiodactyls	
Mule deer	*Odocoileus hemionus*
Rodents	
Deer mouse	*Peromyscus maniculatus*
Eastern white-throated woodrat	*Neotoma leucodon*
Hispid cotton rat	*Sigmodon hispidus*
Hispid pocket mouse	*Chaetodipus hispidus*
Jones's pocket gopher	*Geomys knoxjonesi*
Merriam's pocket mouse	*Perognathus merriami*
Mexican ground squirrel	*Spermophilus mexicanus*
Northern grasshopper mouse	*Onychomys leucogaster*
Ord's kangaroo rat	*Dipodomys ordii*
Plains harvest mouse	*Reithrodontomys montanus*
Plains pocket mouse	*Perognathus flavescens*
Southern plains woodrat	*Neotoma micropus*
Spotted ground squirrel	*Spermophilus spilosoma*
Western harvest mouse	*Reithrodontomys megalotis*
White-footed mouse	*Peromyscus leucopus*
Lagomorphs	
Black-tailed jackrabbit	*Lepus californicus*
Desert cottontail	*Sylvilagus audubonii*
Eastern cottontail	*Sylvilagus floridanus*

(a) According to Schmidly (2004)
(b) Nomenclature follows Manning et al. (2008)

3.8 Recreationally and Commercially Important Species

A species is considered important if one or more of the following criteria applies:

a. the species is recreationally or commercially valuable
b. the species is endangered or threatened
c. the species affects the well-being of some important species within criterion (a) or (b)
d. the species is critical to the structure and function of the ecological system
e. the species is a biological indicator

Wildlife resources within the Study Area provide human benefits resulting from both consumptive and non-consumptive uses. Non-consumptive uses include observing and photographing wildlife, bird watching, and other similar activities. These uses, although difficult to quantify, deserve consideration in the evaluation of the wildlife resources of the Study Area. Consumptive uses, such as fishing, hunting,

and trapping, are more easily quantifiable. Consumptive and non-consumptive uses of wildlife are often enjoyed contemporaneously and are generally compatible. Many species occurring in the Study Area provide consumptive uses, and all provide the potential for non-consumptive benefits.

The white-tailed deer (*Odocoileus virginianus*) is the most economically important big game mammal in Texas (Schmidly, 2004). The TPWD divides the State into ecological regions for deer management. Gaines and Yoakum Counties fall within the High Plains Ecological Region. During the 2016–2017 hunting season, an estimated 1,069 white-tailed deer were harvested within this ecological region (Purvis, 2017a).

Mule deer (*Odocoileus hemionus*) are one of the most valued game animals in the Trans-Pecos and Panhandle regions of Texas due to limited distribution, low numbers, and their unique appearance and behavior (TPWD, 2000). The mule deer population in Texas ranges from 150,000 during dry conditions to about 250,000 during wet periods. Approximately 80 to 85 percent of the population inhabits the Trans-Pecos Ecological Region while the remaining population inhabits the Panhandle and western Edwards Plateau regions (TPWD, 2000). The majority of mule deer populations in the Panhandle inhabit rough, broken land of the Rolling Plains along the Canadian River and Caprock Escarpment. In the High Plains Ecological Region, mule deer primarily inhabit sandhill and draw habitats with some occurrence in mesquite flats. During the 2016–2017 hunting season an estimated 2,073 mule deer were harvested in the High Plains Ecological Region (Purvis, 2017a).

The High Plains Ecological Region also provides habitat for a variety of economically and recreationally important upland game birds, including the mourning dove (*Zenaida macroura*), white-winged dove (*Zenaida asiatica*), northern bobwhite (*Colinus virginianus*), scaled quail (*Callipepla squamata*), and ring-necked pheasant (*Phasianus colchicus*). During the 2016–2017 hunting season, an estimated 501,650 mourning dove, 149,534 white-winged dove, 80,758 northern bobwhite, 55,083 scaled quail, and 25,892 ring-necked pheasant were harvested within this ecological region (Purvis, 2017b).

No commercial fishing occurs within the Study Area. Also, very limited public access to recreational fishing is available in the Study Area. Common recreational fisheries in the general area include largemouth bass, white crappie, flathead catfish (*Pylodictis olivaris*), and sunfish (*Lepomis* spp.).

According to TPWD (2018c), one record of a black-tailed prairie dog (*Cynomys ludovicianus*) town exists in the Study Area. It is located just west of U.S. Highway (US) 62/385 within the eastern portion of the Study Area. An additional black-tailed prairie dog town was observed by Burns & McDonnell staff during field reconnaissance of the Study Area. The prairie dog town is located on the south side of CR

390 and CR 355 intersection. Historically, millions of acres of Texas grassland were covered by black-tailed prairie dog towns. Prairie dog towns in Texas now occupy less than 1 percent of their historic range (TPWD, 2018d). Over the last 50 years, prairie dogs have been displaced by activities associated with livestock production and farming. Many people consider prairie dogs a destructive nuisance species, and control methods such as poisoning, trapping, and shooting have been popular practices. Other causes for decline have included the pet trade and sylvatic plague (TPWD, 2018d). Consequently, their former range and numbers have been considerably reduced (Schmidly, 2004). Although the black-tailed prairie dog is not currently listed as endangered or threatened, attempts were made in the past to list the species, and it is a former candidate for listing. Protection for the black-tailed prairie dog under the ESA was determined "Not Warranted" in 2009.

3.9 Endangered and Threatened Species

An endangered species is one that is in danger of extinction throughout all or a significant portion of its natural range, while a threatened species is one likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

3.9.1 Endangered and Threatened Plant Species

Available information from the USFWS (2018a), TPWD's NDD (TPWD, 2018c) and TPWD (2018e) was reviewed to identify endangered or threatened plant species of potential occurrence within the Study Area. Currently, 31 plant species are listed by the USFWS as endangered or threatened species in Texas (USFWS, 2018b). However, no Federal or State-listed plants have been recorded from Gaines and Yoakum Counties (USFWS, 2018a; TPWD 2018c, 2018e). No sensitive plant communities have been specifically identified by either the USFWS or TPWD as occurring within the Study Area (USFWS, 2018a; TPWD 2018c, 2018e).

3.9.2 Federally Listed Fish and Wildlife Species

The USFWS (2018a) and TPWD (2018e) county lists of endangered and threatened species indicate that six federally listed endangered and threatened fish and wildlife species may occur in Gaines and Yoakum Counties (Table 3-4). Protection under the ESA can also include protection of habitat designated as critical habitat for supporting a listed species. It should be noted that inclusion in this table does not necessarily mean that a species is known to occur in the Study Area, but only acknowledges the potential for its occurrence, based on historic records, known ranges, and presence of potential habitat. Only those species that USFWS lists as endangered or threatened have Federal protection under the ESA. Most avian species are protected under the MBTA, and bald and golden eagles are protected under the BGEPA.

