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Control Number - 56799

Item Number - 2

STANDARD APPLICATION FOR A CERTIFICATE OF CONVENIENCE AND NECESSITY FOR A PROPOSED TRANSMISSION LINE

DOCKET NO. 56799

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

July 25, 2024

Standard Application for a Certificate of Convenience and Necessity for a Proposed Transmission Line
and
Application for a Certificate of Convenience and Necessity for a Proposed Transmission Line Pursuant To 16 TAC §25.174

Note: As used herein, the term "joint application" refers to an application for proposed transmission facilities for which ownership will be divided. All applications for such facilities should be filed jointly by the proposed owners of the facilities.

1. Applicant (Utility) Name:

For joint applications, provide all information for each applicant.

Applicant (Utility) Name:	Oncor Electric Delivery Company LLC ("Oncor")
Certificate Number:	30043
Street Address:	1616 Woodall Rodgers Freeway Dallas, Texas 75202
Mailing Address:	1616 Woodall Rodgers Freeway Dallas, Texas 75202-1234

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.

Oncor will hold the sole ownership interest in the Reiter Switch – Tesoro Switch 345 kilovolt ("kV") Transmission Line Project (the "Proposed Transmission Line Project").

3.	**Person to Contact:**	Christine Williams
	Title/Position:	Regulatory Senior Project Manager
	Phone Number:	(214) 486-5841
	Mailing Address:	1616 Woodall Rodgers Fwy, Suite 6A-014 Dallas, Texas 75202-1234
	Email Address:	Christine.Williams@oncor.com
3a.	**Alternate Contact:**	Thomas Yamin
	Title/Position:	Director of Regulatory, Transmission & Planning
	Phone Number:	(214) 486-3512
	Mailing Address:	1616 Woodall Rodgers Fwy, Suite 6B-005 Dallas, Texas 75202-1234
	Email Address:	Thomas.Yamin@oncor.com

3b. Legal Counsel: Jaren A. Taylor
Rachael L. Curtin
Phone Number: (214) 220-7754
Mailing Address: Vinson & Elkins LLP
Trammell Crow Center
2001 Ross Avenue, Suite 3900
Dallas, Texas 75201
Email Address: jarentaylor@velaw.com
rcurtin@velaw.com

Please contact Jaren Taylor with any inquiries regarding the project.

4. Project Description:

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.

If the project will be owned by more than one party, briefly explain the 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.).

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.

Name or Designation of Project:	Reiter Switch – Tesoro Switch 345 kV Transmission Line Project
Design Voltage Rating (kV):	345 kV
Operating Voltage Rating (kV):	345 kV
Normal Peak Operating Current (A):	5,138 A

The Proposed Transmission Line Project is a new, double-circuit 345 kV transmission line to be built on double-circuit lattice steel towers, between Oncor's planned Reiter Switch in Ector County and Oncor's existing Tesoro Switch in Midland County, both in Texas.[1] The Proposed Transmission Line Project is needed to address reliability issues

[1] The Reiter Switch is planned for construction prior to the estimated construction start date for, and independent of, the Proposed Transmission Line Project. A certificate amendment is not required under 16 TAC § 25.101(c)(2).

identified by the Electric Reliability Council of Texas ("ERCOT") and Oncor in the Permian Basin region of West Texas.

Reiter Switch will be a new station established in the existing Oncor Odessa EHV Switch to Moss Switch and Odessa EHV Switch to Wolf Switch 345 kV transmission line circuits. The portion of Oncor's fee-owned property upon which the Reiter Switch is to be constructed is located approximately 1.2 miles north of the intersection of State Highway ("SH") Loop 338 and Farm-to-Market Road ("FM") 3503, south of Odessa, Texas. The Tesoro Switch is located approximately 1.5 miles southeast of the intersection of Interstate Highway ("IH") 20 and SH Loop 338, near Odessa, Texas.

The length of the Proposed Transmission Line Project is approximately 4.0 to 5.2 miles, depending on which route is selected by the Public Utility Commission of Texas ("PUC" or "Commission").

The Proposed Transmission Line Project includes modifications to the 345 kV switchyard at the existing Tesoro Switch. The 345 kV switchyard at the Tesoro Switch is currently in operation. The 345 kV switchyard at Reiter Switch is planned to be in operation prior to the estimated construction start date for the Proposed Transmission Line Project. Minimal work is needed to terminate the Proposed Transmission Line Project at the planned Reiter Switch.

5. Conductor and Structures:

Conductor Size and Type:	1926.9 kcmil Aluminum Conductor Steel Supported Trapezoidal-Shaped Wire ("ACSS/TW")
Number of conductors per phase:	2
Continuous Summer Static Current Rating (A):	5,138 A
Continuous Summer Static Line Capacity at Operating Voltage (MVA):	3,070 MVA
Continuous Summer Static Line Capacity at Design Voltage (MVA):	3,070 MVA
Type and composition of Structures:	Double-Circuit Lattice Steel Tower
Height of Typical Structures:	120 feet*
Estimated Maximum Height of Structures:	180 feet*

* This number reflects the approximate visible height of the structure from ground to structure top, which may vary depending on terrain and other engineering constraints.

Explain why these structures were selected; include such factors as landowner preference, engineering considerations, and costs comparisons to alternate structures that were considered.

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

Oncor selected the double-circuit 345 kV self-supporting lattice steel towers for numerous reasons including costs, technical specifications, structure footprint, right-of-way ("ROW") requirements, the specific characteristics of the study area, and other engineering-related reasons. This structure type is Oncor's current standard for new single- and double-circuit 345 kV construction.

Provide dimensional drawings of the typical structures to be used in the project.

A dimensional drawing of the typical tangent structure is shown in Figure 1-2, page 1-7, of the *Environmental Assessment and Alternative Route Analysis for the Proposed Reiter Switch – Tesoro Switch 345 kV Transmission Line Project in Ector and Midland Counties, Texas* ("Environmental Assessment and Routing Study"), prepared by Halff Associates, Inc. ("Halff") and included as Attachment No. 1.

6. Right-of-way:

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.

Miles of Right-of-Way:	Approximately 4.0 to 5.2 miles
Miles of Circuit:	Approximately 8.0 to 11.0 miles
Width of Right-of-Way:	Approximately 160 feet
Percent of Right-of-Way Acquired:	6.1% to 10.6%*

* Oncor has acquired ROW for portions of alternative routes within the boundaries of its Reiter Switch fee-owned property and its Tesoro Switch perpetual easement. Please refer to Tables 5-2 and 5-3 in the Environmental Assessment and Routing Study, included as Attachment No. 1, and the Routing Memorandum Map in Attachment No. 10 for additional details on the extent to which proposed routing alternatives utilize existing Oncor ROW.

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 situated within Ector and Midland counties, with the City of Odessa extending into the northwest portion of the study area. No unincorporated towns or communities are located within the study area. Most of the study area consists of rural, undeveloped land used primarily for oil and gas production or livestock grazing. The topography of the study area is gently rolling, with several unnamed stream features that generally drain to the northeast.

Residential development is represented by two isolated developments located along Bates Field Road (also known as Ector County Road ["CR"] 1285) and Midland CR 171.

Commercial developments are generally associated with the City of Odessa in the northwestern corner of the study area. Development in the central portion of the study area is associated with oil and gas production.

Specific discussion regarding natural, human, and cultural resources in the study area is set forth in Sections 3.1 through 3.8, pages 3-1 through 3-68, of the Environmental Assessment and Routing Study, included as Attachment No. 1.

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.

Tesoro Switch

The existing Tesoro Switch is an Oncor-owned switching station located approximately 1.5 miles southeast of the intersection of IH-20 and SH Loop 338 near Odessa, Texas. The dimensions of the existing Tesoro Switch are approximately 1,250 feet by 700 feet. Construction of the Proposed Transmission Line Project will not change the current dimensions of the Tesoro Switch.

Relay panels, a supervisory control and data acquisition ("SCADA") system, and controls for the existing 138 kV switchyard equipment are housed in a dedicated control center. The existing 138 kV switchyard is a 12-breaker, breaker-and-a-half bus arrangement with capacity for future expansion. Ultimately, the layout can be expanded to accommodate additional 138 kV terminals with an 18-breaker, 138 kV breaker-and-a-half bus arrangement.

Relay panels, a SCADA system, and controls for the existing 345 kV switchyard equipment are housed in a dedicated control center. The existing 345 kV switchyard is a 10-breaker, breaker-and-a-half bus arrangement with two 345/138 kV autotransformers and two 37.5 MVAR reactors on the tertiary of each autotransformer and capacity for future expansion. The Proposed Transmission Line Project will add four new 345 kV breakers, in a breaker-and-a-half arrangement, and related controls within the footprint of the existing 345 kV switchyard. Ultimately, the layout can be expanded to accommodate additional 345 kV terminals with an 18-breaker, 345 kV breaker-and-a-half bus arrangement.

The dimensions and additional details of the Tesoro Switch are provided in Attachment No. 2-A.

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.

Reiter Switch

Oncor's planned Reiter Switch will be a 345/138 kV switchyard constructed to terminate the Proposed Transmission Line Project on Oncor-owned property located approximately 1.2 miles north of the intersection of SH Loop 338 and FM 3503, south of Odessa, Texas. Reiter Switch will be built adjacent to Oncor's existing Odessa EHV Switch to Moss Switch and Odessa EHV Switch to Wolf Switch 345 kV circuits. These circuits will terminate into the Reiter Switch 345 kV switchyard prior to construction of the Proposed Transmission Line Project.

The dimensions of the Reiter Switch's 345/138 kV switchyard will be approximately 1,600 feet by 750 feet. At the start of construction for the Proposed Transmission Line Project, Reiter Switch will include a 138 kV 13-breaker, breaker-and-a-half bus arrangement, a 345 kV 16-breaker, breaker-and-a-half bus arrangement with two 345/138 kV autotransformers and two 37.5 MVAR reactors on the tertiary of each autotransformer. Relay panels, a SCADA system, and controls for the switchyard equipment will be housed in two dedicated control centers. Ultimately, the layout can be expanded to accommodate additional 138 kV terminals with an 18-breaker, 138 kV breaker-and-a-half bus arrangement with shunt reactive equipment and additional 345 kV terminals with a 24-breaker, 345 kV breaker-and-a-half bus arrangement.

The Proposed Transmission Line Project will connect to two of the 16 initial 345 kV breakers in a breaker-and-a-half bus arrangement and related controls within the footprint of the planned 345 kV switchyard.

The dimensions and additional details regarding the planned layout of the Reiter Switch are provided in Attachment No. 2-B.

8. Estimated Schedule:

[*The remainder of this page is intentionally left blank. The table begins on the following page.*]

Estimated Dates of:	Start[1]	Completion[1]
Right-of-way and Land Acquisition	02/2025	12/2026
Engineering and Design	03/2025	04/2026
Material and Equipment Procurement	07/2025	07/2026
Construction of Facilities	07/2026	12/2026
Energize Facilities	-	12/2026

[1] Estimated schedule is based on a 180-day CCN process and numerous other factors. The estimated construction schedule should not in any way be considered a representation, promise, or guarantee.

9. Counties:

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

All of the proposed alternative routes have portions within both Ector and Midland counties.

10. Municipalities:

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

The proposed route will not traverse any 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.

Evidence of consent for service in this area is publicly available and previously filed in PUC Docket Nos. 24 (Ector County) and 53 (Midland County).

11. Affected Utilities:

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

No other electric utility will be served by or connected to the Proposed Transmission Line Project.

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.

No other electric utility will be involved in the construction of the Proposed Transmission Line Project, and no other electric utility's existing facilities will be utilized for the Proposed Transmission Line Project.

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.

Oncor proposes to finance the facilities included in the Proposed Transmission Line Project with a combination of debt and equity in compliance with its authorized capital structure, which is similar to the means used for previous construction projects. Oncor plans to utilize internally generated funds (equity) and proceeds received from the issuance of securities. Oncor will typically obtain short-term borrowings as needed for interim financing of its construction expenditures in excess of funds generated internally. These borrowings are then repaid through the issuance of long-term debt securities, the type and amount of which are as of yet undetermined.

Oncor is the sole applicant. No other party will be reimbursed for any portion of the Proposed Transmission Line Project.

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.

[*The remainder of this page is intentionally left blank. The table begins on the following page.*]

	Transmission Facilities[1]	Substation Facilities	
		Reiter Switch[2]	Tesoro Switch[3]
Right-of-way and Land Acquisition	*	$ -	$ -
Engineering and Design (Utility)	*	$ -	$ 156,000
Engineering and Design (Contract)	*	$ -	$ 190,000
Procurement of Material and Equipment (including stores)	*	$ -	$ 3,094,000
Construction of Facilities (Utility)	*	$ -	$ -
Construction of Facilities (Contract)	*	$ -	$ 1,985,000
Other (all costs not included in the above categories)	*	$ -	$ -
Estimated Total Cost	*	$ -	**$ 5,425,000**

[1] Refer to Attachment No. 3 for cost estimates for each alternative route presented in the Application.
[2] The cost for the minimal work needed to terminate the Proposed Transmission Line Project at the planned Reiter Switch is included in the transmission line cost category. Costs associated with the establishment of the switch and termination of the existing 345 kV circuits will be captured in a separate project.
[3] Estimates for Tesoro Switch station costs include a four-breaker, breaker-and-a-half expansion of the 345 kV switchyard and associated controls to connect the Proposed Transmission Line Project. Relay panels and controls for the 345 kV switchyard equipment will be housed in a control center.

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 Transmission Line Project will expand and upgrade Oncor's transmission system in West Texas to address reliability issues. Load growth, load integration requests, and the age of existing facilities all contribute to the Proposed Transmission Line Project's need. The following table shows historical and projected load in the project area:

YEAR	2022	2023	2024	2025	2026	2027	2028
LOAD (MW)	5,824	6,476	8,480	10,139	11,119	11,595	11,993

In December 2021, ERCOT completed the Permian Basin Load Interconnection Study Report ("Permian Basin Study"), included as Attachment No. 4. The Permian Basin Study identified transmission upgrades necessary to reliably serve the existing and projected oil and gas loads in the Permian Basin area. The Permian Basin Study includes Oncor's Proposed Transmission Line Project to resolve an overload condition on the Odessa EHV 345/138 kV autotransformer identified in the 2025 and 2030 cases that were studied by ERCOT.

Additionally, the Proposed Transmission Line Project is included in Oncor's West Texas 345 kV Infrastructure Rebuild Project, which was submitted to ERCOT's Regional Planning Group on November 3, 2023 ("RPG Submittal"), included as Attachment No. 5. The RPG Submittal recommends the Proposed Transmission Line Project and identifies the need for an in-service date by the summer of 2028. In May 2024, ERCOT issued its Independent Review of the RPG Submittal ("Independent Review"), included as Attachment No. 6. Using ERCOT's previous Permian Basin Study as its foundation, ERCOT's Independent Review found that the Proposed Transmission Line Project is needed for the reliability of the ERCOT transmission system and recommended that the project be in-service by the summer of 2028. On June 18, 2024, ERCOT's Board of Directors formally endorsed the West Texas 345 kV Infrastructure Rebuild Project, including the Proposed Transmission Line Project, as a Tier 1 project under 16 Texas Administrative Code ("TAC") § 25.101(b)(3)(D). A letter with the meeting minutes memorializing this approval is included as Attachment No. 7.

The Permian Basin area lacks the transmission facilities necessary to address the substantial load growth it is experiencing. Without the Proposed Transmission Line Project, capacity would not exist to further serve anticipated oil and gas development and load in the general project area. Without transmission system upgrades, the continuation of this load growth will increase the likelihood of reliability issues rises. ERCOT's Permian Basin Study identified the Proposed Transmission Line Project as necessary by the summer of 2028 to resolve potential thermal overload violations during an N-1 condition—that is, the unexpected failure or outage of a transmission system

component—relating to certain North American Electric Reliability Corporation ("NERC") Category P7 contingencies. Under NERC Reliability Standard TPL-001-5.1, with certain exceptions, a Category P7 contingency includes the loss of any two (vertically or horizontally) adjacent circuits on a common structure. The Proposed Transmission Line Project will address these potential NERC Reliability Standard violations.

The Proposed Transmission Line Project will result in improvements such as: (1) providing increased operational flexibility during emergency conditions; (2) enhancing voltage support in the Permian Basin by creating a more-integrated 345 kV transmission system; (3) providing transformer redundancy in the area; and (4) allowing for future expansion in the project area.

The Proposed Transmission Line Project will address reliability violations under NERC Reliability Standards and improve the transmission system's import capability to support future load growth in the area. This will improve service for new and existing customers as swift economic expansion occurs in the Permian Basin area.

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 Permian Basin Load Interconnection Study recommended the Proposed Transmission Line Project as part of the preferred reliability upgrades identified by the study. The study evaluated three alternatives to the Proposed Transmission Line Project. Two of the alternatives were found not to perform as well as the Proposed Transmission Line Project while the third alternative would be more costly.

Distribution alternatives to the Proposed Transmission Line Project would not resolve the identified reliability issues on the transmission system or address the large loads and generation seeking interconnection at transmission level voltage. Adding transformers or upgrading voltage or bundling conductors for existing facilities would also fail to address the identified reliability issues or provide the necessary level of service to meet electric demand in the area.

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.

A schematic of the transmission system in the proximate area of the Proposed Transmission Line Project is shown in Attachment No. 8. The location and voltage of existing transmission lines, substations, taps, ties, meter points, and other facilities involving electric utilities in relation to the Proposed Transmission Line Project are included in the map provided as Attachment No. 9. A map outlining the study area can be found in Figure 3-1 of the Environmental Assessment and Routing Study (Appendix D), included as Attachment No. 1.

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.

Oncor retained Halff to prepare the Environmental Assessment and Routing Study. The objective of the Environmental Assessment and Routing Study was to provide information in support of this Application in addressing the requirements of PURA § 37.056(c)(4)(A)-(D) of the Texas Utilities Code, the PUC CCN Application form, and 16 TAC § 25.101 as they apply to the Proposed Transmission Line Project.

By examining existing environmental conditions, including the human and natural resources that are located in the study area, the Environmental Assessment and Routing Study appraises the environmental effects of construction, operation, and maintenance of the Proposed Transmission Line Project. The Environmental Assessment and Routing Study may also be used in support of any additional local, state, or federal permitting activities that may be required for the Proposed Transmission Line Project.

To assist Halff in its evaluation, Oncor provided information regarding the project endpoints, need for the project, engineering and design requirements, construction practices, and ROW requirements.

After considering environmental and geographical data, Halff defined a study area that encompassed the provided endpoints with a sufficient area to identify a diverse set of potential routing alternatives. Refer to Section 3.0 of the Environmental Assessment and Routing Study, included as Attachment No. 1, for a discussion of the study area. Routing constraints were identified after collection of area data from many sources (*e.g.*, governmental agencies, evaluation of aerial photography) and consideration of the criteria established in PURA § 37.056(c)(4)(A)-(D), the PUC CCN Application form, and 16 TAC § 25.101.

Potential line segments were identified by evaluating the constraints mapped within the study area and then developing potential pathways, such as existing corridors and other

linear features where constraints were minimal. Corridors were identified and developed into potentially viable routes. Potential impacts to both the human and natural environment were evaluated by Halff for each identified preliminary alternative route.

Oncor then evaluated the alternative routes and selected Route 10 as the route that best addresses the requirements of PURA § 37.056(c)(4)(A)-(D) and 16 TAC § 25.101.

Specific discussion regarding selection of a study area, identification of constraints, selection of potential line segments, and alternative route analysis is set forth in the Environmental Assessment and Routing Study. Specific discussion regarding the evaluation and selection of routes filed with the Application and the route that Oncor believes best complies with the requirements of PURA and the PUC's Substantive Rules is contained in an office memorandum from Amy L. Zapletal (included as Attachment No. 10).

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.

The Proposed Transmission Line Project, including both endpoints, traverses property owned by seven (7) landowners, including Oncor. Oncor did not hold a public meeting because the prerequisites for public meetings under 16 TAC § 22.52 were not met.

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).

A one inch = 1,500 feet map is included as Figure 3-1 in Appendix D of the Environmental Assessment and Routing Study included as Attachment No. 1. This base map includes sufficient cultural and natural features to identify the location of all routes

in the field. This figure delineates the study area, routing constraints, and all routes and route links considered in the selection of routes. This map also depicts the approximate locations of electronic installations (such as radio transmitters), airstrips, irrigated pasture or cropland, parks and recreational areas, historical and archeological sites, and environmentally sensitive areas, such as wetlands, if any. Figure 3-1 in Appendix D also identifies existing transmission facilities in the area of the Proposed Transmission Line Project, including taps, ties, meter points, or other utility facilities, as applicable.

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 3-1 in Appendix D of the Environmental Assessment and Routing Study, included as Attachment No. 1, depicts on an aerial photograph, as applicable: (1) the location of each link that is used in the alternative routes filed in this CCN Application, with each link identified; (2) the locations of all major public roads, including all federal and state roadways; (3) the locations of all known habitable structures on properties directly affected by any link used in the alternative routes, if any; and (4) the boundaries (approximate or estimated according to best available county tax information) of all properties directly affected by any link used in an alternative route. In addition, the locations of radio transmitters and other electronic installations, airstrips, irrigated pasture or cropland, parks and recreational areas, historical and archeological sites, and any environmentally sensitive areas, such as wetlands, if any, are depicted.

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.

Attachment No. 11 includes a table that cross-references each directly affected property identified in Figure 3-1 in Appendix D of the Environmental Assessment and Routing Study; the cross-reference table includes corresponding landowner names and addresses. No known habitable structures were identified within 500 feet of the centerline of any proposed alternative route.

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.

The following permits/approvals and related actions will be obtained/taken after PUC approval of the CCN and prior to beginning construction, if necessary:

1. Texas Department of Transportation ("TxDOT") permit(s) for crossing a state-maintained roadway, if any.
2. A Storm Water Pollution Prevention Plan ("SWPPP") will be prepared and a Notice of Intent will be submitted to the Texas Commission on Environmental Quality under the Texas Pollutant Discharge Elimination System ("TPDES") program.
3. A cultural resources survey plan will be developed with the Texas Historical Commission ("THC") for the proposed project.
4. Consultation with the U.S. Army Corps of Engineers will occur following the Commission's approval of this Application to determine appropriate requirements under Section 404/Section 10 Permit criteria.
5. Consultation with the U.S. Fish and Wildlife Service will occur following the Commission's approval of this Application to determine appropriate requirements under the Endangered Species Act.
6. Consultation with the Federal Aviation Administration ("FAA") will occur following the Commission's approval of this Application to determine appropriate requirements and notification under Federal Aviation Regulations (14 CFR Part 77).
7. Texas General Land Office miscellaneous easement(s) for crossing riverbeds, navigable streams, or other properties involving State property interests.

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 230kV or less, or within 500 feet of the centerline if the proposed project will be constructed for operation at greater than 230kV. 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.

As depicted on Figure 3-1 in Appendix D of the Environmental Assessment and Routing Study, included as Attachment No. 1, no habitable structures are located within 500 feet of any route links used in the proposed alternative routes.

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.

There are no known AM radio transmitters located within 10,000 feet of the centerline of any of the alternative route links and no known FM radio transmitters located within 2,000 feet of the centerline of any of the alternative route links.

One communication tower is located within 2,000 feet of the centerline of the filed alternative routes. This communication tower ("Tower 1") is located east of SH Loop 338 and is depicted on Figure 3-1 in Appendix D of the Environmental Assessment and Routing Study, included as Attachment No. 1. A general description of Tower 1 and its distance from the centerline of proposed alternative route links is provided in the table below.

