Environmental Assessment and Routing Study for The 138 kV Zenith-Franz Project Harris County, Texas

Prepared for:

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EXECUTIVE SUMMARY

CenterPoint Energy Houston Electric, LLC (“CenterPoint Energy”) proposes to construct a new 138 kilovolt ("kV") double-circuit transmission line located in Harris County, Texas, that would extend for approximately six to ten miles from CenterPoint Energy’s existing Zenith Substation to the existing 138 kV transmission system. Potential existing 138 kV transmission system tie points are located along an existing 138 kV transmission line corridor. The location of the existing Zenith Substation site is approximately 2.5 miles northwest of the intersection of Grand Parkway (State Highway [SH] 99) and Farm-to-Market (FM) 529 in Harris County. CenterPoint Energy retained HDR, Inc. (HDR) to prepare this Environmental Assessment and Routing Study to support the Public Utility Commission of Texas (“PUC”) application for a Certificate of Convenience and Necessity for the proposed project.

CenterPoint Energy provided the location of the existing 138 kV transmission line connection corridor and the existing Zenith Substation. The study area boundary was then delineated utilizing potential paralleling features. Data collection was conducted to identify the environmental and land use constraints within the study area that were pertinent to the identification of preliminary transmission line segments. Data collection activities included review of readily available data, coordination with federal and state regulatory agencies and local officials, and reconnaissance surveys from public viewpoints. HDR and CenterPoint Energy identified 39 geographically diverse preliminary transmission line segments that were presented at a public meeting in August of 2014 to solicit public input and concerns. Input received from the public meeting, local agencies, and reconnaissance surveys in conjunction with consideration of the project objectives, including geographic diversity, resulted in the identification of 15 primary transmission line routes.

The potential environmental and land use impacts for each primary transmission line route was tabulated by HDR for each evaluation criteria. CenterPoint Energy provided the engineering review and estimated construction cost for each primary transmission line route. The primary transmission line routes were grouped into geographically diverse route families and key evaluation criteria were selected and used to compare potential impacts to select proposed alternative routes within each route family. Seven proposed alternative routes were compared

and a proposed alternative route that is believed to best address the requirements of the Public Utility Regulatory Act (“PURA”) and the PUC Substantive Rules was recommended.

CenterPoint Energy provided input and review throughout the routing study process and agreed that Proposed Alternative Route 8 is the proposed alternative route that best addresses the requirements of PURA and the PUC Substantive Rules.

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Acronyms and Abbreviations

AM	Amplitude Modulation
amsl	above mean sea level
BEG	Bureau of Economic Geology
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practices
B.P.	Before Present
CCN	Certificate of Convenience and Necessity
CFR	Code of Federal Regulations
Commission	Public Utility Commission of Texas, also *PUC*
CWA	Clean Water Act
EA	Environmental Assessment and Routing Study
EMF	Electromagnetic Field
ESA	Endangered Species Act
ESSS	Ecologically Significant Stream Segment
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FM	Farm-to-Market Road
FM	Frequency Modulation
GIS	Geographic Information Systems
GLO	Texas General Land Office
HDR	HDR, Inc.
HGAC	Houston-Galveston Area Council
HPA	High probability area
HTC	Historic Texas Cemetery
ISD	Independent School District
kV	Kilovolt
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NESC	National Electrical Safety Code
NHL	National Historical Landmark
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NOT	Notice of Termination
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
NWP	Nationwide Permit
OTHM	Official Texas Historical Marker
PALM	Potential Archeological Liability Map
PEM	Palustrine emergent

PFO	Palustrine forested
PSS	Palustrine shrub-shrub
PUC	Public Utility Commission of Texas, also *Commission*
PURA	Public Utility Regulatory Act
RIP	Record, Investigate, and Protect program
ROW	Right-of-way
RRC	Railroad Commission of Texas
SAL	State Archeological Landmark
SH	State Highway
SHPO	State Historic Preservation Office
SWPPP	Storm Water Pollution Prevention Plan
TAC	Texas Administrative Code
TARL	Texas Archeological Research Laboratory
TASA	Texas Archeological Site Atlas
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
THSA	Texas Historical Sites Atlas
TMDL	Total Maximum Daily Load
TPDES	Texas Pollution Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
TXNDD	Texas Natural Diversity Database
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USDOD	U.S. Department of Defense Siting Clearinghouse
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 DESCRIPTION OF THE PROPOSED PROJECT

1.1 SCOPE OF THE PROJECT

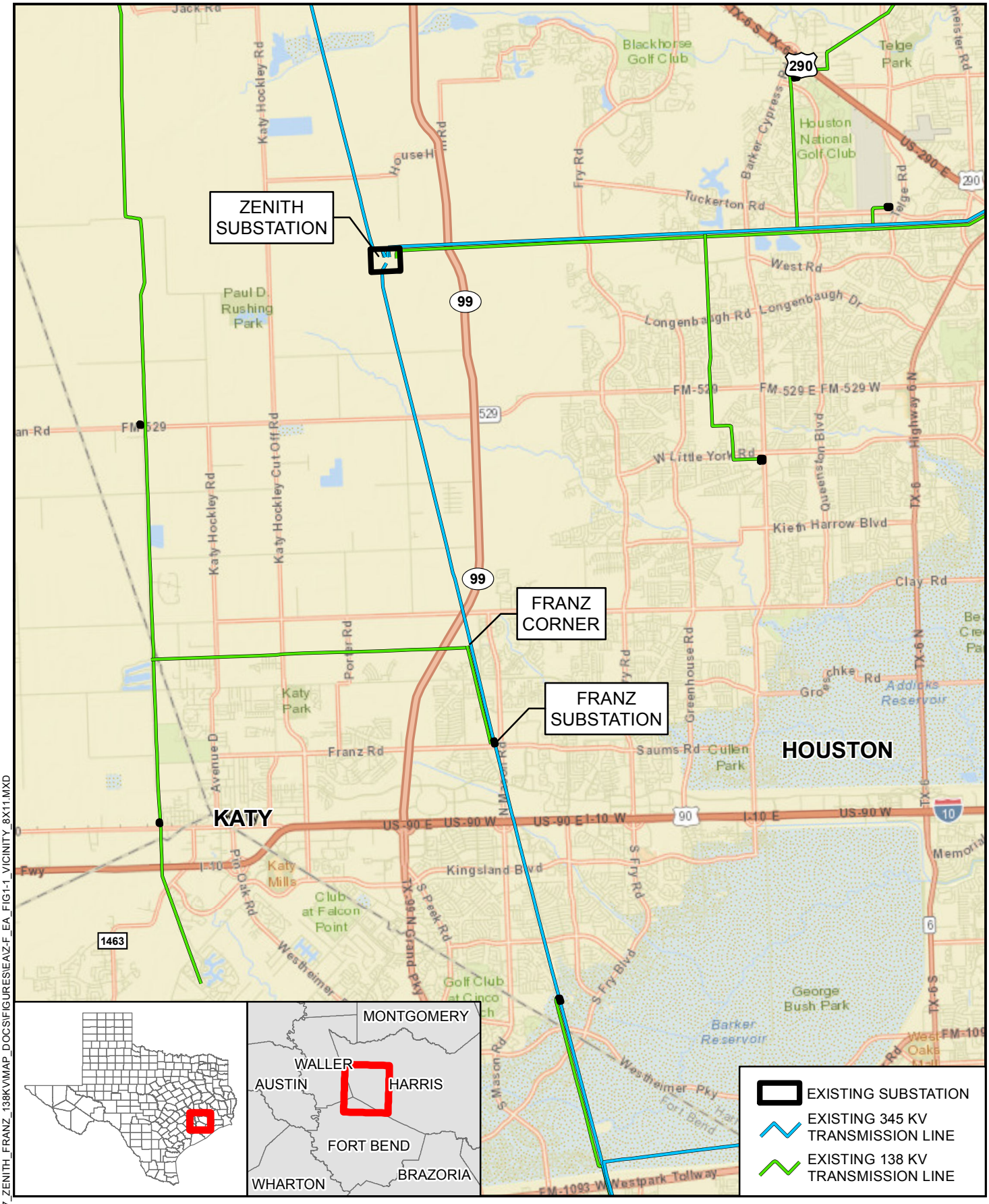
CenterPoint Energy Houston Electric, LLC ("CenterPoint Energy") proposes to construct a new 138 kilovolt ("kV") double-circuit transmission line located in Harris County, Texas. See Figure 1-1 for a map of the area of the project vicinity. The new transmission line will connect CenterPoint Energy's existing Zenith Substation to the existing 138 kV transmission system. Potential existing 138 kV transmission system tie points are located along an existing 138 kV transmission line corridor. The location of the existing Zenith Substation site is approximately 2.5 miles northwest of the intersection of Grand Parkway (State Highway [SH] 99) and Farm-to-Market (FM) 529 in Harris County.

CenterPoint Energy retained HDR, Inc. (HDR) to prepare this Environmental Assessment and Routing Study ("EA") to support the application for a Certificate of Convenience and Necessity ("CCN") for the proposed project. This EA discusses the environmental and land use constraints identified within the study area, documents routing methodologies and public involvement, and provides an evaluation of alternative routes. This document provides information in compliance with the requirements of Section 37.056(c)(4)(A)-(D) of the Texas Utilities Code ("PURA"), the Public Utility Commission of Texas ("PUC" or "Commission") CCN application form, and P.U.C. Substantive Rule 25.101. The EA may also be used to support any additional local, state, or federal permitting activities that may be required for construction of the proposed project.

To assist HDR with the evaluation of the proposed project, CenterPoint Energy provided HDR with the project endpoint and tie points, information regarding the need, construction practices, and right-of-way ("ROW") requirements. CenterPoint Energy also provided information regarding engineering and design requirements, as well as estimated cost information associated with the alternative routes.

1.2 AGENCY ACTIONS

Numerous federal, state, and local regulatory agencies have rules and regulations regarding the routing process and potential impact assessment associated with construction of high voltage electrical transmission lines. This section describes the major regulatory agencies and issues that are involved in planning and permitting of transmission lines within the state of Texas. HDR



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138 KV ZENITH-FRANZ PROJECT

PROJECT VICINITY

N

0 1 2

MILES

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FIGURE 1-1

solicited project scoping comments from various regulatory agencies during the development of this document. Records of correspondence are provided in Appendix A.

1.2.1 Public Utility Commission of Texas

The PUC regulates the routing of transmission lines in Texas under Section 37.056(c)(4)(A)-(D) of PURA. The PUC regulatory rules and guidelines for routing transmission lines include:

- P.U.C. Substantive Rule 25.101(b)(3)(B)
- P.U.C. Procedural Rule 22.52(a)(4)
- Policy of prudent avoidance
- CCN application requirements

This EA has been prepared by HDR in support of CenterPoint Energy's CCN application for this project to be filed at the PUC for approval.

1.2.2 United States Army Corps of Engineers

The United States Army Corps of Engineers ("USACE") has been directed by Congress to administer Section 10 of the Rivers and Harbors Act of 1899 (33 United States Code [U.S.C.] §403), and Section 404 of the Clean Water Act ("CWA") (33 U.S.C. §1344). Under Section 10, the USACE regulates all work or structures in or affecting the course, condition, or capacity of navigable waters of the United States ("U.S."). The intent of this law is to protect the navigable capacity of waters important to interstate commerce. Under Section 404 of the CWA, the USACE regulates the discharge of dredged and fill material into "waters of the U.S.", including associated wetlands. The purpose of Section 404 is to protect the nation's waters from indiscriminate discharge and to minimize the potential adverse impacts and degradation of the "waters of the U.S." and aquatic ecosystems.

Although the USACE Galveston District does not publish a list of navigable waters, multiple waterways within the study area may be designated as navigable. A USACE-Section 10 permit will be required if construction will cause obstruction or alterations to navigable waters of the U.S. Review of the National Hydrology Dataset and National Wetland Inventory ("NWI") maps indicated numerous surface waters of the U.S. within the study area. Surface waters include riverine and lacustrine habitats associated with creeks, ditches, and ponds. Herbaceous, forested, and shrub/scrub wetlands are also located throughout the study area associated with marshes and floodplains. Upon PUC approval of a route, additional coordination, jurisdictional

wetland verifications, and permitting with the USACE Galveston District for a Section 404 permit may be required. The construction of the transmission line will likely meet the criteria of the Nationwide Permit ("NWP") No. 12—Utility Line Activities, which applies to activities associated with any cable, line, or wire for the transmission of electrical energy. If the proposed impacts of the project exceed the criteria established under NWP 12 or other regional conditions listed under the NWP, then a preconstruction notification or an Individual Permit will be required.

1.2.3 United States Fish and Wildlife Service

The United States Fish and Wildlife Service ("USFWS") is charged with the responsibility of enforcement of federal wildlife laws and providing comments on proposed construction projects with a federal nexus under the National Environmental Policy Act ("NEPA"); and within the framework of several federal laws including the Endangered Species Act ("ESA"), Migratory Bird Treaty Act ("MBTA"), and Bald and Golden Eagle Protection Act ("BGEPA"). HDR reviewed the USFWS listed species for Harris County, Texas and solicited Texas Natural Diversity Database ("TXNDD") element occurrence records from the Texas Parks and Wildlife Department ("TPWD").

Upon PUC approval of a route, coordination with the USFWS Clear Lake Ecological Services Field Office may be required to determine the need for any required species specific surveys or additional permitting under Section 7 of the ESA and the MBTA.

1.2.4 Federal Aviation Administration

According to Federal Aviation Administration ("FAA") regulations, Part 77 (FAA, 2008), the construction of a transmission line requires FAA notification if any tower structure height exceeds the height of an imaginary surface extending outward and upward at one of the following slopes:

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

The PUC CCN application also requires listing private airports within 10,000 feet of any alternative route centerline. After PUC route approval, and if any of the FAA notification criteria are met for the selected route, a Notice of Proposed Construction or Alteration, FAA Form 7460-1, will be completed and submitted to the FAA Southwest Regional Office in Fort Worth, Texas at least 30 days prior to construction.

1.2.5 Texas Parks and Wildlife Department

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

1.2.6 Harris County Floodplain Management

Flood Insurance Rate Maps, published by the Federal Emergency Management Agency ("FEMA"), and USACE technical reports were reviewed to determine storm surge and floodplain boundaries within the study area. The mapped 100-year floodplains are typically associated with Bear Creek and South Mayde Creek. The 100-year floodplain represents a flood event that has a one percent chance of being equaled or exceeded for any given year. Construction of the proposed transmission line is not anticipated to create any significant permanent changes in the existing topographical grades and should not significantly affect the stormwater runoff rates within the study area. Additional coordination with the Harris County floodplain administrator may be required after PUC route approval to determine if any permits or mitigation is necessary.

1.2.7 Texas Commission on Environmental Quality

The construction of the project may require a Texas Pollution Discharge Elimination System ("TPDES") General Construction Permit (TX150000) as implemented by the Texas Commission on Environmental Quality ("TCEQ") under the provisions of Section 402 of the CWA, and Chapter 26 of the Texas Water Code. The TCEQ has developed a tiered approach for implementing this permit that is dependent on the acreage of ground disturbance. No permitting is required for land disturbances of less than one acre. If more than one acre but less than five

acres are disturbed, then a Stormwater Pollution Prevention Plan ("SWPPP") must be developed prior to and implemented during construction activities, accompanied with posting a site notice and sending notification to the Municipal Separate Sewer System Operator. If more than five acres of land are disturbed, then the previous requirements mentioned above are necessary and the submittal of a Notice of Intent ("NOI") and Notice of Termination ("NOT") are also required by the TCEQ. Once a route is approved by the PUC, the proposed disturbed surface area will be calculated, and appropriate conditions of the TX150000 permit will be determined.

A Section 401 Water Quality Certificate from the TCEQ may also be required if the project requires an USACE Individual Permit for proposed impacts to surface waters or wetlands as previously discussed. TCEQ has the authority to review federally permitted or licensed activities that may result in a discharge of pollutants to the waters of the U.S. within the state of Texas.

1.2.8 Texas Historical Commission

Cultural resources are protected by federal and state laws if they have some level of significance under the criteria of the National Register of Historic Places ("NRHP") (36 Code of Federal Regulations [CFR] Part 60) or under state guidance (Texas Administrative Code ("TAC"), Title 13, Part 2, Chapter 26.7-8). The Texas Historical Commission ("THC") was contacted by HDR to identify known cultural resources within the study area boundary. HDR also reviewed Texas Archeological Research Laboratory ("TARL") records for known locations of archeological sites and the THC's online, restricted-access Texas Archeological Sites Atlas ("TASA") and Texas Historical Sites Atlas ("THSA") for the locations of recorded cemeteries, NRHP properties, and Official Texas Historical Markers ("OTHMs"). Once a route is approved by the PUC, additional coordination with the THC will occur, if required, to determine the need for cultural resource surveys or additional permitting requirements. Even if no additional surveys are required, CenterPoint Energy will implement an unanticipated discovery procedure during construction activities. If artifacts are discovered during construction, activities will cease and CenterPoint Energy will notify the State Historic Preservation Office ("SHPO") for additional consultation.

1.2.9 Texas Department of Transportation

The Texas Department of Transportation ("TxDOT") has been notified of the proposed project. If the route approved by the PUC crosses TxDOT roadways, the project will be constructed in

accordance with the rules, regulations, and policies of TxDOT. Best Management Practices ("BMP") will be used, as required, to minimize erosion and sedimentation resulting from the construction. Revegetation will occur within existing TxDOT ROWs as required under the "*Revegetation Special Provisions*" and contained in TxDOT Form 1023 (Rev. 9-93). Traffic control measures will comply with applicable portions of the Texas Manual of Uniform Traffic Control Devices.

1.2.10 Texas General Land Office

The Texas GLO requires a miscellaneous easement ("ME") for ROW within any coastal submerged lands (tidally influenced), state owned riverbeds, and navigable streams (non-tidal). A ME will be required if the approved project ROW crosses areas meeting these criteria.

1.3 DESCRIPTION OF PROPOSED DESIGN AND CONSTRUCTION

1.3.1 Structure Design

CenterPoint Energy proposes to use various types of transmission structures suitable for different ROW conditions within the study area. Depending upon the route approved by the PUC, CenterPoint Energy proposes to construct the transmission line utilizing lattice towers, single concrete poles, or a combination of these structures as route conditions necessitate.

If a route is approved by the PUC within the existing CenterPoint Energy, north-south heading, 345 kV W.A. Parish – N. Texas transmission ROW (Segments B, H, N, V, AA, AF, AI, or AM), CenterPoint Energy proposes to use 138 kV double-circuit, steel lattice tower structures (see Figure 1-2). Lattice towers are proposed for both tangent and dead end applications to match the existing construction type in the ROW.

If a route is approved by the PUC within the existing CenterPoint Energy, east-west heading, 345 kV T.H. Wharton – Zenith transmission ROW (Segment A), CenterPoint Energy proposes to use 138 kV double-circuit, single concrete pole structures with single steel poles at angles (see Figure 1-3). Concrete and steel poles are proposed to accommodate the limited electrical clearance space between the existing 345 kV and 138 kV transmission lines within the existing ROW.

If the PUC approves a route requiring new ROW adjacent to and along Grand Parkway (SH 99), CenterPoint Energy proposes 138 kV double-circuit single concrete pole tangent structures in a

60-foot-wide ROW (see Figure 1-4). Single steel poles or lattice towers are proposed for angles depending on the ROW conditions.

If a route using existing road ROW is approved by the PUC, CenterPoint Energy proposes to use single concrete poles. These poles will be placed within the road ROW where possible, and will require a 25-foot-wide aerial easement parallel and adjacent to the road ROW for electrical clearance and vegetation management (see Figure 1-5). Single steel poles are proposed for angles.

Construction of lattice towers will require drilled pier foundations made of steel-reinforced concrete. The span length between lattice tower structures will be approximately 600 to 800 feet. Typical tower height will be 106 to 126 feet depending on terrain and required National Electrical Safety Code ("NESC") clearances (see Figure 1-2).

Construction of concrete poles includes direct embedment with crushed limestone backfill. Typical concrete poles will be 85 to 100 feet in height, have a span length of approximately 300 to 400 feet, and will allow for distribution underbuild on the same poles (see Figures 1-3, 1-4 and 1-5).