Table 3-4: Federally Listed Fish and Wildlife Species for Gaines and Yoakum Counties[a]

Common Name	Scientific Name[b]	Status	Potential for Occurrence in the Study Area
		USFWS	
Birds			
Interior least tern[c]	*Sternula antillarum athalassos*	Endangered	Not likely[d]
Whooping crane	*Grus americana*	Endangered	Not likely[d]
Piping plover[c]	*Charadrius melodus*	Threatened	Not likely[d]
Red knot[c]	*Calidris canutus rufa*	Threatened	Not likely[d]
Mammals			
Black-footed ferret[e]	*Cynomys ludovicianus*	Endangered	Does not occur[f]
Gray wolf[e]	*Canis lupus*	Endangered	Does not occur[f]

(a) According to USFWS (2018a) and TPWD (2018c, 2018e)
(b) Nomenclature follows Manning et al. (2008), Crother et al. (2012), Chesser et al. (2018), USFWS (2018a), and TPWD (2018e)
(c) Species only needs to be considered for wind energy related projects (USFWS, 2018a)
(d) Only expected to occur as a migrant, transient, or rare vagrant within the Study Area
(e) Not listed by USFWS (2018a) as occurring in Gaines and Yoakum Counties
(f) Extirpated in Texas

The USFWS considers four of the taxa in Table 3-4 as endangered: the interior least tern (*Sternula antillarum athalassos*), whooping crane (*Grus americana*), black-footed ferret (*Cynomys ludovicianus*), and gray wolf (*Canis lupus*). Two of the taxa in Table 3-4, the piping plover (*Charadrius melodus*) and red knot (*Calidris canutus rufa*) are federally listed as threatened. Although the USFWS (2018a) states that the interior least tern, piping plover, and red knot only need to be considered for wind energy projects, they are included in this document for completeness.

The TPWD county list for Gaines and Yoakum Counties shows the black-footed ferret and gray wolf to be federally listed as endangered; however, the USFWS (2018a) does not list them for either county. Rather, the USFWS does not list the black-footed ferret or gray wolf as occurring in any counties in Texas.

3.9.2.1 Interior Least Tern

In Texas, the interior least tern historically nested on sandbars of the Colorado River, Red River, and Rio Grande. Currently, its winter range includes the entire Texas Gulf Coast. The interior least tern's preferred nesting habitat is unvegetated, frequently flooded sand flats, salt flats, sand and gravel bars, and sand, shell, and gravel beaches (Thompson et al., 1997; Campbell, 2003). The species would only be expected as a rare migrant within the Study Area (Lockwood and Freeman, 2014). No documented

records exist from the Study Area (TPWD, 2018c; eBird, 2018), and the species is not expected to occur within the Study Area due to the general absence of suitable habitat.

3.9.2.2 Whooping Crane

The whooping crane is North America's tallest wading bird. Only four wild populations of whooping crane exist. The only self-sustaining and largest wild population is the Aransas-Wood Buffalo population (AWBP). The AWBP breeds in Wood Buffalo National Park in northern Canada and migrates annually to wintering grounds in the Aransas National Wildlife Refuge (NWR) and adjacent areas of the central Texas Coast in Aransas, Calhoun, and Refugio counties (USFWS, 1995, 2009a; Lewis, 1995; Canadian Wildlife Service (CWS) and USFWS, 2007). Individuals have wintered a considerable distance from these three counties, including as far away as the Panhandle and south to Willacy County (Lockwood and Freeman, 2014). The three smaller wild populations include the non-migratory Florida and Louisiana populations and one population that migrates between Wisconsin and Florida. These are not self-sustaining populations, and each is designated as an "experimental population, non-essential."

During migration, whooping cranes travel during daylight hours and stop over at wetlands, fallow cropland, and pastures to roost and feed. Whooping cranes have an unpredictable pattern of stopover use and may not use the same stopover sites annually. They spend a short period of time at any one location ranging from overnight to several days in inclement weather. Federal and State efforts to record information on whooping cranes sighted in migration began in 1975 and have continued to the present day through the Cooperative Whooping Crane Tracking Project (CWCTP) in the U.S. and Canada (USFWS, 2009a; Tacha et al., 2010). The database incorporates records for the period of 1943 through 2009. As of the fall of 2009, 140 confirmed sightings of migrating whooping cranes occurred in Texas, from the fall of 1965 to the fall of 2009 (USFWS, 2009b). None of these recorded occurrences are within the Study Area, or Gaines and Yoakum Counties.

The Study Area does not lie within the zone that encompasses 95 percent of known sightings, and it is extremely unlikely that the species will occur within the Study Area due to a lack of suitable stop over habitat.

3.9.2.3 Piping Plover

The piping plover is a small shorebird that inhabits sandy beaches and alkali flats (Cornell Lab of Ornithology, 2018). Approximately 35 percent of the known global population of piping plovers winters along the Texas Gulf Coast, where they spend 60 to 70 percent of the year (Campbell, 2003). The piping plover population that winters in Texas breeds on the northern Great Plains and around the Great Lakes.

The species is an uncommon to locally common winter resident along the coastal areas of Texas and can linger through the summer on very rare occasions. Piping plovers are not often observed during migration at inland locations, and most appear to pass east of the Balcones Escarpment (Lockwood and Freeman, 2014). No documented records of the piping plover exist from the Study Area (TPWD, 2018c; eBird, 2018), and it is extremely unlikely that this species would occur in the Study Area.

3.9.2.4 Red Knot

The red knot is a medium-sized, stocky, short-necked sandpiper with a rather short, straight bill. The *rufa* subspecies, one of three subspecies occurring in North America, has one of the longest migration distances known, travelling between its breeding grounds in the central Canadian Arctic to wintering areas that are primarily in South America (USFWS, 2011). During migration and winter in Texas, red knots may be found feeding in small groups, on sandy, shell-lined beaches, and to a lesser degree, on flats of bays and lagoons (Oberholser, 1974). It is an uncommon migrant along the coast, especially the Upper Texas coast, and very rare to casual inland, primarily in the eastern half of the State (Lockwood and Freeman, 2014). No documented records of the red knot exist from the Study Area (TPWD, 2018c; eBird, 2018), and it is extremely unlikely that this species would occur in the Study Area.

3.9.2.5 Black-footed Ferret

The black-footed ferret is a large weasel that is associated primarily with prairie dogs (*Cynomys* spp.) and prairie dog towns. Historically, black-footed ferrets ranged throughout the Great Plains where they occurred in semi-arid grasslands and mountain basins in Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, and Wyoming (Campbell, 2003). In Texas, black-footed ferrets originally ranged throughout the northeastern third of the State, including the Panhandle, Trans-Pecos, and most of the Rolling Plains (Schmidly, 2004). The last Texas records of the species were from Bailey County in 1963 (Schmidly, 2004). Most authorities consider the black-footed ferret extirpated from Texas; it does not occur in the Study Area.

3.9.2.6 Gray Wolf

The gray wolf historically inhabited the western two-thirds of the State, but has been extirpated in Texas (Schmidly, 2004), with the last authenticated reports being recorded in Texas in December 1970. It does not occur in the Study Area.

3.9.3 Critical Habitat

The USFWS, in Section 3(5)(A) of the ESA, defines critical habitat as:

> *"(i) the specific areas within the geographical area occupied by the species, at the time that it is listed in accordance with the ESA, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination by the Secretary of the Interior that such areas are essential for the conservation of the species."* (USFWS, 1973)

No critical habitat has been designated in the Study Area for any species included under the ESA.