Facility ID	Installation Type	Licensee	Link	Distance (ft)	Direction to Link
THERE ARE NO AM RADIO TRANSMITTERS WITHIN 10,000 FEET OF ROUTES					
Facility ID	**Installation Type**	**Licensee**	**Link**	**Distance (ft)**	**Direction to Link**
THERE ARE NO FM RADIO TRANSMITTERS WITHIN 2,000 FEET OF ROUTES					
Facility ID	**Installation Type**	**Licensee**	**Link**	**Distance (ft)**	**Direction to Link**
OTHER ELECTRONIC INSTALLATIONS WITHIN 2,000 FEET OF ROUTE LINKS					
Tower 1	Unknown	Unknown	B4	1,930	Southwest
			C2	1,930	Southwest
			D3	610	South
			E3	740	Southeast
			E4	420	East
			F4	740	Southeast

Please refer to Section 3.7.7, page 3-60; Section 5.7.7, page 5-16; and Tables 5-2 and 5-3, Appendix C, of the Environmental Assessment and Routing Study, included as Attachment No. 1.

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.

Halff's review of federal and state aviation/airport maps and directories, aerial photo interpretation, and reconnaissance survey identified: (1) no FAA-registered airport with a runway greater than 3,200 feet in length within 20,000 feet of the proposed routes; (2) no FAA-registered airport without a runway greater than 3,200 feet in length within 10,000 feet of the proposed routes; (3) no heliport within 5,000 feet of the proposed routes; and (4) no private airstrip within 10,000 feet of the proposed routes.

Please refer to Section 3.7.6, pages 3-59 and 3-60; Section 5.7.6, page 5-15; and Tables 5-2 and 5-3, Appendix C, of the Environmental Assessment and Routing Study, included as Attachment No. 1.

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.

Results of aerial photography interpretation and a field reconnaissance survey did not identify any agricultural land irrigated by traveling irrigation systems (rolling or pivot type) that will be traversed by any of the alternative routes of the Proposed Transmission Line Project.

Please refer to Section 3.7.3, pages 3-57 and 3-58; Section 5.7.3, page 5-13; and Tables 5-2 and 5-3, Appendix C, of the Environmental Assessment and Routing Study, included as Attachment No. 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.

A copy of the written direct notice, with attached map, that will be provided via first-class mail to the owners of land that will be "directly affected" by the Proposed Transmission Line Project, as that term is used in 16 TAC § 22.52(a)(3), is included as Attachment No. 12. The names and addresses of the directly affected landowners to whom notice will be mailed via first-class mail are included in Attachment No. 11. The list of owners of directly affected land in Attachment No. 11 consists of landowner data obtained via the tax offices and the appraisal districts for Ector and Midland counties.

No notice is required under Texas Utilities Code § 37.054(c) because Oncor is not requesting approval to build a new load serving substation in this application.

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

A copy of the written direct notice, with attached map, that will be provided to utilities that are located within five miles of the routes is included as Attachment No. 13. The following utilities will be provided the requisite notice on or before the filing date as required by Commission rules:

Garland Power & Light
Lower Colorado River Authority
Wind Energy Transmission Texas, LLC

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/.

A representative copy of the written notice, with attached map, that will be provided to county authorities is included as Attachment No. 13. The following county authorities will be provided the requisite notice on or before the Application filing date, as required by Commission rules:

Ector County, County Judge
Ector County, County Commissioners – Precincts 1, 2, 3, and 4
Midland County, County Judge
Midland County, County Commissioners – Precincts 1, 2, 3, and 4

A representative copy of the written notice, with attached map, that will be provided to municipal authorities is included as Attachment No. 13. The following municipal authorities will be provided the requisite notice on or before the filing date, as required by Commission rules:

City of Odessa, Mayor
City of Odessa, Council Members – Districts 1, 2, 3, 4, 5, and At-Large
City of Midland, Mayor
City of Midland, Council Members – Districts 1, 2, 3, 4, and At-Large

A representative copy of the written notice, with attached route description and map, that will be provided to the Department of Defense Military Aviation and Installation Siting Clearinghouse by email at osd.dod-siting-clearinghouse@mail.mil, and by first-class mail to the address below on the date this Application is filed, is included as Attachment No. 13.

DOD Military Aviation and Installation Assurance Siting Clearinghouse
3400 Defense Pentagon, Room 5C646
Washington, DC 20301-3400

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.

Notice for this Application will be published in the *Odessa American* and in the *Midland Reporter-Telegram*, newspapers of general circulation in Ector and Midland counties, respectively. A representative copy of the general public notice to be published is included as Attachment No. 14.

Proof of publication will be provided in the form of a publisher's affidavit and tear sheet following publication of this notice.

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 notices, Applicant may take into consideration any comments made by Commission staff before the notices are published or sent by mail.

Not applicable.

A copy of the Application and all attachments will be provided to the Texas Office of Public Utility Counsel ("OPUC"). A representative copy of the written notice, with

attached route description and map, that will be provided to OPUC is included as Attachment No. 13.

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.

A review of federal, state, and local websites and maps, as well as a field reconnaissance survey, identified no parks or recreational areas owned by a government body or an organized group, club, or church located were identified within 1,000 feet of the centerline of any alternative route for the Proposed Transmission Line Project.

Please refer to Section 3.7.2, page 3-57; Section 5.7.2, page 5-13; and Tables 5-2 and 5-3, Appendix C, of the Environmental Assessment and Routing Study, included as Attachment No. 1.

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.

Research and a records review of the Texas Historic Commission ("THC") Historic Sites Atlas and the THC Archaeological Sites Atlas were conducted to locate known cultural resources within 1,000 feet of any alternative route centerline for the proposed project. THC records indicated no known historical or archeological sites within 1,000 feet of the centerline of any route for the Proposed Transmission Line Project. THC records indicated no National Register of Historic Places listings, State Antiquities Landmarks, or cemeteries recorded within 1,000 feet of the proposed route centerline.

Please refer to Section 3.8, pages 3-60 through 3-68; Section 5.8, pages 5-16 through 5-21; and Tables 5-2 and 5-3, Appendix C, of the Environmental Assessment and Routing Study, included as Attachment No. 1.

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 Transmission Line Project is not located, either in whole or in part, within the coastal management program boundary as defined in 31 TAC § 27.1 (formerly 31 TAC § 503.1).

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.

The Environmental Assessment and Routing Study prepared by Halff is included as Attachment No. 1.

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 Environmental Assessment and Routing Study and Application will be provided to the Texas Parks and Wildlife Department ("TPWD") for review within seven days following the filing of the Application for the Proposed Transmission Line Project. Please refer to Attachment No. 17 for a copy of the transmittal letter with which the Environmental Assessment and Routing Study and Application will be sent to the TPWD.

30. Affidavit

Attach a sworn affidavit from a qualified individual authorized by the applicant to verify and affirm that, to the best of their knowledge, all information provided, statements made, and matters set forth in this application and attachments are true and correct.

31. List of Attachments to the CCN Application

Attachment No. 1:	Environmental Assessment and Alternative Route Analysis
Attachment No. 2-A:	Preliminary Layout — Tesoro Switch with the Proposed Transmission Line Project Connection
Attachment No. 2-B:	Preliminary Layout — Reiter Switch with the Proposed Transmission Line Project Connection
Attachment No. 3:	Cost Estimates
Attachment No. 4:	ERCOT's Permian Basin Load Interconnection Study Report (December 2021)
Attachment No. 5:	ERCOT RPG Submittal for Oncor's West Texas 345 kV Infrastructure Rebuild Project (November 3, 2023)
Attachment No. 6:	ERCOT Independent Review of Oncor's West Texas 345 kV Infrastructure Rebuild Project (May 16, 2024)
Attachment No. 7:	ERCOT's Board of Directors Meeting Minutes Memorializing Approval for Oncor's West Texas 345 kV Infrastructure Rebuild Project (June 18, 2024)
Attachment No. 8:	Schematic of Transmission System in Proximate Area of Project
Attachment No. 9:	Transmission Area Map in Project Area
Attachment No. 10:	Routing Memorandum of Amy L. Zapletal
Attachment No. 11:	List of Directly Affected Landowners for Notice and Recipients of Courtesy Notice to Pipeline Owners/Operators
Attachment No. 12:	Copy of Notice to Directly Affected Landowners
Attachment No. 13:	Copy of Notice to Utilities, Counties, OPUC, Municipalities, and Department of Defense Military Aviation and Installation Siting Clearinghouse
Attachment No. 14:	Copy of Newspaper/Public Notice
Attachment No. 15:	Copy of Courtesy Notice to Pipeline Owners/Operators
Attachment No. 16:	Transmittal Letter to TPWD
Attachment No. 17:	Affidavit

ENVIRONMENTAL ASSESSMENT AND ALTERNATIVE ROUTE ANALYSIS

for the proposed

Reiter Switch — Tesoro Switch 345 kV Transmission Line Project in Ector and Midland Counties, Texas

Prepared for

Oncor Electric Delivery Company LLC
1616 Woodall Rodgers Freeway
Dallas, Texas 75202-1234

Prepared by

1201 North Bowser Road
Richardson, Texas 75081-2275

JULY 2024

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Acronyms and Abbreviations

amsl	Above mean sea level
AD	*anno Domini* (after Christ)
APLIC	Avian Power Line Interaction Committee
BEG	Bureau of Economic Geology
BMP	Best Management Practice
BP	Before present
C	Candidate species
ca.	*circa* (approximately)
CCN	Certificate of Convenience and Necessity
CFR	Code of Federal Regulations
CNAH	Center for North American Herpetology
Cornell	Cornell Lab of Ornithology
CR	County Road (e.g., CR 171)
DM	Delisted, Monitored, or Recovered Species
DoD	Department of Defense
E	State Listed Endangered Species
EA	Environmental Assessment
e.g.	*exempli gratia* (for example)
EMST	Ecological Mapping Systems of Texas
EOID	Element Occurrence Identification
EPA	U.S. Environmental Protection Agency
EPRI	Electric Power Research Institute
ESA	Endangered Species Act
et al.	*et alia* (and others)
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FM	Farm-to-Market Road (e.g., FM 3503)
FPPA	Farmland Protection Policy Act
GIS	Geographic Information System
GLO	Texas General Land Office
HIFLD	Homeland Infrastructure Foundation-Level Data
HPA	High Probability Area
i.e.	*id est* (that is)
IH	Interstate Highway (e.g., IH 20)
Integra	Integra Realty Resources
ISD	Independent School District
IUCN	International Union for Conservation of Nature and Natural Resources
kV	kilovolt (1,000 Volts)
LRR	Land Resource Region
LT	Federally Listed Threatened Species
LWCF	Land and Water Conservation Fund Act
MBTA	Migratory Bird Treaty Act
MLRA	Major Land Resource Area

Acronyms and Abbreviations – Continued

NDD	Natural Diversity Database
NCED	National Conservation Easement Database
NETR	Nationwide Environmental Title Research
NGS	National Geographic Society
NHD	National Hydrography Dataset
NRCS	Natural Resources Conservation Service (an agency of the USDA)
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWP	Nationwide Permit
Oncor	Oncor Electric Delivery Company LLC
OTHM	Official Texas Historical Markers
PCN	Pre-construction Notification
PE	Proposed Endangered
PUCT	Public Utility Commission of Texas
ROW	Right-of-Way
RRC	Railroad Commission of Texas
SAL	State Antiquities Landmark
SCS	Soil Conservation Service (agency was renamed NRCS, see above)
Section 404	Section 404 of the Clean Water Act
SGCN	Species of Greatest Conservation Need
spp.	Species (plural)
ssp.	Subspecies
SWPPP	Storm Water Pollution Prevention Plan
T	State Listed Threatened Species
TAC	Texas Administrative Code
TARL	Texas Archeological Research Laboratory
TASA	Texas Archeological Sites Atlas
TDA	Texas Department of Agriculture
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
TLC	Texas Land Conservancy
TNRIS	Texas Natural Resource Information System
TPWD	Texas Parks and Wildlife Department
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
U.S.	United States
US	United States Highway (e.g., US 277)
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USNPS	United States National Park Service
var.	Variation
3DHP	USGS 3D National Hydrography Program

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1.0 PROJECT DESCRIPTION

1.1 Scope of the Project

Oncor Electric Delivery Company LLC (Oncor) proposes to construct a double-circuit 345 kilovolt (kV) transmission line between Oncor's planned Reiter Switch in Ector County, Texas, and Oncor's existing Tesoro Switch in Midland County, Texas. The planned Reiter Switch property is located approximately 1.2 miles north of the intersection of Loop 338 and Farm-to-Market Road (FM) 3503. The existing Tesoro Switch property is located approximately 1.5 miles southeast of the intersection of Interstate Highway (IH) 20 and Loop 338 near Odessa, Texas. The proposed transmission line project will be approximately 4-5 miles in length. Each of these project endpoints is shown relative to local road network and county boundaries on **Figure 1-1**.

Oncor retained Halff to identify and evaluate alternative routes and prepare an Environmental Assessment (EA) and Alternative Route Analysis report to support Oncor's application for a Certificate of Convenience and Necessity (CCN). This report has been prepared to provide information and address the requirements of Section 37.056(c)(4)(A)-(D) of the Texas Utilities Code, Public Utility Commission of Texas (PUCT) Procedural Rules Section 22.52(a)(4), PUCT Substantive Rules Section 25.101, and the PUCT CCN application form for a proposed transmission line. This report may also be used in support of local, state, or federal permitting activities that may be required for the proposed project.

To assist Halff in the evaluation of the proposed project, Oncor provided Halff with information regarding the need, construction practices, and right-of-way (ROW) requirements for the proposed project. Oncor also provided information regarding the engineering and design requirements for the routing study.

The following sections include a description of the proposed project (**Section 1.0**), an explanation of the methodology used to select alternative routes (**Section 2.0**), a description of the existing environmental and social conditions in the study area (**Section 3.0**), and a description of the preliminary alternative routes that were developed by this process (**Section 4.0**). An evaluation of expected environmental impacts is presented in (**Section 5.0**), followed by a list of report preparers (**Section 6.0**), and bibliographical references used in preparing this report (**Section 7.0**). The appendices include copies of

agency correspondence (**Appendix A**), link composition of alternative routes (**Appendix B**), alternative route and link environmental data (**Appendix C**), and an environmental and land use constraints map (**Appendix D**).

1.2 Need for the Project

Oncor will provide support for the purpose and need for the proposed project as a part of the CCN application.

1.3 Description of Proposed Construction

1.3.1 Transmission Line Design

For the proposed project, Oncor anticipates the use of self-supporting, double-circuit lattice, steel towers (**Figure 1-2**). Design criteria will comply with applicable statutes, the appropriate edition of the National Electrical Safety Code, and Oncor's standard design practices. The typical structure height is anticipated to be 120 to 180 feet, but tower height will vary depending on terrain and other engineering constraints. The results of site-specific geotechnical and engineering studies will be used to determine the appropriate design and placement of the structures.

1.3.2 Right-of-Way Requirements

The ROW width for the proposed project will be approximately 160 feet in most circumstances. The ROW normally extends an equal distance on both sides of the transmission line centerline. Additional ROW may be required at line angles or dead ends or for terrain-related constraints. Reduced ROW may also be required in certain constrained areas.

1.3.3 Clearing Requirements

All brush and undergrowth within the ROW will be removed and maintained. For areas requiring hand-clearing, vegetation will be cut level with the ground. No stump exceeding 2 inches above the ground will remain. Any tree located in a fence line having a diameter greater than 4 inches will be cut even with the top of the fence. Stumps located on hillsides or uneven ground will be cut where a mowing machine can pass over the ROW without striking any stumps, roots, or snags.

1.3.4 Support Structure Assembly and Erection

Foundations for the lattice steel towers will be completed before erecting the structures. Four holes will be augered into the ground (i.e., one hole per tower footing) at each tower location. The holes will be filled with steel-reinforced concrete to form piers to hold the structure securely in place. Stub angles for anchoring the tower will be embedded at the center of the concrete foundations. Depth and diameter of the foundation will vary depending on the design of the structure specific to that location.

Each lattice steel tower will be assembled on the ground near its designed location. Tower assemblies will then be lifted by crane and aligned with and attached to foundation stub angles with structure arms oriented perpendicular to the transmission line centerline. For angle structures, towers will be set with structure arms oriented on the angle bisector.

1.3.5 Conductor Stringing

Once a series of structures has been erected along the transmission line centerline, the conductor stringing phase can begin. Specialized equipment will be attached to properly support and protect the conductor during the pulling, tensioning, and sagging operations. Once conductors and shield wire are in place and tension and sag have been verified, conductor and shield wire hardware will be installed at each suspension point to maintain conductor position. Conductor stringing continues until the transmission line construction is complete. All construction equipment will be removed after construction is completed. All temporary culverts and construction-related environmental controls previously installed will be removed after construction is completed.

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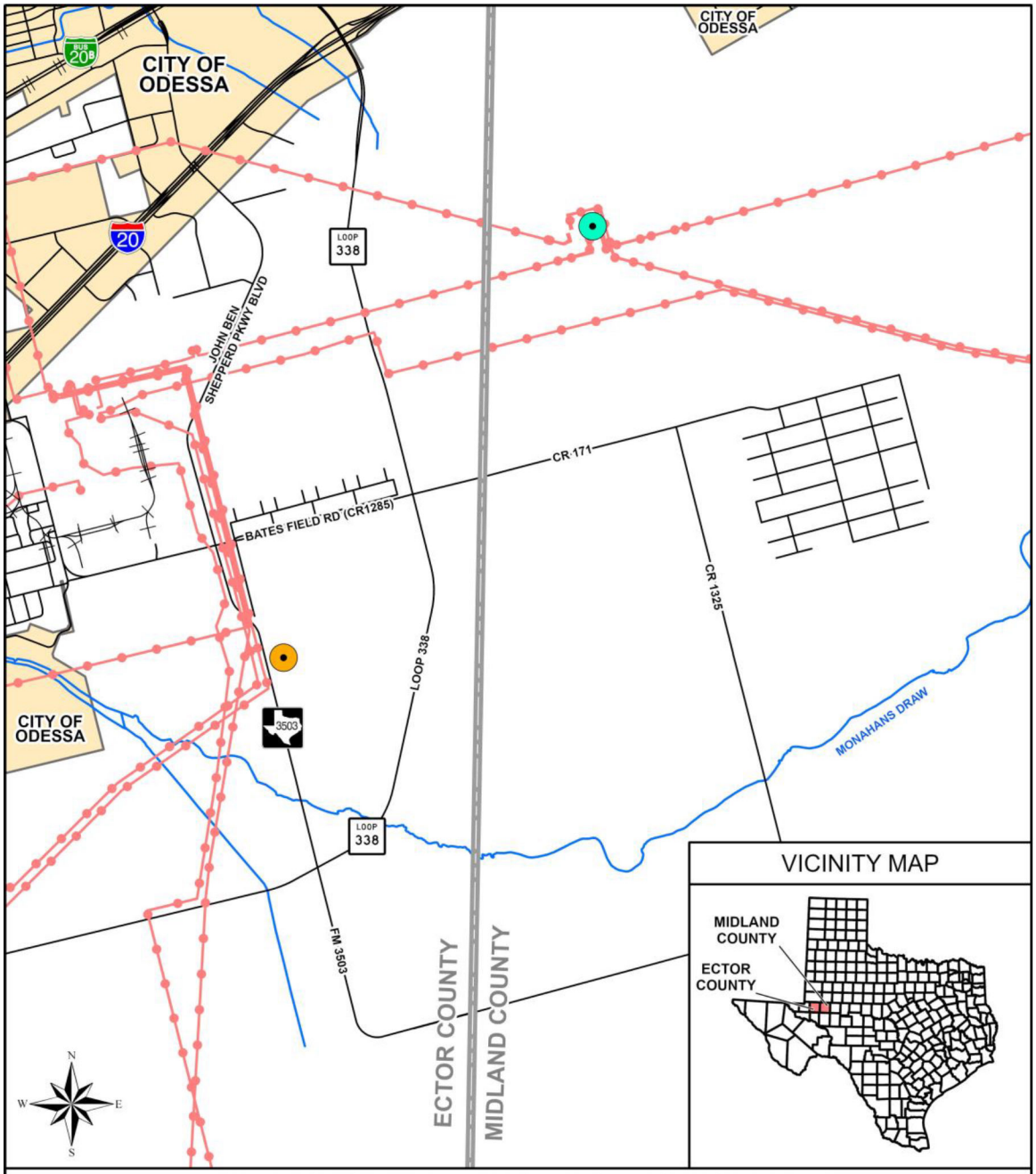

FIGURE 1-1. PROJECT LOCATION MAP

REITER SWITCH — TESORO SWITCH 345 kV TRANSMISSION LINE PROJECT

PLANNNED REITER SWITCH
COUNTY BOUNDARY
CITY LIMITS
EXISTING TRANSMISSION LINE
ROAD
RAILROAD
EXISTING TESORO SWITCH
RIVER / STREAM

0 0.5 1 2

MILES

ONCOR

BASE MAP: TEXAS NATURAL RESOURCES INFORMATION SYSTEM (TNRIS), 2024

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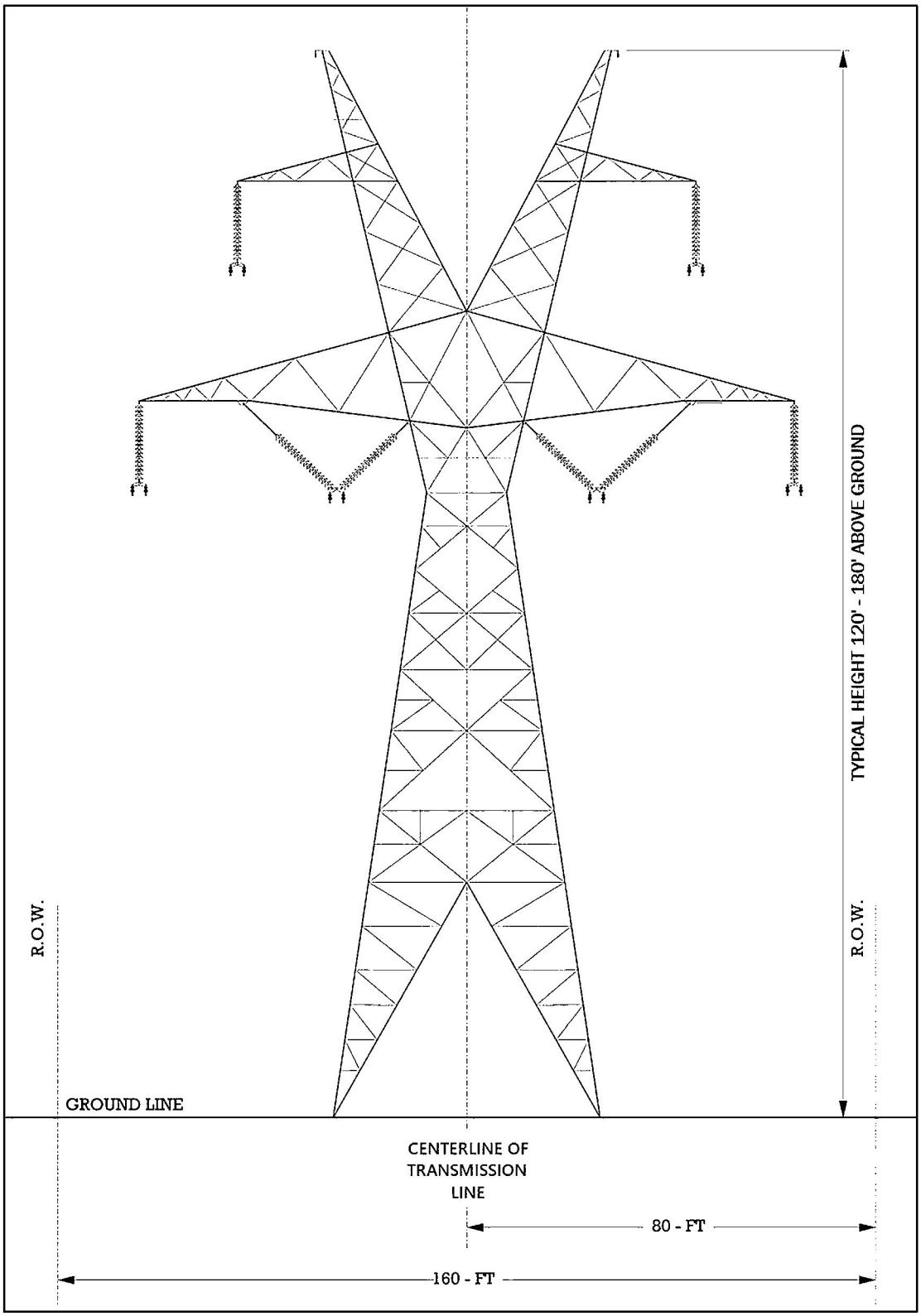

Figure 1-2. Typical 345 kV Double-Circuit Lattice Steel Tower*

*345 kV double-circuit lattice steel tower graphic provided by Oncor

— FIGURE NOT TO SCALE —

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2.0 ROUTE SELECTION METHODOLOGY

The objective of this routing study is to identify and evaluate alternative transmission line routes for the proposed project. Throughout this report, the terms "environment" and "environmental" include both the human and the natural environment. Halff utilized a comprehensive transmission line routing methodology to identify and evaluate alternative transmission line routes. Potential routes were identified and evaluated in accordance with Section 37.056(c)(4)(A)-(D) of the Texas Utilities Code, PUCT Substantive Rules Section 25.101 (including the PUCT policy of prudent avoidance), PUCT Procedural Rules Section 22.52(a)(4), and the PUCT CCN Application Form for a Proposed Transmission Line.