PROPOSED
DT-850-10X

106.00' INCLUDING 10' EXTENSION

EXISTING
DT-115-DS DELTA ØX

40.00'

90.00'

EXISTING 220.00' CNP RIGHT OF WAY
LOOKING NORTH FROM FM-529

138 KV ZENITH-FRANZ PROJECT

TYPICAL 138 KV LATTICE TOWER
WITHIN EXISTING ROW

NOT TO SCALE

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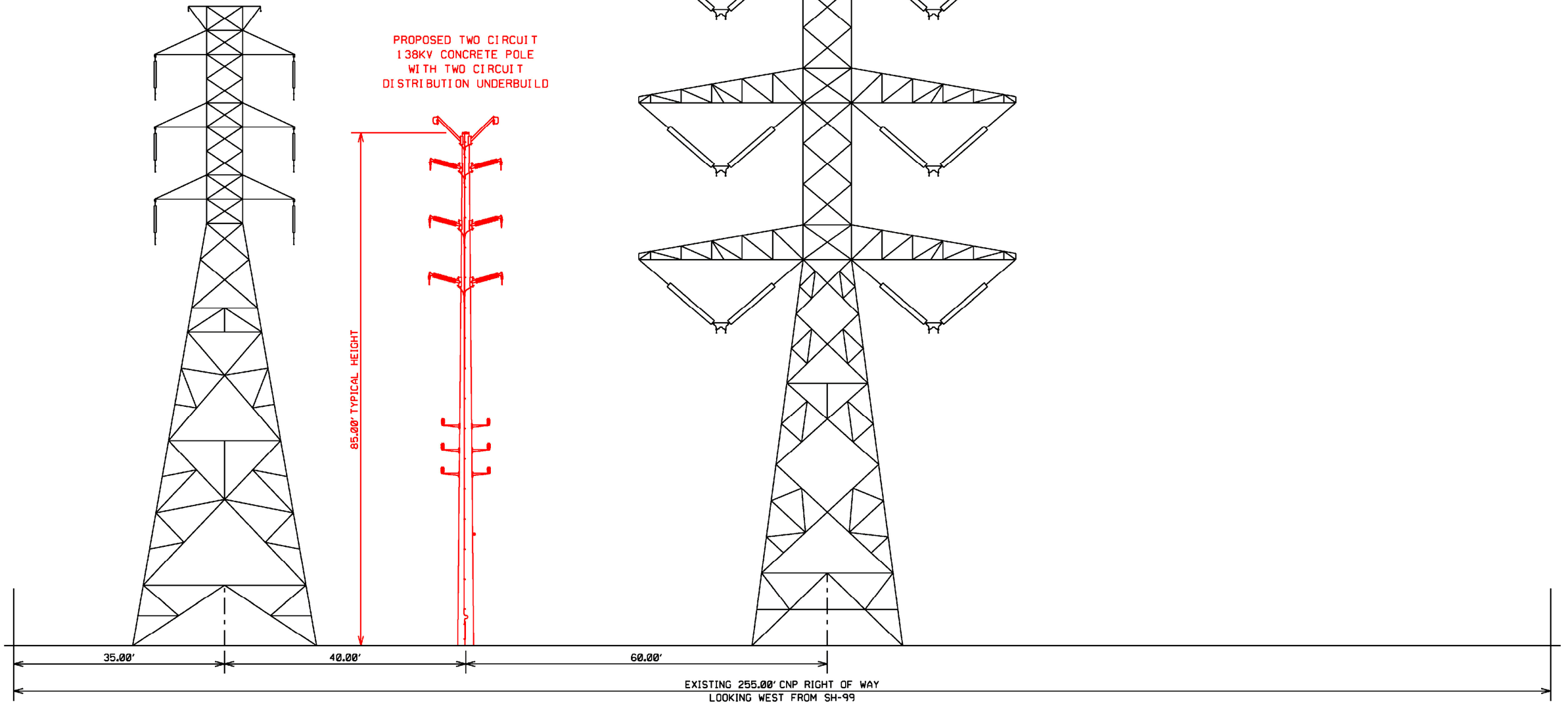
EXISTING
DT-850-10X

PROPOSED TWO CIRCUIT
138KV CONCRETE POLE
WITH TWO CIRCUIT
DISTRIBUTION UNDERBUILD

EXISTING
DT-115-DS 12X



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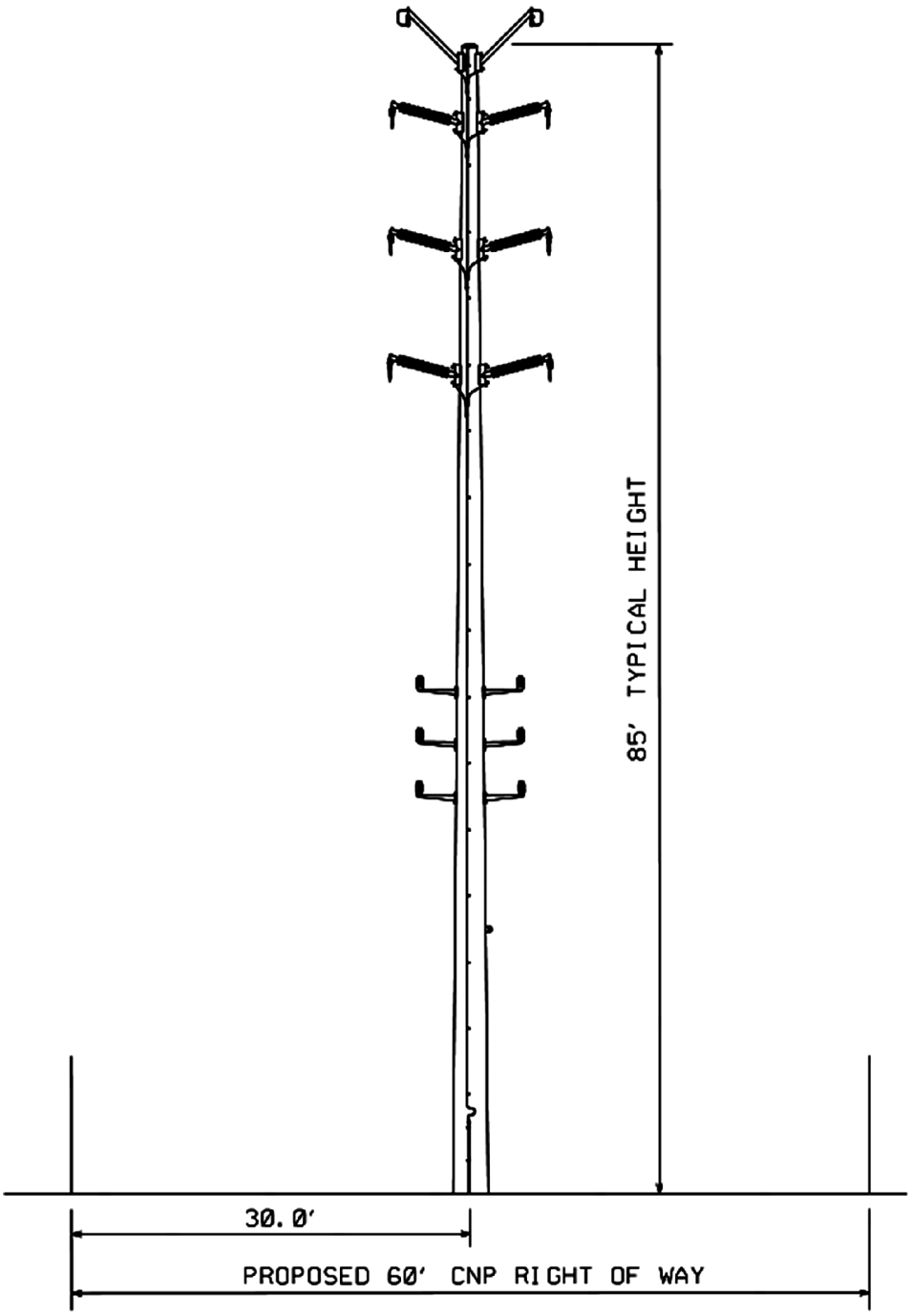
138 KV ZENITH-FRANZ PROJECT TYPICAL 138 KV CONCRETE POLE WITHIN EXISTING ROW	NOT TO SCALE	CenterPoint Energy	HDR JAN 2015 | FIGURE 1-3

TWO CIRCUIT 138KV
CONCRETE POLE WITH
TWO CIRCUIT DISTRIBUTION
UNDERBUILD



138 KV ZENITH-FRANZ PROJECT TYPICAL 138 KV CONCRETE POLE WITHIN NEW ROW	NOT TO SCALE	CenterPoint® Energy	HDR JAN 2015 | FIGURE 1-4

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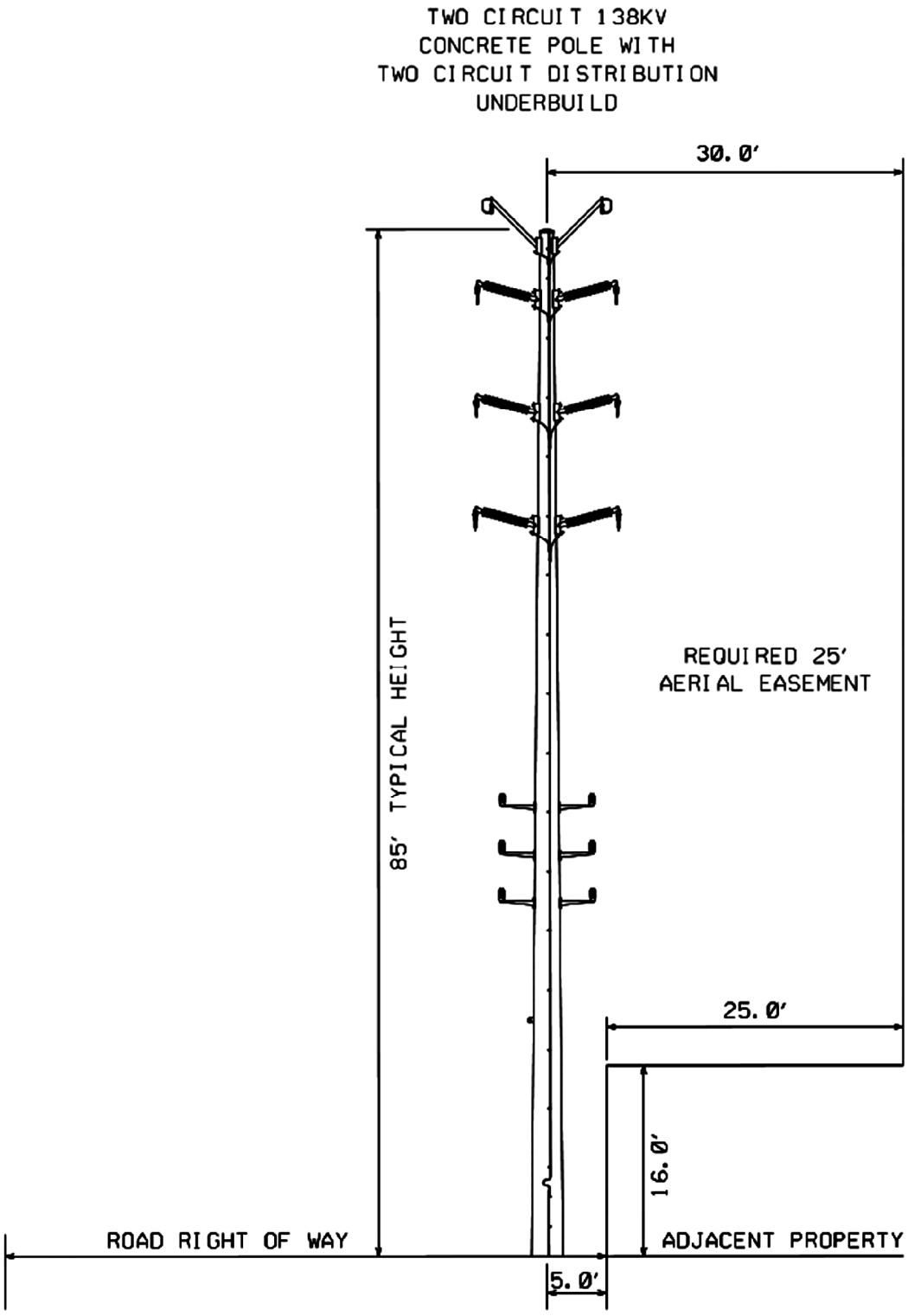

138 KV ZENITH-FRANZ PROJECT TYPICAL 138 KV CONCRETE POLE WITHIN ROAD ROW	NOT TO SCALE	CenterPoint® Energy	HDR JAN 2015 | FIGURE 1-5

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1.3.2 Surveying

Surveying of the transmission line ROW is required to locate the centerline, the structure locations, obstacles above and below ground, and the edges of both new and existing ROW.

1.3.3 Clearing

Tree and shrub clearing may be needed in areas where new ROW is acquired. If a SWPPP is required, it will be implemented along the approved route prior to the start of clearing. Mechanized cutters and hand tools will be used to remove impeding vegetation to ground level.

1.3.4 Structure Placement

Specialized wide-track vehicles and line trucks with trailers will be used to transport construction materials along the ROW to the structure locations.

Concrete poles will be delivered to the site location shortly before the poles are ready to be set. A large crane would then set the pole directly into an excavated hole. The hole will be backfilled with crushed limestone.

Typically, the concrete foundations will be installed several weeks before the steel lattice towers are erected to allow the foundations to cure and reach their maximum strength. The towers will be delivered in bundles and set next to the proposed structure location shortly before structure erection. The towers will be assembled on-site, and a crane will be used to set the sections into place onto the previously installed foundations.

1.3.5 Conductor and Static Wire Installation

Once the structures have been erected, the stringing and clipping-in of conductors and static wires will begin. Outages are not anticipated during the conductor and static wire installation. Each road crossing will have temporary guard poles installed for public protection while stringing in the new conductors.

1.3.6 Cleanup

Cleanup operations will be performed as construction activities are completed. Cleanup includes removal of debris, unused materials, and trash. Any necessary soil stabilization and reestablishing of vegetation cover will also occur during cleanup, following the procedures

dictated in the SWPPP, if required. Pre-construction contours will also be restored following construction.

2.0 DESCRIPTION OF THE STUDY AREA

HDR, with input from CenterPoint Energy, identified the study area boundaries based on the location of the existing Zenith Substation and the location of the existing 138 kV transmission line connection corridor for the project. The study area was defined to provide an area large enough to develop an adequate set of geographically diverse alternative routes. The western study area boundary is located west of Katy Hockley Cut Off Road. The eastern study area boundary is located approximately one mile east of Grand Parkway (SH 99) to include this linear feature as a potential paralleling opportunity. The northern study area boundary is located south of House Hahl Road; and the southern study area boundary is located south of Morton Road and Morton Ranch Road to include potential tie points to the existing 138 kV transmission line located approximately one-half mile to the north. The study area boundary is depicted in Figure 2-1.

To describe the environmental setting of the study area, resource data were collected for community values and environmental integrity.

2.1 COMMUNITY VALUES

The term “community values” has not been formally defined for regulatory purposes by the PUC, but is included as a consideration for transmission line certification under Section 37.056(c)(4)(A-D) of PURA. In several dockets, the PUC and the PUC Staff (“Staff”) have used the following as a working definition: “the term ‘community values’ may be interpreted as a shared appreciation of an area or other natural resource by a national, regional, or local community.” The PUC CCN application requires information related to the following items that may provide indications of community value impacts:

- Public meeting or public open house;
- Approval or permits required from other governmental agencies;
- Brief description of the area traversed;
- Habitable structures within 300 feet of the centerline for a 138 kV transmission line;
- Amplitude Modulation (“AM”), Frequency Modulation (“FM”), microwave, and other electronic installations in the area;
- FAA-registered airstrips, private airstrips, and heliports located in the area; and
- Irrigated pasture or croplands utilizing center-pivot or other traveling irrigation systems.

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ZENITH SUBSTATION

FRANZ CORNER

FRANZ SUBSTATION

345 KV CKTS 98D & 99D

345 KV CKTS 71C & 98I

138 KV CKTS 09J & 76A

345 KV CKTS 95F & 71D

138 KV CKTS 66A & 09H

SACK-O-GRANDE ACROPORT

HAROLD FREEMAN FARM

FREEMAN PROPERTY AIRPORT

MC GILL RANCH

LANGHAM CREEK

BEAR CREEK

SOUTH MAYDE CREEK

LONGENBAUGH RD

FREEMAN RD

CLAY RD

STOCKDICK SCHOOL RD

PORTER RD

KATY HOCKLEY CUT OFF RD

PEEK RD

GRAND PKWY

99

529

KATY

HOUSTON

PROJECT COMPONENTS
- STUDY AREA BOUNDARY

LAND USE FEATURES
- COMMUNICATION TOWER
- SCHOOL
- PARK & RECREATION

EXISTING UTILITY FEATURES
- EXISTING SUBSTATION
- EXISTING 345 KV TRANSMISSION LINE
- EXISTING 138 KV TRANSMISSION LINE

TRANSPORTATION FEATURES
- STATE HIGHWAY
- FARM TO MARKET ROAD
- LOCAL ROAD
- AIRPORT
- HELIPORT

ADMINISTRATIVE BOUNDARIES
- CITY BOUNDARY

SURFACE WATER
- STREAM / DRAINAGE
- OPEN WATER

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138 KV ZENITH-FRANZ PROJECT

STUDY AREA BOUNDARY

N

0 2,500 5,000

FEET

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JAN 2015

FIGURE 2-1

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HDR collected this information and also evaluated the study area for community values that may be of importance to a particular community as a whole. Examples of a particular community value would be a park or recreational area, historical and archeological site, or a scenic vista, which can be related to aesthetics. Community values data were collected for land use, recreational and park areas, and historical and aesthetic values. Recreational and park areas, and historical and aesthetic values are further discussed in more detail in Sections 2.2 and 2.3. HDR also mailed consultation letters to local officials to obtain insight into community values from appointed and elected officials. In addition, HDR participated in CenterPoint Energy's project public open house meeting to collect information regarding community values directly from the public.

2.1.1 Land Use

Land jurisdiction is defined as the control maintained by major landholders or land managers. Jurisdiction does not necessarily represent ownership. Potential conflicts could arise from crossing jurisdictional boundaries that were evaluated in this study. For example, a 138 kV transmission line crossing publicly-held land may cause a conflict with ongoing planning processes or a land management plan. In order to establish the existing land jurisdiction in the study area, a Geographic Information System ("GIS") was used to evaluate land use information obtained from interpretation of aerial photographs, United States Geological Survey ("USGS") topographical maps, county appraisal district information, and reconnaissance surveys.

The majority of the study area is currently in agricultural use with scattered residential areas and commercial development and is traversed by several transportation corridors. The southern portion of the study area closer to the City of Katy jurisdictional limits has more residential development than the rest of the study area (**Figure 2-1**). All of the land use types found within the study area are described further below.

2.1.1.1 Urban and Residential Areas

The urban and residential classification represents concentrations of surface disturbing land uses, which include habitable structures and other developed areas characterized with low, medium and high intensities. The various levels of development include a mix of residential, institutional, commercial, and industrial land uses.

The PUC definition of a habitable structure was used for this routing study. P.U.C. Substantive Rule 25.101(a)(3) defines habitable structures as "structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis. Habitable structures include, but are not limited to, single-family and multi-family dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, residential structures, churches, hospitals, nursing homes, and schools." Habitable structures were identified using aerial photographs and reconnaissance surveys from public points of view.

Low, Medium, and High Intensity developed areas were identified using aerial photograph interpretation and reconnaissance surveys. These classifications are described below:

- **Low Intensity** areas typically include rural settings with single-family housing units.
- **Medium Intensity** areas typically include single-family housing units that are grouped in residential subdivisions and may include peripheral commercial structures.
- **High Intensity** areas include highly developed areas where people reside or work in high numbers. Examples include apartment complexes and commercial or industrial parks.

The study area is located near the Gulf Coast in an agricultural and residential area in the western portion of Harris County, Texas. Existing developments include industrial facilities, residential subdivisions, and commercial businesses concentrated along roadway corridors, including FM 529 (Freeman Road), Grand Parkway (SH 99), Clay Road, Morton Road, and Katy Hockley Cut Off Road. These existing developments are primarily within the southern portion of the study area.

2.1.1.2 Agriculture

The agriculture in the study are includes mainly pastureland with isolated pockets of small cropland areas. Based on aerial photography interpretation and reconnaissance surveys, most of the pastureland is used for cattle or appears unused or undeveloped. Pasture areas are typically comprised of grasses, legumes, or grass-legume mixtures planted for livestock grazing, or the production of seed or hay crops, typically on a perennial cycle. Cultivated croplands are used for the production of annual row crops and perennial woody crops, such as orchards and vineyards. No orchards or vineyards were found during field reconnaissance or aerial photograph investigation. Agriculture activities within the study area are limited primarily to

pasturelands. Based on field reconnaissance, pastureland in the study area is used to support cattle operations.

2.1.1.3 Oil and Gas Facilities

Oil and gas well data was obtained from the Railroad Commission of Texas ("RRC") website (RRC, 2012) and digitized by HDR to create a GIS layer for existing oil and gas wells, pipelines, and supporting facilities. Multiple crude oil and natural gas pipelines were identified within the study area. Several pipelines run east to west through the middle and southern portion of the study area. There are also nearly 100 dry holes, gas wells, and oil wells throughout the study area.

2.1.1.4 Planned Land Use

The planned land use component identifies objectives and policies regarding land use goals and plans, including conservation easements, managed lands, and proposed developments. Communities typically prepare comprehensive land use plans to provide strategic direction for the individual community. The websites for the City of Katy, Harris County, and Houston-Galveston Area Council (HGAC) were reviewed and correspondence was submitted to local city and county officials to identify any planned land use conflicts. Developers provided information about planned development in the study area during the public meetings. Planned development projects identified within the study area include multiple residential developments and potential Katy Independent School District (ISD) school sites.

2.1.1.5 Transportation/Aviation/Utilities

Transportation

The existing transportation system within the study area includes a state highway, local roads, arterial roadways, and one airport. Roads within the study area include SH 99 (Grand Parkway), Katy Hockley Cut Off Road, Porter Road, FM 529 (Freeman Road), Longenbaugh Road, Beckendorff Road, Stockdick School Road, and Clay Road. The airport within the study area is the Freeman Property Airport.

Local roads, county roads, FM roads, SHs, U.S. highways, interstate highways, railroads, and airports or airstrips are included in the transportation category. Roadways were identified using TxDOT county transportation maps and reconnaissance surveys.

A review of TxDOT's "Project Tracker" database indicated that there were no planned roadway maintenance activities within the study area (TxDOT, 2014).

Aviation

According to FAA regulations, Part 77 (FAA, 2008), the construction of a transmission line requires FAA notification if tower structure height exceeds the height of an imaginary surface extending outward and upward at one of the following slopes:

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

The PUC CCN application also requires the listing of private airports within 10,000 feet of any alternative route centerline.

A review of aerial photos and USGS topographic maps revealed two airports within the study area, the Freeman Property Airport and the Harold Freeman Farm. The Freeman Property Airport is in the southwest portion of the study area near the intersection of Stockdick School Road and Katy Hockley Cut Off Road. The Harold Freeman Farm landing strip is in the northwestern portion of the study area near the intersection of Katy Hockley Cut Off Road and FM 529 (Freeman Road). While outside of the study area, Sack-O-Grande Acroport was the only FAA registered public airport identified within a 20,000 foot radius of the study area boundaries.

Utilities

Existing utility corridors, easements, and ROWs were identified within the study area and mapped using GIS. These linear features are considered potential paralleling opportunities. There are four 138kv circuits and six 345kV transmission circuits located within the study area. Several of these transmission lines directly support distribution substations for the surrounding residential development. CenterPoint Energy's existing 345 kV transmission line ROWs (Circuits 98D, 99D, 99F, 71D, 71C, and 98I) and existing 138 kV transmission line ROWs (Circuits 66A, 09H, 09J, and 76A) were mapped with information provided by CenterPoint

Energy. Existing distribution lines were mapped based on reconnaissance surveys. There are also nearly 200 crude oil and natural gas lines located entirely or partially within the study area (RRC, 2012). Existing distribution lines, primarily along existing road ROWs, were considered opportunity areas for potential overbuilding of transmission lines proposed by the project.

2.1.1.6 Communication Towers

Communication tower location information was obtained from the Federal Communication Commission ("FCC") (FCC, 2014), and where required, corrections of the tower location data were made based on field reconnaissance and aerial photo interpretation. Twenty-three communication towers, which are AM or FM radio transmitters, cellular or microwave relay station towers, were identified throughout the study area (see Figure 2-1).

2.1.2 Socioeconomics

The following is a description of the socioeconomic patterns related to population and employment in Harris County, Texas. The trend analysis is based upon the most recent U.S. Census Bureau information for the years 2000, 2010 and 2012 (U.S. Census Bureau, 2014a, 2014b, and 2014c).

2.1.2.1 Population Trends

Harris County has increased in population at a higher rate compared with the state of Texas. Table 2-1 presents population data for the state of Texas and Harris County. Harris County has experienced a 20.3% increase in population between 2000 and 2010, which is higher than that of the state of Texas (17.1%) (U.S. Census Bureau, 2014a, 2014b).

Table 2-1 Population Trends

State/County	2000	2010	Percent Change (%)
State of Texas	20,851,820	25,145,561	17.1
Harris County	3,400,578	4,092,459	20.3

Source: U.S. Census Bureau, 2014a, 2014b.

2.1.2.2 Employment

In 2012, employment in Harris County consisted of 1,944,732 employed persons over the age of 16. The major occupations in Harris County in 2012 are listed under the category of management, business, science, and art occupations, followed by sales and office occupations (U.S. Census Bureau, 2014c). Table 2-2 presents the number of persons employed within each occupation category during 2012 in Harris County, Texas.

Table 2-2 Leading Occupations in Harris County, Texas

Occupations	Total for Harris County
Management, business, science, and art occupations	656,491
Sales and office occupations	471,667
Service occupations	335,853
Production, transportation and material moving occupations	250,875
Natural resources, construction, and maintenance occupations	229,846

Source: U.S. Census Bureau, 2014c

In 2012, the five industries employing the most people in Harris County were healthcare and social assistance; retail trade; professional, scientific and technical services; accommodation and food services; and manufacturing. Table 2-3 presents the number of persons employed in each listed industry in 2012 (U.S. Census Bureau, 2014c).