3.9.4 State-Listed Fish and Wildlife Species

State-listed species receive protection under State laws, such as Chapters 67, 68, and 88 of the TPWD Code, and sections 65.171–65.184 and 69.01–69.14 of Title 31 of the TAC. Three species are protected at the State level and designated as threatened within Gaines and Yoakum Counties (Table 3-5) (TPWD, 2018e). They are the bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), and Texas horned lizard (*Phrynosoma cornutum*).

Table 3-5: State-Listed Fish and Wildlife Species for Gaines and Yoakum Counties[a]

Common Name	Scientific Name[b]	Status	Potential for Occurrence in the Study Area
		TPWD	
Birds			
Bald eagle	*Haliaeetus leucocephalus*	Threatened	Not likely[c]
Peregrine falcon	*Falco peregrinus*	Threatened	Likely[c]
Reptiles			
Texas horned lizard	*Phrynosoma cornutum*	Threatened	Likely

(a) According to USFWS (2018a) and TPWD (2018c, 2018e)
(b) Nomenclature follows Manning et al. (2008), Crother et al. (2012), Chesser et al. (2018), USFWS (2018a), and TPWD (2018e)
(c) Only expected to occur as a migrant, transient, or rare vagrant within the Study Area

3.9.4.1 Bald Eagle

The bald eagle is present year-round in Texas, and individuals may include breeding, wintering, migrating, and postbreeding dispersing birds. In Texas, bald eagles breed primarily in the eastern third of the State, although in the last decade nesting pairs have been found over a wider area of the State, including sites in the Panhandle (Lockwood and Freeman, 2014). Bald eagles prefer large bodies of water surrounded by tall trees or cliffs, which they use as nesting sites. In 2007, the USFWS removed the bald eagle from the list of endangered and threatened wildlife species (72 Federal Register 130:37345–37372, July 9, 2007); however, the bald eagle still receives Federal protection under provisions of the BGEPA and MBTA. According to TPWD (2018c), no documented bald eagle records or nests occur in the Study

Area. The bald eagle may migrate through the Study Area but would not be expected to occur as a winter resident due to the lack of large water bodies within the Study Area.

3.9.4.2 Peregrine Falcon

The peregrine falcon was removed from Federal listing under the ESA by the USFWS in 1999. The TPWD also revised the status of the subspecies American peregrine falcon (*Falco peregrinus anatum*) from endangered to threatened and dropped the subspecies Arctic peregrine falcon (*Falco peregrinus tundrius*) from the State endangered and threatened list altogether. The American peregrine falcon is a rare summer resident in the mountains of Trans-Pecos in Texas. The Arctic peregrine falcon is an uncommon to rare migrant and winter resident Statewide (Lockwood and Freeman, 2014). Since the two subspecies are difficult to differentiate in the field, the TPWD will generally only reference this bird at the species level (TPWD, 2018e). Although the TPWD (2018c) and eBird (2018) have no records from the Study Area, the species probably occurs occasionally in the Study Area as a migrant or winter vagrant.

3.9.4.3 Texas Horned Lizard

The Texas horned lizard occurs throughout the western half of the State in a variety of habitats but prefers arid and semi-arid environments in sandy loam or loamy sand soils that support patchy bunch-grasses, cacti, yucca, and various shrubs (Henke and Fair, 1998). While the species has almost vanished from the eastern half of the State over the past 30 years, it still maintains relatively stable numbers in west Texas. Although TPWD (2018c) shows no documented records within the Study Area for this species, the Texas horned lizard may occur in small numbers in suitable habitat within the Study Area.

3.10 Socioeconomics

This section presents a summary of the economic and demographic characteristics of Gaines and Yoakum Counties, and provides a brief comparison with the socioeconomic environment of the State of Texas and the region. Reviewed literature sources include publications of the U.S. Census Bureau, the Texas Workforce Commission (TWC), the U.S. Bureau of Labor Statistics (BLS), and the TWDB.

3.10.1 Population Trends

Table 3-6 shows the population trends and projections for Gaines and Yoakum Counties and the State of Texas. The population of Gaines County has increased steadily since 1980, when it was recorded at 13,150 persons. Gaines County's population increased by 973 (7.4 percent) during the 1980s, by 344 (2.4 percent) during the 1990s, and then increased by 3,059 (21.1 percent) between 2000 and 2010. Gaines County's population was estimated to be 20,638 in 2017. Yoakum County's population decreased and then grew at a much lower rate during the same period. Yoakum County's population, recorded at 6,148

in 1980, decreased by 537 (8.7 percent) during the 1980s, increased by 120 (2.1 percent) in the 1990s, and increased by 84 (1.5 percent) between 2000 and 2010 to reach 5,815 persons. Yoakum County's population was estimated at 8,568 in 2017. By comparison, the State's population increased by 19.4 percent in the 1980s, by 22.8 percent in the 1990s, and by 20.6 percent between 2000 and 2010 when more than 25.1 million persons were recorded. U.S. Census Bureau estimates placed the State's population at nearly 28.3 million in 2017 (U.S. Census Bureau, 1990, 2000, 2010, 2018).

The TWDB publishes population projections for Texas and its counties for the purpose of estimating future water demand. As shown in Table 3-6, the TWDB projects the population of Gaines County to increase by 13,471 (76.9 percent) and reach approximately 30,997 people by 2040. Strong population growth is also projected within Yoakum County between 2010 and 2040. Yoakum County's total population is expected to increase by 5,313 (91.4 percent) to reach approximately 11,128 people by 2040. For comparison, the population of the State of Texas is projected to grow by nearly 29.2 million persons over the same period, which is an increase of 116.2 percent (TWDB, 2015).

Table 3-6: Population Trends and Projections for Gaines and Yoakum Counties

Place		Population						
	1980	1990	2000	2010	2017	2020	2030	2040
Gaines County	13,150	14,123	14,467	17,526	20,638	21,316	25,746	30,997
Yoakum County	6,148	5,611	5,731	5,815	8,568	8,920	10,089	11,128
Texas (in 1,000s)	14,229	16,987	20,852	25,146	28,300	30,542	44,956	54,369

Source: U.S. Census Bureau (1990, 2000, 2010, 2018); TWDB (2015)

3.10.2 Employment

Table 3-7 shows the labor force and unemployment for Gaines and Yoakum Counties and the State of Texas. The labor force within Gaines County grew by 2,703 (45 percent) between 1990 and January 2018 overall, although the growth rate fluctuated during that period. Gaines County's labor force decreased by 1.8 percent during the 1990s, rebounded with 19.3 percent growth between 2000 and 2010, and increased approximately 24.1 percent between 2000 and January 2018 to reach 9,239. The labor force within Yoakum County fell by 218 (5.5 percent) between 1990 and January 2018 overall, but also fluctuated during that period. Yoakum County's labor force decreased by 16.1 percent during the 1990s, rebounded with 6.4 percent growth between 2000 and 2010, and increased approximately 5.9 percent between 2010 and January 2018 to reach 3,778. For comparison, the labor force within Texas grew approximately 61.8 percent (from 8,471,199 to 13,621,781) between 1990 and January 2018. The State's labor force

increased approximately 22.7 percent during the 1990s, 16.6 percent between 2000 and 2010, and 13.2 percent between 2010 and January 2018 (TWC, 2018a).