The following subsections provide a description of the route selection methodology, which includes study area delineation, data collection, constraints mapping, identification of preliminary alternative routes, public involvement program, and evaluation of the alternative routes.

2.1 Study Area Delineation

The first step in the identification of the proposed project was defining a study area. This area needed to encompass the project endpoints (i.e., the planned Reiter and existing Tesoro switches) and be large enough that a reasonable number of forward progressing, geographically diverse alternative routes could be investigated and identified. The purpose of delineating the study area for the proposed project was to establish boundaries and limits for the information gathering process (i.e., identifying environmental and land use constraints). The delineation of the study area also allowed Halff to focus its evaluation within a specific area.

Halff reviewed United States Geological Survey (USGS) 1:24,000 scale and 1:250,000 scale topographic maps (USGS, 1954-1981) and aerial photography (NearMap, 2023) to develop and refine the study area boundary for the proposed project. Halff located and depicted the project endpoints on various maps to identify major features in or near the study area, such as the Monahans Draw, IH 20, Loop 338, FM 3503, City of Odessa, and the boundary between Ector and Midland counties. **Figure 2-1** shows the study area

boundary Halff delineated overlaid on aerial photography and general constraints as a result of the above-described process.

Figure 2-2 provides a more detailed map of the study area relative to the local road network and the city limit boundary for the City of Odessa. The study area is roughly square in shape and includes a concentration of existing transmission lines along the north and west boundaries. Monahans Draw forms the southern boundary, and residential road networks are evident along the east and west study area boundaries. The longer axes (i.e., north and south boundaries) traverse approximately 4.3 miles, whereas the shorter axes (i.e., east and west boundaries) traverse approximately 4.1 miles. As shown on **Figure 2-2**, the public road network within the study area is limited.

2.2 Data Collection

2.2.1 Solicitation of Information from Local, State, and Federal Officials and Agencies

Once the study area boundary was identified, Halff initiated a variety of data collection activities. One of the first such activities was the development of a list of officials to whom a consultation letter regarding the proposed project would be mailed. The purpose of the consultation letters was to inform the various officials and agencies of the proposed project and give them the opportunity to provide information and feedback they may have regarding the study area. Halff utilized regional planning websites and confirmed via telephone calls to identify incorporated cities and towns within and near the study area and to identify the local officials within each city and town. State and federal agencies that may have potential permitting requirements or other interests in the proposed project were also identified. Correspondence was sent to the following federal, state, or regional agencies, and local officials and departments. Copies of all correspondence with these agencies and officials are included in **Appendix A**.

FEDERAL AGENCIES/OFFICIALS

- Federal Aviation Administration (FAA) – Southwest Region
- Federal Emergency Management Agency (FEMA) – Region VI
- United States (U.S.) Army Corps of Engineers (USACE) – Evaluation Branch Regulatory Division

- U.S. Department of Agriculture – Natural Resources Conservation Service (NRCS) – Midland Service Center
- U.S. Department of Defense (DoD) – Military Aviation and Installation Assurance Siting Clearinghouse
- U.S. Fish and Wildlife Service (USFWS) – Ecological Services Field Office

STATE AGENCIES/OFFICIALS

- Railroad Commission of Texas (RRC) – Austin Office
- Texas Archeological Research Laboratory (TARL)
- Texas Department of Transportation (TxDOT) – Aviation Division, Odessa District, and Environmental Affairs Division
- Texas General Land Office (GLO)
- Texas Historical Commission (THC)
- Texas Parks and Wildlife Department (TPWD) – Habitat Assessment Program
- Texas State Soil and Water Conservation Board – Area 2
- Texas Water Development Board (TWDB) – Panhandle/West Texas Region 1

REGIONAL OR INDEPENDENT AGENCIES/OFFICIALS

- Permian Basin Regional Planning Commission – Executive Director

COUNTY AGENCIES/OFFICIALS

- Ector County – County Judge and Commissioners
- Midland County – County Judge and Commissioners

CITY AGENCIES/OFFICIALS

- City of Odessa – Mayor and City Council Members

SCHOOL DISTRICTS/OFFICIALS

- Ector Independent School District (ISD)
- Midland ISD

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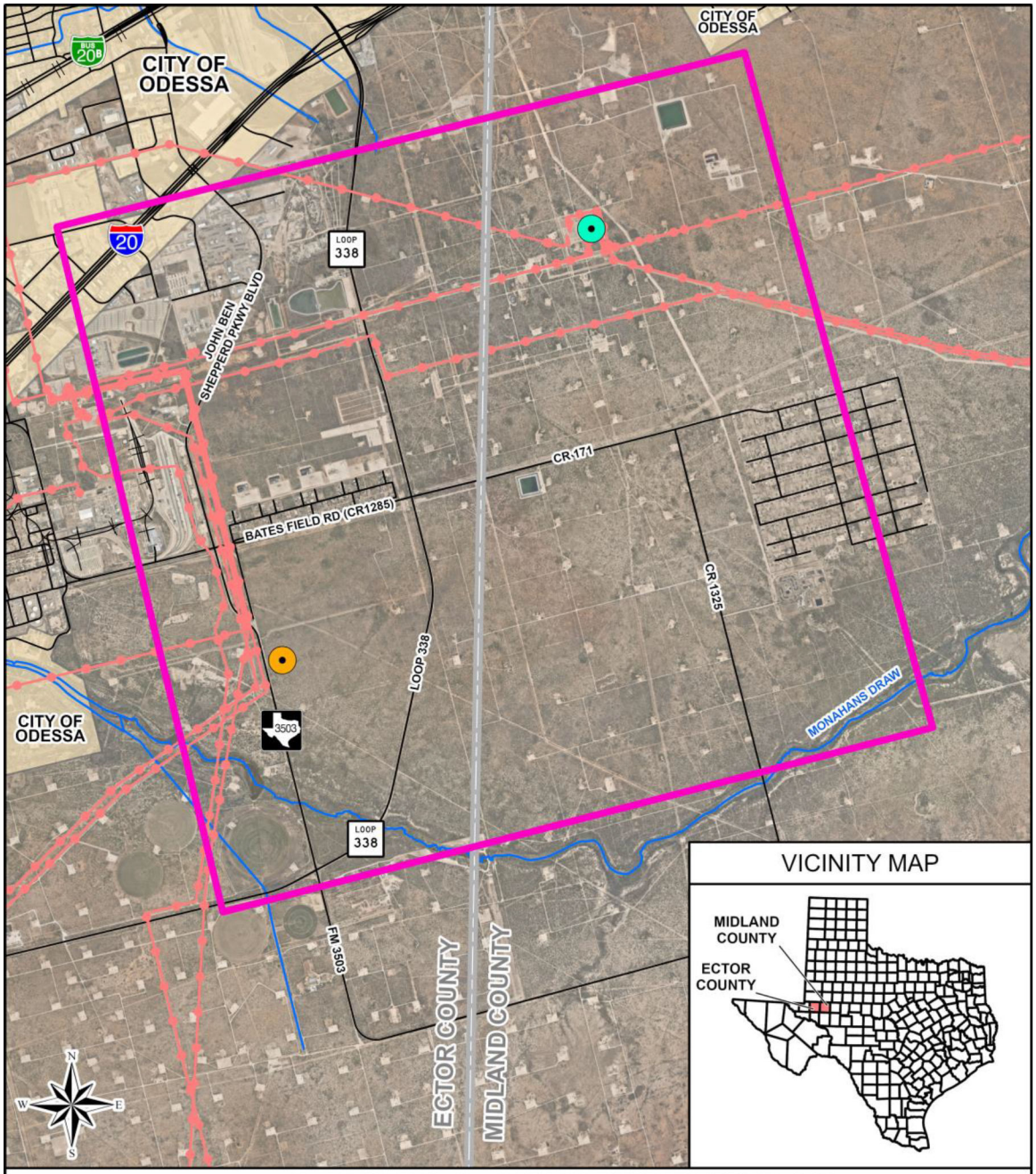

FIGURE 2-1. PROJECT AREA MAP

REITER SWITCH — TESORO SWITCH 345 kV TRANSMISSION LINE PROJECT

PLANNED REITER SWITCH
COUNTY BOUNDARY
CITY LIMITS
EXISTING TRANSMISSION LINE
ROAD
RAILROAD
EXISTING TESORO SWITCH
RIVER / STREAM

0 0.5 1 2

MILES

BASE MAP: NEARMAP, 2023

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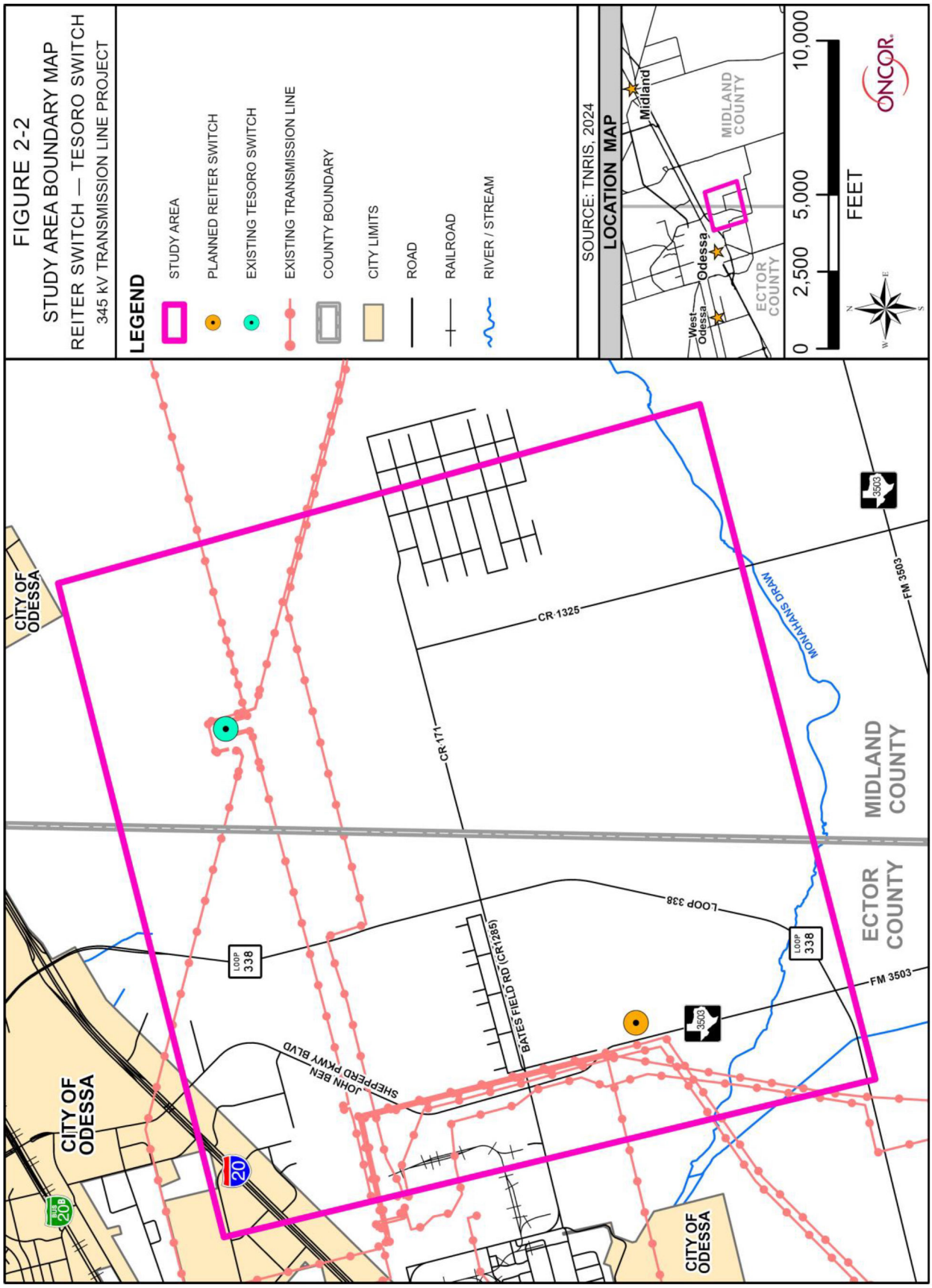
FIGURE 2-2
STUDY AREA BOUNDARY MAP
REITER SWITCH — TESORO SWITCH
345 kV TRANSMISSION LINE PROJECT
LEGEND
STUDY AREA
PLANNED REITER SWITCH
EXISTING TESORO SWITCH
EXISTING TRANSMISSION LINE
COUNTY BOUNDARY
CITY LIMITS
ROAD
RAILROAD
RIVER / STREAM
SOURCE: TNRIS, 2024
LOCATION MAP
Midland
Odessa
West Odessa
MIDLAND COUNTY
ECTOR COUNTY
0
2,500
5,000
10,000
FEET
ONCOR
CITY OF ODESSA
CR 1325
CR 171
MONAHANS DRAW
FM 3503
LOOP 338
BATES FIELD RD (CR 1285)
JOHN BEN SHEPPERD PKWY BLVD
I-20
BUS 20

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Other data collection activities included a file and record review of various regulatory agency databases, published literature, and various maps, including recent aerial photography (NearMap, 2023), seamless USGS topographic maps (National Geographic Society [NGS], 2019), county highway maps, and county appraisal district land parcel boundary maps (Integra Realty Resources [Integra], 2024). Findings of the data collection activities are detailed in **Section 3.0**.

2.2.2 Reconnaissance Survey

Halff conducted a reconnaissance survey of the study area on May 6, 2024, to develop and confirm the findings of the above-mentioned research and data collection activities and to identify existing conditions or constraints that may not have been previously noted. This ground reconnaissance survey was conducted by visual observation of the study area characteristics from Oncor's existing Tesoro Switch access easement and from public roads and public ROW located within the study area. Reconnaissance survey information was noted in the field and geographically referenced against digital aerial photography base maps, as necessary.

The data collection for the EA and Alternative Route Analysis report started with gathering information from public sources and continued up to the point of finalization of the proposed project. Results of the various data collection activities (e.g., solicitation of information from local, state, regional, and federal officials and agencies; file/record review; and the visual reconnaissance survey) are included in **Section 3.0** and **Section 5.0** of this report.

2.3 Constraints Mapping

The data and information collected from the activities outlined above were used to develop an environmental and land use constraints map. The constraints map, public maps, aerial photography, reconnaissance survey, and other research material were used to identify and select potential preliminary alternative routes within the study area. In this context, constraints are land use or landscape features that may affect, or be affected by, the location of a transmission line. The goal of this approach is to identify areas where constraints are absent or fewer, and those areas with a lower likelihood of containing existing natural or human resources that could be affected by a transmission line. For linear projects, crossing over or near certain constraints is often unavoidable. In these

instances, special considerations or mitigation measures may be used, even though there is no law or regulation that would otherwise prohibit the proximity of a transmission line.

2.4 Identification of Preliminary Alternative Route Links

Upon completion of initial data collection activities and the constraint mapping process, the next step was to identify preliminary alternative route links to connect the project endpoints. Halff utilized the following sources of information to identify the preliminary alternative routes:

- input received from correspondence with agencies and local officials, as described in **Section 2.2.1**;
- results from the visual reconnaissance survey of the study area;
- review of recent aerial photography;
- findings of publicly available data collection activities;
- environmental and land use constraints map;
- apparent property boundaries;
- existing compatible corridors;
- locations of existing developments; and
- other information.

Preliminary alternative route links were identified in accordance with Section 37.056(c)(4)(A)-(D) of the Texas Utilities Code and PUCT Substantive Rules Section 25.101, including the PUCT policy of prudent avoidance. The intent was to identify an adequate number of geographically diverse alternative routes, which were environmentally acceptable considering factors such as: community values; park and recreation areas; historical and aesthetic values; vegetation, wildlife, and water resources; environmental quality; length of route parallel to or utilizing existing compatible corridors; length of route parallel to apparent property boundaries; and the PUCT policy of prudent avoidance. A more detailed discussion of the development of alternative route links is presented in **Section 4.0**.

2.5 Public Involvement Program

PUCT Procedural Rules Section 22.52(a)(4) requires that Oncor hold at least one public meeting if 25 or more persons would be entitled to receive direct mail notice of the CCN application. A property ownership abstractor contracted by Oncor used the preliminary

alternative route links to identify potentially affected landowners in preparation for public meeting notification. The total number of landowners within the study area is less than the number established by the PUCT Procedural Rules; therefore, no public meeting was held.

2.6 Evaluation of the Alternative Routes

The analysis of the alternative routes presented in **Section 5.0** involved the inventory and tabulation of data related to multiple environmental and land use evaluation factors. Many of these factors relate to natural and man-made features that would be crossed by an alternative route (e.g., number of stream crossings, length across cropland, etc.). Some of the evaluation factors include features that are counted or measured if an alternative route link would be within a specified distance of a feature (e.g., airports or communication towers). Other factors included the length of an alternative route that runs parallel to and/or utilizes existing compatible corridors, such as electric transmission lines and public roads. The number or amount of each factor was determined primarily by reviewing recent aerial photography within a Geographic Information System (GIS) mapping program, and, where possible, verified by visual observations during field reconnaissance.

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3.0 ENVIRONMENTAL SETTING OF THE STUDY AREA

3.1 Constraints Mapping

Halff identified environmental and land use constraints within the study area. A constraints map was developed that identifies the locations of environmentally sensitive areas and other land use constraints, all of which are mapped on a recent aerial photograph base (NearMap, 2023) and shown in **Figure 3-1** (**Appendix D**). The information obtained and reviewed in completing the routing study, and the environmental and land use constraints depicted in this figure, are described in detail in the following sections.

3.2 Physiography and Geology

The study area lies in the Southern High Plains subregion of the High Plains physiographic region (or "province") that eventually grades into the Edwards Plateau (Bureau of Economic Geology [BEG], 1996). As shown in **Figure 3-2**, rocks and unconsolidated deposits from the Quaternary geologic periods are represented in the study area. Windblown cover sand sheet deposits typify most of the surface geology throughout the study area. Fluviatile terrace deposits and alluvium generally corresponds with the Monahans Draw in the southern half of the study area. Fluviatile terrace deposits can include gravel, sand, and silt. Alluvium is associated with floodplain deposits and is comprised of bedrock and well-cemented conglomerates of limestone and chert cobbles. Quaternary playa deposits are interspersed throughout the study area. These deposits are located among shallow depressions and consist of clayey, silty, or sandy textures in a light gray soil covered by a thin layer of deposits from the late Wisconsinan sedimentation (BEG, 1976; BEG, 1996; USGS, 2017; USGS, 2024a).

The Southern High Plains province generally has a moderate elevation of approximately 3,800 feet above mean sea level (amsl) (BEG, 1996). The topography of the region is rolling with several unnamed stream features that generally drain to the northeast. The streams in the southern portion of the study area were labeled as Monahans Draw on historical USGS topographic maps; however, these streams are no longer named on modern mapping sources (USGS, 2024b). The elevation of the study area ranges from 2,810 feet amsl, near the southeastern corner of the study area, to 2,900 feet amsl near the northwestern corner of the study area (USGS, 1954-1981).

3.3 Soils

3.3.1 Soil Associations

Data from the NRCS (formerly the Soil Conservation Service [SCS]) were used to identify and characterize the soils that encompass the study area. In 2006, the NRCS completed its Digital General Soil Map of the United States, which consists of a broad inventory and mapping of general soil association units. Soil associations are main patterns of soils defined and delineated based on criteria such as soil texture, parent material, slope, characteristics of horizons in the soil profile, and degree of erosion (NRCS, 2019). The NRCS project merged soil association data from the myriad of county soil surveys into a seamless national data set. This soil mapping approach resolved a basic challenge in using individual county soil surveys, which often reflect different soil names for similar soils from one county to the next. A brief description of each soil association's general characteristics is provided in **Table 3-1**, and **Figure 3-3** shows the NRCS-mapped soil associations within the study area. The soil associations in the seamless NRCS map were compared graphically with the soil associations defined and mapped in the county-level soil surveys for Ector and Midland counties (NRCS, 2019; SCS, 1973; SCS, 1978). The column on the right side of **Table 3-1** shows the names of the corresponding soil association(s) from the soil surveys for Ector and Midland counties, where applicable.

Table 3-1. Soil Associations within the Study Area

Soil Association Map Unit # - Name [1]	Study Area Percent	Description of Soil Association [2]	County Soil Survey: Soil Association Name [3]
s7166 – Amarillo	64.1	Deep and moderately deep, nearly level to gently sloping, loamy soils.	Ector: Faskin-Douro
		Nearly level to gently sloping, deep to moderately deep fine sandy loams.	Midland: Amarillo-Arvana-Midessa
s7327 – Faskin-Douro	19.4	Deep and moderately deep, nearly level to gently sloping, loamy soils.	Ector: Faskin-Douro
s7588 – Reakor-Ratliff-Holloman	16.5	Very shallow to deep, nearly level to gently sloping, loamy soils over calcium carbonate or gypsum.	Ector: Ratliff-Holloman-Reakor
		Nearly level to moderately steep, very shallow to moderately deep loams and Gypsum land.	Midland: Reeves-Gypsum

Sources: NRCS, 2019; SCS, 1973; SCS, 1978.
Notes:

[1] Map unit # and name correspond with the number and name assigned to each association in the 2006 NRCS Digital General Soil Map of the U.S., as shown for the study area in **Figure 3-3**.

[2] The description used for the soil association is a composite of the descriptions for the soil associations from individual county soil surveys that correspond geographically with the 2006 NRCS Digital General Soil Map.

[3] This column shows the soil association names from the county soil surveys that correspond to the 2006 NRCS Digital General Soil Map.