Table 2-3 Top Employing Industries in Harris County, Texas

Industries	2012
Healthcare and social assistance	233,001
Retail trade	192,127
Professional, scientific and technical services	177,107
Accommodation and food services	165,688
Manufacturing	165,285

Source: U.S. Census Bureau, 2014c

2.2 RECREATIONAL AND PARK AREAS

Recreational, park, and preservation areas were identified through state, federal, and local agency websites, county documents, and reconnaissance surveys. This category primarily includes existing areas that are:

- Dedicated as park land or open space by a governmental body, an organized group, club, or church.
- Recognized as nationally or regionally significant preservation or recreation areas.
- Formally designated unique or undisturbed natural areas.

Federal and state databases, and county and local maps were reviewed to identify any recreational or park areas within the study area. Reconnaissance surveys were also conducted to identify any additional recreational or park areas. No state or national parks, national trails, or historic landmarks were identified within the study area (NPS, 2014a and 2014b) (TPWD, 2014b).

2.2.1 County and Local Parks

Two county parks were identified within the study area; Four Seasons Park and John Paul's Landing. Four Seasons Park is a county park located on the east side of Katy Hockley Cut Off Road at the end of Roland Road. The park offers baseball fields, softball fields, and restrooms. John Paul's landing is a location in the northwest corner of the study area proposed for a large lake that has not yet been constructed. This park is described further in section 2.4.3.4. In addition to these county parks HDR identified 18 local parks within residential developments in the southern portion of the study area. These parks often include playground areas, ponds, and green space for community enjoyment.

2.2.2 Wildlife Viewing Trails

A review of the TPWD Great Texas Wildlife Trails (TPWD, 2014c) indicated that the study area is located within the broad area of the Katy Prairie Loop. The Longenbaugh Waterfowl Pond is described by TPWD as being within the study area at the intersection of Longenbaugh Road and Katy Hockley Cut Off Road. However, using TPWD's description, current aerial photography, and field reconnaissance HDR was unable to locate this pond in the study area. However, there are several ponds and lakes located in Paul D. Rushing Park outside of the study area near this intersection meant to attract waterfowl and other fauna. Even though the waterfowl pond could not be located, the study area is within an area known for its birding opportunities. The Katy Prairie area is known for hosting resident and migratory species. Birders drive the local roads, farm roads, and ranch roads in the area looking for birds in undeveloped areas (Eubanks, 2008).

Additional recreational opportunities, including hunting and fishing, may occur on private properties within the study area. However, these are not typically considered to be open to the general public.

2.3 HISTORICAL AND AESTHETIC VALUES

Section 37.056(c)(4)(A-D) of PURA incorporates historical and aesthetic values as a consideration when evaluating proposed electric transmission facilities. The THC and TARL maintain records of known cultural resources (archeological, architectural, and cemeteries) and of previous field investigations. Information from the THC and TARL databases was reviewed and shapefiles showing the locations of all previously documented archeological resources were requested in order to identify potential cultural resources constraints within the study area. Cultural resources include districts, sites, buildings, structures, or objects important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. For this study, cultural resources have been divided into three major categories: archeological resources, architectural resources, and historic cemeteries.

Archeological Resources are locations where human activity has measurably altered the earth or left deposits of physical remains (e.g., burnt rock middens, stone tools, petroglyphs, house foundations, bottles). Archeological resources can date to either prehistoric times or the historic era.

Architectural Resources include standing buildings (e.g., houses, barns, outbuildings) and intact structures (dams, canals, bridges, roads, silos).

Cemeteries are places of intentional human interment and may include large public burial grounds with multiple burials, small family plots with only a few burials, or individual grave sites. In some instances, cemeteries may be designated as Historic Texas Cemeteries. Historic Texas Cemeteries include cemeteries that have been officially added to the THC records and are recognized with a Texas Historical Marker. Other cemeteries may have been documented as part of the THC's Record, Investigate, and Protect (RIP) program and have been assigned a designation number (e.g., C-0249).

2.3.1 Cultural Background

The project area is located within the Southeast Texas archeological region (Patterson, 1995) (Story et al., 1990) (Pertulla, 2004) within the Eastern Planning Region (Figure 2-2). This region extends from the Sabine River along the upper Texas coast southwestward to the Brazos River delta, and encompasses the gulf coastline as well as the adjacent inland coastal plain. Very generally, the sequence of recognized archeological manifestations in southeast Texas has been divided into three periods: Paleoindian, Archaic, and Late Prehistoric or Ceramic periods. These cultural periods are roughly equivalent to broad patterns of environmental change, described by Aten (1983). These patterns are the Late Glacial (12,000–9,000 years before present [B.P.]), post-Pleistocene adaptations that resulted in a shift in economic orientation and an increasing population (9,000–3,000 B.P.), and, lastly, essentially modern environmental conditions which developed approximately 3,000 B.P. Ensor et al. (1990:7-8) proposed a prehistoric cultural sequence in southeastern Texas as follows: Paleoindian (10,000–8,000 B.C.), early Archaic (8,000–5,000 B.C.), middle Archaic (5,000–1,000 B.C.), late Archaic (1,000 B.C.–A.D. 400), early Ceramic (A.D. 400–A.D. 800) and late Ceramic (A.D. 800–A.D. 1750). Aten (1979, 1983) offered a ceramic seriation and chronology for the Ceramic period that is still the subject of testing and refinement. The following review of the prehistoric setting in southeast Texas follows the chronology of Ensor et al. (1990), but includes information from a number of sources.

2.3.1.1 Paleoindian Period (ca. 10,000–8,000 B.C.)

The earliest well-established human occupations of North America are referred to as Paleoindian. Isolated Paleoindian chipped stone projectile points, typed as Clovis, have been found on the upper Texas coast in surficial or mixed contexts (Wheat, 1953) (Hester, 1980) (Patterson, 1980). Story et al. (1990) summarized the distribution and context of Paleoindian remains in southeast Texas, and found that except for well inland of the modern coastline, Paleoindian artifacts on the upper Texas coast are from disturbed or secondary contexts.

Aten (1983:116-117) estimates that during the Paleoindian period, the coastline of the Gulf of Mexico was between 30 and 40 kilometers seaward of its present location. Woodlands apparently covered much of the upper Texas coast, and probably extended onto the now submerged continental shelf. Most of the archeological sites dating to this period may lie offshore, be deeply buried in the terraces of major streams, or have been obliterated by Holocene erosion (Hester, 1980) (Abbot, 2001).

CULTURAL RESOURCE PLANNING REGION BOUNDARY
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Because such limited data exist for the Paleoindian period in this area, only certain assumptions can be made regarding Paleoindian cultural development in the region. The presence of large projectile points suggests that hunting large mammals was undoubtedly an important component of the subsistence strategy, although a collection of readily available plant foods probably also contributed to the diet (Collins, 2002). Environmental changes that brought about the extinction or dislocation of Rancholabrean megafauna triggered a shift away from Paleoindian adaptations toward a broad-based subsistence orientation termed Archaic (Willey and Phillips, 1958) (Aten, 1983).

2.3.1.2 Archaic Period (ca. 8,000 B.C.–A.D. 400)

Probably the most prominent characteristic of the Archaic period is that it epitomizes the foraging lifestyle. The Archaic period on the upper Texas coast is marked by sea-level rise and climatic fluctuation in the middle to late Holocene, from 7,000 B.C. to A.D. 100 (Aten 1983). Few Archaic sites are recorded on the upper Texas coast, and Story (1985) suggests site density was low on the coastal plain. Archaic sites that have been tested or excavated near the modern shoreline generally consist of shell-bearing sites with lithic tools and debitage, shell or bone tools, and the bones of fish, mammals, and reptiles. An overall lack of faunal and macro-botanical remains precludes inferences about specific subsistence activities other than hunting and plant gathering that continued into the Archaic period.

Very few intact early Archaic (8,000-5,000 B.C.) components are known on the upper Texas coast (Aten, 1983), and Story (1985:31) suggests the inland margin of the coastal plain may have been occupied more intensely than the coast as sea levels rose during the early Archaic. The coastline reached its current location during the middle Archaic (5,000–3,000 B.C.) (Aten 1983). The earliest known shell middens in the area date to this period (Howard et al., 1991). Excavation of 41AU36 on the lower Brazos River revealed a cemetery in use from the middle Archaic through the early Ceramic period (Hall, 1981). Story (1985) suggests the establishment of cemeteries along major streams on the coastal plain indicates increased territoriality during the middle and late Archaic.

During the late Archaic (3,000 B.C.–A.D. 400), sea level stabilized and the modern climatic regime became established (Aten, 1983). Beginning around 1,000 B.C., subsistence adaptations increasingly focused on coastal zone resources (Aten, 1983) (Story et al., 1990). Aten (1979, 1983) hypothesized the establishment of seasonal rounds, including regular movements from littoral to inland areas during the late Archaic. The historic native groups have

been demonstrated to move in a yearly round from small, dispersed band-sized or less groups during the warm seasons to aggregated villages during the colder months (Aten, 1979) (Newcomb, 1961). During this period, grave goods from 41AU36 indicate the inhabitants of the site were involved in an import-export sphere extending far beyond southeast Texas, as far as Arkansas (Hall, 1981).

Story (1985) views the establishment of large cemeteries along drainages as evidence of strong territorial ties by certain groups resulting from increased population growth in the region. Hall (1981) argued that the highly productive environments such as river valley bottoms, estuaries, and bays that formed during the late Holocene were home to an aggregate of resources. Many of these resources were predictable, concentrated, and fixed on the landscape, and allowed late Archaic groups to operate within smaller, more exclusive territories.

2.3.1.3 Ceramic Period (A.D. 400–A.D. 1750)

Ceramics became a regular part of the archeological material culture in the Galveston Bay area beginning around 2000 B.P. Shafer (1975) views the introduction of pottery in the Early Ceramic period as having little effect on the lifeways of prehistoric groups in southeast Texas. The contents of shell-bearing sites along the Upper Texas Coast during the Ceramic periods vary little from the late Archaic shell middens, except for the addition of pottery to the native technological repertoire (Takac et al., 2000).

Story et al. (1990) differed from other researchers in the region such as Aten (1983) and Shafer (1975), who referred to the post-Archaic inhabitants of the region as Woodland, by referring to the long developmental sequence of ceramic styles on the upper coast and inland areas as the "Mossy Grove Tradition." Following the introduction of Tchefuncte varieties, as early as 400 B.C. (Ensor, 1998), the incised design motifs of the Mossy Grove Tradition were strongly influenced by the Coles Creek tradition of the Lower Mississippi Valley (Ricklis and Weinstein, 2005).

The early Ceramic period (A.D.400–A.D. 800) is identified by the co-occurrence of sandy or clay paste ceramics and dart points (primarily Gary and Kent types). Aten (1983) believes population densities increased during the Ceramic periods and intraregional differences became more pronounced. Group territories were established along major streams marked by at least one cemetery (Aten, 1983). Arrow points and grog-tempered ceramics were introduced during the late Ceramic period (A.D. 800–A.D. 1750). Arrow points were introduced around A.D. 600,

and grog-tempered ceramics around A.D. 1000, although sandy paste ceramics and dart points from the early Ceramic continue to be used during this period. Shafer (1975) believes some evidence exists for more permanent residence inland near modern Lake Conroe.

2.3.1.4 Historic Period

The first European contact in the region began in the early sixteenth century with the landing of Cabeza de Vaca on the Texas coastline in 1528. It is believed that his party crossed Oyster Creek, Old Caney Creek, and the Brazos and San Bernard rivers in their quest for provisions. More long-term contacts resulting from the permanent European settlement did not directly impact aboriginal lifeways in southeast Texas until the early eighteenth century (Patterson 1995), although diseases introduced by explorers and early traders had begun to affect Native American populations by the sixteenth century (Ewers 1974). Anglo-American exploration of the Harris County area began with the expeditions launched to aid the Mexican Revolution during the early 19th century (Henson 2010). This exploration led to the settlement of Harris County in 1822 by the men who had joined these expeditions (Henson 2010). Harris County formed the southeastern border of Stephen F. Austin's land grant, resulting in further settlement of the county and eventually the foundation of Harrisburg Municipality in 1835 (Henson 2010; Muir 2014). The municipality of Harrisburg played a central role in the Texas Revolution but was eventually sacked by Santa Anna and burnt to the ground (Henson 2010).

After the Texas Revolution, Harrisburg County (now Harris County) was formed and the county seat, the city of Houston, became the capital city of the Republic of Texas (Henson 2010). The modern boundaries of the county were established in 1838 and it was renamed Harris County in 1839 (Henson 2010). By the mid-nineteenth century, the county saw the introduction of several railroads, with Harrisburg serving as the terminus (Henson 2010). Harris County was primarily agricultural and slave labor was an important part of the county's economy prior to the Civil War (Henson 2010). By the twentieth century Harris County had grown substantially and the discovery of oil between 1903 and 1907 brought many migrant workers into the county (Henson 2010). Harris County began to industrialize by 1911 and became a major shipping hub with chief exports consisting of rice, cotton, cement, and petroleum products (Henson 2010). In the 1960s, Houston became home of the NASA Manned Spacecraft Center (now Lyndon B. Johnson Space Center) making it synonymous with space exploration. Today Harris County is the most populous county in Texas, inhabited by over 4 million people (US Census Bureau 2014a).

2.3.2 Records Review

Cultural resource data for the study area were reviewed online through the THSA, TASA, and TARL. GIS shapefiles identifying the locations of previously recorded archeological sites were requested from TARL. GIS data from TARL were used to map cultural resource site locations within the study area. Previously recorded cultural resource site data available online from the THSA and TASA were obtained to identify locations of designated historical sites, cemeteries, Historic Texas Cemeteries ("HTCs"), and OTHMs within the study area, as well as previously conducted cultural resource investigations. TxDOT's historic bridges database was also reviewed for bridges that are listed or determined eligible for listing on the NRHP. The National Park Service ("NPS") databases and websites pertaining to NRHP, National Historic Trails, and National Historic Landmark properties were also reviewed to locate and define boundaries for historic properties recorded at the national level.

The results of the record search are summarized in Table 2-4, including the number of previously recorded archeological sites, cemeteries, HTCs, NRHP-listed properties, National Historic Trails, and OTHMs in the study area.

Table 2-4 Cultural Resources Recorded within the Study Area

Recorded Archeological Sites	NRHP-listed or determined eligible properties	National Historic Trail	Cemeteries	HTC	OTHM
4	0	0	0	0	0

Source: THC, 2014b,c.

The review of the THSA, TASA (THC, 2014b, 2014c), and TARL data indicates that four previously recorded archeological sites have been recorded within one mile of the study area. None of these previously recorded sites are designated as State Archeological Landmarks (SALs). Of these four recorded archeological sites, three (41HR730, 41HR1002, and 41HR1084) are prehistoric in age and one (41HR975) is a historic site. Of the prehistoric sites, one (41HR730) is recorded as a Paleoindian site, one (41HR1002) is recorded as a Late Prehistoric/Neo-American campsite, and one (41HR1084) is an unknown prehistoric lithic scatter. The historic site (41HR975) is the only recorded site within the study area and consists of a barbed-wire fence surrounding three pier and beam structures, an agricultural well pump, and a windmill. No cemeteries, HTCs, OTHMs, SALs, NRHP-listed properties, NRHP-eligible bridges, or National Historic Landmarks (NHLs) are located within the study area.

Review of the previously recorded cultural resource sites data indicates that the study area has not been examined entirely during previous archeological and historical investigations. Consequently, the records review results do not include all possible cultural resources sites within the study area. To further assess and avoid potential impacts to cultural resources, high probability areas ("HPAs") for prehistoric archeological sites will be defined during the route analysis process. High probability areas were designated based on a review of the Houston Potential Archeological Liability Map (PALM). The PALM analyzes landform types, soil types, evidence of recent and historic land use, and environmental determinations to define HPAs. The Houston PALM uses the following map units:

- Unit 0—Waterbodies; no survey recommended.
- Unit 1—Surface survey recommended; deep reconnaissance recommended if deep impacts are anticipated.
- Unit 2—Surface survey recommended; no deep reconnaissance recommended.
- Unit 2a—Surface survey of mounds only; no deep reconnaissance recommended.
- Unit 3—No surface survey recommended; deep reconnaissance recommended if deep impacts are anticipated.
- Unit 3a—No surface survey recommended; deep reconnaissance recommended if severe deep impacts are anticipated.
- Unit 4—No survey recommended.

Within the PALM, high probability areas for prehistoric materials are represented in map units 1 and 2.

Historic age resources are likely to be found near water sources. However, they will also be located in proximity to primary and secondary transportation routes (e.g., trails, roads, and railroads) which provided access to the sites. Buildings and cemeteries are also more likely to be located within or near historic communities. Locations and patterns of distribution for historic-period sites are not readily predictable or quantifiable, and the route analysis process discussed in Section 4 considers only recorded sites listed with official state and federal agencies and HPAs developed for prehistoric resources within the study area.

2.3.3 Previous Investigations

According to the TASA (THC, 2014c), there have been 18 previously conducted cultural resource investigations within the study area boundaries. Several of these surveys include large areas along Grand Parkway, parts of FM 529 (Freeman Road), and near Katy Hockley Cut Off Road.

2.3.4 Aesthetic Values

Section 37.056(c)(4)(C) of PURA incorporates aesthetics as a consideration when evaluating proposed electric transmission facilities. There are currently no formal guidelines provided for managing visual resources on private, state, or county-owned lands located within the study area. For the purposes of this study, the term aesthetics is defined by HDR to include the subjective perception of natural beauty in a landscape and measurement of an area's scenic qualities. The visual inventory was conducted by describing the regional setting and determining the viewer sensitivity ratings. Related literature, aerial photograph interpretation, and reconnaissance surveys were used to describe the regional setting and to determine the landscape character types for the area.

For this study, the potential visual impacts considered for the project were limited to line-of-sight views within the immediate foreground (one-half mile, unobstructed) from points located on federal and state highways, FM and county roads, and recreational and park areas

Consideration of the visual environment includes a determination of aesthetic values (where the major potential effect of a project on the resource is considered visual), and recreational values (where the location of a transmission line could potentially affect the scenic enjoyment of the area). HDR considered the following criteria that combine to give an area its aesthetic identity:

- Land form and topography (hills, valleys, etc.)
- Prominence of water in the landscape (rivers, lakes, etc.)
- Vegetation variety (woodland, meadows)
- Diversity of scenic elements
- Degree of human development or alteration
- Overall uniqueness of the scenic environment compared with the larger region

Based on these criteria, the study area exhibits a medium degree of aesthetic quality for the region. The majority of the study area is generally comprised of undeveloped pasture land and residential neighborhoods. The region is characterized by relatively flat topography with several water bodies draining into the Gulf of Mexico.

No Texas Heritage Trails or OTHM were identified within the study area (THC, 2014a). A review of the NPS website did not identify Wild and Scenic Rivers, National Trails, NHLs,

National Parks, National Monuments, National Historic Sites, or National Battlefields within the study area (NWSRS, 2014) (NPS, 2014a, and 2014b).

No outstanding aesthetic resources, designated scenic views, scenic roadways, or unique visual elements were identified from the literature review or from reconnaissance surveys of the study area. However, as discussed in Section 2.2.2 the area is within the Katy Prairie Loop which is valued by birders who enjoy the undeveloped portions of the study area for birding. In summary, although some portions of the study area are visually appealing, very little distinguishes its aesthetic quality from that of other areas within the region.

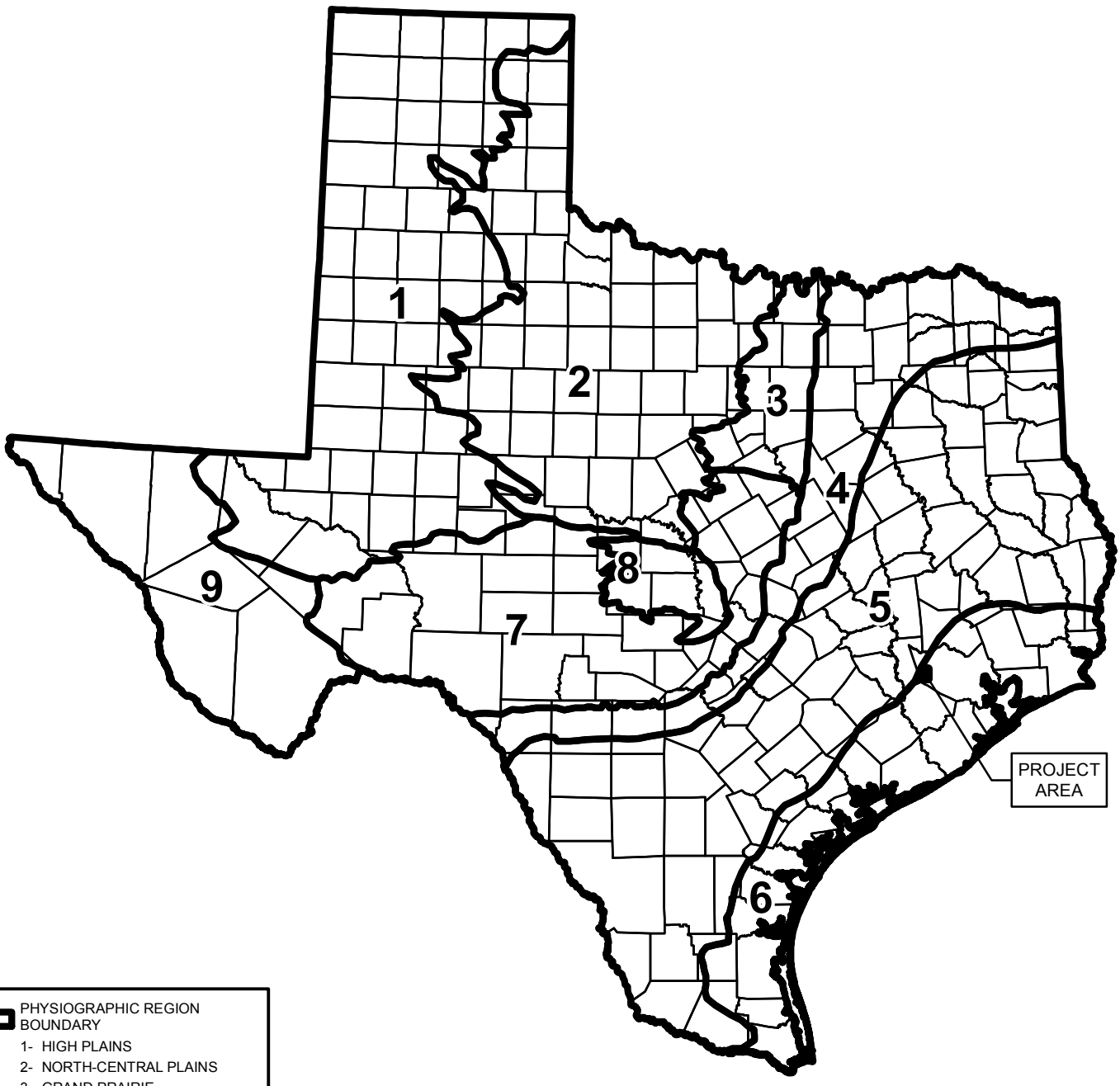
2.4 ENVIRONMENTAL INTEGRITY

Resource inventory data were collected for physiography, geology, soils, surface waters, wetlands, and ecological resource areas. These data were mapped within the study area utilizing GIS layers. Additional data collection activities consisted of file and record reviews conducted with the various state and federal regulatory agencies, a review of published literature, and review of various maps and aerial photographs. Maps and data layers reviewed include USGS 7.5 minute topographic maps, Bureau of Economic Geology (BEG) Geologic Atlas maps, NWI maps, TxDOT county highway maps, and county appraisal district land parcel boundary maps.