As shown in Table 3-7, unemployment rates within Gaines and Yoakum Counties also fluctuated over the past few decades, but were on the rise until the last 8 years. Unemployment rates in Gaines County were recorded at 4.6 percent in 1990, 5.1 percent in 2000, 7.1 percent in 2010, and 2.6 percent in January 2018. Unemployment rates in Yoakum County were recorded at 3.1 percent in 1990, 6.4 percent in 2000, 8.1 percent in 2010, and 3.0 percent in January 2018. During this same period, unemployment rates within the State of Texas fluctuated to a greater degree. The State's unemployment rates were recorded at 6.6 percent in 1990, 4.8 percent in 2000, 8.6 percent in 2010, and 4.2 percent in January 2018 (TWC, 2018a).

Table 3-7: Labor Force and Unemployment for Gaines and Yoakum Counties

Place	Labor Force				Unemployment Rate (percent)			
	1990	2000	2010	Jan 2018	1990	2000	2010	Jan 2018
Gaines County	6,356	6,242	7,446	9,239	4.6%	5.1%	7.1%	2.6%
Yoakum County	3,996	3,352	3,568	3,778	3.1%	6.4%	8.1%	3.0%
Texas (in 1,000s)	8,417	10,326	12,035	13,622	6.6%	4.8%	8.6%	4.2%

Source: TWC (2018a)

3.10.3 Leading Economic Sectors

Table 3-8 compares covered employment and major economic sectors for the third-quarter of 2012 and 2017 for Gaines County, Yoakum County, and the State of Texas. The employment data discussed below include workers who are covered by State unemployment insurance and most agricultural employees. Also included are all corporation officials, executives, supervisory personnel, clerical workers, wage earners, piece workers, and part-time workers. The data exclude employment covered by the Railroad Retirement Act, self-employed persons, and unpaid family workers. A comparison of third quarter TWC employment data over the 5-year period between 2012 and 2017 shows that covered employment in Gaines County increased 11.1 percent (from 5,794 jobs to 6,436 jobs) and covered employment in Yoakum County decreased 8.9 percent (from 4,217 jobs to 3,844 jobs). For comparison, the total number of jobs Statewide increased approximately 11.7% (from 10,737,238 jobs to 11,991,887 jobs) during the same 5-year period (TWC, 2018b).

As shown in Table 3-8, third-quarter 2017 leading employment sectors in Gaines County included the Natural Resources & Mining sector (2,055), the Trade, Transportation, & Utilities sector (1,224), and the Education & Health Services sector (1,153). Third-quarter 2017 leading employment sectors in Yoakum

County included the Natural Resources & Mining sector (1,404), the Education & Health Services sector (647), and the Trade, Transportation, & Utilities sector (602). The leading employment sectors for the State of Texas for the third quarter of 2017 were the Education & Health Services sector (2,761,240), the Trade, Transportation, & Utilities sector (2,528,705), and the Professional & Business Services sector (1,689,329) (TWC, 2018b).

Table 3-8: Covered Employment and Major Economic Sectors, Third-Quarter 2012 and 2017

Employment Sector	Employment		Percent Change
	2012	2017	2012–2017
Gaines County			
Natural Resources & Mining	1,994	2,055	3.06%
Construction	487	556	14.17%
Manufacturing	122	229	87.70%
Trade, Transportation & Utilities	1,213	1,224	0.91%
Information	40	35	-12.50%
Financial Activities	166	172	3.61%
Professional & Business Services	115	146	26.96%
Education & Health Services	1,069	1,153	7.86%
Leisure & Hospitality	273	498	82.42%
Other Services	110	105	-4.55%
Unclassified	0	31	3,100.00%
Public Administration	205	232	13.17%
Total Employment	5,794	6,436	11.08%
Yoakum County			
Natural Resources & Mining	1,652	1,404	-15.01%
Construction	446	360	-19.28%
Manufacturing	294	60	-79.59%
Trade, Transportation & Utilities	580	602	3.79%
Information	16	16	0.00%
Financial Activities	87	179	105.75%
Professional & Business Services	135	105	-22.22%
Education & Health Services	588	647	10.03%
Leisure & Hospitality	169	223	31.95%
Other Services	75	88	17.33%
Unclassified	0	0	0.00%
Public Administration	175	160	-8.57%

Employment Sector	Employment		Percent Change
Total Employment	4,217	3,844	-8.85%
State of Texas			
Natural Resources & Mining	332,595	284,432	-14.48%
Construction	623,396	743,314	19.24%
Manufacturing	874,184	860,108	-1.61%
Trade, Transportation & Utilities	2,266,299	2,528,705	11.58%
Information	203,533	208,474	2.43%
Financial Activities	657,204	752,891	14.56%
Professional & Business Services	1,434,911	1,689,329	17.73%
Education & Health Services	2,454,860	2,761,240	12.48%
Leisure & Hospitality	1,132,519	1,366,384	20.65%
Other Services	313,024	330,420	5.56%
Unclassified	4,199	14,020	233.89%
Public Administration	440,514	452,570	2.74%
Total Employment	10,737,238	11,991,887	11.69%

Source: TWC (2018b)

3.10.4 Community Values

The term “community values” is included as a factor for the consideration of transmission line certification under PURA § 37.056(c)(4). Although the term is not formally defined in the statute or PUC rules, the PUC has recognized a working definition as “a shared appreciation of an area or other natural resource by a national, regional, or local community” in several CCN proceedings.

Burns & McDonnell evaluated the proposed Project for community resources that may be important to a particular community as a whole, such as parks or recreational areas, historical and archeological sites, or scenic vistas within the Study Area. Additionally, Burns & McDonnell mailed consultation letters to Federal, State, and local officials (Appendix A) to, among other things, identify and collect information regarding community values and community resources. Input received was used in the evaluation of the proposed Project. Community values and community resources are discussed in the following sections.

3.11 Human Resources

3.11.1 Land Use

The Study Area is located within the north-central portion of Gaines County and the southeast portion of Yoakum County, approximately 2.5 miles northwest of the City of Seminole in Gaines County and approximately 0.5 mile east of Denver City in Yoakum County. Gaines County has a total land area of approximately 1,503 square miles and Yoakum County has a total land area of approximately 800 square miles. No incorporated cities or unincorporated communities are located within the Study Area. The Seminole Independent School District (ISD), Seagraves ISD, and Denver City ISD serve the Study Area; however, no ISD schools or other facilities are located within the Study Area boundary (Texas Education Agency, 2018).

The Gaines County portion of the Study Area is located within State Planning Region No. 9, represented by the Permian Basin Regional Planning Commission (PBRPC), which covers 23,443 square miles and includes Andrews, Borden, Crane, Dawson, Ector, Gaines, Glasscock, Howard, Loving, Martin, Midland, Pecos, Reeves, Terrell, Upton, Ward, and Winkler Counties. Founded in 1971, PBRPC serves the needs of the community and provides services to regional members that individual entities cannot provide alone by serving as the Area Agency on Aging; operating the Permian Basin Law Enforcement Academy; facilitating emergency communications; promoting pipeline safety awareness; managing and supporting solid waste activities; and planning, coordinating, and implementing homeland security programs (Texas Association of Regional Councils [TARC], 2018).

The Yoakum County portion of the Study Area is located within State Planning Region No. 2, represented by the South Plains Association of Governments (SPAG), which covers 13,617 square miles and includes Bailey, Cochran, Crosby, Dickens, Floyd, Garza, Hale, Hockley, King, Lamb, Lubbock, Lynn, Motley, Terry, and Yoakum Counties. The SPAG contains approximately 430,348 people within its service area and is charged with representing the interests of local governments of the region and facilitating orderly development of the economic, social, and physical environment (TARC, 2018).