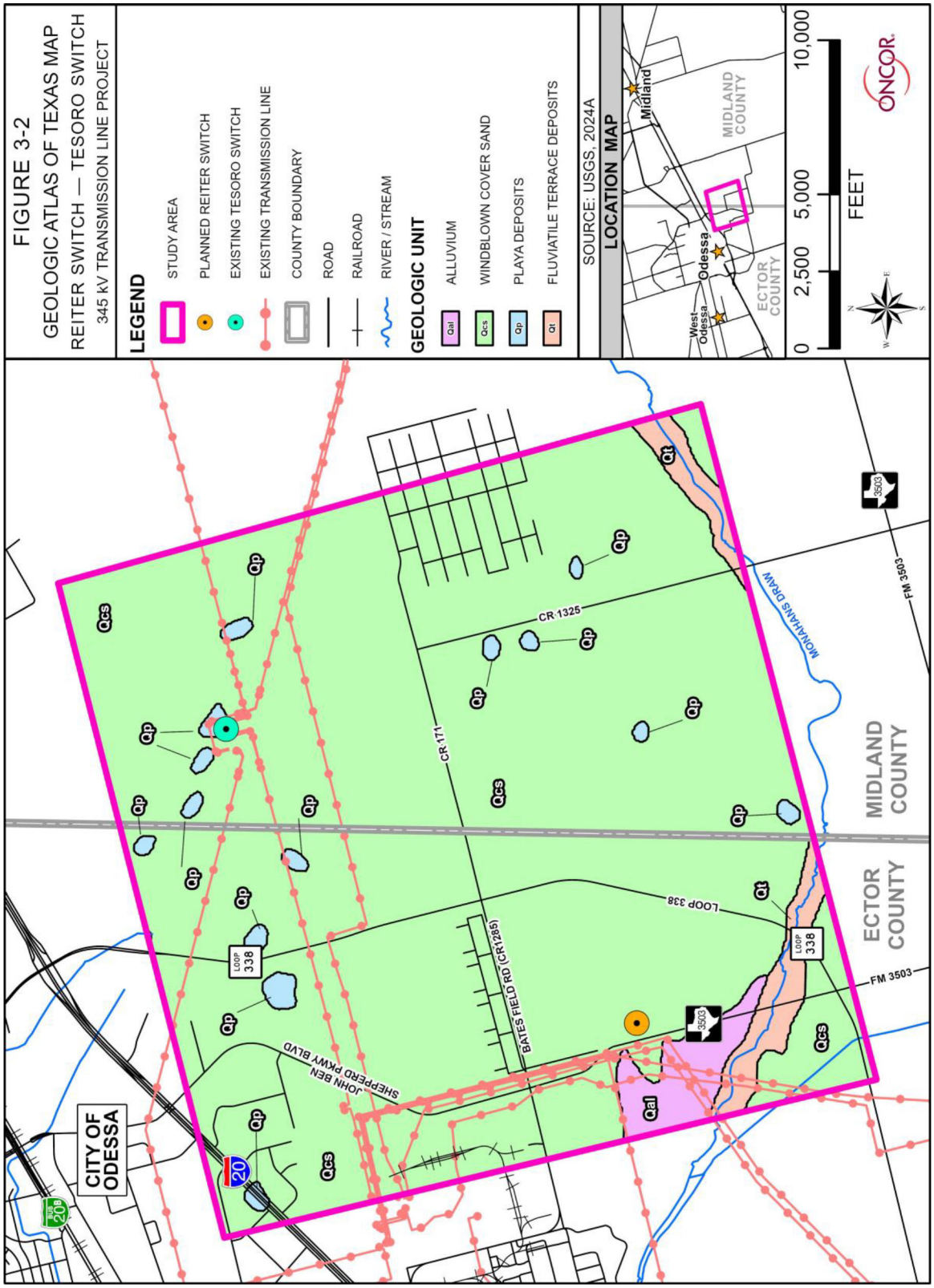
FIGURE 3-2
GEOLOGIC ATLAS OF TEXAS MAP
REITER SWITCH — TESORO SWITCH
345 kV TRANSMISSION LINE PROJECT
LEGEND
STUDY AREA
PLANNED REITER SWITCH
EXISTING TESORO SWITCH
EXISTING TRANSMISSION LINE
COUNTY BOUNDARY
ROAD
RAILROAD
RIVER / STREAM
GEOLOGIC UNIT
Qal ALLUVIUM
Qcs WINDBLOWN COVER SAND
Qp PLAYA DEPOSITS
Qt FLUVIATILE TERRACE DEPOSITS
SOURCE: USGS, 2024A
LOCATION MAP
Midland
Odessa
West Odessa
MIDLAND COUNTY
ECTOR COUNTY
0 2,500 5,000 10,000
FEET
ONCOR
CITY OF ODESSA
CR 1325
CR 171
LOOP 338
BATES FIELD RD (CR 1285)
JOHN BEN SHEPPERD PKWY BLVD
MONAHANS DRAW
FM 3503
Qp
Qcs
Qt
Qal
20

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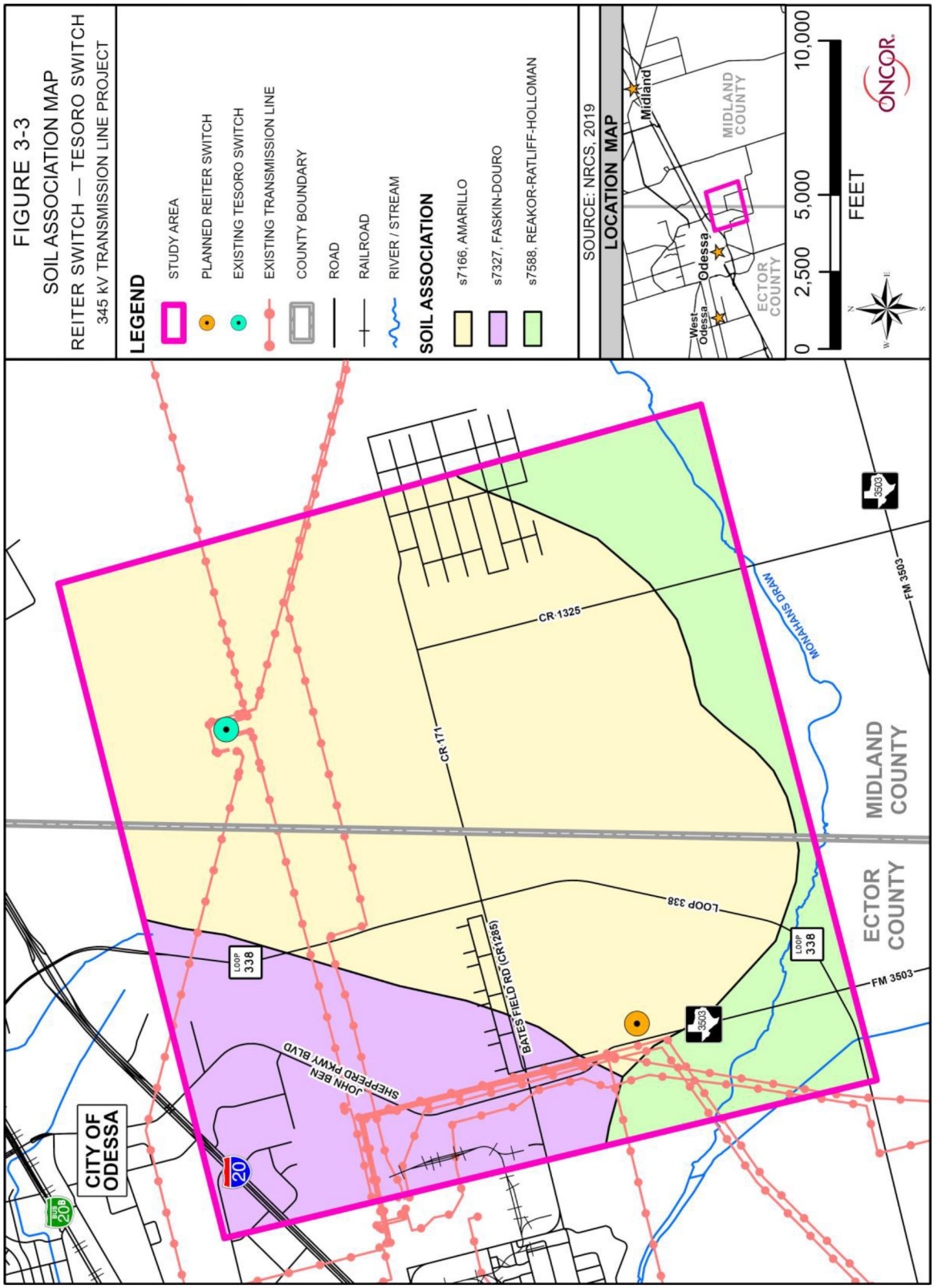
FIGURE 3-3
SOIL ASSOCIATION MAP
REITER SWITCH — TESORO SWITCH
345 kV TRANSMISSION LINE PROJECT
LEGEND
STUDY AREA
PLANNED REITER SWITCH
EXISTING TESORO SWITCH
EXISTING TRANSMISSION LINE
COUNTY BOUNDARY
ROAD
RAILROAD
RIVER / STREAM
SOIL ASSOCIATION
s7166, AMARILLO
s7327, FASKIN-DOURO
s7588, REAKOR-RATLIFF-HOLLOMAN
SOURCE: NRCS, 2019
LOCATION MAP
Midland
Odessa
West Odessa
MIDLAND COUNTY
ECTOR COUNTY
0
2,500
5,000
10,000
FEET
ONCOR
CR 1325
CR 171
LOOP 338
BATES FIELD RD (CR 1285)
JOHN BEN SHEPPERD PKWY BLVD
FM 3503
MONAHANS DRAW
CITY OF ODESSA
20
MIDLAND COUNTY
ECTOR COUNTY

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Three different soil associations were identified within the study area, none of which have components that are associated with floodplains. The surface geology discussed in the previous section is the foundation for the soils found within the study area, and soil maps bear a general similarity with geologic maps of the area. Regardless of the type of underlying bedrock, the upland soils throughout the study area occur over relatively flat terrain with mild sloping in areas of local drainage. Soil textures vary between sandy loams and loams (NRCS, 2019; SCS, 1973; SCS, 1978).

3.3.2 Prime Farmland

In the Farmland Protection Policy Act (FPPA), federal law 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..." (7 U.S. Code Section 4201(c)(1)(A)). Such lands have the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. Additionally, potential prime farmlands are areas with soils that meet most of the requirements of prime farmland but fail because they lack water management facilities, such as irrigation systems, or they lack sufficient natural moisture; such areas would be regarded as prime farmland if these areas were irrigated. There are several soil classifications within the Amarillo and Reakor-Ratliff-Holloman soil associations considered prime farmland, if irrigated. The NRCS encourages the use of accepted erosion control methods during the construction of all projects, regardless of exemption status.

3.4 Water Resources

3.4.1 Surface Water and Floodplains

The entire study area lies within the Johnson Draw Sub-basin (TPWD, 2024a). As shown in the figures of **Section 3.0**, two unnamed drainage features are present in the southern portion of the study area, flow in a generally westerly to easterly direction, and are represented as the Monahans Draw on historical USGS topographic maps.

The National Hydrography Dataset (NHD), now known as the USGS 3D National Hydrography Program (3DHP), shows several small surface water bodies scattered across the study area that vary greatly in size and shape (USGS, 2024b). Aerial

photography supports that some features are associated with the drainage features in the southern portion of the study area while others are associated with a water treatment facility in the southeastern corner of the study area. Review of aerial imagery suggests the stream features in the study area do not support perennial flow but may exhibit wetland or marsh characteristics during wet seasons.

State legislation in 1997 (see Texas Water Code Section 16.051) modified the state-wide water resources planning process by authorizing regional planning groups to recommend ecologically unique river and stream segments to the Texas State Legislature in regional and state water plans (TWDB, 2022). A primary purpose for this approach is to ensure that future water impoundments do not destroy stream segments that are considered unique under specified designation criteria (see 31 Texas Administrative Code [TAC] Section 357.8), which include biologic functions and habitat for threatened and endangered species. State designation as "ecologically unique" would also prevent state agencies or municipalities from acquiring property or easements that would destroy the ecological values forming the basis for the designation. Part of the process for designating ecologically unique stream segments requires regional water planning groups to coordinate with TPWD about candidate stream segments (TWDB, 2021; 2022). No stream within or immediately adjacent to the study area is designated as ecologically significant under the relevant designation criteria (TPWD, 2002).

No rivers or streams within the study area are listed by the Texas Commission on Environmental Quality (TCEQ) under Section 303(d) of the Clean Water Act as being monitored for impairment or having other water quality concerns (TCEQ, 2022; 2024). FEMA prepared Flood Insurance Rate Maps (FIRM) for Midland County in 2005 and conducted a detailed floodplain analysis for Ector County in 2012. Within the study area, the FEMA FIRM identifies riparian corridors along ephemeral drainages or streams and several isolated areas, all of which are mapped as areas with a flood hazard (i.e., 1% exceedance or 100-year floodplain) (FEMA, 2024).

3.4.2 Groundwater/Aquifer

The major aquifer within the study area is the Edwards-Trinity Plateau Aquifer (TWDB, 2006; George et al., 2011). The Edwards-Trinity Plateau Aquifer extends through much of the southwestern portion of Texas. Water bearing sediments include limestone and dolomite of the Edwards Group and sands of the Trinity Group. Thickness of the maximum

saturation fill exceeds 800 feet, and freshwater saturated thickness averages about 430 feet. The water quality is highly variable (e.g., ranging from fresh to slightly saline), with water typically being hard among the Edwards Group and increasing in salinity westward within the Trinity Group. Total dissolved solids in groundwater in the Edwards-Trinity Plateau Aquifer widely varies from 100 to 3,000 milligrams per liter. Elevated levels of fluoride are present in nearby Glasscock and Irion counties exceeding the primary drinking water standards. Springs are prevalent among the northern and eastern reaches of this aquifer. Groundwater pumped from this aquifer is primarily used for agricultural irrigation and the remainder is distributed among municipalities and used for livestock. The rate at which the Edwards-Trinity Plateau Aquifer has been pumped from has generally followed the recharge rate, thereby keeping aquifer water levels relatively stable (George et al., 2011). Groundwater resources for Ector and Midland counties are located within the TWDB Groundwater Management Area #7 (TWDB, 2024). However, no groundwater conservation district services Ector and Midland counties (TWDB, 2019).

The minor aquifer within the study area is the Dockum Aquifer, encompassing all but the southeastern corner of the study area (TWDB, 2017). The Dockum Aquifer extends throughout numerous counties in west Texas. Only the Dockum Subsurface portion of the aquifer is located in the study area. This aquifer includes the Santa Rosa Formation, Tecovas Formation, Trujillo Sandstone, and the Cooper Canyon Formation. Groundwater is located in the sandstone and conglomerate units. Most of the water production comes from the coarsest grained deposits in the middle and base of the Dockum Group. While the eastern outcrop areas of the aquifer are generally freshwater, the western subsurface areas consist of brine. Although some parts of the aquifer produce freshwater containing less than 1,000 milligrams per liter of total dissolved solids, the water is generally slightly to moderately saline and contains total dissolved solids ranging between 1,000 and 10,000 milligrams per liter. The water is used primarily for irrigation, municipal water supply, and waterflooding operations in oil-producing areas (George et al., 2011).

3.5 Ecology

3.5.1 Vegetation

The NRCS has studied the characteristics of ecological regions for decades to better understand the biology and management of natural resources. The NRCS published a

handbook in 2022 that maps general Land Resource Regions (LRRs) that share similar geology and land physiography, moisture and climate, and soils characteristics (NRCS, 2022; 2024). The study area is located entirely within the Central Great Plains Winter Wheat and Range Region. The Central Great Plains Winter Wheat and Range Region extends across much of the Great Plains from Texas to Nebraska. Average annual precipitation ranges from 17 to 36 inches throughout most of the region (NRCS, 2022; 2024).

As shown in **Figure 3-4**, NRCS soil scientists have further subdivided the LRR into more detailed Major Land Resource Areas (MLRAs). As the criteria used to define both MLRAs and the larger LRRs focus fundamentally on soils and soil-forming factors, the delineation of MLRAs is closely linked to the various soil associations that have been mapped over the past half century. This approach to the study of vegetation focuses on the land's potential for supporting natural vegetation or agricultural practices, rather than simply reporting a snapshot of vegetation as it may exist at a single point in time. A small portion of the northeastern corner of the study area is located within the boundaries of the Southern High Plains, Southern Part (MLRA 77C). The remainder of the study area is located within the boundaries of the Southern High Plains, Southwestern Part (MLRA 77D) (NRCS, 2022; 2024).

The Southern High Plains, Southern Part has an average annual precipitation of 16 to 22 inches, fluctuating widely from year to year. Most of the rainfall occurs as high-intensity, convective thunderstorms in late spring and early fall. The growing season averages 225 days, ranging from 195 to 255 days and increasing from north to south in this MLRA. The physiography of the Southern High Plains, Southern Part is distinguished by vast open plains on the Llano Estacado, an elevated plateau. This MLRA includes interspersed playa depressions varying in size from 5 to 160 acres. The geology of this MLRA is primarily covered by eolian sediments in the Blackwater Draw Formation of the Pleistocene age. The dominant soil orders found in this MLRA are Alfisols, Inceptisols, Mollisols, and Vertisols. The soils vary from moderately deep to very deep, are well drained, and are generally clayey, loamy, or sandy in texture (NRCS, 2022; 2024).

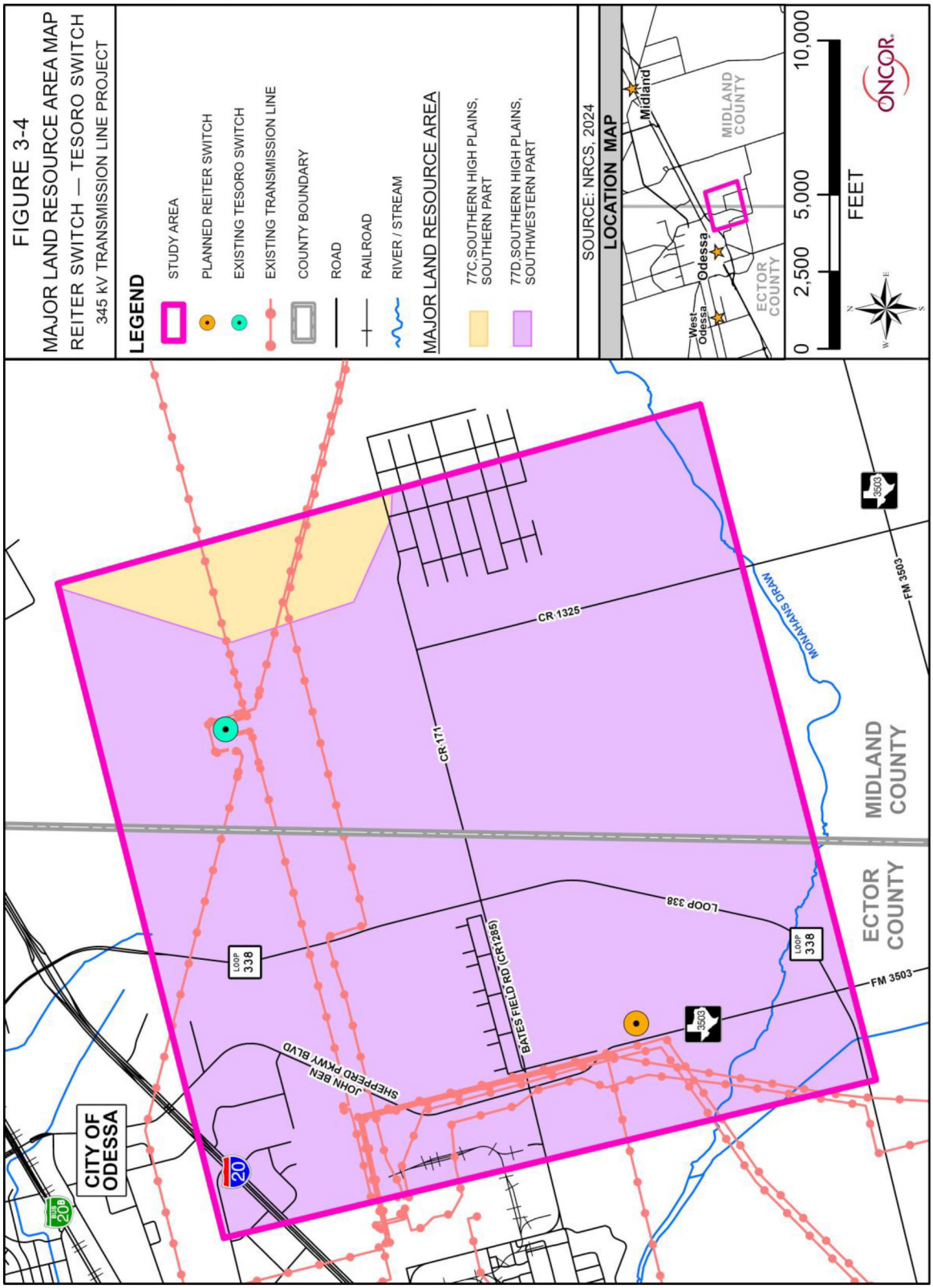
FIGURE 3-4
MAJOR LAND RESOURCE AREA MAP
REITER SWITCH — TESORO SWITCH
345 kV TRANSMISSION LINE PROJECT
LEGEND
STUDY AREA
PLANNED REITER SWITCH
EXISTING TESORO SWITCH
EXISTING TRANSMISSION LINE
COUNTY BOUNDARY
ROAD
RAILROAD
RIVER / STREAM
MAJOR LAND RESOURCE AREA
77C,SOUTHERN HIGH PLAINS, SOUTHERN PART
77D,SOUTHERN HIGH PLAINS, SOUTHWESTERN PART
SOURCE: NRCS, 2024
LOCATION MAP
Midland
Odessa
West Odessa
MIDLAND COUNTY
ECTOR COUNTY
0 2,500 5,000 10,000
FEET
ONCOR
CR 1325
CR 171
LOOP 338
BATES FIELD RD (CR 1285)
JOHN BEN SHEPPERD PKWY BLVD
MONAHANS DRAW
FM 3503
CITY OF ODESSA
I-20
BUS I-20

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The Southern High Plains, Southwestern Part has an average annual precipitation of 14 to 16 inches, fluctuating widely from year to year. Most of the rainfall occurs as high-intensity, convective thunderstorms in the spring and late summer. Winter precipitation comes in the form of light snow and rainfall. The growing season averages 210 days, ranging from 180 to 230 days and increasing from north to south in this MLRA. The physiography of this MLRA is also distinguished by the Llano Estacado. This MLRA includes interspersed playa depressions varying in size from 5 to over 100 acres. The geology of this MLRA is primarily covered by eolian sediments in the Blackwater Draw Formation of the Pleistocene age and sand sheets and dunes of the Quaternary age. Lower layers of sand and gravel originate from the Miocene-Pliocene Ogallala Formation. The dominant soil orders found in this MLRA are Aridisols and Entisols. The soils vary from very shallow to very deep, are well drained, and are generally loamy or sandy (NRCS, 2022; 2024).

The southwestern reach of both the Southern High Plains, Southern Part and the Southern High Plains, Southwestern Part, which include the study area, support mixed prairie grasses on top of gently sloping plains and gently to strongly sloping sandhills. Vegetation mixes are dependent on soil texture, such as moderately fine and moderately coarse textured soils, which include a mix of mid and tall prairie grasses with relatively few short grasses, while loamy soils are characterized with mid prairie grasses, where sideoats grama (*Bouteloua curtipendula*) is the dominant species. Approximately 5 percent or less of this MLRA incorporates woody shrubs like yucca (*Yucca* spp.), catclaw acacia (*Acacia greggii*), and sand sagebrush (*Artemisia filifolia*). Sandy soils are dominated with tall prairie grasses, such as little bluestem (*Schizachyrium scoparium*) and sand bluestem (*Andropogon hallii*). Woody shrubs may constitute up to 30 percent of the overall plant community on sandy soil conditions, specifically with sand sagebrush, Harvard's shin oak (*Quercus havardii*), and skunkbush sumac (*Rhus trilobata*). The majority of the Southern High Plains, Southern Part is cropland, predominantly for cotton, grain sorghum, and peanuts in the southern portion. Beef cattle and dairies are also economically important in the small percentage of farmland within areas of the MLRA that consist of rangeland, improved pasture, and wildlife habitat. Three-fourths or more of the Southern High Plains, Southwestern Part is rangeland, predominantly for the beef cattle industry. Nearly one-fourth of this MLRA is cropland, of which two-thirds is irrigated. Cotton, wheat, grain sorghum, and alfalfa hay are the principal crops in this region (NRCS, 2022; 2024).