2.4.1 Physiography and Geology

As shown in Figure 2-3, the study area is located within the Coastal Prairies sub-province of the Gulf Coastal Plains Physiographic Region of Texas (BEG, 1996a). The Coastal Prairies Region extends inland from the Texas Gulf Coast, and is characterized by young deltaic sands, silts and clays, creating nearly flat grasslands. Trees are uncommon throughout the region, except along streams and river bottoms. Elevations in the region range from 125 to 165 feet above mean sea level (“amsl”) and within the study area the terrain is dominated by nearly level topography that slopes to the southeast (USGS, 1971a, 1971b).

The entire study area is underlain by the Lissie Formation (BEG, 1996b). This Quaternary age formation is comprised of clay, silt, and sand, with minor constituents of siliceous gravel. These deltaic deposits of the Lissie Formation consist of three major units: (1) fine-grained undifferentiated detrital from meander belt, levee, crevasse splay, distributary sand, and flood-basin mud deposits, about 60m thick (2) fine-grained channel facies, 10-25m thick (3) fine-grained overbank facies, 55-65m thick. The Lissie Formation is stratigraphically located below



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the Beaumont Formation and disconformably above the Willis Formation (Moore and Wermund, 1993).

2.4.1.1 Geological Hazards

Several geologic hazards potentially affecting construction and operation of the transmission line were reviewed within the study area. Potential geologic hazards reviewed include fault lines, historical coal mining locations, gravel quarries, subsidence, and subsurface contamination.

A review of the BEG Geologic Atlas maps (BEG, 1996b) did not indicate any faults within the study area. However, the study area occurs within the Gulf-margin normal faults region in Texas. Faults in this region are strike oriented normal faults controlled by tensional forces. Over 150 faults have been identified in the Houston metropolitan area. The majority of these faults are deep-seated in the subsurface at depths of 3,200 to 13,000 feet (Verbeek et al., 1979). Some of the faults in the Texas Gulf Coast are still active and moving at rates of 0.2 to 0.8 inches per year (Shah and Lanning-Rush, 2005).

According to the RRC map of coal mine area prior to 1977, no historical coal mining activities have occurred or currently occur within the study area (RRC, 2014). Additionally no gravel or sand quarries were identified within the study area.

The Harris-Galveston Coastal Subsidence District was created in 1975 to control subsidence in the eastern coastal part of Texas that includes the greater Houston area and Galveston. Subsidence occurring within the region is primarily due to increased groundwater withdrawal and clay compaction within Harris, and neighboring Galveston, and Fort Bend counties. The USGS measures cumulative clay compaction continuously at 10 sites in Harris County. Subsidence monitoring and the start of groundwater regulation occurred at about the same time in the mid-1970s. The average annual rate of subsidence at the sites before regulation was estimated at 0.08 foot per year; after regulation, it was 0.05 foot per year (Kasmarek et al., 2009).

The presence of subsurface contamination of soils or groundwater from commercial activities, such as dumps or landfills, can require additional considerations during routing and may create a potential hazard during construction activities. A review of Environmental Protection Agency Superfund/National Priority List Sites (USEPA, 2014a) and the TCEQ—State Superfund Sites (TCEQ, 2013) did not indicate any listed sites within the study area. No county landfills or

historical landfills were identified within the study area. A review of the TCEQ—Leaking Petroleum Storage Tanks database indicates there are no sites located within the study area.

2.4.2 Soils

2.4.2.1 Soils

The published Natural Resources Conservation Service ("NRCS") soil survey for Harris County was reviewed to identify and characterize the soils occurring within the study area. Only one soil association was identified within the study area in Harris County: the Katy-Aris Association (NRCS, 1976). A soil association map unit consists of one or more major soil series and other minor soils. Table 2-5 provides a brief summary that indicates if any mapped soil series within the study area are considered hydric or prime farmlands.

Table 2-5 Mapped Soil Units within the Study Area

Soil Map Unit	Description	Percent of Study Area	Hydric Soil	Prime Farmland Soil
Harris County				
Aris fine sandy loam	Loamy; poorly drained; very slowly permeable soils; on flats	0.9	Yes	Yes, if drained
Aris-Gessner complex	Loamy; poorly drained; very slowly permeable soils; on flats	15.4	Yes	Yes, if drained
Clodine fine sandy loam, 0 to 1 percent slopes	Loamy; somewhat poorly drained; moderately permeable; on flats	0.1	Yes	No
Gessner fine sandy loam, 0 to 1 percent slopes, ponded	Loamy; poorly drained; very slowly permeable; on depressions	6.3	Yes	Yes, if drained
Katy fine sandy loam, 0 to 1 percent slopes	Loamy; moderately well drained; moderately slowly permeable; on flats	76.9	No	Yes
Verland silty clay loam	Loamy and clayey; somewhat poorly drained; very slowly permeable; on meander scrolls	0.1	No	Yes, if drained
Water	-	0.2	-	-

Source: NRCS, 1976, 2014.

2.4.2.2 Prime Farmland Soils

The Secretary of Agriculture, within U.S.C. §7-4201(c)(1)(A), defines prime farmland soils as those soils that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. They 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. Additional potential prime farmlands are those soils that meet most of the requirements of prime farmland, but fail because they lack the installation of water management facilities or they lack sufficient natural moisture. The U.S. Department of Agriculture ("USDA") would consider these soils prime farmland if such practices were installed. According to the NRCS—Web Soil Survey (NRCS, 2014), Katy fine sandy loam, 0 to 1 percent slopes is designated as prime farmland soils located within the study area. Other soils as indicated in Table 2-5 meet prime farmland criteria only if drained.

Typically, the NRCS does not consider power lines to be a conversion of prime farmlands because the site can still be used for farming after construction and these projects are normally exempt from the Farmland Protection Policy Act. The NRCS responded to HDR's solicitation for information in a letter dated June 30, 2014, that stated the following: "The proposed project is exempt because transmission lines are not a conversion of Important Farmlands and the site can still be used after construction." (see Appendix A).

2.4.3 Water Resources

Water resources evaluated in this study include surface water and groundwater. Information on water resources within the study area was obtained from a variety of sources, including the Texas Water Development Board (TWDB, 2011 and 2014), USGS topographical maps (1971a), and aerial photographs (Google, 2014).

2.4.3.1 Surface Waters

The study area is located within the San Jacinto River basin (TWDB, 2011) and sits approximately 35 miles west of the San Jacinto River. The local watersheds within the study area include the Langham Creek Watershed, Bear Creek Watershed, South Mayde Creek Watershed, and Buffalo Bayou Watershed. These watersheds drain to the southeast and eventually empty into the San Jacinto River. Langham Creek runs just north of the study area and drains approximately 2,242 acres in the northeast corner of the study area. Bear Creek flows through the north central portion of the study area and drains approximately 7,250 acres.

The largest watershed is in the south central portion of the study area and is associated with South Mayde Creek. The South Mayde Creek watershed drains approximately 8,092 acres. Mason Creek located just south of the study area is within the Buffalo Bayou Watershed and drains approximately 1,312 acres in the southwest corner of the study area. Several additional smaller canals, tributaries, ponds, ditches, and marshes are located within the study area.

All surface waters and their associated wetlands located within the study area are subject to USACE regulations as "waters of the U.S." under Section 404 of the CWA.

Navigable waters and associated tributaries or backwaters located within the study area are subject to USACE regulations as "navigable waters of the U.S." under Section 10 of the Rivers and Harbors Act of 1899. While the USACE Galveston District does not publish a list of Section 10 waters, no water within the study area are deemed jurisdictional.

2.4.3.2 Special Status Waters

Under 31 TAC 357.8, TPWD has identified Ecologically Significant Stream Segments ("ESSS") based on habitat value, threatened and endangered species, species diversity, and aesthetic value criteria. Review of the TPWD (2014a) data did not indicate any designated ESSS stream segments within the study area.

In accordance with Section 303(d) of the CWA, the TCEQ identifies surface waters that do not meet current Total Maximum Daily Load ("TMDL") and implements measures to bring the water quality within the TMDL standard. Review of the TCEQ (2014), 303(d) list did not indicate any stream segments within the study area that do not currently meet the water quality standards for designated uses.

No portion of the study area is located within the Coastal Management Zone.

2.4.3.3 Floodplains

Available floodplain and floodway data were obtained from FEMA. The 100-year flood (1% flood or base flood) represents a flood event that has a 1% chance of being equaled or exceeded for any given year. The FEMA-mapped 100-year floodplain within the study area accounts for 9,034 acres and includes areas associated with Langham Creek, Bear Creek, South Mayde Creek, and Mason Creek (FEMA, 2007, 2013). Mapped floodplains can be seen on Figure 5-1.

2.4.3.4 Future Surface Water Developments

In 1997, Senate Bill 1 was enacted to develop a regional approach for the development, conservation, and management of the state's water resources. Sixteen planning regions were developed and each Regional Planning Group was charged with the development of a Regional Water Plan to be incorporated into the State Water Plan. The study area is within Region H, and a review of this plan did not indicate any evaluated, proposed, or potential new reservoirs within the study area (TWDB, 2011).

A new park named John Paul's Landing, is located near the intersection of Katy Hockley Cut Off and Sharp roads in the northern portion of the study area. As proposed, the park will feature a large 400-to 500-acre lake for canoeing and fishing that will also provide stormwater storage.

2.4.3.5 Groundwater

The Gulf Coast Aquifer is the major groundwater aquifer within the study area. No minor aquifers were mapped within the study area (TWDB, 2011). The Gulf Coast Aquifer extends along the Texas Gulf Coast from Louisiana to Mexico to approximately 100-120 miles inland. The Gulf Coast Aquifer was deposited in a way that generated interbedded sand and clay layers. It occurs within the study area as an outcrop consisting of sand, silt, clay, and gravel beds ranging in a thickness from 200 to 2,400 feet (TWDB, 2011).

Review of the TWDB (2014) water well data indicated many public and private water wells located throughout the study area. Depths of these wells rang from approximately 200 to 1,000 feet below ground surface. Review of the USGS topographic maps did not indicate any springs within the study area.

2.4.4 Ecological Resources

2.4.4.1 Ecological Region

Within the Level III Ecoregions, the study area is located in the Western Gulf Coastal Plain (USEPA, 2014b) (Griffith et al., 2007). The Western Gulf Ecoregion is characterized by flat coastal plains, grasslands, and pine forests in the northern extent. Conversion of land for agricultural uses and urban and industrialized development has been a major concern for the ecology in these regions (Griffith et al., 2007). The study area is located within the Northern Humid Gulf Coastal Prairies Level IV Ecoregion (Griffith et al., 2007).

2.4.4.2 Vegetation Types

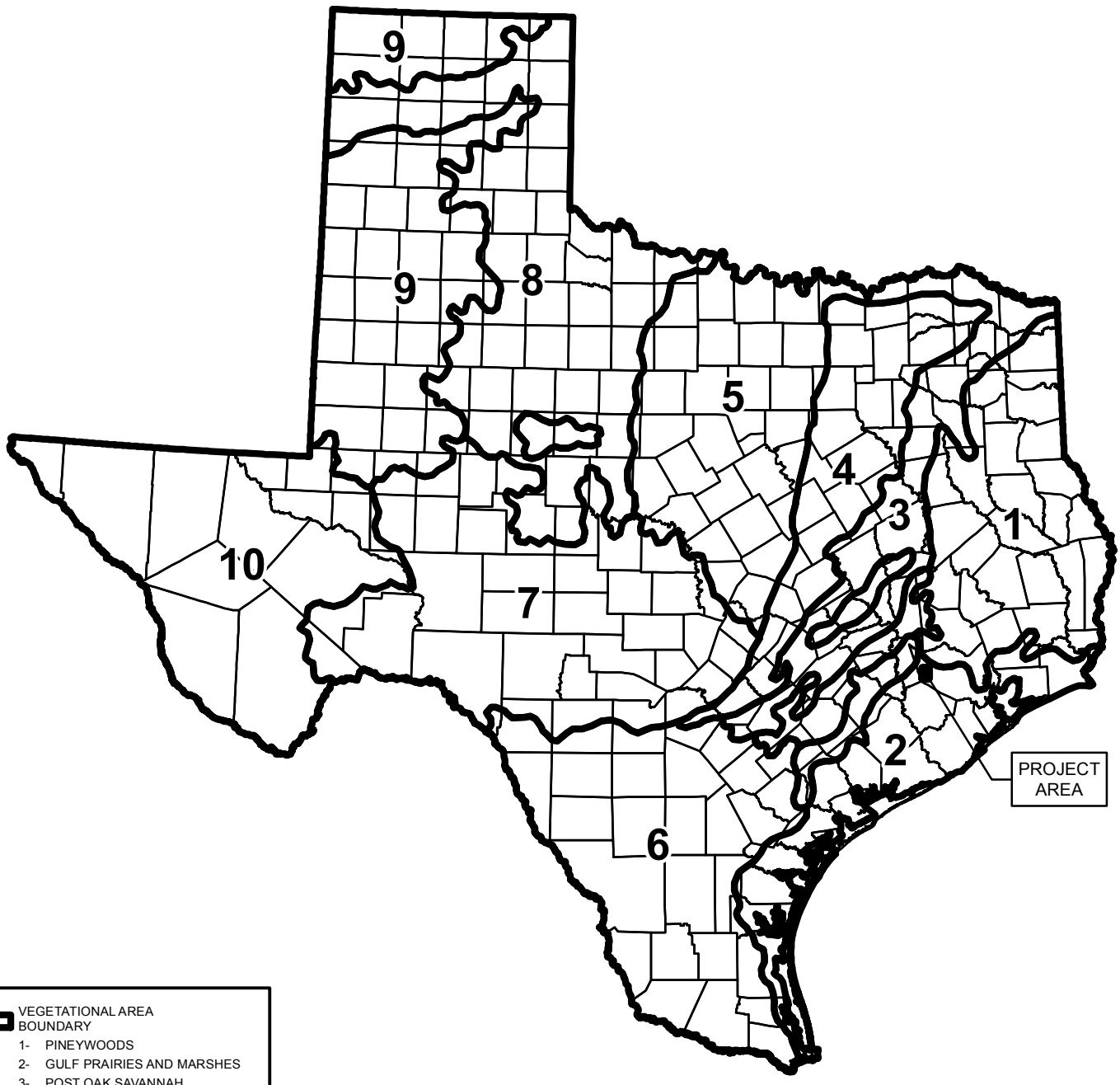
The study area is located within the Gulf Prairies vegetational area of Texas (Gould et al., 1960) (See Figure 2-4). The sub-vegetational classification for the study area is Croplands (Frye et al., 1984); however crops were not the dominant vegetation type found.

Trees are uncommon in this region except along streams and planted in residential developments. Based on field reconnaissance and aerial interpretation, it appears that there may be some parcels of native vegetation currently used as pastureland for livestock in the northern half of the study area. The southern portion of the study area is developing into residential areas.

Parcels currently being used for livestock, mainly cattle, generally have a monoculture of species that can survive browsing or are unpalatable to grazers. The monoculture often includes species such as king ranch bluestem (*Bothriochloa ischaemum* var. *songarica*), Johnson grass (*Sorghum halepense*), coastal Bermuda (*Cynodon dactylon*), Dallisgrass (*Paspalum dilatatum*), Bahiagrass (*Paspalum notatum*), panic grass (*Panicum* sp., and fescue (*Festuca* sp.). Pastures in this area which have not been grazed recently begin to return to native prairie species after a few years and may still contain native micro topography such as mima mounds and prairie potholes. These un-grazed pastures support species of wildflower, grass, and herbaceous species such as prairie coneflower (*Ratibida columnaris*), blackeyed susan (*Rudbeckia hirta*), little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), side oats grama *(Bouteloua curtipendula*), and dewberry (*Rubus trivialis*).

Terrestrial Habitats

Terrestrial habitats within the study area include pasture lands, developed areas, and riparian forests associated with South Mayde Creek and Bear Creek. The remaining terrestrial landscape is dissected by roads, residential subdivisions and commercial developments, and utility lines. Potential tree and shrub species occurring within the study area are summarized in Table 2-6. The occurrence, density, and composition of wooded areas depend on location, hydrology, soil type and magnitude of previous ground disturbance or land management activities (Simpson, 1999).



VEGETATIONAL AREA BOUNDARY
1- PINEYWOODS
2- GULF PRAIRIES AND MARSHES
3- POST OAK SAVANNAH
4- BLACKLAND PRAIRIES
5- CROSS TIMBERS AND PRAIRIES
6- SOUTH TEXAS PLAINS
7- EDWARDS PLATEAU
8- ROLLING PLAINS
9- HIGH PLAINS
10- TRANS-PECOS
COUNTY BOUNDARY

138 KV ZENITH-FRANZ PROJECT

VEGETATIONAL AREAS OF TEXAS

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JAN 2015 | FIGURE 2-4

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Table 2-6 Potential Tree/Shrub Species within the Study Area

Common Name	Scientific Name	Common Name	Scientific Name
Black willow	*Salix nigra*	Overcup oak	*Quercus lyrata*
Blackjack oak	*Quercus marilandica*	Pecan	*Carya illinoinensis*
Box elder	*Acer negundo*	Post oak	*Quercus stellata*
Carolina basswood	*Tilia caroliniana*	Rattlebush	*Sesbania drummondii*
Cherry laurel	*Prunus laurocerasus*	Red cedar	*Juniperus virginiana*
Chinese tallow	*Triadica sebifera*	Red mulberry	*Morus rubra*
Eastern cottonwood	*Populus deltoides*	Southern red oak	*Quercus falcata*
Escarpment live oak	*Quercus fusiformis*	Water oak	*Quercus nigra*
Green ash	*Fraxinus pennsylvanica*	Western soapberry	*Sapindus saponaria L. var. drummondii*
Hawthorn	*Crataegus spp.*	Willow oak	*Quercus phellos*
Huisache	*Acacia farnesiana*	Winged elm	*Ulmus alata*
Live oak	*Quercus virginiana*	Yaupon	*Ilex vomitoria*

Source: Simpson, 1999; Griffith et al., 2007.

Aquatic and Hydric Habitats

Aquatic habitats within the study area are associated with surface waters and wetlands. These habitats are primarily associated with South Mayde Creek and Bear Creek, and other ponds, marshes, and ditches within the study area. Other aquatic habitats may be associated with the tributaries to these surface waters, including pooled areas of perennial or intermittent drainages. Emergent vegetation in these aquatic habitats is typically limited to the shallow areas along the shorelines or within shallow marshes. Aquatic environments support vegetative species, such as water hyacinth (*Eichhornia crassipes*), arrowhead (*Sagittaria* spp.), coontail (*Ceratophyllum demersum*), cabomba (*Cabomba caroliniana*), pickerelweed (*Pontederia cordata*), pennyworts (*Hydrocotyle* spp.), water lilies (*Nymphaea* spp.), spiderworts (*Tradescantia* spp.), duckweeds (*Lemna* spp.), widgeongrass (*Ruppia maritima*), and glasswort (*Salicornia depressa*) (McMahan et al., 1984).

The hydric habitats in the study area are primarily located within floodplains and riparian areas associated with creeks, ponds, and depressional areas. These habitats undergo a seasonal inundation and maintain saturated soils. Typical woody plant species in these riparian areas include Chinese tallow, pecan, water oak, and winged elm (McMahan et al., 1984) (Griffith et al., 2007).

Emergent wetlands within the study area are generally located along South Mayde Creek and Bear Creek, ponds, and ditches. These wetlands are comprised of aquatic species, such as cattails (*Typhus* spp.), sedges (*Carex* spp.*),* flatsedges (*Cyperus* spp.), smartweeds (*Polygonum* spp.), bushy bluestem (*Andropogon glomeratus*), cordgrass (*Spartina* spp.), bull rushes (*Scirpus* spp.; *Schoenoplectiella* spp.), giant reed (*Arundo donax*), common reed, and rushes (*Juncus* spp.) *(*McMahan et al., 1984*).*

Mapped wetland information was derived from digital copies of the NWI maps (USFWS, 2014a). NWI maps are based on topography and interpretation of infrared satellite data and color aerial photographs and are classified under the Cowardin System (Cowardin et al., 1979). These maps are typically conservative estimates of wetlands, primarily because the hydrology of the area has likely been modified by ground disturbing activities, such as farming, channelized streams, installation of levees and drainages. Review of NWI maps indicated numerous freshwater palustrine emergent ("PEM") wetlands and freshwater palustrine forested/shrub (PFO and PSS) wetlands throughout the study area. PEM wetlands consist of rooted herbaceous hydrophytes located in pond margins, freshwater marshes, or shallow water areas. PFO wetlands are wetland areas comprised of hydrophytic trees that constitute 30% or greater of the areal vegetation coverage. PSS wetlands are areas where hydrophytic trees constitute less than 30% and the scrub-shrub layer constitutes 30% or greater of the areal vegetation cover. Other surface waters mapped within the study area include freshwater ponds.

The dredging or filling of materials within wetlands is regulated by the USACE under Section 404 of the CWA. Additional coordination with the USACE will be required to determine if any permit requirements will be necessary due to the construction of the proposed transmission line.

2.4.4.3 Wildlife and Fisheries

Wildlife

The study area is located on the eastern border of the Texan Biotic Province (see Figure 2-5) (Blair, 1950). At the time of publication, the Texan Biotic Province was known to support 13 anurans, five urodeles, 39 snake species, nine lizards, two land turtles, and least 49 species of mammals (Blair, 1950).

BIOTIC PROVINCE BOUNDARY
COUNTY BOUNDARY

138 KV ZENITH-FRANZ PROJECT

BIOTIC PROVINCES OF TEXAS

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JAN 2015 | FIGURE 2-5

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Amphibian species (frogs, toads, salamanders and newts) that potentially occur within the study area are listed in Table 2-7. Frogs and toads may occur in all vegetation types, and salamanders and newts are typically restricted to moist habitats (Tipton et al., 2012). None of the species listed are considered rare, threatened, or endangered under Section 7 of the Endangered Species Act (ESA).

Table 2-7 Amphibian Species Potentially Occurring within the Study Area

Common Name	Scientific Name
Frogs/Toads	
American bullfrog	*Rana catesbeiana*
Cope's gray tree frog	*Hyla chrysoscelis*
Crawfish frog	*Lithobates areolatus*
Eastern narrow-mouth toad	*Gastrophryne carolinensis*
Gray tree frog	*Hyla versicolor*
Great plains narrow-mouthed toad	*Gastrophryne olivacea*
Green frog	*Lithobates clamitans*
Green tree frog	*Hyla cinerea*
Gulf Coast toad	*Incililius nebulifer*
Houston toad	*Bufo houstonensis*
Hurter’s spadefoot	*Scaphiopus hurteri*
Northern cricket frog	*Acris crepitans*
Rio Grande chirping frog	*Syrrhophus cystignathoides*
Southern leopard frog	*Lithobates sphenocephalus*
Spotted chorus frog	*Pseudacrus clarkii*
Spring peeper	*Pseudacris crucifer*
Squirrel tree frog	*Hyla squirella*
Strecker’s Chorus Frog	*Pseudacris streckeri*
Woodhouse's toad	*Anaxrys woodhousi*
Salamanders/Newts	
Dwarf salamander	*Eurycea quadridigitata*
Eastern newt	*Notophthalmus viridescens*
Lesser siren	*Siren intermedia*
Marbled salamander	*Ambystoma opacum*
Small-mouthed salamander	*Ambystoma texanum*
Three-toed Salamander	*Amphiuma tridactylum*

Source: (Tipton et al., 2012)

Reptiles (turtles, lizards and snakes) potentially occurring within the study area are listed in Table 2-8. These include those species that are more commonly observed near water (i.e., snakes) and those that are more common in terrestrial habitats (Dixon, 2000) (Werler and

Dixon, 2005). None of the species listed are considered rare, threatened, or endangered under Section 7 of the ESA.