The USDA National Agricultural Statistics Service (NASS) geospatial data and interactive maps were referenced to quantify land use cover within the Study Area boundary. The total land acreage of the Study Area is approximately 83,227 acres (130 square miles), which includes approximately 51,154 acres of cropland (approximately 61.5 percent) and 27,282 acres of grassland/rangeland (approximately 32.8 percent). Only 4,764 acres (5.7 percent of the entire Study Area) were classified as developed land

(USDA, 2017). The majority of the Study Area is dominated by agricultural use, consisting primarily of irrigated cropland. Circle-pivot irrigation systems are used throughout the Study Area.

The oil and gas industry, historically the major contributor to the region's economy, has greatly influenced and defined the area's history and land use. Oil and gas development and production occurs throughout the Study Area, but is most heavily concentrated in the northwestern and southern portions. A significant number of oil and gas wells, gathering and transmission pipelines, storage facilities, and pumping stations are located throughout the Study Area. According to RRC records, 1,142 oil/gas wells are currently recorded within the Study Area (RRC, 2018). Extraction in the area began in 1936, and by the 1970s 17 oil fields were scattered over Gaines County, with 1,600 wells reaching depths of 5,000 to 14,000 feet. By January 1991, 1.67 billion barrels of petroleum had been extracted; Yoakum County had an almost identical level of extraction, with 1.66 billion barrels in the same timeframe (Hunt, 2016; Leffler, 2016).

The two largest oil fields in the area include the Wasson Oil Field, a portion of which is located in the northwestern corner of the Study Area, and the Seminole Oil Field located in the southern portion of the Study Area. This field has a long history of extraction dating back to 1936, when it was originally drilled on 40-acre spacing. Through primary recovery and waterflooding, 460 million barrels have already been extracted from this field, and it is estimated that another 200 million barrels can be extracted via CO_2-enhanced oil recovery from an estimated original pool of one billion barrels (Melzer Consulting, 2013). Additionally, the ODC Oil Field is a small concentration of oil wells located near the center of the Study Area, around the intersection of CR 211 and CR 222. Extensive existing oil wells, as well as numerous new pads and derricks, new access roads, new pipelines, and new storage facilities were observed in the Study Area during field reconnaissance.

3.11.2 Recreation

A review of the Texas Outdoor Recreation Plan (TORP), Federal, State, and local maps, an internet search, and field reconnaissance identified no Federal or State parks, forests/grasslands, wildlife refuges, wildlife management areas, or preserves within the Study Area (TPWD, 2018f; National Park Service [NPS], 2018).

Portions of the Gaines County Park and Golf Course are located on the central-eastern edge of the Study Area. The facility has an 18-hole course including a driving range, practice greens, a clubhouse, playground, picnic tables, and two basketball courts. The course follows the natural southeasterly flow of McKenzie Draw and features two manmade ponds separated by a bridge.

The Gaines County shooting range is located just northwest of the Gaines County Golf Course, at the intersection of CR 216 and CR 203. The shooting range also features four designated areas for trap and skeet.

Additional recreational activities such as hunting may occur on private properties within the Study Area, but these properties are not open to the public.

3.11.3 Agriculture

As noted in Section 3.11.1, agriculture is the dominant land use in the Study Area. According to the USDA 2012 Census of Agriculture, the total market value of agricultural products sold in Gaines County was $180,470,000, which is a 7 percent decrease from the county's 2007 total market value of $193,195,000. The 2012 total market value of agricultural products sold in Yoakum County was recorded at $80,008,000, which marks an 11 percent decrease below the county's 2007 total market value of $90,130,000. For comparison, the total market value of agricultural products sold within Texas rose 21 percent during the same period (from approximately $21 billion to over $25.3 billion).

The number of farms in Gaines County decreased 22 percent between 2007 and 2012 (from 825 to 644). By comparison, the number of farms in Yoakum County fell from 348 to 339 (a decrease of just 3 percent) during the same period. The total land in farms within Gaines County decreased by 172,906 acres (18 percent) between 2007 and 2012, from 947,728 acres to 774,822 acres. The total land in farms within Yoakum County increased by nearly 44,953 acres, from 443,540 acres to 488,493 acres during the same 5-year period.

In terms of value of sales by commodity group, the most valuable agricultural products in Gaines County in 2012 included: (1) cotton and cottonseed ($88,443,000); (2) other crops and hay ($65,452,000); and (3) grains, oilseeds, dry beans, and dry peas ($11,608,000). The most valuable agricultural products in Yoakum County include: (1) cotton and cottonseed ($31,903,000); (2) other crops and hay ($24,048,000); and (3) vegetables, melons, potatoes, and sweet potatoes ($12,489,000) (USDA, 2012). Gaines and Yoakum Counties rank first and second in Texas, respectively, for total acreage dedicated to peanuts (Texas Almanac, 2015). According to USDA NASS geospatial data, the top five crops, by land cover within the Study Area, are as follows: (1) cotton, with 37,747 acres (45.4 percent of Study Area); (2) sorghum, with 4,602 acres (5.5 percent); (3) winter wheat, with 3,704 acres (4.4 percent); (4) peanuts, with 3,169 (3.8 percent), and (5) rye, with 1,389 acres (1.7 percent) (USDA, 2017).

3.11.4 Transportation/Aviation

The major transportation features located within the Study Area are State Highway (SH) 214, which extends approximately 13.5 miles northwest to southeast across the Study Area, and SH 83, which extends approximately 9 miles west to east across the northern portion of the Study Area. The total length of SH 214 is approximately 193.2 miles, as it extends south from Interstate Highway (IH) 40 in Adrian through seven counties (Oldham, Deaf Smith, Parmer, Bailey, Cochran, Yoakum, and Gaines) to Seminole via the cities of Muleshoe, Morton, Plains, and Denver City. The total length of SH 83 is approximately 56.1 miles, as it extends eastward from the Texas-New Mexico State Line through three counties (Yoakum, Gaines, and Dawson) via Denver City and Seagraves to an intersection with SH 137 in Welch (TxDOT, 2018a). A small portion of Farm-to Market Road (FM) 1757 crosses the far southwestern corner of the Study Area. The transportation grid within the Study Area is completed by several county-maintained roadways and a number of residential and private roads.

TxDOT's Project Tracker indicated that no new roadway projects are planned within the Study Area; however, it shows that SH 214 will have rumble strips milled-in between Seminole and the Yoakum County line during 2018 (TxDOT, 2018b). Additional correspondence received from the TxDOT Lubbock District indicated that TxDOT has no plans for widening existing TxDOT ROW, nor construction of highway overpasses within the Study Area.

A review of the Albuquerque Sectional Aeronautical Chart (FAA, 2018), the TxDOT Airport Directory (TxDOT, 2018c), (AirNav, 2018), aerial photography, USGS maps, field reconnaissance, and internet sources identified no FAA-registered airport, FAA-registered heliport, private airstrip, or private heliport within the Study Area. However, the Study Area is located within the Bronco 4 Military Operations Area (MOA). A MOA is a special use airspace designed for routine training or testing maneuvers, but is not restricted or prohibited airspace; it identifies where military activity occurs, provides for segregation of activities, and allows charting to keep users informed. They are usually positioned over isolated, rural areas to provide separation for noise nuisance and accident debris. The Bronco 4 MOA is listed as having a floor level (FL) altitude of 10,000 feet (FAA, 2018) and should not affect project construction or operations.