The Ecoregions of Texas Level III and Level IV maps were prepared by a collaborative effort between the U.S. Environmental Protection Agency (EPA), TCEQ, and the NRCS (Griffith et al., 2007). This classification system analyzes the ecoregions at a finer scale than the MLRAs. While the spatial extent may vary in some areas, this general description of the overall vegetation type, based on NRCS research, is consistent with other regional descriptions of ecological regions in west Texas, including the Ecoregions of Texas maps. Under the Ecoregions of Texas Level III classification, the entire study area is located within the High Plains ecoregion. The High Plains ecoregion physiography is generally higher and drier than the Central Great Plains to the east and characteristically consists of smooth to slightly irregular plains with a high percentage of cropland, as opposed to the irregular rangeland of the Northwestern Great Plains ecoregion to the far north. Vegetative cover is predominantly grassland plains prevalent with grama grasses (*Bouteloua* spp.) and buffalograss (*Buchloe dactyloides*), as opposed to the Trans-Pecos semi-desert and arid shrubland to the west or the tallgrass prairies to the east. This ecoregion includes thousands of playa depressions or lakes, many of which are important recharge zones for the Edwards-Trinity Plateau Aquifer and serve as crucial stopover sites for migratory waterfowl species utilizing the Central Flyway Zone. Oil and gas production is common throughout the High Plains ecoregion.

At Level IV, the study area is located entirely within the Arid Llano Estacado ecoregion. The Arid Llano Estacado ecoregion is drier than the primary Llano Estacado ecoregion to the north, as this ecoregion acts as a transitional zone between the Llano Estacado and the arid Trans-Pecos to the southwest. The physiography of the Arid Llano Estacado is broken terrain over a relatively level and elevated plain with fewer streams and playa depressions as noted among the regions to the north. Mean annual precipitation varies between 13 and 17 inches. This ecoregion includes shortgrass prairies as the dominant vegetative cover, predominantly a grama grass and buffalograss mixture, such as blue grama (*Bouteloua gracilis*), black grama (*Bouteloua eriopoda*), hairy grama (*Bouteloua hirsute*), buffalograss, silver bluestem (*Bothriochloa laguroides* ssp. *torreyana*), sand dropseed (*Sporobolus cryptandrus*), threeawn (*Aristida* spp.), Arizona cottontop (*Digitaria californica*), hairy tridens (*Erioneuron pilosum*), muhly (*Muhlenbergia* spp.), bottlebrush squirreltail (*Elymus elymoides*), and sand sagebrush. Areas exposed to overgrazing often see an increase in burrograss (*Scleropogon brevifolius*), threeawns, tobosa (*Pleuraphis mutica*), and broom snakeweed (*Gutierrezia sarothrae*). Typical vegetative forb species (e.g., non-grass herbaceous plants) for this ecoregion include bush sunflower (*Encelia*

californica), gray goldaster (*Heterotheca canescens*), prairie clover (*Dalea* spp.), and gayfeather (*Liatris* spp.). Invading shrub and woody vegetation of this ecoregion include honey mesquite (*Prosopis glandulosa*), narrowleaf yucca (*Yucca angustissima*), juniper (*Juniperus* spp.), Mormon-tea (*Ephedra* spp.), catclaw acacia, sensitive briar (*Mimosa nuttallii*), and tarbush (*Flourensia cernua*). Land use consists primarily of ranching, livestock grazing, and irrigated cropland. Oil and gas production is scattered, yet locally prevalent, throughout this ecoregion.

3.5.1.1 Terrestrial Vegetation

GIS data from TPWD Ecological Mapping Systems of Texas (EMST) were used to estimate areas of major types of existing vegetation cover within the study area (Elliott et al., 2014). Data were developed from satellite imagery with 10-meter by 10-meter mapping resolution collected from 2005 to 2007 and refined with *in situ* data. Using this refined imagery, TPWD created a statewide land cover data set that includes a sufficient number of land cover types to provide insights for planning and management at a variety of scales (Elliott, 2014; Elliott et al., 2014; TPWD, 2014; TPWD, 2024b). For this study area, the more specific ecological types were grouped into six general land cover classes. **Figure 3-5** displays TPWD land cover data by different land/vegetation cover types, as it was grouped for the purposes of this study.

The description of study area terrestrial vegetation that follows is based on field observations, interpretation of recent aerial photography (NearMap, 2023), and a review of reports and maps produced by NRCS (2024), TPWD (1984; 2011; 2014; 2024b), and TCEQ (Griffith et al., 2007). Cover types are provided in the general order as shown in **Figure 3-5**.

Upland Grassland/Prairie is the predominant land cover class within the study area as shown in **Figure 3-5**. This land cover class is composed of five EMST cover types (in order of prevalence):

1. Rolling Plains: Mixedgrass Prairie;
2. Trans-Pecos: Sandy Desert Grassland;
3. High Plains: Sand Prairie;
4. Trans-Pecos: Salty Desert Grassland; and
5. Trans-Pecos: Gyp Grassland.

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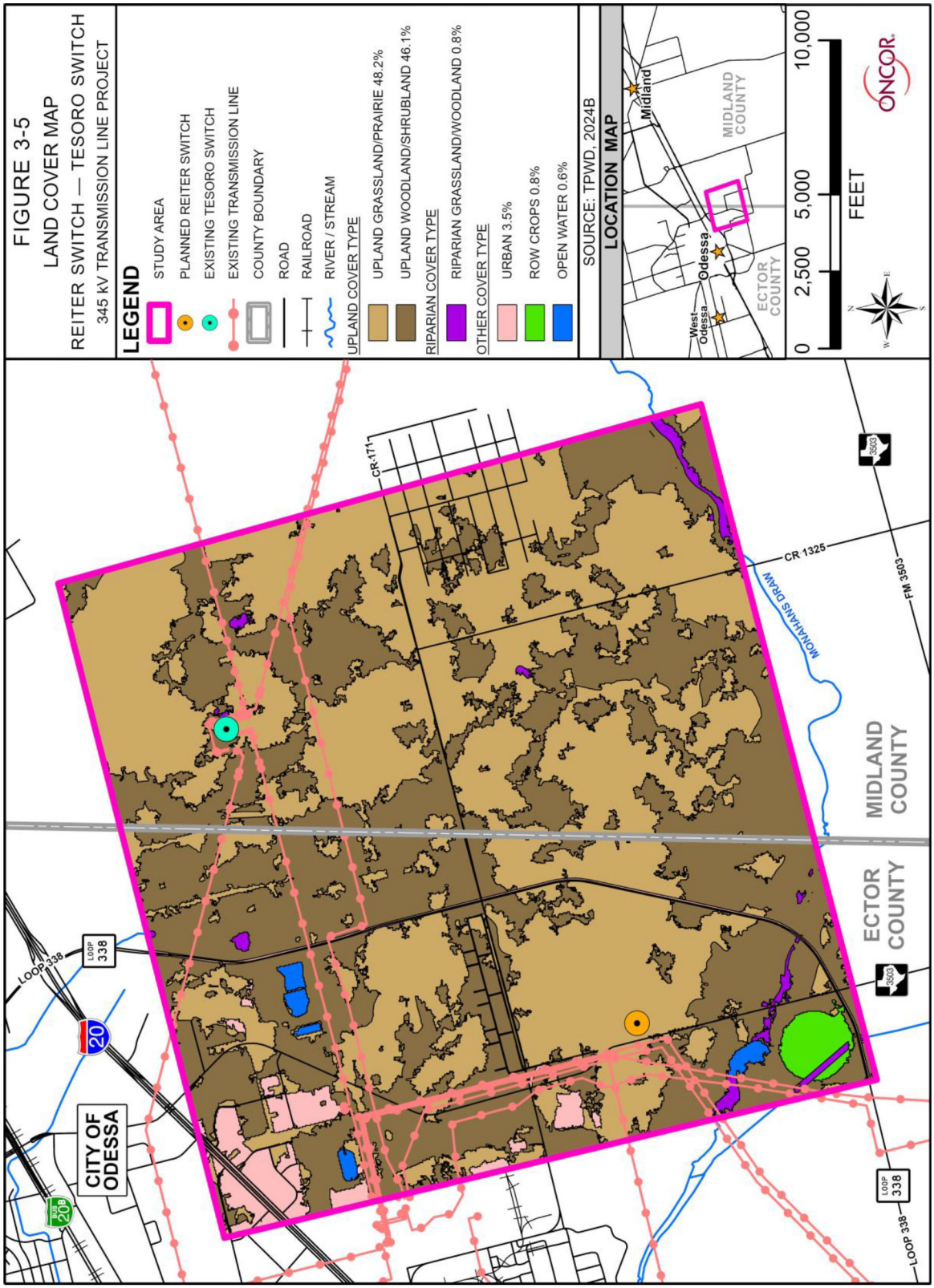
FIGURE 3-5
LAND COVER MAP
REITER SWITCH — TESORO SWITCH
345 kV TRANSMISSION LINE PROJECT
LEGEND
STUDY AREA
PLANNED REITER SWITCH
EXISTING TESORO SWITCH
EXISTING TRANSMISSION LINE
COUNTY BOUNDARY
ROAD
RAILROAD
RIVER / STREAM
UPLAND COVER TYPE
UPLAND GRASSLAND/PRAIRIE 48.2%
UPLAND WOODLAND/SHRUBLAND 46.1%
RIPARIAN COVER TYPE
RIPARIAN GRASSLAND/WOODLAND 0.8%
OTHER COVER TYPE
URBAN 3.5%
ROW CROPS 0.8%
OPEN WATER 0.6%
SOURCE: TPWD, 2024B
LOCATION MAP
Midland
Odessa
West Odessa
MIDLAND COUNTY
ECTOR COUNTY
0 2,500 5,000 10,000
FEET
ONCOR
CR-171
CR 1325
FM 3503
MONAHANS DRAW
MIDLAND COUNTY
ECTOR COUNTY
LOOP 338
I-20
CITY OF ODESSA

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The Rolling Plains: Mixedgrass Prairie EMST cover type is found throughout the study area. This cover type is typically found among loam, clay loams, or sandy loam soils over gently rolling upland plains. Grass species dominate this cover type with species such as little bluestem, Texas wintergrass (*Nassella leucotricha*), sideoats grama, and silver bluestem. Increased grazing activities often tend to favor shorter grass species like buffalograss and blue grama. This cover type is frequently invaded by juniper, specifically redberry juniper (*Juniperus pinchotii*), lotebush (*Ziziphus obtusifolia*), and honey mesquite. Sandy sites may include additional woody vegetation of sand sagebrush and Harvard's shin oak invading the cover type.

The Trans-Pecos: Sandy Desert Grassland ESMT cover type is the second most prevalent cover type found throughout the study area, intermixed among the Native Invasive: Mesquite Shrubland EMST cover type. This cover type is found over aeolian sands like caliche or sandstone on level to gently rolling plains. Soils are typically sandy, loamy sand, and shallow sandy loams. The herbaceous layer is dominated with black grama, mesa dropseed (*Sporobolus flexuosus*), sand dropseed, sand muhly (*Muhlenbergia arenicola*), alkali sacaton (*Sporobolus airoides*), common sandbur (*Cenchrus spinifex*), and purple threeawn (*Aristida purpurea*). A scattered woody component may include species such as honey mesquite, soaptree yucca (*Yucca elata*), plains yucca (*Yucca campestris*), Torrey's yucca (*Yucca torreyi*), and creosote bush (*Larrea tridentata*). Lehmann lovegrass (*Eragrostis lehmanniana*) and Mediterranean lovegrass (*Eragrostis barrelieri*) are frequent non-native species present in this cover type.

The High Plains: Sand Prairie EMST cover type is found in the northwestern corner of the study area. This cover type is found over deep sands and sandhills. This cover type is dominated by giant dropseed (*Sporobolus giganteus*), sand dropseed, sand bluestem, big bluestem (*Andropogon gerardii*), little bluestem, thin paspalum (*Paspalum setaceum*), big sandreed (*Calamovilfa gigantea*), common sandbur, sand sagebrush, and Havard's shin oak.

The Trans-Pecos: Salty Desert Grassland is one of two EMST cover types classified as salty grassland, present only in the southwestern corner of the study area, along the Monahans Draw depicted on historical USGS topographic maps. This cover type is classified with significant cover with graminoid vegetation, such as alkali sacaton, big sacaton (*Sporobolus wrightii*), saltgrass (*Distichlis spicata*), false Rhodes grass (*Trichloris*

crinita), pink pappusgrass (*Pappophorum bicolor*), tobosa, burrograss, prickly Russian thistle (*Salsola tragus*), camelthorn (*Alhagi maurorum*), and African rue (*Peganum harmala*). A shrub canopy cover is typically sparse or absent.

The Trans-Pecos: Gyp Grassland EMST cover type is the second land cover type classified as a salty grassland cover type. It occurs on rolling uplands with minor erosion and level basins or drainages. These sites are often attributed to a sparse shrub layer and a barren to vegetated herbaceous layer. Frequent species found include gypgrass (*Sporobolus nealleyi*), gyp grama (*Bouteloua breviseta*), rough coldenia (*Tiquilia hispidissima*), sand nama (*Nama carnosum*), threadleaf glowwort (*Sartwellia flaveriae*), onion blanket-flower (*Gaillardia multiceps*), ringstems (*Anulocaulis* spp.), and moonpods (*Selinocarpus* spp.). In addition, Hartweg evening primrose (*Calylophus hartwegii*), alkali sacaton, burrograss, sand dropseed, wooly dalea (*Dalea lanata*), sand bluestem, giant dropseed, spectaclepod (*Dimorphocarpa wislizeni*), wooly tidestromia (*Tidestromia lanuginosa*), trailing ratany (*Krameria lanceolata*), and blazingstar (*Mentzelia* spp.) may also be encountered. A shrub canopy cover is typically sparse or absent.

Upland Woodland/Shrubland is the second most dominant land cover class within the study area as shown in **Figure 3-5**. This cover class is composed of seven EMST cover types (in order of prevalence):

1. Native Invasive: Mesquite Shrubland;
2. High Plains: Sandy Deciduous Shrubland;
3. Trans-Pecos: Salty Desert Scrub;
4. Trans-Pecos: Gyp Shrubland;
5. Non-Native Invasive: Saltcedar Shrubland;
6. High Plains: Mesquite Shrubland; and
7. Non-Native Invasive: Elm – Olive Woodland.

The Native Invasive: Mesquite Shrubland EMST cover type is the most prevalent habitat feature throughout the study area. This area is often dominated by honey mesquite. Other important species include huisache (*Acacia farnesiana*), sugar hackberry (*Celtis laevigata*), Ashe juniper (*Juniperus ashei*), cedar elm (*Ulmus crassifolia*), lotebush, agarito (*Mahonia trifoliolata*), winged elm (*Ulmus alata*), sumacs (*Rhus* spp.), brasil (*Condalia hookeri*), common persimmon (*Diospyros virginiana*), Texas persimmon (*Diospyros texana*), granjeno (*Celtis ehrenbergiana*), and Texas prickly pear (*Opuntia engelmannii*

var. *lindheimeri*). A sparse canopy may occur, with plateau live oak (*Quercus fusiformis*), coastal live oak (*Quercus virginiana*), and post oak (*Quercus stellata*).

The High Plains: Sandy Deciduous Shrubland EMST cover type is isolated in the northwestern portion of the study area. This cover type often resides over sandy substrates. This cover type is dominated by sand sagebrush, honey mesquite, Chickasaw plum (*Prunus angustifolia*), skunkbush sumac, and Harvard's shin oak.

The Trans-Pecos: Salty Desert Scrub EMST cover type is one EMST cover type classified as salty shrubland, mapped in the southern portion of the study area adjacent to the Monahans Draw depicted on historical USGS topographic maps. This cover type typically includes significant shrub cover of four-wing saltbush (*Atriplex canescens*), pickle-weed (*Allenrolfea occidentalis*), desert seepweed (*Suaeda suffrutescens*), tasajillo (*Cylindropuntia leptocaulis*), honey mesquite, allthorn (*Koeberlinia spinosa*), tubercled saltbush (*Atriplex acanthocarpa*), tarbush, lotebush, southern Jimmy-weed (*Isocoma pluriflora*), western honey mesquite (*Prosopis glandulosa var. torreyana*), and winged sea purslane (*Sesuvium verrucosum*). Prickly Russian thistle, camelthorn, African rue, and saltcedars (*Tamarix* spp.) are commonly encountered within this cover type.

The Trans-Pecos: Gyp Shrubland EMST cover type is another cover type classified as salty shrubland, mapped in the southwestern portion of the study area, adjacent to the Monahans Draw depicted on historical USGS topographic maps. The Trans-Pecos: Gyp Shrubland is mapped over gyp-influenced soils, usually at relatively low elevations. Shrubs may include honey mesquite, four-wing saltbush, Torrey jointfir (*Ephedra torreyana*), creosote bush, burrobush (*Ambrosia dumosa*), Torrey's yucca, and javelina bush (*Condalia ericoides*). Other common species include gyp dropseed (*Sporobolus nealleyi*), gyp grama, hairy crinklemat (*Tiquilia hispidissima*), bristly nama (*Nama hispidum*), threadleaf glowwort, and onion blanket-flower.

The Non-Native Invasive: Saltcedar Shrubland EMST cover type is mapped in the southern portion of the study area, adjacent to the Monahans Draw depicted on historical USGS topographic maps. This cover type is proportionally small compared to other cover types. This cover type is often dominated by saltcedars, yet shrubby sumpweed (*Iva frutescens*), baccharis (*Baccharis* spp.), honey mesquite, huisache, sugar hackberry, and sea ox-eye daisy (*Borrichia frutescens*) may also be present.

The High Plains: Mesquite Shrubland EMST cover type is isolated along the eroded drainages of tributaries and is typically found along drainages and floodplains on top of bottomland soils. This cover type is difficult to distinguish from other honey mesquite dominated cover types (e.g., Native Invasive: Mesquite Shrubland), besides the presence of a bottomland soil component. A scattered overstory may be present and may include netleaf hackberry (*Celtis reticulata*), western soapberry (*Sapindus saponaria* var. *drummondii*), eastern cottonwood (*Populus deltoides*), and black willow (*Salix nigra*). Albeit few in numbers, other shrub species found may include lotebush, Chickasaw plum, and baccharis. Herbaceous forb cover may include switchgrass (*Panicum virgatum*), silver bluestem, Texas wintergrass, and little bluestem. Non-native grasses are commonly present, if not dominating, as the herbaceous vegetative cover in this cover type and often include Bermuda grass (*Cynodon dactylon*), rescuegrass (*Bromus catharticus*), Johnsongrass (*Sorghum halepense*), and field brome (*Bromus arvensis*).

The Non-Native Invasive: Elm – Olive Woodland EMST cover type is present in the southwestern portion of the study area in three isolated areas. This cover type is often found along fences, home sites, and in areas with shelterbelt plantings. This cover type is often dominated by Siberian elm (*Ulmus pumila*) and Russian olive (*Elaeagnus angustifolia*) with less common honey mesquite and hackberries (*Celtis* spp.).

The Riparian Grassland/Woodland land cover class is primarily found in the southern portion of the study area, adjacent to the Monahans Draw depicted on historical USGS topographic maps, as shown in **Figure 3-5**. This land cover class is composed of six EMST cover types (in order of prevalence):

1. High Plains: Riparian Hardwood Forest;
2. High Plains: Playa Marsh;
3. High Plains: Riparian Herbaceous Vegetation;
4. High Plains: Playa Grassland;
5. Non-Native Invasive: Giant Reed; and
6. High Plains: Depressional Marsh.

The High Plains: Riparian Hardwood Forest EMST cover type is found in the southern portion of the study area adjacent to the Monahans Draw depicted on historical USGS topographic maps. This cover type is dominated by deciduous species and comprised of eastern cottonwood, black willow, netleaf hackberry, western soapberry, Ashe juniper,

redberry juniper, or plateau live oak. The herbaceous layer is generally comprised of tobosa, Texas wintergrass, silver bluestem, and little bluestem. Other species that may be present include honey mesquite, saltcedars, Russian olive, and Siberian elm.

The High Plains: Playa Marsh EMST cover type is mapped adjacent to the Native Invasive: Mesquite Shrubland EMST cover type in the northern half of the study area. As opposed to the High Plains: Playa Grassland EMST cover type, this cover type correlates with areas of a playa depression or lake with significant periods of inundation, where marsh vegetative cover often dominates the feature. This herbaceous vegetation cover includes species that include arrowheads (*Sagittaria* spp.), cattails (*Typha* spp.), bulrushes (*Schoenoplectus* spp.), spikerushes (*Eleocharis* spp.), and smartweeds (*Polygonum* spp.).

The High Plains: Riparian Herbaceous Vegetation EMST cover type is found among isolated drainage or depression features within the study area. This cover type includes grassland or marsh habitat among riparian intermittent headwater streams or drainages developed via erosional, instead of depositional, processes over bottomland soils. This cover type is primarily represented with mesic grasslands or marshes and may include herbaceous species such as tobosa, Texas wintergrass, silver bluestem, and little bluestem.

The High Plains: Playa Grassland EMST cover type is mapped in two isolated areas in the eastern half of the study area. These playa depressions reside over Vertisol soils and are generally shallow, small, and circular. Playas found within this cover type act as recharge basins for the Edwards-Trinity Plateau Aquifer by pooling moisture from rainfall among internally draining watersheds. This cover type is typically found in drier portions of playa lakes not as frequently inundated for extended periods of time. The High Plains: Playa Grassland EMST cover type is often found among playa lakes dominated with herbaceous species such as western wheatgrass (*Pascopyrum smithii*), buffalograss, pale spikerush (*Eleocharis macrostachya*), vine mesquite (*Panicum obtusum*), blue-weed (*Helianthus ciliaris*), common frog-fruit (*Phyla nodiflora*), beakpod evening primrose (*Oenothera canescens*), narrowleaf goosefoot (*Chenopodium leptophyllum*), woollyleaf bur ragweed (*Ambrosia grayi*), Pennsylvania smartweed (*Polygonum pensylvanicum*), and eastern annual saltmarsh aster (*Symphyotrichum subulatum*).

The Non-Native Invasive: Giant Reed EMST cover type is isolated in the southwestern corner of the study area. This cover type is monotypic and consists of giant reed (*Arundo donax*).

The High Plains: Depressional Marsh EMST cover type is mapped in one isolated area in the southeastern corner of the study area. This cover type includes depressions along drainages, lakes, and lowland depressions. As this cover type incorporates a broad spectrum of emergent and submergent marshes, a wide variety of herbaceous vegetation may be included within this cover type, including emergent species such as cattails, sedges (*Carex* spp.), rushes (*Juncus* spp.), and bulrushes, or floating genera like pondweeds (*Potamogeton* spp.), arrowheads, and hornworts (*Ceratophyllum* spp.).