Table 2-8 Reptilian Species Potentially Occurring within the Study Area

Common Name	Scientific Name
Turtles	
Common snapping turtle	*Chelydra serpentina*
Eastern box turtle	*Terrapene carolina carolina*
Eastern mud turtle	*Kinosternon subrubrum*
Ornate box turtle	*Terrapene ornata ornata*
Spiny softshelled turtle	*Apalone spinifera*
Texas Diamond-backed terrapin	*Malaclemys terrapin littoralis*
Western chicken turtle	*Deirochelys reticularia miaria*
Lizards	
Broad-headed skink	*Plestiodon laticeps*
Brown anole	*Anolis sagrei*
Common five-lined skink	*Plestiodon fasciatus*
Green anole	*Anolis carolinensis*
Little brown skink	*Scincella lateralis*
Mediterranean house gecko	*Hemidactylus turcicus*
Prairie lizard	*Sceloporus undulatus*
Prairie skink	*Plestiodon septentrionalis*
Six-lined racerunner	*Aspidoscelis sexlineata*
Texas horned lizard	*Phrynosoma cornutum*
Western slender glass lizard	*Ophisaurus attenuatus*
Snakes	
Coachwhip	*Masticophis flagellum*
Common gartersnake	*Thamnophis sirtalis*
Cornsnake	*Pantherophis guttatus*
Cottonmouth	*Agkistrodon piscivorus*
DeKay's brownsnake	*Storeria dekayi*
Diamond-backed water snake	*Nerodia rhombifer rhombifer*
Eastern hog-nosed snake	*Heterodon platirhinos*
Eastern racer	*Coluber constrictor*
Flat-headed snake	*Tantilla gracilis*
Glossy crayfish snake	*Regina rigida*
Graham's crayfish snake	*Regina grahamii*
Lined snake	*Tropidoclonion lineatum*
Milksnake	*Lampropeltis triangulum*
Plains hog-nosed snake	*Heterodon nasicus*
Prairie king snake	*Lampropeltis calligaster*
Pygmy rattlesnake	*Sistrurus milarius*

Table 2-8 Reptilian Species Potentially Occurring within the Study Area

Common Name	Scientific Name
Ring-necked snake	*Diadphis punctatus*
Rough earth snake	*Virginia striatula*
Rough green snake	*Opheodrys aestivus*
Smooth greensnake	*Opheodrys vernalis*
Southern copperhead	*Agkistrodon contortrix contortix*
Southern watersnake	*Nerodia fasciata*
Texas coral snake	*Micrurus tener*
Texas rat snake	*Elaphe obsoleta lindheimeri*
Western diamond-backed rattlesnake	*Crotalus atrox*
Western Ground snake	*Sonora semiannulata*
Western ribbonsnake	*Thamnophis proximus*

Source: Dixon ,2000; Werler and Dixon, 2005.

Numerous avian species are present within the study area, including year-round residents as listed in Table 2-9 (Lockwood and Freeman, 2004). Additional bird species may migrate through the study area in the spring and fall or use the area for nesting in the spring and summer or to overwinter. Winter resident species that may potentially occur in the study area are listed in Table 2-10 (Lockwood and Freeman, 2004). Summer residents that may potentially occur in the study area are listed in Table 2-11 (Lockwood and Freeman, 2004). The likelihood for occurrence of each species depends upon suitable habitat and season. All migratory birds have protection under the MBTA of 1918.

Table 2-9 Year-Round Resident Bird Species Potentially Occurring within the Study Area

Common Name	Scientific Name
American crow	*Corvus brachyrhynchos*
American robin	*Turdus migratorius*
Barn owl	*Tyto alba*
Barred owl	*Strix varia*
Black vulture	*Coragyps atratus*
Black-bellied whistling duck	*Dendrocygna autumnalis*
Black-crowned night-heron	*Nycticorax nycticorax*
Blue jay	*Cyanocitta cristata*
Boat-tailed grackle	*Quiscalus major*
Brown-headed cowbird	*Molothrus ater*
Carolina chickadee	*Poecile carolinensis*
Carolina wren	*Thryothorus ludovicianus*
Cattle egret	*Bubulcus ibis*
Common grackle	*Quiscalus quiscula*

Table 2-9 Year-Round Resident Bird Species Potentially Occurring within the Study Area

Common Name	Scientific Name
Common ground-dove	*Columbina passerina*
Common moorhen	*Gallinula chloropus*
Common yellowthroat	*Geothlypis trichas*
Downy woodpecker	*Picoides pubescens*
Eastern bluebird	*Sialia sialis*
Eastern meadowlark	*Sturnella magna*
Eastern screech owl	*Megascops asio*
Eurasian collared-dove	*Streptopelia decaocto*
European starling	*Sturnus vulgaris*
Glossy ibis	*Plegadis falcinellus*
Grasshopper sparrow	*Ammodramus savannarum*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Great horned owl	*Bubo virginianus*
Greater roadrunner	*Geococcyx californianus*
Great-tailed grackle	*Quiscalus mexicanus*
Green heron	*Butorides virescens*
Horned lark	*Eremophila alpestris*
House finch	*Carpodacus mexicanus*
House sparrow	*Passer domesticus*
Inca dove	*Columbina inca*
Killdeer	*Charadrius vociferus*
Lark sparrow	*Chondestes grammacus*
Least bittern	*Ixobrychus exilis*
Least grebe	*Tachybaptus dominicus*
Loggerhead shrike	*Lanius ludovicianus*
Marsh wren	*Cistothorus palustris*
Mottled duck	*Anas fulvigula*
Mourning dove	*Zenaida macroura*
Neotropic cormorant	*Phalacrocorax brasilianus*
Northern bobwhite	*Colinus virginianus*
Northern cardinal	*Cardinalis cardinalis*
Northern mockingbird	*Mimus polyglottos*
Pied-billed grebe	*Podilymbus podiceps*
Pileated woodpecker	*Dryocopus pileatus*
Red-bellied woodpecker	*Melanerpes carolinus*
Reddish egret	*Egretta rufescens*
Red-shouldered hawk	*Buteo lineautus*
Red-tailed hawk	*Buteo jamaicensis*

Table 2-9 Year-Round Resident Bird Species Potentially Occurring within the Study Area

Common Name	Scientific Name
Red-winged blackbird	*Agelaius phoeniceus*
Rock pigeon	*Columba livia*
Tufted titmouse	*Baeolophus bicolor*
Turkey vulture	*Cathartes aura*
White-eyed vireo	*Vireo griseus*
White-faced ibis	*Plegadis chihi*
White-winged dove	*Zenaida asiatica*
Wood duck	*Aix sponsa*
Yellow-crowned night-heron	*Nyctanassa violacea*

Source: Lockwood and Freeman, 2004.

Table 2-10 Winter Resident Bird Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*
American goldfinch	*Carduelis tristis*
American kestrel	*Falco sparverius*
American pipit	*Anthus rubescens*
American wigeon	*Anas americana*
American woodcock	*Scolopax minor*
Ash-throated flycatcher	*Myiardus cinerascens*
Belted kingfisher	*Megaceryle alcyon*
Black-and-white warbler	*Mniotilta varia*
Black-bellied plover	*Pluvialis squatarola*
Black-chinned hummingbird	*Archilochus alexandri*
Blue winged teal	*Anas discors*
Blue-gray gnatcatcher	*Polioptila caerulea*
Blue-headed vireo	*Vireo solitarius*
Brewer's blackbird	*Euphagus cyanocephalus*
Bronzed cowbird	*Molothrus aeneus*
Brown creeper	*Certhia americana*
Brown thrasher	*Toxostoma rufum*
Buff-bellied hummingbird	*Amazilia yucatanensis*
Bufflehead	*Bucephala albeola*
Burrowing owl	*Athene cunicularia*
Canada goose	*Branta canadensis*
Cedar waxwing	*Bombycilla cedrorum*
Chipping sparrow	*Spizella passerina*
Cooper's hawk	*Accipiter cooperii*
Eared grebe	*Podiceps nigricollis*
Eastern phoebe	*Sayornis phoebe*

Table 2-10 Winter Resident Bird Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*
Eastern towhee	*Pipilo erythrophthalmus*
Ferruginous hawk	*Buteo regalis*
Field sparrow	*Spizella pusilla*
Fox sparrow	*Passerella iliaca*
Golden-crowned kinglet	*Regulus satrapa*
Gray catbird	*Dumetella carolinensis*
Greater white-fronted goose	*Anser albifrons*
Greater yellowlegs	*Tringa melanoleuca*
Green-winged teal	*Anas crecca*
Groove-billed ani	*Crotophaga sulcirostris*
Henslow's sparrow	*Ammodramus henslowii*
Hermit thrush	*Catharus guttatus*
Hooded Merganser	*Lophodytes cucullatus*
Horned grebe	*Podiceps auritus*
House wren	*Tryoglodytes aedon*
LeConte's sparrow	*Ammodramus leconteii*
Lincoln's sparrow	*Melospiza lincolnii*
Long-billed curlew	*Numenius americanus*
Long-billed dowitcher	*Limnodromus scolopaceus*
Long-tailed duck	*Clangula hyemalis*
Mallard	*Anas platyrhynchos*
Merlin	*Falco columbarius*
Northern flicker	*Colaptes auratus*
Northern harrier	*Circus cyaneus*
Northern pintail	*Anas acuta*
Northern shoveler	*Anas clypeata*
Orange-crowned warbler	*Vermivora celata*
Palm warbler	*Setophaga palmarum*
Peregrine falcon	*Falco peregrinus*
Pine siskin	*Carduelis pinus*
Pine warbler	*Dendroica pinus*
Red-breasted merganser	*Mergus serrator*
Red-breasted nuthatch	*Sitta canadensis*
Redhead	*Aythya americana*
Ruby-crowned kinglet	*Regulus calendula*
Rufous hummingbird	*Selasphorus rufus*
Rusty blackbird	*Euphagus carolinus*
Sandhill crane	*Grus canadensis*
Savannah sparrow	*Passerculus sandwichensis*

Table 2-10 Winter Resident Bird Species Potentially Occurring within the Study Area

Common Name	*Scientific Name*
Sedge wren	*Cistothorus platensis*
Semipalmated plover	*Charadrius semipalmatus*
Sharp-shinned hawk	*Accipiter striatus*
Short-billed dowitcher	*Limnodromus griseus*
Short-eared owl	*Asio flammeus*
Song sparrow	*Melospiza melodia*
Spotted sandpiper	*Actitis macularius*
Spotted towhee	*Pipilo maculatus*
Swamp sparrow	*Melospiza georgiana*
Tree swallow	*Tachycineta bicolor*
Vermilion flycatcher	*Pyrocephalus rubinus*
Vesper sparrow	*Pooecetes gramineus*
Western meadowlark	*Sturnella neglecta*
White-crowned sparrow	*Zonotrichia leucophrys*
White-throated sparrow	*Zonotrichia albicollis*
Wilson's snipe	*Gallinago delicata*
Winter wren	*Troglodytes troglodytes*
Yellow-bellied sapsucker	*Sphyrapicus varius*
Yellow-rumped warbler	*Dendroica coronata*

Source: Lockwood and Freeman, 2004.

Table 2-11 Summer Resident Bird Species Potentially Occurring within the Study Area

Common Name	Scientific Name
Barn swallow	*Hirundo rustica*
Blue grosbeak	*Passerina caerulea*
Broad-winged hawk	*Buteo platypterus*
Chimney swift	*Chaetura pelagica*
Chuck-will's-widow	*Caprimulgus carolinensis*
Cliff swallow	*Petrochelidon pyrrhonota*
Common nighthawk	*Chordeiles minor*
Dickcissel	*Spiza americana*
Eastern kingbird	*Tyrannus tyrannus*
Fulvous whistling duck	*Dendrocygna bicolor*
Great crested flycatcher	*Myiarchus crinitus*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Orchard oriole	*Icterus spurius*
Painted bunting	*Passerina ciris*
Purple gallinule	*Porphyrio martinica*
Purple martin	*Progne subis*

Table 2-11 Summer Resident Bird Species Potentially Occurring within the Study Area

Common Name	Scientific Name
Ruby-throated hummingbird	*Archilochus colubris*
Scissor-tailed flycatcher	*Tyrannus forficatus*
Summer tanager	*Piranga rubra*
Western kingbird	*Tyrannus verticalis*
Yellow-billed cuckoo	*Coccyzus americanus*

Source: Lockwood and Freeman, 2004; Cornell Lab of Ornithology, 2014

Mammals potentially occurring in the study area are listed in Table 2-12 (Schmidly, 2004). The occurrence of each species depends upon the availability of suitable habitat. None of the species listed are considered rare, threatened, or endangered under Section 7 of the ESA.

Table 2-12 Mammalian Species Potentially Occurring within the Study Area

Common Name	Scientific Name
American beaver	*Castor canadensis*
American mink	*Neovison vison*
Baird's pocket gopher	*Geomys breviceps*
Big brown bat	*Eptesicus fuscus*
Big free-tailed bat	*Nyctinmops macrotis*
Black-tailed jackrabbit	*Lepus californicus*
Bobcat	*Lynx rufus*
Brazilian free-tailed bat	*Tadarida brasiliensis*
Common gray fox	*Urocyon cinereoargenteus*
Common raccoon	*Procyon lotor*
Coyote	*Canis latrans*
Deer mouse	*Peromyscus maniculatus*
Eastern cottontail	*Sylvilagus floridanus*
Eastern fox squirrel	*Sciurus niger*
Eastern gray squirrel	*Sciurus carolinensis*
Eastern harvest mouse	*Reithrodontomys humulis*
Eastern mole	*Scalopus aquaticus*
Eastern pipistrelle	*Perimyotis subflavus*
Eastern red bat	*Lasiurus borealis*
Eastern spotted skunk	*Spilogale putorius*
Eastern woodrat	*Neotoma floridana*
Elliot's short-tailed shrew	*Blarina hylophaga*
Feral pig	*Sus scrofa*
Fulvous harvest mouse	*Reithrodontomys fulvescens*
Hispid cotton rat	*Sigmodon hispidus*

Table 2-12 Mammalian Species Potentially Occurring within the Study Area

Common Name	Scientific Name
Hispid pocket mouse	*Chaetodipus hispidus*
House mouse	*Mus musculus*
Hoary bat	*Lasiurus cinereus*
Least shrew	*Cryptotis parva*
Long-tailed weasel	*Mustela frenata*
Marsh rice rat	*Oryzomys palustris*
Nine-banded armadillo	*Dasypus novemcinctus*
Northern pygmy mouse	*Baiomys taylori*
Northern yellow bat	*Lasiurus intermedius*
Norway rat	*Rattus norvegicus*
Nutria	*Myocastor coypus*
Red fox	*Vulpes vulpes*
Ringtail	*Bassariscus astutus*
Roof rat	*Rattus rattus*
Seminole bat	*Lasiurus seminolus*
Silver-haired bat	*Lasionycteris noctivagans*
Southern flying squirrel	*Glaucomys volans*
Southern short-tailed shrew	*Blarina carolinensis*
Striped skunk	*Mephitis mephitis*
Virginia opossum	*Didelphis virginiana*
White-footed mouse	*Peromyscus leucopus*
White-tailed deer	*Odocoileus virginianus*

Source: Schmidly, 2004; Mammals of Texas, 2014

Fisheries

The divisions of the biotic provinces were separated on the basis of terrestrial vertebrate distributions; however, the distribution of freshwater fish generally corresponds with the terrestrial province boundaries (Hubbs, 1957). Areas showing the greatest deviation from this general rule include northeast Texas and the coastal zone.

The study area is located within the San Jacinto River basin (TWDB, 2011) and sits approximately 35 miles west of the San Jacinto River. The local watersheds that drain into the study area include the Langham Creek Watershed, Bear Creek Watershed, South Mayde Creek Watershed, and Buffalo Bayou Watershed. These watersheds drain to the southeast and eventually empty into the San Jacinto River. Of the perennial waters that drain into the study area, only two are located within the study area boundaries. Bear Creek flows through the north central portion and South Mayde Creek, the largest watershed in the study area, is located in

the south central portion of the study area. Additionally, smaller, intermittent canals, tributaries, ponds and ditches are found within the study area as well wetland fringes adjacent to each creek. All surface waters and wetland habitat identified within the study area provide consistent aquatic habitat that support freshwater fish and macro-invertebrates.

Over 100 species of fish are known to occur in this region of Texas (Hubbs et al., 2008). Based on the size and characteristics of the various surface waters, very few of these species would occur in the habitats represented in the study area. Fish species that occur within the study area include those species common to low-gradient, warm freshwater streams and associated wetlands in southeastern Texas. Typical fish and macro-invertebrate species associated with these habitats include black bullhead *(Ameiurus melas),* bluegill *(Lepomis macrochirus),* crayfish *(Cambarus sp.),* sunfish (*Lepomis* sp.), flathead catfish (*Pylodictis olivaris*), fathead minnow *(Pimephales promelas),* red shiner *(Cyprinella lutrensis*) and Texas shiner *(Notropis amabilis)* (TPWD, 2014d).

Several species of turtles, snakes, and amphibians are also dependent on perennial surface waters for their habitat requirements. Several of these species will infrequently use terrestrial habitats to migrate between surface waters, but they primarily inhabit impounded and perennial surface waters.

2.4.4.4 Threatened and Endangered Species

Data on special status species and unique vegetation resources within the study area were obtained from a variety of sources including correspondence with the USFWS (2014b) and TPWD (2014e). Additional information was obtained from published literature and technical reports. All biological resource inventory data for the study area was mapped utilizing GIS.

For the purpose of this routing study, emphasis was placed on obtaining known locations of unique vegetative communities and critical habitat or known occurrences of special status species that have been previously documented within the study area. Special status species include those listed by the USFWS as threatened, endangered, proposed, or candidate; and those listed by TPWD as threatened, endangered or as a species of concern or rare species. A GIS shapefile of known occurrences for listed species and sensitive vegetative communities was obtained from the TXNDD on September 16, 2014. Review of TXNDD data indicates that the eastern boundary of the study area overlaps with the western boundary of a rookery recorded in 1979. TXNDD (2014) data does not indicate occurrences of any other threatened or

endangered species within the study area. It should be noted that the TXNDD report is not substituted as presence or absence survey data, but is used during this study as an indication of whether the listed species has previously occurred within the study area.

The USFWS maintains a federal listing of all threatened, endangered, and candidate species for each county. By definition, a threatened species is defined as likely to become endangered within the near future throughout all or a significant portion of its range. An endangered species is in danger of extinction throughout all or a significant portion of its range. Candidate species are those that have sufficient information on their biological vulnerability and threats to support listing as threatened or endangered, and are likely to be proposed for listing in the near future.

The ESA also provides for the conservation of "designated critical habitat," which is defined as the areas of land, water, and air space that an endangered species needs for survival. These areas include sites with food and water, breeding areas, cover or shelter sites, and sufficient habitat to provide for normal population growth and behavior for the species. The primary threat to threatened and endangered species is the destruction or modification of critical habitat areas by uncontrolled land and water development. According to the USFWS Critical Habitat Mapper (2014c) there is no "designated critical habitat" within the study area.

Plant Species

The Harris County listings for federal and state listed species were obtained from the USFWS and TPWD (USFWS, 2014b) (TPWD, 2014e). Additionally, TPWD also lists plants that are rare, but are not afforded any regulatory protection. The TPWD also maintains the TXNDD database that contains federal and state listed species occurrences for each county within the state. TXNDD data is not substituted for presence or absence of survey data, but provides an indication of whether the species of concern has occurred within the study area.

There is one federally and state listed endangered plant species and ten state plant species of concern listed for Harris County (USFWS, 2014b) (TPWD, 2014e). The federally endangered Texas prairie dawn-flower (*Hymenoxys texana*) is found on poorly drained, sparsely vegetated areas (slick spots) at the base of mima mounds in open grassland or almost barren areas on slightly saline soils that are sticky when wet and powdery when dry. The species of concern include coastal gay-feather (*Liatris bracteata*), Florida lady's tresses (*Spiranthes brevilabris var. floridana*), giant sharpstem umbrella-sedge (*Cyperus cephalanthus*), Houston daisy (*Rayjacksonia aurea*), neglected cone flower (*Echinacea paradoxa var. neglecta*), panicled

indigobush (*Amorpha paniculata*), Texas ladies'-tresses (*Spiranthes brevilabris var. brevilabris*), Texas meadow-rue (*Thalictrum texanum*), Texas windmill-grass (*Chloris texensis*), and threeflower broomweed (*Thurovia triflora*) (TPWD, 2014e). Habitat requirements for the coastal gay feather, threeflower broomweed, and Texas windmill-grass are similar. Potential habitat for these species generally occurs in prairies with clay or sandy loam soils and sometimes on barren land or pimple mounds. Texas windmill-grass may also potentially occur along roadsides. Habitat requirements for Florida lady's tresses and Texas ladies'-tresses include moist pinelands in sandy soils. The Houston daisy is found on and around naturally barren or sparsely vegetated saline slick spots or pimple mounds on coastal prairies. The neglected cone flower is found on rocky prairies, glades, and crosstimber open woodlands and savannas in full sun. The giant sharpstem umbrella-sedge prefers habitats in depressional prairie areas with low to moderately drained soils that include heavy black clays or fine sandy loam. The Texas meadow-rue occurs on pimple mounds or in uplands and stream terraces in woodlands where a sandy loam soil surface layer is present (Poole et al., 2007) (TPWD, 2014e). Review of TXNDD (2014) data does not indicate the occurrence of any listed plant species within the study area; however, all these plant species may be present within the study area if suitable habitat and environmental conditions exists.

Wildlife Species

Threatened, endangered, and candidate wildlife species lists from the USFWS and TPWD were reviewed for Harris County and the information is summarized in Table 2-13 (USFWS, 2014b) (TPWD, 2014e). Species not designated as federally threatened or endangered are not afforded any regulatory protection under the ESA.

The USFWS and TPWD threatened and endangered species list for Harris County includes 28 species. One of the twenty-eight species, Sprague's pipit, is a candidate for the threatened or endangered list with the USFWS. A brief description of the habitat for the species listed in Table 2-13 is summarized after the table.