3.11.5 Communication Towers

A search of the Federal Communications Commission (FCC) website, online cell tower search engines, and field reconnaissance identified no commercial AM or FM radio towers or TV transmission towers within the Study Area. However, four cellular or other electronic communication towers are located

within the Study Area (FCC, 2018; AntennaSearch, 2018; Cell Reception, 2018). The towers within the Study Area are:

- El Paso Natural Gas Company, LLC – located in the southeast corner of the CR 370 and CR 355 intersection.
- New Cingular Wireless Pcs LLC (AT&T) – located approximately 0.5 mile southwest of the CR 390 and CR 355 intersection.
- Xcel Energy Services Inc. – located approximately 0.4 mile northwest of the CR 390 and CR 355 intersection.
- Communication tower (Owner unknown) – located approximately 1.4 miles west-northwest of the CR 208 and SH 214 intersection.

3.11.6 Utilities

Utility features identified within the Study Area include existing electric transmission lines, distribution lines, pipelines, oil and gas wells, oil and gas storage tanks or facilities, and water wells. Data sources used to identify the utility features included: RRC, TWDB, BEG data; utility company and regional system maps; USGS topographic maps; aerial imagery; and field reconnaissance. Electric facilities within the Study Area are operated by Xcel Energy and Golden Spread Electric Cooperative. A significant number of oil/gas pipelines and 1,142 oil/gas wells are recorded within the Study Area (RRC, 2018). A total of 858 water wells occur within the Study Area (TWDB, 2018).

3.11.7 Aesthetic Values

Aesthetics is included as a factor for consideration in the evaluation of transmission facilities in PURA § 37.056(c)(4). The term aesthetics refers to the subjective perception of natural beauty in the landscape, and this section of the document attempts to define and measure the Study Area's scenic qualities. Consideration of the visual environment includes a determination of aesthetic values where the major potential effect of the project on the resource is considered aesthetic, or where the location of a transmission line could affect the scenic enjoyment of a recreation area.

The aesthetic analysis primarily considers potential visual impacts to the public. Areas visible from major roads and highways, or publicly owned or accessible lands (for example, parks or privately-owned recreation areas open to the public) were analyzed. Several factors are taken into consideration when attempting to define the potential impact to a scenic resource that would result from the construction of the proposed transmission line. Among these are:

- topographical variation (hills, valleys, etc.)
- prominence of water in the landscape
- vegetation variety (forests, pasture, etc.)
- diversity of scenic elements
- degree of human development or alteration
- overall uniqueness of the scenic environment compared to the larger region

The THC operates the Texas Heritage Trails Program, a Statewide heritage tourism program based on 10 scenic driving trails originally created by TxDOT. This program operates throughout 10 regions of Texas and enables people to learn about, and be surrounded by, local customs, traditions, history, and culture of the different regions. The Study Area is located within the Texas Plains Region, which contains the Texas Plains Trail. This trail region stretches across 52 counties in the Panhandle of Texas and highlights the canyons, lakes, prairies, historic towns, and cultural and recreational opportunities of the region. Although the Study Area is located within the Texas Plains Region, none of the recommended cities or sites is located within the Study Area (THC, 2018).

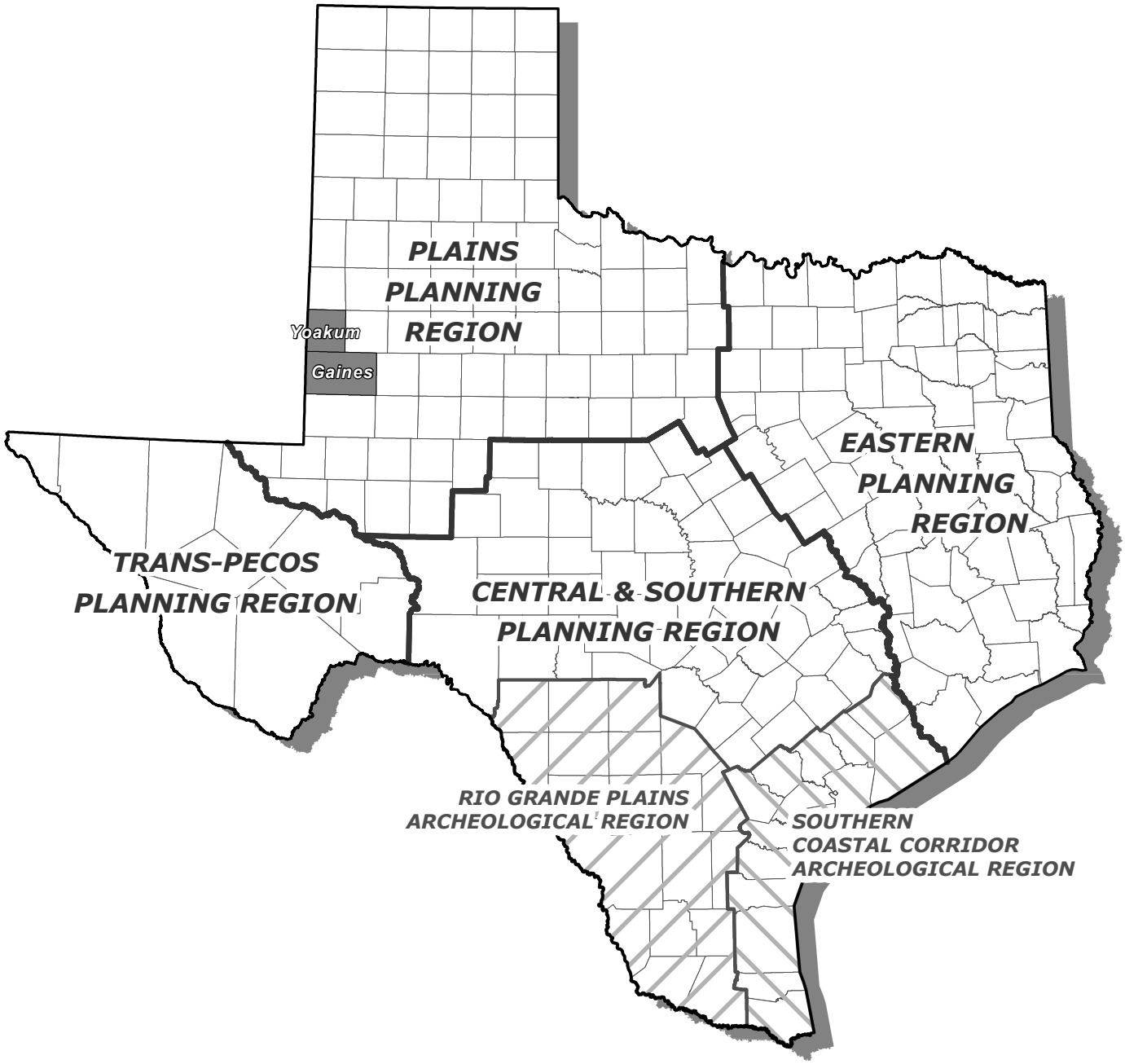
In 1998, TxDOT published a list of some of the best "Scenic Overlooks and Rest Areas" in Texas, each of which presented particularly strong aesthetic views or settings (TxDOT, 1998). A review of this list found that no highlighted scenic overlook or rest area is located within the Study Area. No other outstanding aesthetic resources, designated scenic views, or unique visual elements were identified from the literature review or from ground reconnaissance of the Study Area.