A list of plant species commonly found throughout the various cover classes in the study area is presented in **Table 3-2**. The prairie component in these cover types was originally maintained by periodic fires that destroyed invading woody species, such as honey mesquite and redberry juniper. During historical times, farmers and ranchers used fire, as well as mechanical clearing and herbicides, to suppress encroaching woody plants.

The Urban land cover class includes areas where little or no vegetation cover existed at the time of image data collection. The urban cover types are isolated in the northwestern portion of the study area, associated with the City of Odessa, oil and gas facilities, and Loop 338. (NRCS, 2019; TPWD, 2014; TPWD, 2024b; United States Department of Agriculture [USDA], 2022). A variety of grasses, forbs, and woody species pervade unimproved rangeland pastures and roadside areas. As previously noted, unmanaged, grass-dominated areas (in the absence of fire) eventually transition to upland shrubland areas. These shrubland areas continue to provide rangeland pasture for livestock, although of decreasing forage quality and quantity.

The Row Crop land cover class consists of irrigated crops isolated in the southwestern corner of the study area, and is discussed further in **Section 3.5.1.3**. The Open Water land cover class is present in the western half of the study area as isolated features. The Open Water land cover types are associated with the Monahans Draw depicted on historical USGS topographic maps in the southwestern portion of the study area and utility facilities in the northwestern portion of the study area.

Table 3-2. Plant Species within EMST Cover Classes

Common Name	Scientific Name	EMST Cover Class[1]		
		Upland Grassland / Prairie	Upland Woodland / Shrubland	Riparian Grassland / Woodland
Major Associated Grasses				
Alkali sacaton	*Sporobolus airoides*	X		
Bermuda grass	*Cynodon dactylon*		X	
Beakpod evening primrose	*Oenothera canescens*			X
Big bluestem	*Andropogon gerardii*	X		
Big sacaton	*Sporobolus wrightii*	X		
Big sandreed	*Calamovilfa gigantea*	X		
Black grama	*Bouteloua eriopoda*	X		
Blazingstar	*Mentzelia* spp.	X		
Blue grama	*Bouteloua gracilis*	X		
Blue-weed	*Helianthus ciliaris*			X
Buffalograss	*Buchloe dactyloides*	X		X
Bulrush	*Schoenoplectus* spp.			X
Burrograss	*Scleropogon brevifolius*	X		
Cattail	*Typha* spp.			X
Common frog-fruit	*Phyla nodiflora*			X
Common sandbur	*Cenchrus spinifex*	X		
Eastern annual saltmarsh aster	*Symphyotrichum subulatum*			X
False Rhodes grass	*Trichloris crinita*	X		
Field brome	*Bromus arvensis*		X	
Giant dropseed	*Sporobolus giganteus*	X		
Gyp dropseed	*Sporobolus nealleyi*		X	
Gyp grama	*Bouteloua breviseta*	X	X	
Gypgrass	*Sporobolus nealleyi*	X		
Johnsongrass	*Sorghum halepense*		X	
Lehmann lovegrass	*Eragrostis lehmanniana*	X		
Little bluestem	*Schizachyrium scoparium*	X	X	X
Mediterranean lovegrass	*Eragrostis barrelieri*	X		
Mesa dropseed	*Sporobolus flexuosus*	X		
Moonpods	*Selinocarpus* spp.	X		
Narrowleaf goosefoot	*Chenopodium leptophyllum*			X
Onion blanket-flower	*Gaillardia multiceps*	X	X	
Pale spikerush	*Eleocharis macrostachya*			X
Pennsylvania smartweed	*Polygonum pensylvanicum*			X
Pink pappusgrass	*Pappophorum bicolor*	X		
Purple threeawn	*Aristida purpurea*	X		
Rescuegrass	*Bromus catharticus*		X	
Ringstems	*Anulocaulis* spp.	X		
Rough coldenia	*Tiquilia hispidissima*	X		
Rush	*Juncus* spp.			X
Saltgrass	*Distichlis spicata*	X		
Sand bluestem	*Andropogon hallii*	X		
Sand dropseed	*Sporobolus cryptandrus*	X		
Sand muhly	*Muhlenbergia arenicola*	X		
Sand nama	*Nama carnosum*	X		
Sea ox-eye daisy	*Borrichia frutescens*		X	
Sedge	*Carex* spp.			X
Sideoats grama	*Bouteloua curtipendula*	X		
Silver bluestem	*Bothriochloa laguroides* ssp. *torreyana*	X	X	X
Spectaclepod	*Dimorphocarpa wislizeni*	X		
Switchgrass	*Panicum virgatum*		X	
Texas wintergrass	*Nassella leucotricha*	X	X	X

Table 3-2. Plant Species within EMST Cover Classes – Continued

Common Name	Scientific Name	EMST Cover Class[1]		
		Upland Grassland / Prairie	Upland Woodland / Shrubland	Riparian Grassland / Woodland
Major Associated Grasses				
Thin paspalum	*Paspalum setaceum*	X		
Trailing ratany	*Krameria lanceolata*	X		
Tobosa	*Pleuraphis mutica*	X		X
Western wheatgrass	*Pascopyrum smithii*			X
Woollyleaf bur ragweed	*Ambrosia grayi*			X
Wooly dalea	*Dalea lanata*	X		
Wooly tidestromia	*Tidestromia lanuginosa*	X		
Vine mesquite	*Panicum obtusum*			X
Major Associated Herbaceous and Forbs				
African rue	*Peganum harmala*	X	X	
Allthorn	*Koeberlinia spinosa*		X	
Arrowhead	*Sagittaria* spp.			X
Bristly nama	*Nama hispidum*		X	
Broom pea	*Psorothamnus scoparius*	X		
Burrobush	*Ambrosia dumosa*		X	
Camelthorn	*Alhagi maurorum*	X	X	
Giant reed	*Arundo donax*			X
Hairy crinklemat	*Tiquilia hispidissima*		X	
Hartweg evening primrose	*Calylophus hartwegii*	X		
Hornwort	*Ceratophyllum* spp.			X
Lotebush	*Ziziphus obtusifolia*	X	X	
Pondweed	*Potamogeton* spp.			X
Prickly Russian thistle	*Salsola tragus*	X	X	
Saltcedars	*Tamarix* spp.		X	X
Shrubby sumpweed	*Iva frutescens*		X	
Smartweeds	*Polygonum* spp.			X
Southern Jimmy-weed	*Isocoma pluriflora*		X	
Spikerushes	*Eleocharis* spp.			X
Tarbush	*Flourensia cernua*		X	
Threadleaf glowwort	*Sartwellia flaveriae*	X	X	
Tubercled saltbush	*Atriplex acanthocarpa*		X	
Western honey mesquite	*Prosopis glandulosa var. torreyana*		X	
Winged sea purslane	*Sesuvium verrucosum*		X	
Major Associated Woody Plants				
Agarito	*Mahonia trifoliolata*		X	
Ashe juniper	*Juniperus ashei*		X	X
Baccharis	*Baccharis* spp.		X	
Black willow	*Salix nigra*		X	X
Brasil	*Condalia hookeri*		X	
Catclaw acacia	*Acacia greggii*			
Cedar elm	*Ulmus crassifolia*		X	
Chickasaw plum	*Prunus angustifolia*		X	
Coastal live oak	*Quercus virginiana*		X	
Common persimmon	*Diospyros virginiana*		X	
Creosote bush	*Larrea tridentata*	X	X	
Desert seepweed	*Suaeda suffrutescens*		X	
Eastern cottonwood	*Populus deltoides*		X	X
Four-wing saltbush	*Atriplex canescens*		X	
Granjeno	*Celtis ehrenbergiana*		X	
Hackberries	*Celtis* spp.		X	
Harvard's shin oak	*Quercus havardii*	X	X	
Honey mesquite	*Prosopis glandulosa*	X	X	X

Table 3-2. Plant Species within EMST Cover Classes – Continued

Common Name	Scientific Name	EMST Cover Class[1]		
		Upland Grassland / Prairie	Upland Woodland / Shrubland	Riparian Grassland / Woodland
Huisache	*Acacia farnesiana*		X	
Javelina bush	*Condalia ericoides*		X	
Netleaf hackberry	*Celtis reticulata*		X	X
Pickle-weed	*Allenrolfea occidentalis*		X	
Plains yucca	*Yucca campestris*	X		
Plateau live oak	*Quercus fusiformis*		X	X
Post oak	*Quercus stellata*		X	
Redberry juniper	*Juniperus pinchotii*	X		X
Russian olive	*Elaeagnus angustifolia*		X	X
Sand sagebrush	*Artemisia filifolia*	X		
Siberian elm	*Ulmus pumila*		X	X
Skunkbush sumac	*Rhus trilobata*		X	
Soaptree yucca	*Yucca elata*	X		
Sugar hackberry	*Celtis laevigata*		X	
Sumac	*Rhus* spp.		X	
Tasajillo	*Cylindropuntia leptocaulis*		X	
Texas persimmon	*Diospyros texana*		X	
Torrey jointfir	*Ephedra torreyana*		X	
Torrey's yucca	*Yucca torreyi*	X	X	
Western soapberry	*Sapindus saponaria* var. *drummondii*		X	X
Winged elm	*Ulmus alata*		X	
Major Associated Succulent or Cactus				
Texas prickly pear	*Opuntia engelmannii* var. *lindheimeri*		X	

Sources: Elliott, 2014; Griffith et al., 2007; NRCS, 2022; NRCS, 2024; TPWD, 1984; TPWD, 2011; TPWD, 2014; TPWD, 2024b.

Notes:

[1] Potential presence of a species within an EMST cover class is denoted with an 'X'.
Vegetation is categorized by major associations that correlate with either: grass species, forb, or herbaceous species (i.e., non-woody plants); woody plant species (e.g., trees or shrubs); vine species; or succulent species. Not all of these major associated plant classes may be present in a given EMST cover class.

3.5.1.2 Aquatic/Hydric Vegetation

The hydric habitats in the study area are limited and are generally adjacent to impoundments, drainages, playa depressions, and unnamed streams. Impoundments generally result in either permanent, intermittent, or ephemeral freshwater flat wetlands, marshes, or fringe marshes. Vegetation in aquatic habitats would typically be limited to the shallow edges of the water. Plant species common to this habitat type include grasses, rushes, sedges, cattails, smartweeds, spikerushes, pondweeds, arrowheads, and hornwort.

To identify areas that may potentially contain wetland habitats, National Wetlands Inventory (NWI) maps (on 1 to 24,000 scale topographic base maps) were examined.

These maps highlight areas where potential jurisdictional wetland features may be found, based on aerial photography and ground topography (USFWS, 2024a).

The NWI maps indicate that wetland areas that range in size and classification consist of several different types and are scattered throughout the study area. Several emergent and forested wetlands are located among stream headwaters that drain northeast. The remaining hydric habitat areas could be considered wetlands subject to federal jurisdiction, if they are associated with streams that have a surface connection to a relatively permanent water that connects to a traditionally navigable water.

3.5.1.3 Commercially or Recreationally Important Vegetation

The production of crops is common in the vicinity of the study area (NearMap, 2023; NRCS, 2022; NRCS, 2024; TPWD, 2014; TPWD, 2024b). Commercially important crops in this region include forage, corn for grain, and cotton, where production of some crops includes use of irrigation systems. While forage is the most prevalent crop, rangeland for livestock is a more widespread agricultural land use in terms of the numbers of acres used throughout Ector and Midland counties (USDA, 2022). The native grassland in the region has been grazed for several generations. As a result, a high percentage of the more desirable grasses and forbs for livestock have been grazed out. This has permitted fewer desirable grasses, weeds, and brush to invade.

Habitat, rather than any particular plant species, is important for recreational hunting in the study area. Birds and mammals that prefer open habitat make use of the abundant rangeland throughout the study area. Waterfowl may make use of playa lakes and wetlands in or near the study area.

3.5.1.4 Endangered and Threatened Plant Species

TPWD maintains the Natural Diversity Database (NDD) to track known occurrences of threatened, endangered, and otherwise rare plant and animal species throughout Texas. The NDD provides information about the locations and descriptions of rare habitats and areas managed to achieve high species diversity, as well as provide quality habitat for common and rare wildlife species. Typically, information obtained from the NDD includes a descriptive record with Element Occurrence Identification (EOID) numbers corresponding with mapped locations of all rare habitats within the study area. TPWD and USFWS lists of endangered and threatened species for Ector and Midland counties were

also reviewed. Maps and data received from the NDD in April 2024 indicated no recorded observations of any state or federally listed plant species within the study area (TPWD, 2024c; TPWD, 2024d; USFWS, 2024b; USFWS, 2024c). It is important to note that because the NDD is based on the best data available to TPWD regarding rare species, these data cannot provide a definitive statement as to the presence, absence, or condition of specific species, natural communities, or other significant features in any area. Given the small proportion of public versus private land in Texas, the NDD does not include a representative inventory of rare resources in the state. Also, the data is not complete, as there are gaps in coverage due to the lack of access to land or data and a lack of staff and resources to collect and process data on all rare and significant resources.

A review of federally and state listed endangered or threatened species was conducted for Ector and Midland counties. There are no endangered or threatened plant species under federal listing with the USFWS or under state listing with TPWD for Ector or Midland counties (TPWD, 2024c; TPWD, 2024d; USFWS, 2024b; USFWS, 2024c). Through the Texas Conservation Action Plan, TPWD strives to sustain "species of greatest conservation need" (SGCN), whether terrestrial, freshwater, or marine species, including birds, mammals, reptiles, amphibians, invertebrates, fishes, plants, and plant communities. Species that exhibit declining numbers or are rare may be designated as SGCN by TPWD. The goal for the Texas Conservation Action Plan is to identify and classify species as SGCN to develop a plan to prevent future listings under the Endangered Species Act (ESA). This designation indicates the agency's awareness of the species but does not signify a protected regulatory status (TPWD, 2012). Data from TPWD county lists indicate the following species shown in **Table 3-3** are known to occur in Ector and Midland counties (TPWD, 2024c). Species with specific geographic locations, assumed endemic to montane habitats, or species with limited ranges isolated from the study area were not included in **Table 3-3**. Species with broad habitat requirements or not geographically bound within Ector or Midland counties may be expected to occur within the study area, where suitable habitat is present.

Table 3-3. Endangered, Threatened, or Rare Plants

Common Name	Scientific Name	Listing Status[1, 2]		Potential to Occur within Study Area?
		Federal	State	
Cory's ephedra	*Ephedra coryi*	--	SGCN	Yes
Jones' selenia	*Selenia jonesii*	--	SGCN	No
Neglected sunflower	*Helianthus neglectus*	--	SGCN	Yes
Sticky tansy aster	*Xanthisma viscidum*	--	SGCN	Yes

Sources: TPWD, 2024c; TPWD, 2024d; USFWS, 2024b; USFWS, 2024c.
Notes:

[1] **USFWS listing codes**: blank = no federal status)

[2] **TPWD listing codes**: SGCN = Species of Greatest Conservation Need (i.e., rare species with no regulatory listing status)

Cory's ephedra is found on dunes, sandy areas, or dry grasslands in the Southern High Plains. This perennial shrub flowers April to September and fruits May to September (NatureServe Explorer, 2024; TPWD, 2024d). The NDD includes two historical records of Cory's ephedra, one within Ector County and one within Midland County, the nearest of which is approximately 2.5 miles north of the study area (TPWD, 2024c). With the presence of sandy loamy soils and dry prairies throughout the study area, there is potential for Cory's ephedra to be present wherever suitable habitat exists.

Jones' selenia is an annual flower found on wet clayey soils of stream margins, playa lakes, and roadsides of the western Edwards Plateau and nearby areas. This plant flowers from February to April and fruits between March and April (TPWD, 2024d). The NDD includes one historical record of Jones' selenia in southeastern Midland County, more than 25 miles southeast of the study area (TPWD, 2024c). The majority of the study area is comprised of loamy soils with minimal amounts of clay loams. The presence in the study area by the Jones' selenia is unlikely given the lack of suitable habitat.

The neglected sunflower is an annual plant that flowers between July and September. This species prefers rolling hills over deep sands or dunes over Pleistocene sand sheets. Common habitats are Harvard's shin oak dwarf woodlands or mesquite-sand sage woodlands (NatureServe Explorer, 2024; TPWD, 2024d). The NDD includes two records of the neglected sunflower in Ector County, the closest of which is approximately 25 miles southwest of the study area (TPWD, 2024c). There is potential for the neglected sunflower to be present wherever suitable habitat exists in the study area.

The sticky tansy aster is an annual species that is generally found in sandy plains. Preferred habitat includes Chihuahuan Desert shrublands or mesquite grasslands that overlay calcareous or sandy soils (NatureServe Explorer, 2024; TPWD, 2024d). There is potential for the sticky tansy aster to be present wherever suitable habitat exists in the study area.

3.5.2 Fish and Wildlife

3.5.2.1 Terrestrial Wildlife

A wide variety of vertebrate species including amphibians, reptiles, mammals, and birds occur throughout the study area. These animals are addressed below in two groups: commonly occurring (i.e., "common") species; and species that are considered threatened, endangered, or rare by TPWD or USFWS. The information about common wildlife species presented in **Tables 3-4** through **3-10** is generally based on reference sources that provide species distribution information on a county-by-county basis. Species with specific geographic locations, or assumed endemic to montane habitats or species with limited ranges isolated from the study area, were not included in **Tables 3-4** through **3-10**. Species with broad habitat requirements or not geographically bound within Ector or Midland counties may be expected to occur within the study area, where suitable habitat is present.

Habitat types for the wildlife discussed below are grouped into seven general categories: woodland, desert, shrubland, open, water, cultivated, and urban. Woodland habitat is home to species that live on or in the ground within forested areas or are arboreal in nature. Woodlands may also include riparian forest areas found in stream floodplains that may overlap water habitats to some extent. Deserts are found in arid regions and may contain a mix of grassland, shrubland, or open habitat. Shrubland habitat is dominated by woody vegetation but is generally low-growing and lacks taller trees. Open habitat includes grasslands or arid/semi-arid rocky areas. Cultivated areas consist of row crops, orchards, or grain fields. Hay meadows were excluded from the cultivated habitat type and characterized as grassland habitat. Water habitat is for all aquatic species, as well as those which live exclusively near water (e.g., frogs or wading birds). Urban habitats are favored by those animals which thrive in man-made environments and succeed in disturbed areas.

Amphibians

Amphibian species native to Texas include caudate species (i.e., salamanders and newts) and anuran species (i.e., frogs and toads). Salamanders and newts are restricted to aquatic or moist habitats, but some frogs/toads inhabit more arid environments. All species require water during reproduction, either during the act of mating or for rearing young. Amphibians are ectothermic (i.e., "cold blooded," lacking the ability to internally regulate body temperature) and are particularly vulnerable to pollution because they respire through their skin. **Table 3-4** presents the amphibian species known to occur within Ector or Midland counties.

Table 3-4. Amphibian Species within the Study Area

Common Name	Scientific Name	Habitat Preference(s)
Order: Anura (frogs and toads)		
Couch's spadefoot toad	*Scaphiopus couchii*	Open
Great Plains narrowmouth toad	*Gastrophryne olivacea*	Desert – Open – Woodland
Green toad	*Anaxyrus debilis*	Desert – Open
Mexican spadefoot	*Spea multiplicata*	Open
Plains spadefoot	*Spea bombifrons*	Open
Red-spotted toad	*Anaxyrus punctatus*	Desert – Open
Rio Grande leopard frog	*Rana berlandieri*	Open – Cultivated
Texas toad	*Anaxyrus speciosus*	Cultivated – Open
Woodhouse's toad	*Anaxyrus woodhousii*	Desert – Open – Woodland
Order: Caudata (salamanders and newts)		
Barred tiger salamander	*Ambystoma mavortium*	Water
Sources: AmphibiaWeb, 2024; Conant and Collins, 1998.		

Reptiles

Reptile species native to west Texas include turtles, snakes, and lizards. Reptiles have thick, scaly skin to protect their bodies. Most lay soft, leathery eggs, although some bear live young. Reptiles, like amphibians, are ectothermic. **Table 3-5** presents the reptile species known to occur within either Ector or Midland counties due to the proximity of the study area to the county line.

Table 3-5. Reptile Species within the Study Area

Common Name	Scientific Name	Habitat Preference(s)
Order: Squamata (snakes and lizards)		
Black-tailed rattlesnake	*Crotalus molossus*	Open
Bullsnake	*Pituophis catenifer sayi*	Desert – Open
Checkered garter snake	*Thamnophis marcianus*	Open – Water
Common checkered whiptail	*Cnemidophorus tesselatus*	Desert – Open – Woodland
Common side-blotched lizard	*Uta stansburiana*	Open
Desert kingsnake	*Lampropeltis getula splendida*	Water
Desert massasauga	*Sistrurus catenatus edwardsii*	Desert

Table 3-5. Reptile Species within the Study Area – Continued

Common Name	Scientific Name	Habitat Preference(s)
Order: Squamata (snakes and lizards)		
Dunes sagebrush lizard	*Sceloporus arenicolus*	Desert – Open – Shrubland
Eastern collared lizard	*Crotaphytus collaris collaris*	Open
Tree lizard	*Urosaurus ornatus*	Woodland – Shrubland
Glossy snake	*Arizona elegans*	Desert – Open
Gray-checkered whiptail	*Aspidoscelis dixoni*	Desert – Open – Woodland
Greater earless lizard	*Cophosaurus texanus*	Desert – Open
Great Plains rat snake	*Elaphe emoryi*	Open
Great Plains skink	*Eumeces obsoletus*	Open – Water
Long-nosed snake	*Rhinocheilus lecontei*	Open
Marbled whiptail	*Cnemidophorus marmoratus*	Desert – Open
New Mexico threadsnake	*Rena dissectus*	Desert – Open
Plains black-headed snake	*Tantilla nigriceps*	Desert – Open
Prairie rattlesnake	*Crotalus viridis*	Open
Prairie racerunner	*Cnemidophorus sexlineatus viridis*	Desert – Open
Prairie ring-necked snake	*Diadophis punctatus arnyi*	Open
Regal ring-necked snake	*Diadophis punctatus regalis*	Water – Woodland
Round-tailed horned lizard	*Phrynosoma modestum*	Desert – Open
Smith's black-headed snake	*Tantilla hobartsmithi*	Woodland – Open – Shrubland
Spot-tailed earless lizard	*Holbrookia lacerata*	Desert – Open
Texas banded gecko	*Coleonyx brevis*	Open
Texas blind snake	*Leptotyphlops dulcis*	Desert – Open
Texas horned lizard	*Phrynosoma cornutum*	Open
Texas night snake	*Hypsiglena torquate texana*	Open
Texas spotted whiptail	*Cnemidophorus gularis gularis*	Open
Western coachwhip	*Masticophis flagellum testaceus*	Open
Western diamondback rattlesnake	*Crotalus atrox*	Open
Western hognose snake	*Heterodon nasicus*	Desert – Open
Western massasauga	*Sistrurus tergeminus*	Desert
Western rattlesnake	*Crotalus viridis*	Open
Order: Testudines (turtles)		
Desert box turtle	*Terrapene ornata luteola*	Open
Ornate box turtle	*Terrapene ornata ornata*	Open
Red-eared slider	*Trachemys scripta*	Water
Snapping Turtle	*Chelydra serpentina*	Water
Western box turtle	*Terrapene ornate*	Open
Yellow mud turtle	*Kinosternon flavescens*	Water
Sources: Conant and Collins, 1998; International Union for Conservation of Nature and Natural Resources (IUCN), 2024; NatureServe Explorer, 2024; Texas Turtles, 2024.		

Birds

Birds differ from other animal groups in that feathers cover part or all of their bodies, and they lay hard, calcium-rich eggs. The four tables below present bird species that could occur in the study area at various times throughout the year. They are divided into groups based on residency: permanent residents (**Table 3-6**); breeding (i.e., summer) residents (**Table 3-7**); winter residents (**Table 3-8**); and those which migrate through the area between their breeding and winter grounds (**Table 3-9**).