Table 2-13 Threatened, Endangered, and Candidate Species Listed for Harris County, Texas

Species		Legal Status	
Common Name	**Scientific Name**	**USFWS[1]**	**TPWD[2]**
Mollusks			
Louisiana pigtoe	*Pleurobema riddellii*	-	T
Sandbank pocketbook	*Lampsilis satura*	-	T
Texas pigtoe	*Fusconaia askewi*	-	T

Table 2-13 Threatened, Endangered, and Candidate Species Listed for Harris County, Texas

Species		Legal Status	
Common Name	**Scientific Name**	**USFWS[1]**	**TPWD[2]**
Fish			
Creek chubsucker	*Erimyzon oblongus*	-	T
Smalltooth sawfish	*Pristis pectinata*	-	E
Birds			
American peregrine falcon	*Falco peregrinus anatum*	-	T
Bald eagle	*Haliaeetus leucocephalus*	R	T
Peregrine falcon	*Falco peregrinus*	-	T
Red-cockaded Woodpecker	*Picoides borealis*	-	T
Sprague's pipit	*Anthus spragueii*	C	-
White-faced ibis	*Plegadis chihi*	-	T
White-tailed hawk	*Buteo albicaudatus*	-	T
Whooping crane	*Grus americana*	-	E
Wood stork	*Mycteria americana*	-	T
Reptiles			
Alligator snapping turtle	*Macrochelys temminckii*	-	T
Green sea turtle	*Chelonia mydas*	-	T
Kemp's Ridley sea turtle	*Lepidochelys kempii*	-	E
Leatherback sea turtle	*Dermochelys coriacea*	-	E
Loggerhead sea turtle	*Caretta caretta*	-	T
Smooth green snake	*Liochlorophis vernalis*	-	T
Texas horned lizard	*Phrynosoma cornutum*	-	T
Timber/Canebrake rattlesnake	*Crotalus horridus*	-	T
Amphibians			
Houston toad	*Anaxyrus houstonensis*	-	E
Mammals			
Louisiana black bear	*Ursus americanus luteolus*	-	T
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	-	T
Red wolf	*Canis rufus*	-	E
West Indian manatee	*Trichechus manatus*	E	-

Note: Some species, such as Whooping Crane and Houston Toad, are endangered but are not believed to occur in Harris County.
[1] USFWS, 2014b
[2] TPWD, 2014e
C - Candidate Species
E - Federal and/or State Listed Endangered
R – Federal listed Recovery
T - Federal and/or State Listed Threatened

Three mollusk species are listed as threatened by the TPWD for Harris County, including the Louisiana pigtoe (*Pleurobema riddellii*), sandbank pocketbook (*Lampsilis satura*), and Texas pigtoe (*Fusconaia askewi*). The Louisiana pigtoe habitat includes streams and moderate size rivers on substrates of mud, sand, or gravel; however, there are no known occurrences of this species near the study area (TPWD, 2013). Therefore it is unlikely that it would be found in the streams crossing the study area. The sandbank pocketbook has only been found in small populations in the Neches and Sabine Rivers (Ford et al, 2010). It may occur in small to large rivers with moderate flows on gravel, gravel-sand, and sand bottoms (Howells et al., 1996). The Texas pigtoe is known to persist in Big Cypress Bayou, the upper and lower Sabine R., upper Neches River, Central Angelina River, Village Creek (Neches drainage), and the West San Jacinto drainage (Howells, 2010). It is not anticipated that any of these species occur within the study area.

Listed fish species for Harris County include the state threatened creek chubsucker (*Erimyzon oblongus*) and smalltooth sawfish (*Pristis pectinata*). The creek chubsucker has been found in tributaries of the Red, Sabine, Neches, Trinity, and San Jacinto rivers. It can also be found in small rivers and creeks of various types, is seldom found in impoundments and prefers headwaters. The young of this species are typically found in headwater rivulets or marshes where they spawn in river mouths or pools, riffles, lake outlets, and upstream creeks. The smalltooth sawfish's range and abundance is unknown along Texas coast, but they can inhabit shallow coastal, estuarine, and brackish habitats. The smalltooth sawfish may inhabit multiple habitats throughout their lifespan. The young will inhabit sandy and muddy bottoms in bays, estuaries or river mouths, while the adults will occur in mangrove, reef, seagrass, and coral habitats (TPWD, 2014f) (NatureServe, 2014). Both of these species could occur in the creeks found within the study area.

Bird species currently listed for Harris County include the American peregrine falcon (*Falco peregrinus anatum*), bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), red-cockaded woodpecker (*Picoides borealis*), sprague's pipit (*Anthus spragueii),* white-faced ibis (*Plegadis chihi*), white-tailed hawk (*Buteo albicaudatus*), whooping crane (*Grus americana*), and wood stork (*Mycteria americana*). The peregrine falcon is an uncommon winter resident throughout Texas coastal prairies but are more common along bays, estuaries, and coastlines during the winter months (Lockwood and Freeman, 2004). The American Peregrine is a resident of the Trans-Pecos region, including the Chisos, Davis, and Guadalupe mountain ranges (TPWD, 2014f). The peregrine falcon may use the study area for foraging

during migration. The bald eagle was delisted in 2007 by the USFWS because the population had recovered beyond the ESA criteria for listing. The status of the bald eagle population is currently monitored by the USFWS and the species is still afforded federal protection under the MBTA and the EPA. The bald eagle nests in tall trees adjacent to major surface waters. The red-cockaded woodpecker makes its home in mature pine forests. Longleaf pines (*Pinus palustris*) are most commonly preferred, but other species of southern pine are also acceptable (USFWS, 2014d). This habitat is not located in the study area nor was any found near the study area. This species is unlikely to be found in the study area. The Sprague's pipit is a ground nester that breeds and winters on open grasslands. It is closely tied with native prairie habitat and breeds in the north-central United States in Minnesota, Montana, North Dakota and South Dakota as well as south-central Canada. Wintering occurs in the southern States of Arizona, Texas, Oklahoma, Arkansas, Mississippi, Louisiana, and New Mexico (USFWS, 2014e). This species could be found in the study area. Preferred habitat for the white-faced ibis and wood stork includes wetlands associated with bottomland stream areas, lakes, and major river systems. The white faced-ibis nests in colonies between April and June, and can nest in trees or in masses of dead grasses, usually in less than three feet of water. The wood stork is considered a post-breeding visitor to the Texas coast and may be observed between June and October. The white-tailed hawk inhabits coastal prairie habitats, but they are more common along coastal areas south of Matagorda Bay. The whooping crane may inhabit surface waters to roost and nearby agriculture fields to forage during diurnal stopovers, typically during fall migrations. The study area is located on the eastern edge of the whooping crane migration corridor. The Sprague's pipit nests in short grass prairies and meadows in the northern states, and may overwinter in Texas utilizing fallow grassy fields (TPWD, 2014f). These species may occur within the study area if suitable habitat and environmental conditions occur.

Turtle species currently listed for Harris County include the alligator snapping turtle (*Macrochelys temminckii*), green sea turtle (*Chelonia mydas*), Kemp's Ridley sea turtle (*Lepidochelys kempii*), leatherback sea turtle (*Dermochelys coriacea*), and the loggerhead sea turtle (*Caretta caretta*). The green sea turtle, Kemp's Ridley sea turtle, leatherback sea turtle, and the loggerhead sea turtle occupy the bays and the Gulf of Mexico, although they are occasionally located within the Gulf Intercoastal Waterway and near river mouths. Sea turtles come onto the beaches to nest in the spring (TPWD, 2014f). The alligator snapping turtle inhabits freshwater ecosystems, such as lakes, canals, bayous, ponds, and river bottoms (Dixon, 2000). Sea turtles are not anticipated to occur within the study area, due to a lack of

suitable habitat, but the alligator snapping turtle may occur within the study area if suitable freshwater habitat is present.

There are two snake species currently listed for Harris County, the smooth green snake (*Liochlorophis vernalis*) and the timber (canebrake) rattlesnake (*Crotalus horridus*). According to the NatureServe Explorer the smooth green snakes habitat include meadows, grassy marshes, moist grassy fields at forest edges, mountain shrublands, stream borders, bogs, open moist woodland, abandoned farmland, and vacant lots. This snake has been found hibernating in abandoned ant mounds (NatureServe, 2014). The canebrake rattlesnake occupies moist lowland forest and hilly woodland areas near surface waters. The species frequently utilizes fallen hollow logs and stumps as habitat, and forages primarily on small mammals (Werler and Dixon, 2005). These species may occur within the study area if suitable habitat is present.

The one lizard species currently listed for Harris County is the Texas horned lizard (*Phrynosoma cornutum*). The Texas horned lizard population has recently decreased due to collection, habitat loss, and increased fire ant populations. The Texas horned lizard forages primarily on red harvester ants (*Pogonomyrmex barbatus*), but also consumes grasshoppers, beetles, and grubs. The lizard inhabits open, arid to semiarid regions with sparse vegetation and thermo-regulates by basking or burrowing into the soil (TPWD, 2014f). This species may occur within the study area, if suitable habitat is present.

The Houston toad (*Anaxyrus houstonensis*) requires loose, deep sands supporting woodland savannah and still or flowing waters for breeding. Conversion of native grassland and woodland savannah to sod-forming introduced grasses, such as bermudagrass and bahiagrass, eliminates habitat because grass growth is generally too dense for the toad to move freely. Dense sod also inhibits burrowing (TPWD, 2014f). This species may occur within the study area, if suitable habitat is present.

Mammal species currently listed for Harris County include the Louisiana black bear (*Ursus americanus luteolus*), Rafinesquie's big-eared bat (*Corynorhinus rafinesquii*), red wolf (*Canis rufus*), and the West Indian manatee (*Trichechus manatus*). Louisiana black bear was once a common inhabitant of forested regions of eastern Texas, Louisiana and Mississippi. Today, the majority of the remaining population is located in the Atchafalaya and Tensas river basins of Louisiana. In Texas, the bear is an inhabitant of bottomland hardwoods and large tracts of forested areas in east Texas (Campbell, 2003). Rafinesque's big-eared bats roost in cave

entrances, hollow trees, abandoned buildings and under bridges in the forests of southeastern United States (TPWD, 2014f). The red wolf historically inhabited coastal prairies and forested areas of Texas, but the wolf was extirpated from the state during the 1960s and 1970s (Schmidly, 2004). The West Indian manatee is rare aquatic species in Texas, and occasionally occurs within rivers, estuaries, canal, and bays (Schmidly 2004). It is not anticipated that any of these listed species are present within the study area due to a lack of suitable habitat.

TPWD Species of Concern and Sensitive Vegetation Communities

While not regulated, TPWD also lists species of concern and sensitive vegetation communities within the study area. TPWD generally recommends consideration for these species and avoidance of listed vegetation communities when routing linear utility corridors. Table 2-14 summarizes the TPWD listed animal species of concern species and for Harris County and a brief description is provided below. Review of TXNDD data does not indicate the presence of any species of concern or sensitive vegetation communities within the study area.

Table 2-14 TPWD Listed Animal Species of Concern for Harris County, Texas

Common Name	Scientific Name
Mollusks	
Little spectaclecase	*Villosa lienosa*
Wabash pigtoe	*Fusconaia flava*
Fish	
American eel	*Anguilla rostrata*
Reptiles	
Gulf salt marsh snake	*Nerodia clarkii*
Birds	
Arctic peregrine falcon	*Falco peregrinus tundrius*
Black rail	*Laterallus jamaicensis*
Brown pelican	*Pelecanus occidentalis*
Henslow's sparrow	*Ammodramus henslowii*
Mountain plover	*Charadrius montanus*
Snowy plover	*Charadrius alexandrinus*
Southeastern snowy plover	*Charadrius alexandrinus tenuirostris*
Mammals	
Plains spotted skunk	*Spilogale putorius interrupta*
Southeastern myotis bat	*Myotis austroriparius*

Source: TPWD, 2014e.

The little spectaclecase (*Villosa lienosa*) typically inhabits small creeks to medium-sized rivers, usually along the banks in slower currents (NatureServe, 2014). The Wabash pigtoe

(*Fusconaia flava*) may be found in medium sized rivers as well as big rivers at depths up to 15 feet. A stable substrate composed of coarse sand and gravel appears most suitable but it also tolerates other substrates (Parmalee and Bogan, 1998). The streams in the study area could provide habitat for these two species.

The American eel (*Anguilla rostrata*) is native throughout most of Texas. Adult eels migrate out to sea to spawn, while eel larvae metamorphose and move into freshwater rivers and creeks to mature. However, this migration has been interrupted by the construction of dams leading to increased concern over the conservation of this species (Thomas et al., 2007) (TPWD, 2014f). This species may occur within the study area if suitable aquatic habitat is present.

The Gulf salt marsh snake (*Nerodia clarkii*) occurs within saline flats, coastal bays, brackish coastal and shallow freshwater marshes along the Texas central and upper coast. Its preferred habitat is dominated by saltgrass (*Distichlis* spp.*)*, cordgrass, and annual seepweed (*Suaeda linearis*) (Werler and Dixon, 2005) (TPWD, 2014f). Because the study area does not contain any saline flats, coastal bays, or brackish water it is unlikely that this species would be found in the study area.

There are seven listed avian species of concern for Harris County. These include the Arctic peregrine falcon (*Falco peregrinus tundrius*), black rail (*Laterallus jamaicensis*), brown pelican (*Pelecanus occidentalis*), Henslow's sparrow (*Ammodramus henslowii*), mountain plover (*Charadrius montanus*), *s*nowy plover (*Charadrius alexandrinus*), and southeastern snowy plover (*Charadrius alexandrinus tenuirostris*). The arctic peregrine falcon is an uncommon winter resident throughout Texas coastal prairies; they are more common along bays, estuaries, and coastlines during the winter months. The black rail will inhabit wetland areas, such as marshes, swamps, wet meadows, and pond edges. The brown pelican can be found in coastal areas like sandy beaches and lagoons around waterfronts and marinas. The preferred habitat for the Henslow's sparrow includes fields and prairies, where abundant bunchgrasses are present. Both the black rail and Henslow's sparrow are rare residents along the Texas coast (Lockwood and Freedman, 2004). The mountain plover is a native of the short-grass prairie, in open, dry areas. The snowy plover is a likely migratory transient or rare winter resident within the study area, favoring lake or river shoreline habitats. The southeastern snowy plover is a migratory transient, and prefers mud or salt flat habitats along beaches and bays (TPWD, 2014f). These species may occur within the study area if suitable habitat is present.

There are two mammal species of concern in Harris County, the plains spotted skunk (*Spilogale putorius interrupta*) and the southeastern myotis bat (*Myotis austroriparius*). The plains spotted skunk typically inhabits open fields, prairies, croplands, wooded and brushy areas and tallgrass prairies (TPWD, 2014f). The Southeastern Myotis roosts in a variety of shelters including caves, mines, bridges, buildings, culverts, and tree hollows. It prefers oak-hickory to mixed conifer-hardwood habitats and is often associated with human habitations near streams or lakes (TPWD, 2014f). These species may occur within the study area if suitable habitat is present.

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3.0 PRIMARY TRANSMISSION LINE ROUTE IDENTIFICATION

3.1 ROUTING STUDY METHODOLOGY

This section describes the methodologies and assumptions that were used to conduct the EA for the 138 kV Zenith-Franz Project. A base map was developed for the HDR planning team and CenterPoint Energy to delineate the study area boundaries. The HDR planning team was comprised of technical experts within each respective resource field. Initial field reconnaissance was conducted and preliminary evaluation criteria were developed. Based on data pertinent to the study area, the HDR planning team and CenterPoint Energy also established criteria, consistent with PUC standards, for the resource analysis. Data were collected pertaining to land use, recreational and park areas, historical and aesthetic values, and environmental integrity. Available GIS coverage with associated metadata was reviewed, and relevant resource data were selected and mapped. Sensitive resource locations were identified on an environmental and land use composite constraints map. Feasible and geographically diverse preliminary transmission line segments were developed and a public meeting was conducted. Following the public meeting and additional site reconnaissance, data were tabulated for the resulting primary transmission line segments, which were then organized into primary transmission line routes. A comparative potential impact assessment of all of the primary transmission line routes was completed culminating in the recommendation of the proposed alternative routes.

The study approach included the following major tasks:

- Base Map Development
- Development of Evaluation Criteria
- Study Area Delineation
- Data Collection and Mapping
- Reconnaissance Surveys
- Sensitivity Criteria and Analysis
- Opportunities and Constraints Evaluation
- Preliminary Transmission Line Segment Identification
- Public Involvement Program
- Selection of Primary Transmission Line Routes
- Impact Assessment of Primary Transmission Line Routes
- Alternative Route Selection

A detailed description of the methodologies used to complete this environmental assessment and routing study follows.

3.1.1 Base Map Development

A project base map was prepared at a scale of 1:12,000 (1 inch = 1,000 feet). The base map is a single sheet covering the area between the study area boundaries and was used to initially display resource data for the study area. Resource data categories and factors that were determined appropriate within the study area were selected and mapped.

Data displayed on the base map include:

- Major land jurisdictions and uses
- Major roads, including county roads, farm-to-market roads, U.S. highways, and State highways
- Existing transmission line and pipeline corridors
- Parks and recreational areas
- Major political subdivision boundaries
- Lakes, canals, creeks, and ponds

The base map provides a broad overview of various resource locations indicating obvious routing constraints and areas of potential routing opportunities.

3.1.2 Study Area Delineation

The study area (see Figure 2-1) was defined to include feasible geographically diverse alternatives for the location of the 138 kV transmission line between the existing Zenith Substation site and CenterPoint Energy's 138 kV transmission line connection corridor, which would be the project tie point. Major physiographic features, jurisdictional boundaries, sensitive resources, land uses and existing roadways, and utility corridors helped to define the study area boundaries. The study area boundary was depicted on a study area map that was included with consultation letters, dated June 11, 2014, that were sent to agencies and officials for comment on the project (see Appendix A).

3.1.3 Evaluation Criteria

Evaluation criteria were developed to reflect accepted practices for routing electric transmission lines in Texas (see Table 3-1). Emphasis was placed on acquiring information identified in Section 37.056(c)(4)(A)-(D) of PURA, the PUC CCN application and P.U.C. Substantive Rule 25.101. Evaluation criteria were further refined based on data collection, reconnaissance surveys, and public input. The routing activities were conducted with consideration and incorporation of the evaluation criteria. Routing activities included data collection, reconnaissance surveys, resource analysis, identification of routing opportunities and constraints, and identification of the preliminary transmission line segments. Evaluation criteria data were collected, mapped, tabulated, and compared (Section 4) for each resulting primary transmission line route and ultimately used as a basis for the recommendation of the proposed alternative routes (Section 5).

Table 3-1 Land Use and Environmental Evaluation Criteria

LAND USE
Length of route (feet)
Length of route (miles)
Number of habitable structures within 300 feet of route centerline
Number of habitable structures in previous criterion currently “directly affected” by an existing transmission line
Length of route using existing transmission line easement and/or CenterPoint-owned property
Length of new ROW required for route
Length of route proposed to overbuild existing distribution
Length of route not proposed to overbuild existing distribution
Length of route parallel to existing transmission line ROW
Length of route not utilizing/paralleling existing transmission line ROW
Length of route paralleling apparent property lines
Length of route parallel to other existing ROW (roadway, canals, etc.)
Length of route not parallel to existing ROW
Percent of route parallel with apparent features, property lines, or an existing ROW
Length of route across parks/recreational areas
Number of additional parks/recreational areas within 1,000 feet of route centerline
Length of route across residential areas
Length of route across commercial/industrial areas
Length of route across agricultural land/cropland
Length of route across pastureland
Length of route across mobile irrigated cropland or pastureland
Number of pipeline crossings
Number of transmission line crossings

Table 3-1 Land Use and Environmental Evaluation Criteria

LAND USE
Number of U.S. and state highway crossings
Number of F.M. road crossings
Number of county road crossings
Number of cemeteries within 1,000 feet of the route centerline
Number of heliports within 5,000 feet of route centerline
Number of private airstrips within 10,000 feet of route centerline
Number of FAA-listed airfields within 10,000 feet of route centerline having no runway more than 3,200 feet
Number of FAA-listed airfields within 20,000 feet of route centerline having at least one runway more than 3,200 feet
Number of commercial AM radio transmitters within 10,000 feet of route centerline
Number of FM radio transmitters, microwave relay stations, and other electronic installations etc. within 2,000 feet of route centerline
AESTHETICS
Estimated length of route within foreground visual zone of U.S. and State highways
Estimated length of route within foreground visual zone of FM and county roads
Estimated length of route within foreground visual zone of recreational and park areas
ECOLOGY
Length of route through upland woodlands
Length of route through bottomland/riparian woodlands
Length of route across NWI-mapped wetlands
Length of route across known habitat of federal endangered/threatened species of plants or animals
Length of route across open water (lakes or ponds)
Number of stream crossings
Length of route parallel to streams within 100 feet
Length of route across 100-year floodplains
CULTURAL RESOURCES
Number of recorded cultural resource sites crossed by the ROW
Number of additional recorded cultural resource sites within 1,000 of the centerline of all routes
Number of National Register of Historic Places listed or determined-eligible sites crossed by the route
Number of additional National Register of Historic Places listed or determined-eligible sites within 1,000 feet of centerline of all routes
Length of route through areas of high archeological site potential

3.2 DATA COLLECTION AND CONSTRAINTS MAPPING

Once the study area boundary was identified, comprehensive data collection activities were initiated. A list of potentially interested regulatory agencies, elected officials, and organizations was developed to receive a project scoping letter. The purpose of the letter was to inform the various officials and agencies of the proposed project and to give them the opportunity to

provide information regarding sensitive resources and potential issues within the study area. Various federal and state agencies that may have potential concerns or regulatory permitting requirements for the proposed project were also contacted. Copies of correspondence with the various federal and state regulatory agencies, and county and local officials and departments are included in Appendix A.

Federal, state and local agencies and officials contacted include:

- U.S. Army Corps of Engineers (USACE)
- U.S. Environmental Protection Agency (USEPA)
- U.S. Fish and Wildlife Service (USFWS)
- Federal Emergency Management Agency (FEMA)
- Federal Aviation Administration (FAA)
- Natural Resources Conservation Service (NRCS)
- U.S. Department of Defense Siting Clearinghouse (USDOD)
- Texas Commission on Environmental Quality (TCEQ)
- Texas Department of Transportation (TxDOT)
- TxDOT—Division of Aviation
- TxDOT—Environmental Affairs Division
- Texas General Land Office (GLO)
- Texas Historical Commission (THC)
- Texas Parks and Wildlife Department (TPWD)
- TPWD—Wildlife Diversity Program
- Texas Water Development Board (TWDB)
- Houston-Galveston Area Council (HGAC)
- Harris County
- Cypress-Fairbanks Independent School District (ISD)
- Katy ISD
- City of Houston
- City of Katy

Available data were mapped to identify existing conditions and to determine potential conflicts that would result from the proposed 138 kV transmission line. Resource data were collected for

land use, historical (cultural and archeological) and aesthetic values, physiographic and geologic, surface waters, wetlands, and biological resource areas. Data were mapped within the study area using GIS layers. Additional data collection consisted of file and record reviews conducted with various state regulatory agencies, a review of published literature, and review of various maps, aerial photographs (DigitalGlobe, 2013), and readily available aerial imagery on the internet (TNRIS, 2012) (Google, 2014). Results from the resource inventory data were described in Section 2 and are reflected on the Composite Constraints Map (see Figure 3-1).

3.3 RECONNAISSANCE SURVEYS

HDR personnel conducted reconnaissance surveys of the study area to confirm the findings of the research and data collection activities and to identify potential constraints that may not have been previously noted. Reconnaissance surveys confirmed data point accuracy and identified changes in land use occurring after the date of the aerial photography. Reconnaissance surveys were limited to visual observations conducted from public roads and existing public ROWs located within the study area.