Based on these criteria, the Study Area generally exhibits a moderate degree of aesthetic quality for the region. The majority of the Study Area is cropland, categorized by a flat topography with very little to no woodland and no significant permanent waterbodies. Additionally, the landscape has experienced a high degree of alteration due to extensive agriculture, oil and gas development, transportation corridors, and existing electric transmission and distribution lines.

3.12 Cultural Resources

3.12.1 Cultural Setting

As shown on Figure 3-4, Gaines and Yoakum Counties are located in the Texas Plains Planning Region as delineated by the THC (Mercado-Allinger et al., 1996). Human occupation of the Texas Plains is divided chronologically into five cultural periods that span over 11,500 years: the Paleoindian, Archaic, Ceramic, Protohistoric, and Historic (Perttula, 2004; Johnson and Holliday, 2004). These divisions are



NORTH

100 50 0 100

Miles

BURNS McDONNELL

Figure 3-4
Location of the Study Area Counties in Relation to the Cultural Resources Planning Regions of Texas
Mustang to Seminole
115-kV Transmission Line Project

Source: Mercado-Allinger et al. (1996)

marked by shifts in subsistence strategies and technological innovations visible in the archeological record and through documented oral and written histories. The following sections present an overview of the region's cultural history and the associated archeological and historic resources that could potentially be located within the Study Area.

3.12.1.1 Paleoindian

Archeological evidence suggests that people first lived within the region around 12,000 years ago. This occupational phase is referred to as the Paleoindian period and extends from the end of the Pleistocene Epoch until the early Holocene. The phase can be subdivided further into Clovis (11,500 to 11,000 B.C.), Folsom (10,800 to 10,300 B.C.), and Late Paleoindian cultures, including Plainview (ca. 10,000 B.C.) and Firstview (ca. 8,600 B.C.) (Johnson and Holliday, 2004).

For decades, scholars commonly believed Paleoindian peoples traveled in highly mobile hunting and gathering bands living a nomadic lifestyle and exploiting, by choice, a limited number of resources. However, more recent archeological research at the Aubrey and Lubbock Lake sites outside of Dallas and Lubbock, respectively, has revealed evidence of a more diversified subsistence base that included small and medium mammals in addition to the more traditional large and megafauna. The Folsom culture is well represented at Lubbock Lake, and archeological investigations focusing on this period have provided evidence of increased reliance on extinct species of bison for subsistence as well as shifting lithic technologies (Carlson, 2005).

Following the decline of the Folsom cultural phase around 10,300 B.C., archeologists have identified a series of varied cultural groups distinguished according to a wide range of projectile point styles. Common Late Paleoindian points include Plainview and Firstview, but other points, some of which have contracting stems, were also developed. It appears that people relied upon a diverse diet including plants and small game as well as the continued exploitation of bison. Evidence of this subsistence strategy has been documented at the Lake Theo site in Briscoe County and at Lubbock Lake (Harrison and Killen, 1978; Johnson and Holliday, 2004).

3.12.1.2 Archaic

The start of the Archaic period (8000 to 2000 B.C.) coincides roughly with the start of the Hypsithermal climatic episode that resulted in an overall warmer and drier climate (Hofman, 1989; Kay, 1998). Consequently, a sudden extinction of megafauna populations forced peoples to exploit faunal resources in bottomland and forested areas (Johnson and Holliday, 2004). Changes in overall subsistence practices during the Archaic appear to have led to accompanying technological shifts. Stemmed (expanding and

contracting) and notched (corner and basal) projectile points began to be used, and hafting technologies changed. The lithic toolkit was also expanded to include groundstone tools for the first time such as manos, metates, and pestles.

During the Middle and Late Archaic period, a further expansion of the lithic toolkit appears to have occurred. Varieties of stemmed, corner-notched, and shallow side-notched projectile points became increasingly popular during this period, as did scrapers, perforators, drills, knives, grooved axes, bannerstones, and plummets. The Archaic culture relied heavily upon bison as an important food source along with other smaller game. An increase in groundstone tool use also occurred, including manos and pestles, a phenomenon that is believed to reflect further inclusion of seeds and nuts in people's diets (Blackmar and Hofman, 2006).

3.12.1.3 Ceramic

The Early Ceramic period (2000 to 1000 B.C.) appears to have been a transitional time for peoples living in the Texas Plains. Several new innovations, including pottery and the bow and arrow, were introduced. Additionally, limited evidence of horticulture and the presence of storage features suggest people continued a foraging lifestyle while moving toward a more sedentary existence (Johnson and Holliday, 2004). Typical cultural markers for this time period include thick, conoidal-shaped ceramic vessels and corner- and basally notched arrow points.

Diagnostic artifacts of the Early Ceramic include corner-notched and stemmed arrow points and brownware ceramics (Boyd, 2004). Excavations at the Kent and Sam Wahl sites in the Texas Panhandle suggest a continued foraging lifestyle with seasonal habitation sites and hunting and plant processing campsites. Excavated features include burials, hearths, pits, burned-rock features, and rectangular to oval pit houses.

During the Middle Ceramic period of the Texas Plains, people appear to have been primarily semi-sedentary horticulturists with semi-permanent to permanent residences. Artifact assemblages from this period include cord-marked pottery, diamond-shaped beveled knives, triangular projectile points, distal end scrapers, drills, bison bone digging sticks, and scapula hoes for practicing agriculture. It was during this period that the first widespread permanent villages appear to have been established, typically on ridges and terraces near perennial streams and arable land (Brosowske, 2005). Subsistence strategies included the harvesting of cultigens such as corn, squash, and beans, as well as hunting game and collecting edible wild plants. Bison continued to play a major role in people's diets (Brooks, 2004).

3.12.1.4 Protohistoric

Comanche, Cheyenne, and Kiowa dominated the region during the period of European contact (Hofman, 1989). Evidence from archeological excavations suggests people were primarily nomadic bison hunters with some sedentary camp settlements and limited horticulture. The Tierra Blanca site in Deaf Smith County contains some of the best evidence for protohistoric life on the Texas Plains. Features include tipi rings, stone foundations, open hearths, and a semi-subterranean, slab-lined circular structure (Hofman, 1989).

The Comanche moved into the Texas Plains region during the eighteenth century. Originally from the Great Basin region to the northwest, family bands and groups migrated south following the cultural incorporation of the European horse, which drastically changed the Comanche social, economic, and political structure (Wallace and Hoebel, 1952). The Comanche were highly mobile, followed the seasons, and came together to hunt bison. While groups of Lipan Apache, Kiowa, Cheyenne, Arapaho, and other surviving indigenous cultures continued to occupy the region during the eighteenth and nineteenth centuries, the Comanche dominated the Texas Plains during the Protohistoric period (Hofman, 1989).