Table 3-6. Bird Species that may Permanently Reside within the Study Area

Common Name	Scientific Name	Order	Habitat Preference(s)
American coot	*Fulica americana*	Gruiformes	Water
American kestrel	*Falco sparverius*	Falconiformes	Open
American robin	*Turdus migratorius*	Passeriformes	Open – Woodland
Barn owl	*Tyto alba*	Strigiformes	Woodland – Urban
Bewick's wren	*Thryomanes bewickii*	Passeriformes	Woodland
Black-crowned night-heron	*Nycticorax nycticorax*	Pelecaniformes	Water
Black-throated sparrow	*Amphispiza bilineata*	Passeriformes	Shrubland
Blue jay	*Cyanocitta cristata*	Passeriformes	Woodland
Brown-headed cowbird	*Molothrus ater*	Passeriformes	Woodland – Open
Burrowing owl	*Athene cunicularia*	Strigiformes	Open
Cactus wren	*Campylorhynchus brunneicapillus*	Passeriformes	Desert – Shrubland
Canyon towhee	*Melozone fusca*	Passeriformes	Shrubland – Open
Canyon wren	*Catherpes mexicanus*	Passeriformes	Desert
Cassin's sparrow	*Peucaea cassinii*	Passeriformes	Open
Chihuahuan raven	*Corvus cryptoleucus*	Passeriformes	Shrubland
Cooper's hawk	*Accipiter cooperii*	Falconiformes	Woodland
Crissal thrasher	*Toxostoma crissale*	Passeriformes	Shrubland
Curve-billed thrasher	*Toxostoma curvirostre*	Passeriformes	Shrubland
Eastern meadowlark	*Sturnella magna*	Passeriformes	Open
Eurasian-collared dove	*Streptopelia decaocto*	Columbiformes	Urban
European starling	*Sturnus vulgaris*	Passeriformes	Woodland – Urban
Great blue heron	*Ardea herodias*	Pelecaniformes	Water
Greater roadrunner	*Geococcyx californianus*	Cuculiformes	Woodland – Open
Great horned owl	*Bubo virginianus*	Strigiformes	Woodland – Open – Urban
Great-tailed grackle	*Quiscalus mexicanus*	Passeriformes	Open – Urban
Green heron	*Butorides virescens*	Pelecaniformes	Water
Harris's hawk	*Parabuteo unicinctus*	Accipitriformes	Shrubland
Horned lark	*Eremophila alpestris*	Passeriformes	Open
House finch	*Haemorhous mexicanus*	Passeriformes	Woodland – Open – Urban
House sparrow	*Passer domesticus*	Passeriformes	Urban
Inca dove	*Columbina inca*	Columbiformes	Urban
Killdeer	*Charadrius vociferus*	Charadriiformes	Open
Ladder-backed woodpecker	*Picoides scalaris*	Piciformes	Shrubland
Lark sparrow	*Chondestes grammacus*	Passeriformes	Open
Lesser goldfinch	*Spinus psaltria*	Passeriformes	Woodland – Open
Loggerhead shrike	*Lanius ludovicianus*	Passeriformes	Open
Mourning dove	*Zenaida macroura*	Columbiformes	Woodland – Open – Urban
Northern bobwhite	*Colinus virginianus*	Galliformes	Open
Northern cardinal	*Cardinalis cardinalis*	Passeriformes	Woodland
Northern mockingbird	*Mimus polyglottos*	Passeriformes	Woodland – Open – Urban
Pied-billed grebe	*Podilymbus podiceps*	Podicipediformes	Water
Pyrrhouloxia	*Cardinalis sinuatus*	Passeriformes	Shrubland
Red-tailed hawk	*Buteo jamaicensis*	Falconiformes	Woodland – Open
Red-winged blackbird	*Agelaius phoeniceus*	Passeriformes	Open
Rock dove	*Columba livia*	Columbiformes	Open – Urban

Table 3-6. Bird Species that may Permanently Reside within the Study Area – Continued

Common Name	Scientific Name	Order	Habitat Preference(s)
Rock wren	*Salpinctes obsoletus*	Passeriformes	Open – Desert
Rufous-crowned sparrow	*Aimophila ruficeps*	Passeriformes	Shrubland
Scaled quail	*Callipepla squamate*	Galliformes	Open
Turkey vulture	*Cathartes aura*	Cathartiformes	Open – Woodland – Urban
Verdin	*Auriparus flaviceps*	Passeriformes	Shrubland
Western grebe	*Aechmophorus occidentalis*	Podicipediformes	Water
Western meadowlark	*Sturnella neglecta*	Passeriformes	Open
White-winged dove	*Zenaida asiatica*	Columbiformes	Woodland – Open
Wild turkey	*Meleagris gallopavo*	Galliformes	Open – Woodland
Woodhouse's scrub-jay	*Aphelocoma woodhouseii*	Passeriformes	Shrubland

Sources: Cornell Lab of Ornithology (Cornell), 2024; eBird, 2024; NatureServe Explorer, 2024; Sibley, 2003.

Table 3-7. Bird Species that may Breed within the Study Area

Common Name	Scientific Name	Order	Habitat Preference(s)
American coot	*Fulica americana*	Gruiformes	Water
Ash-throated flycatcher	*Myiarchus cinerascens*	Passeriformes	Open – Woodland
Barn owl	*Tyto alba*	Strigiformes	Woodland – Urban
Barn swallow	*Hirundo rustica*	Passeriformes	Open – Urban
Bell's vireo	*Vireo bellii*	Passeriformes	Shrubland
Bewick's wren	*Thryomanes bewickii*	Passeriformes	Woodland
Black-necked stilt	*Himantopus mexicanus*	Charadriiformes	Water
Black-chinned hummingbird	*Archilochus alexandri*	Caprimulgiformes	Woodland
Black-throated sparrow	*Amphispiza bilineata*	Passeriformes	Shrubland
Blue-gray gnatcatcher	*Polioptila caerulea*	Passeriformes	Woodland
Blue grosbeak	*Passerina caerulea*	Passeriformes	Woodland
Brown-headed cowbird	*Molothrus ater*	Passeriformes	Woodland – Open
Bullock's oriole	*Icterus bullockii*	Passeriformes	Open
Cactus wren	*Campylorhynchus brunneicapillus*	Passeriformes	Desert – Shrubland
Canyon towhee	*Melozone fusca*	Passeriformes	Shrubland – Open
Cassin's sparrow	*Peucaea cassinii*	Passeriformes	Open
Cattle egret	*Bubulcus ibis*	Pelecaniformes	Water
Cave swallow	*Petrochelidon fulva*	Passeriformes	Open
Chihuahuan raven	*Corvus cryptoleucus*	Passeriformes	Shrubland
Chimney swift	*Chaetura pelagica*	Caprimulgiformes	Open – Urban
Cliff swallow	*Petrochelidon pyrrhonota*	Passeriformes	Open – Water
Common nighthawk	*Chordeiles minor*	Caprimulgiformes	Open
Common poorwill	*Phalaenoptilus nuttallii*	Caprimulgiformes	Shrubland
Crissal thrasher	*Toxostoma crissale*	Passeriformes	Shrubland
Curve-billed thrasher	*Toxostoma curvirostre*	Passeriformes	Shrubland
Eastern meadowlark	*Sturnella magna*	Passeriformes	Open
Grasshopper sparrow	*Ammodramus savannarum*	Passeriformes	Open
Greater roadrunner	*Geococcyx californianus*	Cuculiformes	Woodland – Open
Great horned owl	*Bubo virginianus*	Strigiformes	Woodland – Open – Urban
Horned lark	*Eremophila alpestris*	Passeriformes	Open
Killdeer	*Charadrius vociferus*	Charadriiformes	Open
Lark sparrow	*Chondestes grammacus*	Passeriformes	Open
Lesser goldfinch	*Spinus psaltria*	Passeriformes	Woodland – Open
Loggerhead shrike	*Lanius ludovicianus*	Passeriformes	Open

Table 3-7. Bird Species that may Breed within the Study Area – Continued

Common Name	Scientific Name	Order	Habitat Preference(s)
Mississippi kite	*Ictinia mississippiensis*	Accipitriformes	Open – Woodland
Mourning dove	*Zenaida macroura*	Columbiformes	Woodland – Open – Urban
Northern bobwhite quail	*Colinus virginianus*	Galliformes	Open
Northern cardinal	*Cardinalis cardinalis*	Passeriformes	Woodland
Northern mockingbird	*Mimus polyglottos*	Passeriformes	Woodland – Open – Urban
Northern rough-winged swallow	*Stelgidopteryx serripennis*	Passeriformes	Open – Water
Olive-sided flycatcher	*Contopus cooperi*	Passeriformes	Woodland
Orchard oriole	*Icterus spurius*	Passeriformes	Woodland
Painted bunting	*Passerina ciris*	Passeriformes	Shrubland
Purple martin	*Progne subis*	Passeriformes	Water
Pyrrhuloxia	*Cardinalis sinuatus*	Passeriformes	Shrubland
Red-winged blackbird	*Agelaius phoeniceus*	Passeriformes	Open
Rock dove	*Columba livia*	Columbiformes	Open – Urban
Rock wren	*Salpinctes obsoletus*	Passeriformes	Open – Desert
Rufous-crowned sparrow	*Aimophila ruficeps*	Passeriformes	Shrubland
Scissor-tailed flycatcher	*Tyrannus forficatus*	Passeriformes	Open
Snowy plover	*Charadrius nivosus*	Charadriiformes	Water
Summer tanager	*Piranga rubra*	Passeriformes	Woodland
Swainson's hawk	*Buteo swainsoni*	Accipitriformes	Open
Turkey vulture	*Cathartes aura*	Falconiformes	Woodland – Open – Urban
Verdin	*Auriparus flaviceps*	Passeriformes	Shrubland
Vermilion flycatcher	*Pyrocephalus rubinus*	Passeriformes	Open
Western kingbird	*Tyrannus verticalis*	Passeriformes	Open
Western meadowlark	*Sturnella neglecta*	Passeriformes	Open
White-winged dove	*Zenaida asiatica*	Columbiformes	Woodland – Open
Wild turkey	*Meleagris gallopavo*	Galliformes	Open – Woodland
Yellow-billed cuckoo	*Coccyzus americanus*	Cuculiformes	Woodland
Yellow-breasted chat	*Icteria virens*	Passeriformes	Shrubland
Sources: Cornell, 2024; eBird, 2024; NatureServe Explorer, 2024; Sibley, 2003.			

Table 3-8. Bird Species that may Winter within the Study Area

Common Name	Scientific Name	Order	Habitat Preference(s)
American goldfinch	*Carduelis tristis*	Passeriformes	Woodland – Open
American pipit	*Anthus rubescens*	Passeriformes	Open
American wigeon	*Anas americana*	Anseriformes	Water
Bald eagle	*Haliaetus leucocephalus*	Accipitriformes	Woodland
Belted kingfisher	*Megaceryle alcyon*	Coraciiformes	Water
Blue-winged teal	*Anas discors*	Anseriformes	Water
Brewer's blackbird	*Euphagus cyanocephalus*	Passeriformes	Urban – Cultivated – Open
Brown creeper	*Certhia americana*	Passeriformes	Woodland
Brown thrasher	*Toxostoma rufum*	Passeriformes	Shrubland
Bufflehead	*Bucephala albeola*	Anseriformes	Water
Canada goose	*Branta canadensis*	Anseriformes	Open – Water
Canvasback	*Aythya valisineria*	Anseriformes	Water
Cedar waxwing	*Bombycilla cedrorum*	Passeriformes	Woodland – Open
Chestnut-collared longspur	*Calcarius ornatus*	Passeriformes	Open
Chipping sparrow	*Spizella passerine*	Passeriformes	Woodlands – Open
Common goldeneye	*Bucephala clangula*	Anseriformes	Water
Common grackle	*Quiscalus quiscula*	Passeriformes	Open – Urban
Common merganser	*Mergus merganser*	Anseriformes	Water

Table 3-8. Bird Species that may Winter within the Study Area – Continued

Common Name	Scientific Name	Order	Habitat Preference(s)
Dark-eyed junco	*Junco hyemalis*	Passeriformes	Woodland
Double-crested cormorant	*Phalacrocorax auritus*	Suliformes	Water
Eared grebe	*Podiceps nigricollis*	Podicipediformes	Water
Eastern bluebird	*Sialia sialis*	Passeriformes	Woodland
Eastern phoebe	*Sayornis phoebe*	Passeriformes	Woodland – Urban
Ferruginous hawk	*Buteo regalis*	Accipitriformes	Open
Field sparrow	*Spizella pusilla*	Passeriformes	Open
Fox sparrow	*Passerella iliaca*	Passeriformes	Woodland – Open
Gadwall	*Anas strepera*	Anseriformes	Water
Golden eagle	*Aquila chrysaetos*	Accipitriformes	Open
Golden-crowned kinglet	*Regulus satrapa*	Passeriformes	Woodland
Greater yellowlegs	*Tringa melanoleuca*	Charadriiformes	Water
Green-tailed towhee	*Pipilo chlorurus*	Passeriformes	Shrubland
Green-winged teal	*Anas crecca*	Anseriformes	Water
Hermit thrush	*Catharus guttatus*	Passeriformes	Woodland – Open
House wren	*Troglodytes aedon*	Passeriformes	Woodland
Lark bunting	*Calamospiza melanocorys*	Passeriformes	Open
Least sandpiper	*Calidris minutilla*	Charadriiformes	Water
Lesser scaup	*Aythya affinis*	Anseriformes	Water
Lincoln's sparrow	*Melospiza lincolnii*	Passeriformes	Woodland – Open
Long-eared owl	*Asio otus*	Strigiformes	Woodland
Mallard	*Anas platyrhynchos*	Anseriformes	Water – Open
Marsh wren	*Cistothorus palustris*	Passeriformes	Water
McCown's longspur	*Rhynchophanes mccownii*	Passeriformes	Open
Merlin	*Falco columbarius*	Falconiformes	Open
Mississippi kite	*Ictinia mississippiensis*	Accipitriformes	Open – Woodland
Mountain bluebird	*Sialia currucoides*	Passeriformes	Open – Woodland
Northern flicker	*Colaptes auratus*	Piciformes	Woodland
Northern harrier	*Circus cyaneus*	Falconiformes	Open
Northern pintail	*Anas acuta*	Anseriformes	Water
Northern shoveler	*Anas clypeata*	Anseriformes	Water
Orange-crowned warbler	*Leiothlypis celata*	Passeriformes	Woodland – Water
Pine siskin	*Spinus pinus*	Passeriformes	Woodland – Open
Prairie falcon	*Falco mexicanus*	Falconiformes	Open
Red-breasted nuthatch	*Sitta canadensis*	Passeriformes	Woodland
Redhead	*Aythya americana*	Anseriformes	Water
Red-headed woodpecker	*Melanerpes erythrocephalus*	Piciformes	Woodland
Ring-billed gull	*Larus delawarensis*	Charadriiformes	Open – Water
Ring-necked duck	*Aythya collaris*	Anseriformes	Water
Rough-legged hawk	*Buteo lagopus*	Falconiformes	Open
Ruby-crowned kinglet	*Regulus calendula*	Passeriformes	Woodland
Ruddy duck	*Oxyura jamaicensis*	Anseriformes	Water
Sage thrasher	*Oreoscoptes montanus*	Passeriformes	Shrubland
Sandhill crane	*Antigone canadensis*	Gruiformes	Open – Water
Savannah sparrow	*Passerculus sandwichensis*	Passeriformes	Open
Say's phoebe	*Sayornis saya*	Passeriformes	Open
Sharp-shinned hawk	*Accipiter striatus*	Falconiformes	Woodland
Short-eared owl	*Asio flammeus*	Strigiformes	Open
Snow goose	*Chen caerulescens*	Anseriformes	Water
Song sparrow	*Melospiza melodia*	Passeriformes	Woodland
Sora	*Porzana carolina*	Gruiformes	Water
Spotted sandpiper	*Actitis macularius*	Charadriiformes	Water
Spotted towhee	*Pipilo maculatus*	Passeriformes	Shrubland
Sprague's pipit	*Anthus spragueii*	Passeriformes	Open
Swamp sparrow	*Melospiza georgiana*	Passeriformes	Open – Water
Townsend's solitaire	*Myadestes townsendi*	Passeriformes	Open – Woodland

Table 3-8. Bird Species that may Winter within the Study Area – Continued

Common Name	Scientific Name	Order	Habitat Preference(s)
Vesper sparrow	*Pooecetes gramineus*	Passeriformes	Open
Western bluebird	*Sialia mexicana*	Passeriformes	Open – Woodland
White-crowned sparrow	*Zonotrichia leucophrys*	Passeriformes	Woodland – Open
White-throated sparrow	*Zonotrichia albicollis*	Passeriformes	Woodland
Wilson's snipe	*Gallinago delicata*	Charadriiformes	Water
Wood duck	*Aix sponsa*	Anseriformes	Water – Woodland
Yellow-bellied sapsucker	*Sphyrapicus varius*	Piciformes	Woodland
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	Passeriformes	Open
Yellow-rumped warbler	*Dendroica coronata*	Passeriformes	Woodland
Sources: Cornell, 2024; eBird, 2024; NatureServe Explorer, 2024; Sibley, 2003.			

Table 3-9. Bird Species that may Migrate through the Study Area

Common Name	Scientific Name	Order	Habitat Preference(s)
American avocet	*Recurvirostra americana*	Charadriiformes	Water
American bittern	*Botaurus lentiginosus*	Pelecaniformes	Water
American golden-plover	*Pluvialis dominica*	Charadriiformes	Open – Water
American redstart	*Setophaga ruticilla*	Passeriformes	Woodland
American white pelican	*Pelecanus erythrorhynchos*	Pelecaniformes	Water
Baird's sandpiper	*Calidris bairdii*	Charadriiformes	Water
Baltimore oriole	*Icterus galbula*	Passeriformes	Woodland
Bank swallow	*Riparia riparia*	Passeriformes	Open – Water
Black-and-white warbler	*Mniotilta varia*	Passeriformes	Woodland
Black-bellied plover	*Pluvialis squatarola*	Charadriiformes	Water
Black-headed grosbeak	*Pheucticus melanocephalus*	Passeriformes	Woodland – Shrubland
Black-necked stilt	*Himantopus mexicanus*	Charadriiformes	Water
Black tern	*Chlidonias niger*	Charadriiformes	Water
Black-throated gray warbler	*Setophaga nigrescens*	Passeriformes	Woodland
Blue-gray gnatcatcher	*Polioptila caerulea*	Passeriformes	Woodland
Bonaparte's gull	*Chroicocephalus philadelphia*	Charadriiformes	Open – Water
Brewer's sparrow	*Spizella breweri*	Passeriformes	Shrubland
Broad-tailed hummingbird	*Selasphorus platycercus*	Caprimulgiformes	Woodland
Calliope hummingbird	*Selasphorus calliope*	Caprimulgiformes	Woodland
Cinnamon teal	*Spatula cyanoptera*	Anseriformes	Water
Clark's grebe	*Aechmophorus clarkii*	Podicipediformes	Water
Clay-colored sparrow	*Spizella pallida*	Passeriformes	Shrubland
Common loon	*Gavia immer*	Gaviiformes	Water
Common yellowthroat	*Geothlypis trichas*	Passeriformes	Shrubland
Cordilleran flycatcher	*Empidonax occidentalis*	Passeriformes	Woodland
Dickcissel	*Spiza americana*	Passeriformes	Open
Dusky flycatcher	*Empidonax oberholseri*	Passeriformes	Woodland – Shrubland
Eastern kingbird	*Tyrannus tyrannus*	Passeriformes	Open – Woodland
Eastern phoebe	*Sayornis phoebe*	Passeriformes	Woodland
Forster's tern	*Sterna forsteri*	Charadriiformes	Water
Franklin's gull	*Leucophaeus pipixcan*	Charadriiformes	Water
Gray flycatcher	*Empidonax wrightii*	Passeriformes	Shrubland
Gray catbird	*Dumetella carolinensis*	Passeriformes	Woodland
Great crested flycatcher	*Myiarchus crinitus*	Passeriformes	Woodland
Great egret	*Ardea alba*	Pelecaniformes	Water
Greater white-fronted goose	*Anser albifrons*	Anseriformes	Open – Water
Hammond's flycatcher	*Empidonax hammondii*	Passeriformes	Woodland
Herring gull	*Larus argentatus*	Charadriiformes	Open – Water

Table 3-9. Bird Species that may Migrate through the Study Area – Continued

Common Name	Scientific Name	Order	Habitat Preference(s)
Hooded merganser	*Lophodytes cucullatus*	Anseriformes	Water
Indigo bunting	*Passerina cyanea*	Passeriformes	Woodland
Lazuli bunting	*Passerina amoena*	Passeriformes	Open
Least flycatcher	*Empidonax minimus*	Passeriformes	Woodland
Lesser yellowlegs	*Tringa flavipes*	Charadriiformes	Water
Long-billed curlew	*Numenius americanus*	Charadriiformes	Open – Water
Long-billed dowitcher	*Limnodromus scolopaceus*	Charadriiformes	Water
MacGillivray's warbler	*Geothlypis tolmiei*	Passeriformes	Woodland – Open
Marbled godwit	*Limosa fedoa*	Charadriiformes	Water
Nashville warbler	*Oreothlypis ruficapilla*	Passeriformes	Woodland
Northern waterthrush	*Parkesia noveboracensis*	Passeriformes	Woodland – Water
Orange-crowned warbler	*Oreothlypis celata*	Passeriformes	Woodland
Osprey	*Pandion haliaetus*	Falconiformes	Water
Ovenbird	*Seiurus aurocapilla*	Passeriformes	Woodland
Pectoral sandpiper	*Calidris melanotos*	Charadriiformes	Water
Peregrine falcon	*Falco peregrinus*	Falconiformes	Water
Piping plover	*Charadrius melodus*	Charadriiformes	Water
Plumbeous vireo	*Vireo plumbeus*	Passeriformes	Woodland
Red-breasted merganser	*Mergus serrator*	Anseriformes	Water
Reddish egret	*Egretta rufescens*	Pelecaniformes	Water
Red-eyed vireo	*Vireo olivaceus*	Passeriformes	Woodland
Red knot	*Calidris canutus*	Charadriiformes	Water
Red-necked phalarope	*Phalaropus lobatus*	Charadriiformes	Water
Ross's goose	*Anser rossii*	Anseriformes	Open – Water
Rufous hummingbird	*Selasphorus rufus*	Caprimulgiformes	Woodland
Scott's oriole	*Icterus parisorum*	Passeriformes	Woodland
Semipalmated plover	*Charadrius semipalmatus*	Charadriiformes	Open
Semipalmated sandpiper	*Calidris pusilla*	Charadriiformes	Water
Snow goose	*Chen caerulescens*	Anseriformes	Water
Snowy egret	*Egretta thula*	Pelecaniformes	Water
Solitary sandpiper	*Tringa solitaria*	Charadriiformes	Water
Stilt sandpiper	*Calidris himantopus*	Charadriiformes	Water
Swainson's thrush	*Catharus ustulatus*	Passeriformes	Woodland
Townsend's warbler	*Setophaga townsendi*	Passeriformes	Woodland
Tree swallow	*Tachycineta bicolor*	Passeriformes	Woodland
Upland sandpiper	*Bartramia longicauda*	Charadriiformes	Open
Virginia rail	*Rallus limicola*	Gruiformes	Water
Virginia's warbler	*Leiothlypis virginiae*	Passeriformes	Woodland
Warbling vireo	*Vireo gilvus*	Passeriformes	Woodland – Open
Western sandpiper	*Calidris mauri*	Charadriiformes	Water
Western tanager	*Piranga ludoviciana*	Passeriformes	Woodland
Western wood-pewee	*Contopus sordidulus*	Passeriformes	Woodland
White-faced ibis	*Plegadis chihi*	Pelecaniformes	Water
White-rumped sandpiper	*Calidris fuscicollis*	Charadriiformes	Water
Willet	*Tringa semipalmata*	Charadriiformes	Water
Willow flycatcher	*Empidonax traillii*	Passeriformes	Open
Wilson's phalarope	*Phalaropus tricolor*	Charadriiformes	Water
Wilson's warbler	*Cardellina pusilla*	Passeriformes	Woodland
Yellow warbler	*Setophaga petechia*	Passeriformes	Woodland

Sources: Cornell, 2024; eBird, 2024; NatureServe Explorer, 2024; Sibley, 2003.