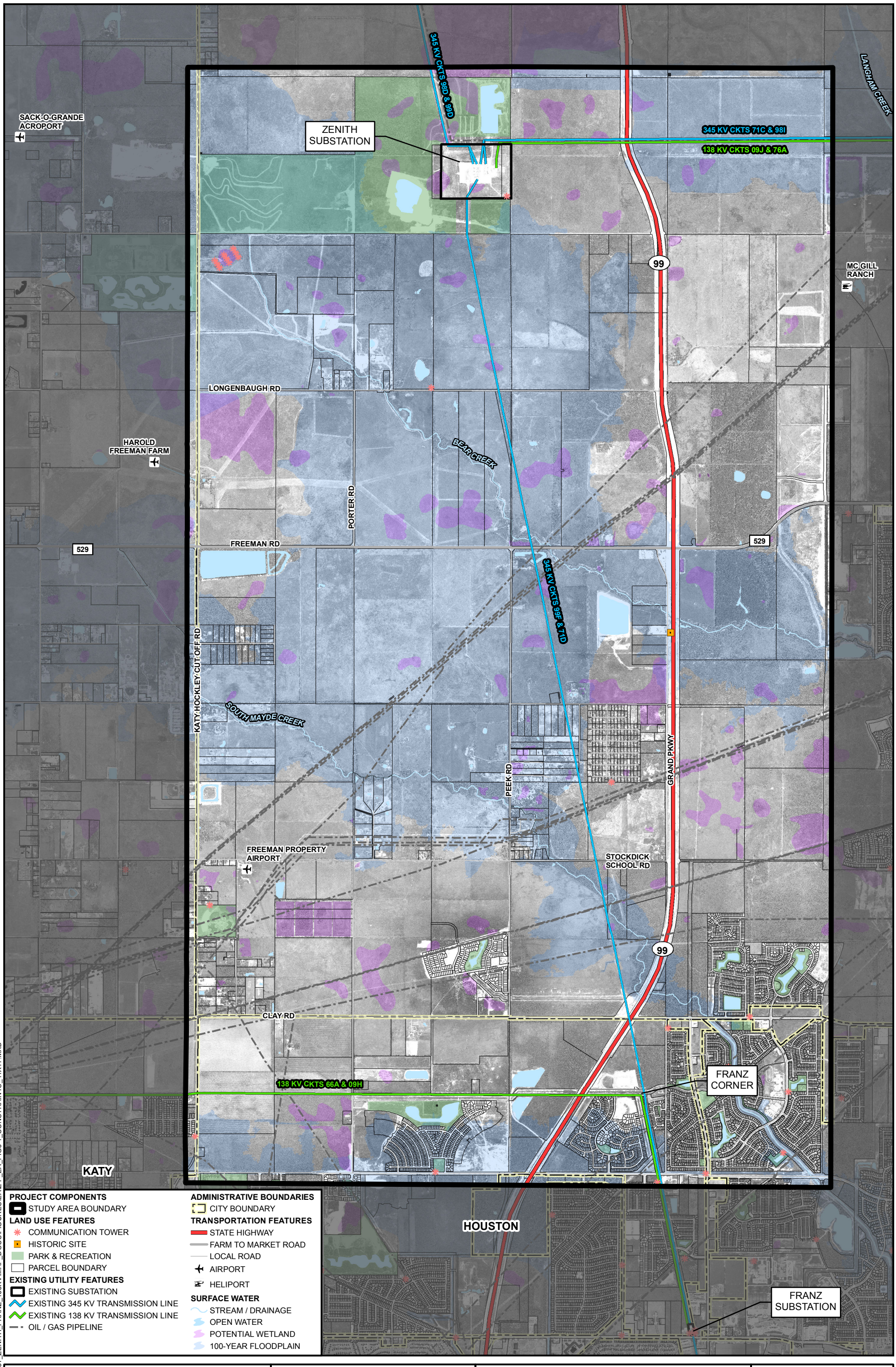
Reconnaissance surveys were conducted on the following dates:

- June 16, 2014
- August 26, 2014
- September 17, 2014

3.4 RESOURCE ANALYSIS

The composite constraints map was used as a foundation for the resource analysis. Criteria were developed for each resource to establish constraint parameters which facilitated the identification of preliminary transmission line segments. The following definitions were considered:

- **Resource Value**: A measure of rarity, intrinsic worth, singularity, or diversity of a resource within a particular area.
- **Protective Status**: A measure of the formal concern as expressed by legal protection or special status designation.



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138 KV ZENITH-FRANZ PROJECT

COMPOSITE CONSTRAINTS

CenterPoint Energy

HDR

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FIGURE 3-1

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- **Present and Known Future Uses**: A measure of the level of potential conflict with land management and land use policies.
- **Hazards**: A measure of the degree to which construction and operation of the transmission line could be affected by a known resource hazard.

Using this framework, overlays of individual resources were mapped to provide a visual representation of constraint areas, and potential routing opportunity areas were identified. Where feasible, identified constraints were avoided to the extent practicable to minimize potential impacts or conflicts.

3.5 OPPORTUNITIES AND CONSTRAINTS EVALUATION

In order to identify preliminary transmission line segments, information gathered during the data collection task, review of agency comments and management plans, and internal review and discussions with the project team were used to determine routing opportunities and constraints within the study area. Routing opportunities were generally located within open, undeveloped areas, or parallel to existing linear corridors. For example, transmission lines, distribution lines, roadways, and property boundaries provided routing opportunities.

3.5.1 Existing Linear Corridors

Within the areas of opportunity, HDR identified existing linear corridor features as potential paralleling opportunities in accordance with the provisions of P.U.C. Substantive Rule 25.101. Apparent property boundaries, roadways, and existing transmission lines were evaluated for potential paralleling opportunities. Data sources used to identify existing linear ROWs include aerial imagery, USGS topographical maps, additional available planning documents, and reconnaissance surveys.

3.5.2 Apparent Property Boundaries

Apparent property boundaries and potential paralleling opportunities were identified using Harris County Appraisal District maps and aerial photography.

3.5.3 Roadway ROWs

HDR evaluated paralleling Grand Parkway (SH 99), Peek Road, Porter Road, Katy Hockley Cut Off Road, Longenbaugh Road, FM 529 (Freeman Road), Beckendorff Road, Stockdick School

Road, Clay Road and other local roads. CenterPoint Energy also has existing distribution lines within some of these road ROWs that provides an opportunity to reduce potential impacts by underbuilding the existing distribution line on the new transmission line poles. However, existing development and habitable structures are also located or planned along some of these road ROWs.

3.5.4 Existing Transmission Line ROWs

HDR identified three existing transmission line corridors within the study area for potential use. An existing, north-south, CenterPoint Energy transmission line easement adjacent to an existing 345 kV transmission line was utilized in developing route alternatives. Additionally, an open area in the existing, east-west, transmission line corridor near the northern portion of the study area was used as a paralleling opportunity while the existing 138 kV transmission line corridor along the southern portion of the study area was utilized for potential tie points.

3.5.5 Existing Pipeline ROWs

HDR reviewed aerial photography and the RRC website to identify pipeline ROWs within the study area. HDR identified multiple existing pipeline ROWs within the study area. They are oriented in a generally southwest to northeast direction. The existing pipeline ROWs were considered, but did not provide potential paralleling opportunities.

3.6 PRIMARY TRANSMISSION LINE ROUTE IDENTIFICATION

CenterPoint Energy provided the location of the existing Zenith Substation and the existing 138 kV transmission line connection corridor to HDR. The preliminary transmission line segments were subsequently developed.

3.6.1 Preliminary Transmission Line Segments

Preliminary transmission line segments were identified on an overlay of the composite environmental and land use constraints map. These segments were developed based upon maximizing the use of routing opportunity areas while avoiding areas of high environmental constraints or conflicting land uses. Aerial photography was used as the background of the composite constraints overlay to identify optimal locations for the preliminary transmission line segment centerlines. During the preliminary transmission line segment development process, the location of residential areas, habitable structures, industrial facilities, levees, pipelines, surface water crossings, wetlands, property boundaries, agricultural land, and other sensitive

resource areas were considered. HDR utilized the following to identify the preliminary transmission line segments:

- Input received from scoping activities with local officials, regulatory agencies, and others.
- Results from reconnaissance surveys of the study area.
- Review of aerial photography.
- Findings of the data collection activities.
- Environmental and land use composite constraints maps.
- Apparent property boundaries from the Harris County Appraisal District.
- Existing compatible opportunity areas.
- Location of existing developments.

The preliminary transmission line segments were identified in accordance with Section 37.056(c)(4)(A)-(D) of PURA, the PUC CCN application, and P.U.C. Substantive Rule 25.101, including the PUC's policy of prudent avoidance, while also considering the evaluation criteria in Table 3-1. It was HDR's intent to identify preliminary transmission line segments that, when combined, formed an adequate number of reasonable and geographically diverse primary transmission line routes based on all of the previously mentioned routing considerations.

HDR, with CenterPoint Energy's input, identified 39 preliminary transmission line segments, A – AM (see Figure 3-2). The preliminary transmission line segments were overlaid on an aerial photograph mosaic (DigitalGlobe, 2013) along with land use and environmental constraint data and were presented at the public meeting (see Section 3.6.2 and Appendix B).

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ZENITH SUBSTATION

345 KV CKTS 98D & 99D

345 KV CKTS 71C & 98I

138 KV CKTS 09J & 76A

345 KV CKTS 99F & 71D

138 KV CKTS 66A & 09H

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA AB AC AD AE AF AG AH AI AJ AK AL AM

99

529

LONGENBAUGH RD

FREEMAN RD

PORTER RD

KATY HOCKLEY CUT OFF RD

PEEK RD

GRAND PKWY

STOCKDICK SCHOOL RD

CLAY RD

BEAR CREEK

SOUTH MAYDE CREEK

LANGHAM CREEK

SACK-O-GRANDE ACROPORT

HAROLD FREEMAN FARM

FREEMAN PROPERTY AIRPORT

RWAVE

MC GILL RANCH

FRANZ CORNER

FRANZ SUBSTATION

KATY

HOUSTON

PROJECT COMPONENTS
- STUDY AREA BOUNDARY
- PRELIMINARY TIE POINT
- A PRELIMINARY TRANSMISSION LINE SEGMENT
- EXISTING 138 KV TRANSMISSION LINE CONNECTION CORRIDOR

LAND USE FEATURES
- COMMUNICATION TOWER
- HISTORIC SITE
- PARK & RECREATION
- PARCEL BOUNDARY

EXISTING UTILITY FEATURES
- EXISTING SUBSTATION
- EXISTING 345 KV TRANSMISSION LINE
- EXISTING 138 KV TRANSMISSION LINE
- OIL / GAS PIPELINE

ADMINISTRATIVE BOUNDARIES
- CITY BOUNDARY

TRANSPORTATION FEATURES
- STATE HIGHWAY
- FARM TO MARKET ROAD
- LOCAL ROAD
- AIRPORT
- HELIPORT

SURFACE WATER
- STREAM / DRAINAGE
- OPEN WATER
- POTENTIAL WETLAND
- 100-YEAR FLOODPLAIN

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138 KV ZENITH-FRANZ PROJECT

PRELIMINARY TRANSMISSION LINE SEGMENTS

N

0 2,500 5,000

FEET

CenterPoint® Energy

HDR

JAN 2015

FIGURE 3-2

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3.6.2 Public Involvement Program

3.6.2.1 Public Meeting

After developing the 39 preliminary transmission line routing segments, a public meeting was held in the City of Cypress which is located east of the study area. The purpose of the public meeting was to solicit comments, concerns and input from residents, landowners, public officials, and other interested parties concerning the proposed project with reference to the preliminary transmission line segments, the overall transmission line routing process, and to:

- Promote a better understanding of the proposed project, including the purpose, need, potential benefits and impacts, and the PUC CCN application approval process.
- Inform the public with regard to the routing procedure, schedule, and decision-making process.
- Ensure that the decision-making process adequately identifies and considers the values and concerns of the public and community leaders.

The public meeting was held on August 26, 2014, from 5:00 to 8:00 p.m. at the Lone Star College CyFair Campus, College Center Building, located at 9191 Barker Cypress Road, Cypress, Texas 77433. Individual notification letters announcing the public meeting were directly mailed by CenterPoint Energy to 127 landowners whose property is located within 300 feet each of the preliminary transmission line segments. CenterPoint Energy also publicized the public meeting through a public notice published in two local newspapers, the *Houston Chronicle* and *Katy Times*, on August 7, 2014, and August 21, 2014. The public notice announced the location, time, and purpose of the meeting. Copies of the landowner notice and the public notice are provided in Appendix B.

At the meeting, personnel from CenterPoint Energy and HDR staffed information stations, with each station devoted to a particular aspect of the project. The stations included maps, illustrations, photographs, and text explaining each topic, as well as interactive GIS computer mapping stations. Interested citizens and property owners were encouraged to visit each station in order that the entire process could be explained in the logical sequence of project development. Using the information station format is advantageous, because it allows attendees to process information in a more relaxed manner, and also allows them to focus on their particular area of interest and ask specific questions. Furthermore, one-to-one discussions with CenterPoint Energy and HDR personnel typically encourage more interaction from those

citizens who might be hesitant to participate in a more formal speaker-audience format. The names of the information stations were: Registration and Information; Project Need; Routing/Environmental; GIS Computer Stations; Right-of-Way/Construction; EMF Information; Refreshments; and Questionnaire Drop Off.

A PowerPoint presentation and an expert panel session was also provided during the public open house meeting to further explain the process and answer any specific questions. The presentation and panel session were scheduled from 6:00 to 7:00 p.m. The expert panel consisted of a transmission line engineer, a ROW professional, an environmental consultant, and an electromagnetic fields ("EMF") expert. An opportunity to submit written questions in advance or at the end of the presentation was provided. Attendees submitted 11 questions on question submittal forms provided by CenterPoint Energy (see Appendix B). Following the PowerPoint presentation, the experts were again available to the public to address any questions.

CenterPoint Energy established a project website, http://www.centerpointenergy.com/zenithfranz, to further provide information to the public. The website content explains the scope of the proposed project including the need for the project and the construction and routing options as well as the PUC's process to review and approve the project. The website also provides several project documents, a project questionnaire, EMF information, maps and aerial photos, and a link to the PUC website.

Upon entering, visitors were asked to sign in and were handed an information packet, including a questionnaire and a map (see Appendix B) indicating the location of the preliminary transmission line segments, the existing Zenith Substation site, and the tie points. The questionnaire solicited comments on the proposed project and an evaluation of the information presented at the meeting. The information packet also included a question sheet that could be submitted to the panel during the discussion, a welcome sheet that explained how the meeting was organized, a Frequently Asked Questions sheet about the project, a project schedule, the transmission need display, certification process for transmission lines display, several construction displays, the PUC's landowner brochure, landowner protestor form, landowner intervenor form, and State of Texas Landowner's Bill of Rights. A copy of the information packet is located in Appendix B.

Of the 127 notification letters, 13 people signed in at the public meeting, which represents approximately 10% of the notified landowners. There were a total of 14 people in attendance at the public meeting. Two questionnaires were submitted at the meeting. An additional two questionnaires were received by mail or email after the meeting. A total of four questionnaires were received. HDR reviewed and evaluated each questionnaire. As a result, the analysis indicated that 100% of the attendees agreed that the need for the project had been adequately explained.

The questionnaire also solicited comments pertaining to community values and concerns, such as features that should be avoided, if possible, when routing the transmission line. The questionnaire asked the respondents to rank their greatest concerns from one, which was the greatest concern, to 11, which was the least concern, from a list of features that included agricultural land, floodplains or wetlands, recreational or park areas, residential areas or subdivisions, commercial areas, schools, churches, cemeteries, historic sites, wildlife, or other concerns. Residential areas or subdivisions (50%) were ranked as the greatest area of concern that should be avoided, if possible, when routing the proposed transmission line.

The questionnaire solicited comments pertaining to which existing linear features the proposed transmission line should follow within the study area. The questionnaire asked the respondents to rank the features they think are most important to follow from one (most important) to seven (least important) from a list of features which included: roads, pipelines, property lines, electrical lines, railroads, ditches, and others. Electric lines (100%) were ranked as the most important linear facilities to be considered for the transmission route to follow if possible.

The questionnaire asked if any other factors or features should be considered in determining the location of the proposed transmission line. Questionnaire responses indicated that future residential developments and airport flight paths be considered and avoided if possible.

Three of the questionnaires received (75%) indicated that the respondents were not aware of any incorrect or missing features on the Environmental and Land Use Constraints Map. One (25%) indicated that features were missing or incorrectly plotted on the map.

When asked on the questionnaire if respondents had a concern with a particular preliminary transmission line segment, one of the respondents (25%) indicated Segment Z; one respondent

(25%) indicated Segments AD, AG, and AK; one respondent (25%) indicated Segments R, Q, U, and K, and one respondent indicated no concern regarding a particular segment.

When asked on the questionnaire if respondents had a preference for the type of transmission line structure that is being proposed for the project, three of the respondents (75%) answered yes. One respondent (25%) indicated that they did not have a preference. Of the three responses indicating yes, all three respondents indicated a preference for concrete or single pole structures.

When asked on the questionnaire which of the following situations applied to them (a preliminary transmission line segment is near my home, business, on my land, none of the above, or other), and to specify which segment, the below responses were received:

- Two (50%) indicated that a preliminary transmission line segment was near their home. Segments Z, AD, AG, and AK received the most comments.
- One (25%) indicated that a preliminary transmission line segment was near their land. Segments K, U, Q, R, L, O, V, Y, W, and N were indicated to be near the respondent's land.
- One (25%) indicated that none of the situations apply.

The questionnaire asked if the information that was provided and the exhibits displayed at the public meeting met their needs. Four (100%) respondents answered yes.

The questionnaire asked whether the respondent had visited the Zenith-Franz Project website to view the information about the project. Of those that responded, two (50%) answered yes, and two (50%) answered no.

The questionnaire also requested additional comments. Two individuals provided additional comments. Below are the written comments, remarks, and concerns that were provided in response to this question:

- "Absolute worst route would be R, Q."
- "It seems very logical to use the existing lines B-H-N-V-AA-AF-AM, or follow HWY 99."

3.6.2.2 Comments from Agencies, Officials, and Organizations

HDR developed a list of federal, state, and local agencies and organizations that would potentially have an interest in the proposed project. Section 3.1.3 listed agencies, organizations, and public officials that were sent scoping letters regarding the proposed project. Maps of the study area were included with each letter. Copies of the agency scoping letters sent and responses received are located in Appendix A.

Responses received are summarized below.

- FEMA requested that the county's floodplain administrator be contacted for project review and possible permit requirements for the project.
- The NRCS responded to HDR's solicitation for information in a letter dated June 30, 2014, that stated the following: "The proposed project is exempt because transmission lines are not a conversion of Important Farmlands and the site can still be used after construction."
- The USFWS responded in an email that resident and migratory avian species are protected under the MBTA and directs HDR to the online listing for protected birds under the MBTA. They also recommend the implementation of the Avian Protection Plan guidelines for the new power line and that any permit requirements should be coordinated with the USACE Galveston District.
- The Wildlife Division of TPWD provided a tracking number (ERCS-9271) and made numerous recommendations. In summary, TPWD recommended avoiding or minimizing potential impacts to native vegetation, listed or rare species, nesting migratory birds, and wetlands. TPWD also recommended that existing utility corridors be utilized and that line markers be placed at creeks or drainages.
- The Division of Aviation of TxDOT quoted FAA regulations Title 14 U.S.C. §77 on the imaginary surface for notification requirements and for structures greater than 200 feet in height. TxDOT indicated the location of one public airport, Sack-O-Grande Airport, near the study area. TxDOT also requested if any criterion of FAR 77.9 were met that CenterPoint Energy should submit FAA Form 7460-1 to the FAA.
- The Texas GLO does not appear to have any environmental issues or land use constraints. The Texas GLO requested further coordination for review if the project crosses any streambeds or Permanent School Fund lands that will require an easement from the Texas GLO.

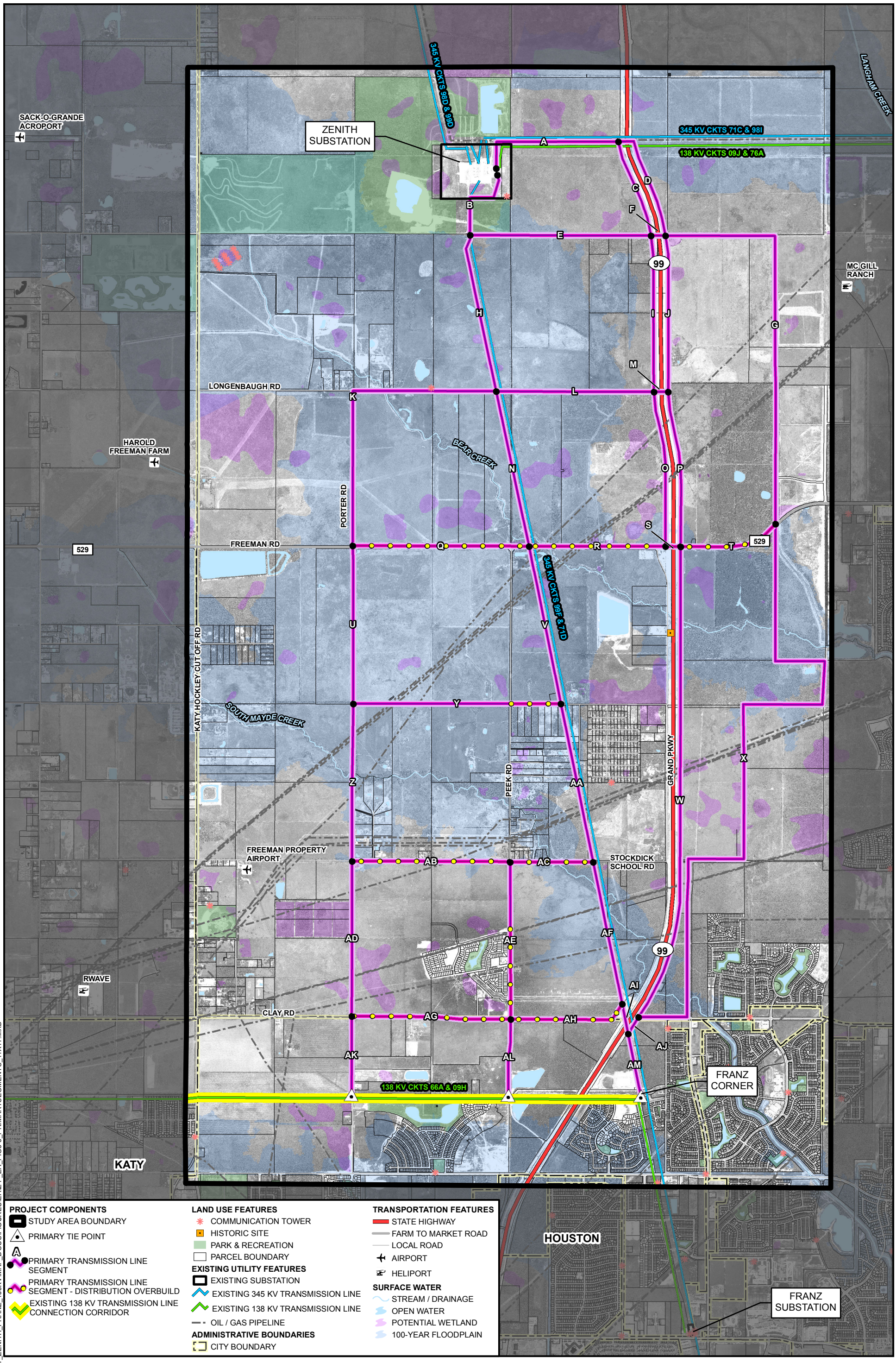
- The THC responded on July 9, 2014, with a stamp indicating, “No historic properties affected - project may proceed.”
- The TWDB responded in a letter dated June 24, 2014, and stated “it appears that the proposed transmission line would not conflict with any recommended water management strategies in the regional or state water plans.”
- The HGAC responded in an email dated June 17, 2014, which stated HGAC does not have any permitting or regulatory authority.
- The Harris County Public Infrastructure Department responded with an email dated June 24, 2014, that stated feedback regarding county concerns would be better discussed once routes were developed.
- Katy ISD responded with an email dated June 24, 2014, that stated no school developments were anticipated for the “proposed project study”.
- The City of Houston responded with a letter dated June 11, 2014, that stated a representative from the Planning and Development Division would communicate with HDR pending further investigation. The City of Houston Planning and Development Division sent a follow-up letter dated July 3, 2014, that indicated several large developments within the study area are in the platting stage and that several roads are planned for widening within the study area. Additionally, the City of Houston sent an email dated June 17, 2014, that stated the City of Houston had no comment.
- The City of Katy responded with an email dated June 19, 2014, that stated there are no concerns with the project.