3.12.1.5 Historic

The first known European in the region was Spanish missionary Fray Juan de Salas who crossed the region in 1632 on his second visit to the Jumano Indians (Leffler, 2016). As westward expansion occurred, conflicts between Europeans and Native Americans prompted the U.S. government to establish a series of frontier forts in the mid-nineteenth century. The Medicine Lodge Treaty of 1867 was created to mitigate conflict by establishing reservations in Oklahoma for the Comanche, Kiowa, Southern Cheyenne, and Arapaho. However, the treaty ultimately proved untenable for all involved due to the U.S. government's inability to honor the terms (Cruse and Mercado-Allinger, 2001). Conditions quickly deteriorated, and as a result, many fled the reservations and joined forces "with the renegade bands who had returned to the Texas Plains" (Cruse and Mercado-Allinger, 2001). Continual attacks on white settlements led to retaliation by the U.S. Army, culminating in what became known as the Red River War, which ended in 1875 (Cruse and Mercado-Allinger, 2001).

In 1876, the Texas legislature formed Gaines and Yoakum Counties from lands formerly assigned to the Bexar District. Gaines County was named for James Gaines, a merchant who signed the Texas Declaration of Independence. Yoakum County is named for Henderson King Yoakum, a lawyer, historian, politician, and Colonel of the Texas militia (Hunt, 2016; Leffler, 2016). Cattle ranching dominated the early economy and populations in both counties were very low. The 1880 census found only eight people living in Gaines County and only four in Yoakum County in 1890. In 1905 a store and

post office were established in Plains, and when Yoakum County was organized in 1907, Plains became the county seat. Gaines County was formally organized in 1905 and Seminole was designated as the county seat. A courthouse was built in the town in 1906 and a jail in 1907. Farming began to develop in the region after 1904, thanks to the sale of railroad land and the 1895 School Land Act, which gave settlers the right to purchase one section of agricultural land at 2 dollars an acre and three sections of grassland at 1 dollar an acre. By 1910, 107 farms or ranches were established in the area, with 206 farms or ranches and 1,255 residents in Gaines County and 602 residents in Yoakum County (Hunt, 2016; Leffler, 2016). Farmers grew corn, sorghum, cotton, and peaches.

Much of the area was devasted during the 1930s as they suffered through the effects of the Dust Bowl and the Great Depression. Some of the effects were offset by the discovery of oil in 1936 at Seminole Pool in Gaines County and in 1939 in Denver City in Yoakum County. During the oil boom the population of Gaines County reached 8,136 by 1940 and 5,345 in Yoakum County (Hunt, 2016; Leffler, 2016). Irrigation and mechanization expanded farming in the decades after World War II. Ranching, farming, and oil remain the backbone of the economy.

3.12.2 Literature and Records Review

Burns and McDonnell reviewed the Texas Archeological Sites Atlas (TASA) to identify previously conducted cultural resources investigations and previously recorded archeological sites and other designated non-archeological historic resources, including NRHP-listed properties and districts, Official Texas Historical Markers (OTHMs), including Recorded Texas Historic Landmarks (RTHLs), State Antiquities Landmarks (SALs), and historic-age cemeteries within the Study Area. Ten previous cultural resources investigations have been conducted within the Study Area. Eight of these surveys were for the PUC in 1997. The remaining two were in 1987 and 1990 for the EPA. No additional information about the surveys is listed in the TASA. No cultural resources have been identified within the Study Area.

4.0 ENVIRONMENTAL IMPACTS OF THE ALTERNATIVE ROUTES

The potential impacts to natural, human, and cultural resources resulting from the proposed Project are discussed below by discipline.

4.1 Impact on Natural Resources

4.1.1 Impact on Physiography and Geology

Construction of the proposed transmission line will have no significant effect on the physiographic or geologic features of the area. Erection of the structures would require the removal or minor disturbance of small amounts of near-surface materials but would have no measurable impact on the geologic or mineral resources or features in the Study Area.

4.1.2 Impact on Soils

The construction and operation of transmission lines normally create very few long-term adverse impacts on soils. Transmission lines do not normally cause a conversion of farmland because the site can still be used in this capacity after construction. The major potential impact upon soils from any transmission line construction would be erosion and soil compaction. The potential for soil erosion is generally greatest during the initial clearing of the ROW; however, SPS employs erosion control measures during the clearing and construction process. Where existing land cover includes woody vegetation within the ROW, much of this vegetation will be removed to provide adequate space for construction activities and to minimize corridor maintenance and operational problems. In these areas, only the leaf litter and a small amount of herbaceous vegetation would remain and both would be temporarily disturbed by the necessary movement of heavy equipment.

Construction of the transmission line would require minimal amounts of clearing in areas that have already been cleared for crops, pastures, and existing road, transmission line, and pipeline ROW. The most important factor in controlling soil erosion associated with construction activity is to revegetate areas that have potential erosion problems immediately following construction. Natural succession would revegetate the majority of the ROW. Impacts from soil erosion caused by construction activity should be minimized due to the implementation of BMPs designed in the SWPPP.

Prime farmland soils, as defined by the NRCS, are soils that are best suited for producing food, feed, forage, or fiber crops. The USDA recognizes the importance and vulnerability of prime farmlands throughout the nation and encourages the wise use and conservation of these soils where possible. Although the Project would not likely cross prime farmland soils, it would likely cross cropland. In

addition to construction-related impacts described above, the major impact of the Project on soils would be the physical occupation of small areas by the actual support structures. However, the majority of the ROW would be available for agricultural use once construction of the transmission line is completed.

4.1.3 Impact on Water Resources

4.1.3.1 Surface Water

Construction and operation of the transmission line would have minimal adverse impact on the surface water resources of the area. Potential impacts from any major construction project include short-term disturbances resulting from construction activities, which would result primarily from increased siltation from erosion and decreased water quality from accidental spillage of petroleum and other chemical products. Additionally, activities such as clearing of vegetation may temporarily increase local stormwater runoff volumes and sediment loading. Potential impacts would be avoided whenever possible by spanning surface waters if present, diverting construction traffic around water resources via existing roads, and eliminating unnecessary clearing of vegetation.

Although impacts would be avoided to the extent possible, some unavoidable impacts would occur. Paralleling existing ROW would minimize these impacts, as would reducing vegetation removal around surface water features and minimizing ground disturbance. The use of erosion control measures, such as silt fencing and selective clearing, and BMPs regarding the use of chemicals, would also minimize potential impacts. As such, impacts occurring from construction of the proposed transmission line would be short term and minor because of the relatively small area that would be disturbed at any given time, the short duration of the construction activities, the preservation of vegetation adjacent to surface water features, and the implementation by SPS of BMPs designated in the SWPPP.

The measurement of the various criteria used in the environmental analysis of the primary alternative routes for this Project is tabulated in Table 6-1 in Section 6.0 of this report. No named rivers are crossed by any alternative route; however, McKenzie Draw is crossed by all the alternative routes and an unnamed tributary of McKenzie Draw is crossed by several alternative routes. The number of stream crossings from one crossing (Routes A, H, and J) to five crossings (Route F). Additionally, two of the alternative routes (Routes B and D) parallel streams within 100 feet for approximately 114 feet (0.02 mile); however, no alternative route crosses open water. It should be noted that although Routes A and C cross a mapped playa lake adjacent to SH 214, this small feature was dry at the time of the field reconnaissance and also appeared dry during review of historic imagery, and thus not counted in the "open water" category.