Mammals

According to Schmidly and Bradley (2016), 202 species of mammals reside in Texas. Mammals are distinct from other groups in that their bodies are covered with hair, and they

feed milk to their young. Nearly all mammals in Texas bear live young using a placenta (i.e., Eutherian or "placental" mammals). A notable exception is the Virginia opossum (*Didelphis virginiana*), which is a pouch-rearing mammal (i.e., marsupial). **Table 3-10** presents the mammals that are expected to occur within suitable habitat in the study area.

Table 3-10. Mammal Species within the Study Area

Common Name	Scientific Name	Habitat Preference(s)
Order: Artiodactyla (even-toed ungulates)		
Collared peccary	*Tayassu tajacu*	Shrubland – Desert
Mule deer	*Odocoileus hemionus*	Open – Desert
Pronghorn	*Antilocapra americana*	Open – Desert – Grassland
White-tailed deer	*Odocoileus virginianus*	Woodland
Feral pig	*Sus scrofa*	Woodland – Shrubland
Order: Carnivora (carnivores)		
American badger	*Taxidea taxus*	Open
Bobcat	*Lynx rufus*	Woodland
Common gray fox	*Urocyon cinereoargenteus*	Woodland
Western hog-nosed skunk	*Conepatus leuconotus*	Woodland – Shrubland – Open
Common raccoon	*Procyon lotor*	Woodland – Water
Coyote	*Canis latrans*	Open
Kit fox	*Vulpes macrotis*	Desert – Open – Cultivated
Long-tailed weasel	*Mustela frenata*	Open
Mountain lion	*Felis concolor*	Shrubland – Desert
Red fox	*Vulpes vulpes*	Shrubland – Woodland – Cultivated
Ringtail	*Bassariscus astutus*	Woodland – Open
Striped skunk	*Mephitis mephitis*	Woodland – Open
Swift fox	*Vulpes velox*	Desert – Open – Cultivated
Western spotted skunk	*Spilogale gracilis*	Desert – Shrubland – Urban
Order: Chiroptera (bats)		
American parastrelle	*Parastrellus hesperus*	Desert
American perimyotis	*Perimyotis subflavus*	Woodland – Cultivated
Big free-tailed bat	*Nyctinomops macrotis*	Desert – Grassland – Urban
Big brown bat	*Eptesicus fuscus*	Woodland – Urban
Brazilian free-tailed bat	*Tadarida brasiliensis*	Woodland – Urban
Cave myotis bat	*Myotis velifer*	Desert – Urban – Shrubland
Eastern pipistrelle	*Pipistrellus subflavus*	Woodland – Cultivated
Eastern red bat	*Lasiurus borealis*	Woodland
Evening bat	*Nycticeius humeralis*	Woodland – Open
Greater western mastiff bat	*Eumops perotis californicus*	Desert – Grassland – Urban
Hoary bat	*Lasiurus cinereus*	Woodland
Mexican long-tonged bat	*Choeronycteris mexicana*	Desert – Grassland – Urban
Pallid bat	*Antrozous pallidus*	Open – Urban – Desert
Silver-haired bat	*Lasionycteris noctivagans*	Woodland – Urban
Western mastiff bat	*Eumops perotis*	Desert – Grassland – Woodland
Western pipistrelle	*Pipistrellus hesperus*	Desert – Open
Order: Lagomorpha (hares, rabbits, and picas)		
Black-tailed jackrabbit	*Lepus californicus*	Open
Desert cottontail	*Sylvvilagus audubonii*	Grassland – Shrubland – Desert
Eastern cottontail	*Sylvilagus floridanus*	Open
Order: Didelphimorphia (opossums and allies)		
Virginia opossum	*Didelphis virginiana*	Woodland – Open – Urban

Table 3-10. Mammal Species within the Study Area – Continued

Common Name	Scientific Name	Habitat Preference(s)
Order: Rodentia (rodents)		
Banner-tailed kangaroo rat	*Dipodomys spectabilis*	Open – Shrubland
Black-tailed prairie dog	*Cynomys ludovicianus*	Open
Botta's pocket gopher	*Thomomys bottae*	Desert – Open
Chihuahuan desert pocket mouse	*Chaetodipus eremicus*	Desert – Open
Deer mouse	*Peromyscus maniculatus*	Woodland – Open
Eastern fox squirrel	*Sciurus niger*	Open – Woodland
Hispid cotton rat	*Sigmodon hispidus*	Open – Urban
Hispid pocket mouse	*Chaetodipus hispidus*	Open
House mouse	*Mus musculus*	Open – Urban
Jones' pocket gopher	*Geomys knoxjonesi*	Open
Merriam's kangaroo rat	*Dipodomys merriami*	Open – Desert
Marriam's pocket mouse	*Perognathus merriami*	Open
Mearn's grasshopper mouse	*Onychomys arenicola*	Desert
Mexican ground squirrel	*Spermophilus mexicanus*	Shrubland – Open
Muskrat	*Ondatra zibethicus*	Water
Nelson's pocket mouse	*Chaetodipus nelsoni*	Desert – Open
North American deermouse	*Peromyscus maniculatus*	Open – Woodland – Grassland
Northern grasshopper mouse	*Onychomys leucogaster*	Open – Shrubland
Northern pigmy mouse	*Baiomys taylori*	Open – Desert – Grassland
Norway rat	*Rattus norvegicus*	Open – Urban
Ord's kangaroo rat	*Dipodomys ordii*	Open – Desert
Plains harvest mouse	*Reithrodontomys montanus*	Open
Plains pocket mouse	*Perognathus flavescens*	Open
Porcupine	*Erethizon dorsatum*	Woodland – Open – Shrubland
Rio Grande ground squirrel	*Ictidomys parvidens*	Open – Shrubland
Rock squirrel	*Spermophilus variegatus*	Woodland – Shrubland – Desert
Roof rat	*Rattus rattus*	Urban
Southern Plains woodrat	*Neotoma micropus*	Shrubland – Desert
Spotted ground squirrel	*Spermophilus spilosoma*	Woodland – Open – Desert
Texas antelope squirrel	*Ammospermophilus interpres*	Desert
Texas deer mouse	*Peromyscus attwateri*	Woodland
Western harvest mouse	*Reithrodontomys megalotis*	Open – Water
White-ankled mouse	*Peromyscus pectorialis*	Desert – Shrubland – Woodland
White-footed mouse	*Peromyscus leucopus*	Woodland
White-throated woodrat	*Neotoma albigula*	Shrubland – Desert
Yellow-faced pocket gopher	*Cratogeomys castanops*	Open – Shrubland – Desert
Order: Xenarthra (other placental mammals)		
Nine-banded armadillo	*Dasypus novemcinctus*	Open – Woodland
Order: Soricomorpha (shrews and moles)		
Crawford's desert shrew	*Notiosorex crawfordi*	Woodland – Desert – Shrubland

Sources: NatureServe Explorer, 2024; Schmidly and Bradley, 2016.

3.5.2.2 Fish and Aquatic Wildlife

As previously mentioned, perennial stream features or other substantial surface water features are not found in the study area. As a result, habitats in the study area are unlikely to support aquatic species, such as fish and mussels, thereby resulting in generally low diversity in these systems. Some amphibians may be adapted to seasonal wet and dry cycles associated with playa depressions, some of which are located in the study area and appear to hold water for part of the year.

3.5.2.3 Commercially or Recreationally Important Wildlife Species

Wildlife within the study area provides human benefits resulting from both consumptive (i.e., involving removal of wildlife) and non-consumptive uses. Bird watching is a popular non-consumptive use. Local Audubon society chapter members play a valuable role in assisting local fish and wildlife agencies with field updates of rare or endangered species sightings (Audubon Texas, 2024). Diverse wildlife populations in the study area provide observing and photographing opportunities, although public access is limited.

According to the USFWS, more than two million people annually engage in recreational hunting within west south-central U.S., which includes Texas, Oklahoma, Arkansas, and Louisiana each year (USFWS, 2022). Hunting adds billions of dollars to the state's economy each year through fees to hunt on public land, through private leases, for equipment, or for travel-related expenses. These numbers include hunters that are residents of Texas as well as those that travel to the state to hunt. Within the study area, established hunting seasons exist for the species listed in **Table 3-11**.

Table 3-11. Game Species within the Study Area

Common Name	Scientific Name
American alligator	*Alligator mississippiensis*
White-winged dove and mourning dove	*Zenaida asiatica; Zenaida macroura*
Duck and coot	Numerous species
Javelina	*Tayassu tajacu*
Light and dark geese	Numerous species
Mule deer	*Odocoileus hemionus*
Northern bobwhite quail and scaled quail	*Colinus virginianus; Callipepla squamata*
Pronghorn	*Antilocapra americana*
Rails, gallinules, and moorhens	Numerous species
Sandhill crane	*Grus canadensis*
Squirrels	*Numerous species*
Teal duck	*Anas discors; Anas crecca; Spatula cyanoptera*
White-tailed deer	*Odocoileus virginianus*
Wild turkey	*Meleagris gallopavo*
Snipe and woodcock	*Gallinago delicata*
Source: TPWD, 2024e.	

3.5.2.4 Endangered and Threatened Wildlife Species

The USFWS has authority under the ESA to list and monitor the status of species whose populations are considered imperiled. USFWS regulations that implement the ESA are codified and regularly updated in Title 50 of the Code of Federal Regulations (CFR) Part 17. The federal process identifies potential candidates based upon the species' biological vulnerability. The vulnerability decision is based upon many factors affecting the species

within its range and is linked to the best scientific data available to the USFWS at the time. Species listed as threatened or endangered by the USFWS are provided full protection under the ESA, including a prohibition of indirect take such as destruction of known critical habitat (i.e., areas formally designated by USFWS in the Federal Register).

Texas endangered species legislation in 1973 and subsequent amendments have established a state regulatory program for the management and protection of endangered species (i.e., species in danger of extinction) and threatened species (i.e., species likely to become endangered within the foreseeable future) (Texas Legislature Online, 2024). Chapters 67 and 68 of the Texas Parks and Wildlife Code authorize TPWD to formulate lists of threatened and endangered fish and wildlife species and to regulate the taking or possession of such species. Under this statutory authority, TPWD regulates the taking, possession, transport, export, processing, selling, offering for sale, or shipping of threatened or endangered species of fish and wildlife.

Table 3-12 lists wildlife species that are considered endangered or threatened by the USFWS and/or TPWD or are designated a SGCN by TPWD, and whose geographic search range includes any portion of Ector or Midland counties. It should be noted that inclusion in the table does not imply that a species is known to occur in the study area but only acknowledges the potential for occurrence. An estimate of the likelihood of a species to occur within the study area is based on an analysis of existing habitat that is available and the known habitat preferences for each species. A discussion of each species' habitat follows **Table 3-12**, grouped first by state or federally listed threatened or endangered species, and followed by the SGCN.

In evaluating species designated as endangered, threatened, or SGCN, Halff accessed TPWD and USFWS county lists to include Ector and Midland counties, due to the location of the study area overlapping the boundary between Ector and Midland counties. Species with specific geographic locations, assumed endemic to montane habitats, or with limited ranges isolated from the study area were not included in **Table 3-12**. Species with broad habitat requirements or not geographically bound within Ector or Midland counties may be expected to occur within the study area, where suitable habitat is present.

Table 3-12. Endangered, Threatened, or Rare Wildlife Potentially in the Study Area

Common Name	Scientific Name	Listing Status[1]		Potential to Occur within Study Area?
		Federal	State	
AMPHIBIANS				
Woodhouse's toad	*Anaxyrus woodhousii*	--	SGCN	Yes
BIRDS				
Bald eagle	*Haliaeetus leucocephalus*	DM[3]	SGCN	No
Chestnut-collared longspur	*Calcarius ornatus*	--	SGCN	Yes
Franklin's gull	*Leucophaeus pipixcan*	--	SGCN	Yes [2]
Golden eagle	*Aquila chrysaetos*	--	SGCN	Yes
Lark bunting	*Calamospiza melanocorys*	--	SGCN	Yes
Mountain plover	*Charadrius montanus*	--	SGCN	Yes [2]
Northern aplomado falcon	*Falco femoralis septentrionalis*	--	E	No
Piping plover	*Charadrius melodus*	LT[3,4]	--	No
Red knot	*Calidris canutus rufa*	LT[3,4]	--	No
Western burrowing owl	*Athene cunicularia hypugaea*	--	SGCN	Yes
White-faced ibis	*Plegadis chihi*	--	T	Yes [2]
INSECTS				
American bumble bee	*Bombus pensylvanicus*	--	SGCN	Yes
Monarch butterfly	*Danaus plexippus*	C	--	Yes [2]
MAMMALS				
Big free-tailed bat	*Nyctinomops macrotis*	--	SGCN	Yes[2]
Black-tailed prairie dog	*Cynomys ludovicianus*	--	SGCN	Yes
Cave myotis bat	*Myotis velifer*	--	SGCN	Yes [2]
Eastern red bat	*Lasiurus borealis*	--	SGCN	Yes[2]
Greater western mastiff bat	*Eumops perotis californicus*	--	SGCN	Yes
Hoary bat	*Lasiurus cinereus*	--	SGCN	Yes [2]
Hooded skunk	*Mephitis macroura*	--	SGCN	Yes
Kit fox	*Vulpes macrotis*	--	SGCN	Yes
Long-tailed weasel	*Mustela frenata*	--	SGCN	Yes
Mountain lion	*Puma concolor*	--	SGCN	Yes
Pronghorn	*Antilocapra americana*	--	SGCN	Yes [2]
Swift fox	*Vulpes velox*	--	SGCN	Yes
Tricolored bat	*Perimyotis subflavus*	PE[3]	SGCN	No
Western hog-nosed skunk	*Conepatus leuconotus*	--	SGCN	Yes
Western spotted skunk	*Spilogale gracilis*	--	SGCN	Yes
REPTILES				
Dunes sagebrush lizard	*Sceloporus arenicolus*	LT[5]	SGCN	No
Gray-checkered whiptail	*Aspidoscelis dixoni*	--	SGCN	Yes
Ornate box turtle	*Terrapene ornata*	--	SGCN	Yes
Plateau spot-tailed earless lizard	*Holbrookia lacerate*	--	SGCN	Yes
Roundtail horned lizard	*Phrynosoma modestum*	--	SGCN	Yes
Texas horned lizard	*Phrynosoma cornutum*	--	T	Yes
Western box turtle	*Terrapene ornate*	--	SGCN	Yes
Western hognose snake	*Heterodon nasicus*	--	SGCN	Yes
Western massasauga	*Sistrurus tergeminus*	--	SGCN	Yes
Western rattlesnake	*Crotalus viridis*	--	SGCN	Yes

Table 3-12. Endangered, Threatened, or Rare Wildlife Potentially in the Study Area – Continued

Common Name	Scientific Name	Listing Status[1]	Potential to Occur within Study Area?

Sources: TPWD, 2024c; TPWD, 2024d; USFWS, 2024b; USFWS, 2024c.
Notes:
[1] **USFWS listing codes**: DM = Recovered, delisted, and being monitored; LT = Federally Listed Threatened Species (i.e., severely depleted population that may become endangered); C = Candidate species; PE = Proposed Endangered; blank = no federal status.
TPWD listing codes: T = State Listed Threatened Species; E = State Listed Endangered Species; SGCN = Species of Greatest Conservation Need (i.e., rare species with no regulatory listing status); blank = no state status.

[2] Assumed to be a transient species, potentially migrating through the study area and using suitable habitat for stopovers.

[3] The USFWS list supersedes information provided for federal status in TPWD Annotated County List of Rare Species, in the case of a discrepancy. The species is listed by USFWS for the county but is not expected to occur within the study area.

[4] According to USFWS Information for Planning and Conservation database, the assessment of this species in the study area is only necessary for wind energy projects.

[5] Per USFWS final rule, effective June 20, 2024, this species has been awarded federal endangered status.

Listed Threatened or Endangered Species

The discussion that follows describes habitat preferences and other characteristics for the state and federal threatened or endangered species shown in **Table 3-12** (i.e., federally listed as LT, PE, C, or DM and/or state listed as T or E). Unless otherwise noted, the information below is drawn primarily from TPWD (2024c; 2024d), USFWS (2024b; 2024c), and NatureServe Explorer (2024) online data and publications. Many of the listed threatened or endangered species that may be found in the study area are migratory birds. These species utilize the area primarily as a travel corridor, where suitable habitats are used for resting and feeding stops.

Breeding habitat for the bald eagle is most commonly located within 2 to 3 miles of a major water source, which can be used for fishing. Primary food sources include fish and waterfowl, most often associated with rivers, lakes, bays, and coastal areas. Bald eagles roost and nest in large trees and often return to the same nest year after year. In Texas, bald eagle nesting typically occurs from October to July. Past threats to the species included reproductive failure due to pesticides, unrestricted taking by humans, and loss of habitat. Recovery efforts have been successful, and the bald eagle populations are currently being monitored. No major bodies of water or streams are located near the study

area. Due to the lack of suitable habitat in the study area, bald eagles would not be expected to occur in the study area (Cornell, 2024; eBird, 2024; Sibley, 2003).

The northern aplomado falcon is a medium-sized falcon known from open rangeland and savanna, semi-arid grasslands with scattered trees and shrubs. It is also known from coastal prairies along sand ridges, in woodlands along desert streams, and in desert grasslands with scattered mesquite and yucca. This bird was once found from southern Texas to southern Arizona. It disappeared from this area by the early 20th century; vagrants seen in New Mexico and west Texas are probably from a small extant population in northern Chihuahua, Mexico. Due to its rarity, the northern aplomado falcon is unlikely to occur in the study area (Cornell, 2024; eBird, 2024; NatureServe Explorer, 2024; Sibley, 2003).

The piping plover is a compact ground bird that breeds in the Northern Plains. In Texas, it is a migrant that winters along the Gulf Coast at beaches and bayside mud or salt flats. This species is considered migratory through the study area. However, the presence in the study area by the piping plover would not be expected due to the lack of suitable stopover habitat (Cornell, 2024; eBird, 2024; Sibley, 2003).

The red knot is a small, plump-bodied, short-necked, shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Red knots migrate long distances in flocks northward through the contiguous U.S. mainly from April to June and southward from July to October. In Texas, this bird winters along the Gulf Coast. The red knot prefers the shoreline of coast and bays and uses mudflats during rare inland encounters. Habitat consists primarily of seacoasts on tidal flats and beaches, herbaceous wetland, and tidal flat/shore. This species is considered migratory through the study area. However, the use of the study area by the red knot would not be expected given the lack of suitable stopover habitat (Cornell, 2024; eBird, 2024; Sibley, 2003).

Habitat preference of the white-faced ibis includes freshwater marshes, sloughs, and irrigated rice fields. Occasionally, this species will attend brackish and saltwater habitats. This colonial nesting species prefers to nest in low trees, in marshes, on the ground among bulrushes or reeds, or on floating mats. Large colonies, also referred to as rookeries, almost exclusively occur near the coast. According to eBird (2024) sightings, the white-

faced ibis is a frequent migrant through this region of Texas. There is potential for the species to utilize the small playa depressions or marshes as temporary stopover sites during migration (Cornell, 2024; eBird, 2024; Sibley, 2003).

In the southwestern states, migrating monarch butterflies tend to occur more often near water sources such as rivers, creeks, roadside ditches, and irrigated gardens. Monarch butterflies would be found during the later spring and summer migrations through Texas. During the breeding season, monarchs lay their eggs on their milkweed host plant (primarily *Asclepias* spp.). TPWD conservation plans stress the importance of maintaining multi-species pollinator floral communities to support and promote migrating monarchs (TPWD, 2016). Natural areas proximal to study area floodplains may contain less disturbed pasture conditions that could provide pollinator habitat suitable for the species.

The tricolored bat is associated with forested habitats, where it can forage near trees and along waterways and can frequently be observed foraging among riparian corridors. The current known extent through Texas does not include the western portions of the state. The tricolored bat is not expected to be present within the study area (IUCN, 2024; Schmidly and Bradley, 2016).

The dunes sagebrush lizard inhabits shin oak sandhills with sagebrush and yucca or is restricted to active sand dunes near Andrews, Crane, Gaines, Ward, and Winkler counties to the west. Although small areas of shin oaks are present within the study area and the NDD includes one record approximately 8 miles northeast of the study area, no active sand dunes or sand prairies are available (TPWD, 2024c). It is not expected for the dune sagebrush lizard to be present in the study area (Conant and Collins, 1998; IUCN, 2024).

The historical range of the Texas horned lizard included the entire state of Texas in arid and semi-arid areas of flat, open terrain with scattered vegetation and sandy or loamy soils. Population declines have been linked to loss of habitat, insecticides, over-collection, and the accidental introduction of the imported fire ant (*Solenopsis invicta*). Despite declines in east and central Texas, the Texas horned lizard is still common in portions of the Rio Grande Plains of south Texas, the Rolling and High Plains of northwest Texas, and the Trans Pecos of far west Texas. The NDD includes multiple records of this species, the closest of which is approximately ten miles northeast of the study area (TPWD, 2024c).

It remains possible that the Texas horned lizard could occur in the study area (Conant and Collins, 1998; IUCN, 2024).

Species of Greatest Conservation Need

Woodhouse's toad prefers sandy areas near marshes, river bottoms, desert streams, canyons, and irrigated agricultural croplands. This toad does exceptionally well in suburban backyards that include irrigated gardens. Although there is little information in the area to indicate whether the Woodhouse's toad is known to occur, there is potential for the species to be present among the marshes, playa depressions, and ephemeral streams within the study area (AmphibiaWeb, 2024; Conant and Collins, 1998; IUCN, 2024).

The chestnut-collared longspur is a ground-dwelling bird that utilizes grassy prairies to breed and winters in fields with short grass. On its journey to winter in southern parts of the United States, this bird is often found in flocks mixed with other longspurs. There is one recorded observation approximately 10 miles northeast of the study area, according to eBird. There is limited potential for this bird to winter within the study area (Cornell, 2024; eBird, 2024; Sibley, 2003).

Franklin's gull is a long-distance migrant bird that utilizes a wide variety of riparian to ephemeral wetlands as stopover sites. In Texas, this species is casually found wintering along the coastline, near shores, among tidal flats or shores, and within herbaceous wetlands. The Franklin's gull has been recorded several times north of the study area, according to eBird. Given the wide migration corridor, there is potential for the Franklin's gull to use suitable stopover habitat that exists within the study area (Cornell, 2024; eBird, 2024; Sibley, 2003).

The golden eagle is a large bird that is found throughout North America. In Texas, this species is found wintering primarily in west Texas. Preferred nesting habitat includes cliffs, grasslands, chapparal, shrubland, and small stretches of forested area that have steep escarpments. This species avoids long, uninterrupted stretches of forest and highly developed areas. There is one recorded observation less than a mile south of the study area and several accounts around the study area and the City of Midland. There is limited potential this species would be found within the study area (Cornell, 2024; eBird, 2024; NatureServe Explorer, 2024).