3.6.3 Modifications to Preliminary Transmission Line Segments

HDR and CenterPoint Energy reviewed and considered all comments received from the public meeting and agencies regarding the preliminary transmission line segments (Figure 3-2). Slight modifications were made to some of the preliminary transmission line segments to realign the segments within existing road ROWs. No segments were deleted. The resulting 39 primary transmission line segments are presented on Figure 3-3.

3.6.3.1 Modified Segments

Segments K, L, M, Q, R, S, T, X, Y, AB, AC, AD, AE, AG, AH, AK, , and AL were slightly realigned to utilize opportunities for overbuilding existing and future distribution lines and minimizing the land use impacts along road ROWs (see Figure 3-3).



PROJECT COMPONENTS
- STUDY AREA BOUNDARY
- PRIMARY TIE POINT
- A — PRIMARY TRANSMISSION LINE SEGMENT
- PRIMARY TRANSMISSION LINE SEGMENT - DISTRIBUTION OVERBUILD
- EXISTING 138 KV TRANSMISSION LINE CONNECTION CORRIDOR

LAND USE FEATURES
- COMMUNICATION TOWER
- HISTORIC SITE
- PARK & RECREATION
- PARCEL BOUNDARY

EXISTING UTILITY FEATURES
- EXISTING SUBSTATION
- EXISTING 345 KV TRANSMISSION LINE
- EXISTING 138 KV TRANSMISSION LINE
- OIL / GAS PIPELINE

ADMINISTRATIVE BOUNDARIES
- CITY BOUNDARY

TRANSPORTATION FEATURES
- STATE HIGHWAY
- FARM TO MARKET ROAD
- LOCAL ROAD
- AIRPORT
- HELIPORT

SURFACE WATER
- STREAM / DRAINAGE
- OPEN WATER
- POTENTIAL WETLAND
- 100-YEAR FLOODPLAIN

FILE: O:\232718_037_ZENITH_FRANZ_138KVMAP_DOCS\FIGURES\EAIZ-F_EA_FIG3-3_PRIMARYSEGMENTS_11X17.MXD

138 KV ZENITH-FRANZ PROJECT

PRIMARY TRANSMISSION LINE SEGMENTS

N

0 2,500 5,000
FEET

CenterPoint® Energy

HDR

JAN 2015 | FIGURE 3-3

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3.6.4 Primary Transmission Line Routes

Of the over 32 forward progressing route combinations originally developed, 15 primary transmission line routes were selected by HDR and CenterPoint Energy that provide geographically diverse alternatives across the study area to interconnect the Zenith Substation with CenterPoint Energy's existing 138 kV transmission line connection corridor. Each of the 39 primary transmission line segments is used in at least one of the 15 primary transmission line routes.

The 15 primary transmission line routes and their segment combinations are presented in Table 3-2. The primary transmission line routes were also subdivided into geographically diverse groups (or "families") represented by a eastern, central, and western characterization based on their location within the study area and segment usage. Figure 3-3 depicts the location of the primary transmission line segments that when combined form the primary transmission line routes.

These primary transmission line routes are further evaluated, discussed, and compared in Section 4. Within each resource area, the evaluation criteria for each primary transmission line routes were tabulated for comparative purposes.

Table 3-2 Segment Composition of the Primary Transmission Line Routes

Primary Transmission Line Routes	Geographic Description/Family*	Segment Combination
1	Eastern	A-D-G-X-AJ-AM
2	Eastern	A-D-G-T-W-AJ-AM
3	Eastern	A-D-J-P-W-AJ-AM
4	Eastern	A-C-I-O-S-W-AJ-AM
5	Eastern	B-E-F-J-P-W-AJ-AM
6	Eastern	B-H-L-M-P-W-AJ-AM
7	Eastern	B-H-N-R-S-W-AJ-AM
8	Central	B-H-N-V-AA-AF-AI-AM
9	Central	B-H-N-V-AA-AC-AE-AL
10	Central	B-H-N-V-AA-AF-AH-AL
11	Western	B-H-K-U-Z-AD-AK
12	Western	B-H-N-Q-U-Z-AD-AK
13	Western	B-H-N-V-Y-Z-AD-AK
14	Western	B-H-K-U-Z-AB-AE-AL
15	Western	B-H-K-U-Z-AD-AG-AL

*Geographic Description/Family is defined by the use of specific segments: AJ=Eastern, AA=Central, Z=Western

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4.0 IMPACT OF THE ALTERNATIVE ROUTES

Evaluation of the 15 primary transmission line routes identified in Section 3 was conducted by utilizing the evaluation criteria listed in Table 3-1 in Section 3.1.3. The tabulated data was used to compare the primary transmission line routes and to conduct a quantitative comparative analysis. This analysis, along with consideration of geographic diversity, was the basis HDR and CenterPoint Energy used to identify the set of proposed alternative routes for inclusion in the PUC CCN Application. This analysis was also utilized to identify a proposed alternative route that best addresses the requirements of PURA and the PUC Substantive Rules.

The potential impacts of the primary transmission line routes were compared with respect to community values, recreational and park areas, historic and aesthetic values, and environmental integrity. The results of the analysis are provided in Tables 4-1 (segment data) and 4-2 (route data) located in Appendix C. This section provides a summary and discussion of the comparison between the primary transmission line routes.

4.1 COMMUNITY VALUES

Impacts on community resources can be divided into direct and indirect effects. Direct effects are those that would occur if the location and construction of a transmission line results in the removal or loss of public access to a valued resource. Indirect effects are those that would result in a loss in the enjoyment or use of a resource due to the characteristics of the proposed transmission line, poles, tower structures, or ROW.

4.1.1 Land Use

The magnitude of potential impacts to land use resulting from the construction of a transmission line is determined by the amount of land or land use type displaced by the actual ROW and by the compatibility of the transmission line ROW with adjacent land uses. During construction, temporary impacts to land uses within the ROW may occur due to the movement of workers, equipment, and materials through the area. Construction noise and dust, as well as temporary disruptions of traffic flow, may also temporarily affect residents and businesses in the area immediately adjacent the ROW. Coordination between CenterPoint Energy, their contractors, and the landowners regarding ROW access and construction scheduling should minimize these disruptions.

The evaluation criteria considered to compare potential land use impacts include overall route length, route length parallel to existing corridors (including apparent property boundaries), route proximity to habitable structures, potential impacts to recreational and park areas, and route length across various land use types. An analysis of the existing land use adjacent to the proposed ROW was required to evaluate the potential impacts. The following sections address potential impacts to land use associated with the 15 primary transmission line routes.

4.1.2 Primary Transmission Line Route Length

The route lengths vary from Primary Transmission Line Route 8 extending for 32,532 feet (approximately 6.16 miles) to Primary Transmission Line Route 1, which extends for 49,599 feet (approximately 9.39 miles). This variance in route lengths reflects the shortest path between the project endpoints of Primary Transmission Line Route 8, which utilizes Segments B, H, N, V, AA, AF, AI, and AM, compared to the longest path of Primary Transmission Line Route 1, which utilizes Segments A, D, G, X, AJ, and AM. The primary transmission line routes are listed in ascending order of their lengths:

- Primary Transmission Line Route 8 at 32,532 feet or approximately 6.16 miles
- Primary Transmission Line Route 9 at 35,156 feet or approximately 6.66 miles
- Primary Transmission Line Route 10 at 35,987 feet or approximately 6.82 miles
- Primary Transmission Line Route 11 at 36,826 feet or approximately 6.97 miles
- Primary Transmission Line Route 7 at 37,701 feet or approximately 7.14 miles
- Primary Transmission Line Route 12 at 38,067 feet or approximately 7.21 miles
- Primary Transmission Line Route 6 at 38,300 feet or approximately 7.25 miles
- Primary Transmission Line Route 4 at 38,379 feet or approximately 7.27 miles
- Primary Transmission Line Route 3 at 38,381 feet or approximately 7.27 miles
- Primary Transmission Line Route 5 at 38,955 feet or approximately 7.38 miles
- Primary Transmission Line Route 13 at 39,227 feet or approximately 7.43 miles
- Primary Transmission Line Route 15 at 42,114 feet or approximately 7.98 miles
- Primary Transmission Line Route 14 at 42,151 feet or approximately 7.98 miles
- Primary Transmission Line Route 2 at 44,714 feet or approximately 8.47 miles
- Primary Transmission Line Route 1 at 49,599 feet or approximately 9.39 miles

4.1.3 Compatible ROW

P.U.C. Substantive Rule 25.101(b)(3)(B) requires that the PUC consider whether new transmission line routes are within existing compatible ROWs or are parallel to existing compatible ROWs, property lines, or other natural or cultural features. Criteria used to evaluate potential land use impacts include the route length within existing transmission line easements, length parallel to existing transmission line ROW, length paralleling apparent property lines, length of route parallel to other existing ROWs, and the length of new ROW required. The route with the longest length within an existing transmission line easement is Primary Transmission Line Route 8 with 32,532 feet. The primary transmission line routes are listed in descending order of their lengths within existing transmission line easements:

- Primary Transmission Line Route 8 at 32,532 feet
- Primary Transmission Line Route 10 at 29,132 feet
- Primary Transmission Line Route 9 at 24,210 feet
- Primary Transmission Line Route 13 at 18,956 feet
- Primary Transmission Line Route 7 at 16,146 feet
- Primary Transmission Line Route 12 at 13,579 feet
- Primary Transmission Line Route 6 at 10,639 feet
- Primary Transmission Line Route 11 at 8,258 feet
- Primary Transmission Line Route 14 at 8,254 feet
- Primary Transmission Line Route 15 at 8,254 feet
- Primary Transmission Line Route 1 at 8,008 feet
- Primary Transmission Line Route 2 at 8,008 feet
- Primary Transmission Line Route 3 at 8,008 feet
- Primary Transmission Line Route 4 at 7,488 feet
- Primary Transmission Line Route 5 at 5,329 feet

Routes that parallel property lines or fence lines, which are considered apparent property boundaries, may minimize the potential for disruption to agricultural activities and may create less of a constraint for future development of a tract of land. The route with the longest length parallel to apparent property lines is Primary Transmission Line Route 1 with 37,551 feet. The primary transmission line routes are listed in descending order of their length parallel to apparent property lines:

- Primary Transmission Line Route 1 at 37,551 feet
- Primary Transmission Line Route 2 at 13,389 feet
- Primary Transmission Line Route 14 at 13,380 feet
- Primary Transmission Line Route 15 at 13,380 feet
- Primary Transmission Line Route 11 at 11,411 feet
- Primary Transmission Line Route 12 at 11,411 feet
- Primary Transmission Line Route 13 at 11,347 feet
- Primary Transmission Line Route 5 at 6,896 feet
- Primary Transmission Line Route 10 at 3,222 feet
- Primary Transmission Line Route 9 at 2,762 feet
- Primary Transmission Line Route 6 at 793 feet
- Primary Transmission Line Route 7 at 793 feet
- Primary Transmission Line Route 8 at 793 feet
- Primary Transmission Line Route 3 at zero feet
- Primary Transmission Line Route 4 at zero feet

Paralleling other existing compatible ROW, such as highways, is also generally considered to be a favorable routing criterion. It is a consideration that usually results in fewer impacts compared to establishing new ROW. The primary transmission line route with the longest length parallel to other existing ROW is Primary Transmission Line Route 4 with 31,233 feet. The primary transmission line routes are listed in descending order of their length parallel to other existing ROWs:

- Primary Transmission Line Route 4 at 31,233 feet
- Primary Transmission Line Route 3 at 30,721 feet
- Primary Transmission Line Route 6 at 27,874 feet
- Primary Transmission Line Route 5 at 27,363 feet
- Primary Transmission Line Route 2 at 23,631 feet
- Primary Transmission Line Route 7 at 21,945 feet
- Primary Transmission Line Route 14 at 20,698 feet
- Primary Transmission Line Route 15 at 19,856 feet
- Primary Transmission Line Route 11 at 17,942 feet
- Primary Transmission Line Route 12 at 13,841 feet

- Primary Transmission Line Route 13 at 9,598 feet
- Primary Transmission Line Route 9 at 8,110 feet
- Primary Transmission Line Route 1 at 4,019 feet
- Primary Transmission Line Route 10 at 3,423 feet
- Primary Transmission Line Route 8 at zero feet

4.1.4 Urban and Residential Areas

Typically, one of the most important measures of potential land use impacts is the number of habitable structures located in the vicinity of each primary transmission line route. HDR determined the number and distance of habitable structures located within 300 feet of the centerline of each primary transmission line route through the interpretation of aerial photography and during reconnaissance surveys. The horizontal accuracy of the aerial photograph used to identify habitable structures was calculated at ±20 feet. To account for this margin of error and to ensure that all habitable structures were properly identified, HDR identified habitable structures within 320 feet of the centerline of each primary transmission line route.

The number of habitable structures located within 300 feet of the centerline of each primary transmission line route ranges from two for Primary Transmission Line Route 12 to 37 for Primary Transmission Line Route 14. The primary transmission line routes are listed in ascending order of the number of habitable structures located within 300 feet of their centerlines:

- Primary Transmission Line Route 12 with two habitable structures
- Primary Transmission Line Route 13 with six habitable structures
- Primary Transmission Line Route 10 with seven habitable structures
- Primary Transmission Line Route 15 with nine habitable structures
- Primary Transmission Line Route 11 with 11 habitable structures
- Primary Transmission Line Route 1 with 13 habitable structures
- Primary Transmission Line Route 2 with 13 habitable structures
- Primary Transmission Line Route 3 with 13 habitable structures
- Primary Transmission Line Route 4 with 13 habitable structures
- Primary Transmission Line Route 5 with 13 habitable structures

- Primary Transmission Line Route 6 with 13 habitable structures
- Primary Transmission Line Route 7 with 14 habitable structures
- Primary Transmission Line Route 8 with 20 habitable structures
- Primary Transmission Line Route 9 with 36 habitable structures
- Primary Transmission Line Route 14 with 37 habitable structures

The number of habitable structures located within 300 feet of the centerline of each primary transmission line route that are also currently directly affected by an existing transmission line ranges from 0 to 20 for Primary Transmission Line Routes 14 and 15 and Primary Transmission Line Route 8, respectively. When the total number of habitable structures within 300 feet of the centerline of each primary transmission line route is compared to the currently directly affected habitable structures, the potential newly directly affected habitable structures can be ascertained. Newly directly affected habitable structures range from zero for multiple primary transmission line routes to 37 for Primary Transmission Line Route 14. The primary transmission line routes are listed in ascending order of the number of newly directly affected habitable structures located within 300 feet of their centerlines with the number of currently directly affected habitable structures also provided in parenthesis:

- Primary Transmission Line Route 10 with zero newly directly affected habitable structures (7 currently directly affected habitable structures)
- Primary Transmission Line Route 1 with zero newly directly affected habitable structures (13 currently directly affected habitable structures)
- Primary Transmission Line Route 2 with zero newly directly affected habitable structures (13 currently directly affected habitable structures)
- Primary Transmission Line Route 3 with zero newly directly affected habitable structures (13 currently directly affected habitable structures)
- Primary Transmission Line Route 4 with zero newly directly affected habitable structures (13 currently directly affected habitable structures)
- Primary Transmission Line Route 5 with zero newly directly affected habitable structures (13 currently directly affected habitable structures)
- Primary Transmission Line Route 6 with zero newly directly affected habitable structures (13 currently directly affected habitable structures)

- Primary Transmission Line Route 8 with zero newly directly affected habitable structures (20 currently directly affected habitable structures)
- Primary Transmission Line Route 12 with one newly directly affected habitable structure (one currently directly affected habitable structures)
- Primary Transmission Line Route 7 with one newly directly affected habitable structure (13 currently directly affected habitable structures)
- Primary Transmission Line Route 13 with four newly directly affected habitable structures (two currently directly affected habitable structures)
- Primary Transmission Line Route 15 with nine newly directly affected habitable structures (zero currently directly affected habitable structures)
- Primary Transmission Line Route 11 with 10 newly directly affected habitable structures (one currently directly affected habitable structure)
- Primary Transmission Line Route 9 with 29 newly directly affected habitable structures (seven currently directly affected habitable structures)
- Primary Transmission Line Route 14 with 37 newly directly affected habitable structures (zero currently directly affected habitable structures)

4.1.5 Land Use Categories

An analysis of compatibility with adjacent land use types was completed for each primary transmission line route. Land use categories occurring within the study area included residential, commercial and industrial areas, agricultural land, cropland, and pastureland. No mobile irrigated cropland or pastureland areas were identified within the study area or are crossed by any of the primary transmission line routes.

Primary transmission line routes with the greatest lengths across residential areas typically have a higher number of habitable structures located within 300 feet of their centerlines. Primary Transmission Line Routes 11, 12, 13, 14, and 15 do not traverse residential areas. The primary transmission line route with the longest length across residential areas is Primary Transmission Line Route 8 with 1,716 feet. Primary Transmission Line Routes 1, 2, 3, 4, 5, 6, and 7 cross residential areas for 912 feet. Primary Transmission Line Routes 9, and 10 cross residential areas for 804 feet.

Commercial and industrial land uses crossed by the primary transmission line routes include an existing substation and an oil / gas facility. The primary transmission line routes with the longest

length across commercial and industrial land uses are Primary Transmission Line Routes 7, 8, 9, 10, 12, and 13 with 1,846 feet each. The primary transmission line routes are listed in ascending order of their length across commercial and industrial areas:

- Primary Transmission Line Route 7 with 1,846 feet
- Primary Transmission Line Route 8 with 1,846 feet
- Primary Transmission Line Route 9 with 1,846 feet
- Primary Transmission Line Route 10 with 1,846 feet
- Primary Transmission Line Route 12 with 1,846 feet
- Primary Transmission Line Route 13 with 1,846 feet
- Primary Transmission Line Route 5 with 1,616 feet
- Primary Transmission Line Route 6 with 1,616 feet
- Primary Transmission Line Route 11 with 1,616 feet
- Primary Transmission Line Route 14 with 1,616 feet
- Primary Transmission Line Route 15 with 1,616 feet
- Primary Transmission Line Route 1 with 799 feet
- Primary Transmission Line Route 2 with 799 feet
- Primary Transmission Line Route 3 with 799 feet
- Primary Transmission Line Route 4 with 799 feet

While the area historically supported cultivation, the primary agricultural land use within the study area is pastureland. No primary transmission line routes cross agricultural land or cropland areas with the exception of pastureland.

All primary transmission line routes cross pastureland areas. Primary Transmission Line Route 12 has the longest length across pasturelands with 23,739 feet. Primary Transmission Line Route 9 has the shortest length across pasturelands with 10,542 feet. The primary transmission line routes are listed in descending order of their length across pastureland:

- Primary Transmission Line Route 12 with 23,739 feet
- Primary Transmission Line Route 5 with 23,119 feet
- Primary Transmission Line Route 4 with 21,377 feet
- Primary Transmission Line Route 13 with 20,411 feet

- Primary Transmission Line Route 6 with 20,187 feet
- Primary Transmission Line Route 2 with 19,895 feet
- Primary Transmission Line Route 1 with 19,562 feet
- Primary Transmission Line Route 3 with 18,856 feet
- Primary Transmission Line Route 11 with 16,593 feet
- Primary Transmission Line Route 14 with 16,593 feet
- Primary Transmission Line Route 15 with 16,593 feet
- Primary Transmission Line Route 7 with 15,461 feet
- Primary Transmission Line Route 10 with 13,203 feet
- Primary Transmission Line Route 8 with 12,719 feet
- Primary Transmission Line Route 9 with 10,542 feet

Because CenterPoint Energy is not proposing to fence the ROW or otherwise separate the ROW from adjacent lands, there should not be any long-term or significant displacement of current grazing activities within pasturelands.

4.1.6 Transportation/Aviation/Utilities

4.1.6.1 Transportation

Potential impacts to transportation could include temporary disruption of traffic and conflicts with future proposed roadways or utility improvements. Traffic disruptions would include those associated with the movement of equipment and materials to the ROW and slightly increased traffic flow and periodic congestion during the construction phase of the proposed project. These impacts are typically considered minor, temporary, and short-term.

Roadways were considered during the routing process and alignments were identified to allow for spanning road crossings. Primary Transmission Line Routes 1, 2, 3, 4, 5, 6, 7, and 8 cross Grand Parkway (SH 99) once at varying locations. FM 529 is crossed by Segments U, V, W, and X. All of the primary transmission line routes include at least one of these segments resulting in each primary transmission line route crossing FM 529 one time.

4.1.6.2 Aviation

As previously stated in Section 1.2.4, construction of the proposed transmission line will require FAA notification if a structure height exceeds the height of an imaginary surface extending outward and upward at certain specified slopes.

During the initial phases of the routing study, all airports and heliports were identified within a 20,000-foot and 5,000-foot radius, respectively, of the study area boundary. A review of aerial photos and USGS topographic maps revealed two airports within the study area, the Freeman Property Airport and the Harold Freeman Farm. The Freeman Property Airport has an approximate runway length of 2,400 feet and is located within 10,000 feet of Primary Transmission Line Routes 9, 11, 12, 13, 14, and 15. The Harold Freeman Farm landing strip has an approximate runway length of 2,400 feet and is located within 10,000 feet of Primary Transmission Line Routes 11, 12, 14, and 15. Additionally, Sack-O-Grande Acroport has a runway greater than 3,200 feet in length and is located within 20,000 feet of all primary transmission line routes.

After the primary transmission line routes were identified, a preliminary analysis was completed to determine if any airports or heliports would meet the FAA notification and PUC reporting criteria based on distances measured from the nearest point on each runway to the closest point on each primary transmission line route centerline. Depending on the route selected, the structures may exceed the horizontal slope requirement for airports.

Once a final transmission line route is approved by the PUC, an evaluation will be completed by CenterPoint Energy to determine notification requirements after completion of the design phase for the project. If required, a Notice of Proposed Construction or Alteration, FAA Form 7460-1, will be completed and submitted to the FAA Southwest Regional Office in Fort Worth, Texas.

4.1.6.3 Utilities

Pipelines will be identified on engineering drawings and flagged prior to construction. CenterPoint Energy will coordinate with the respective pipeline companies at each crossing for continued safe operation of the pipeline during transmission line construction and operation. All primary transmission line routes cross pipelines at 11 crossings in various locations.

CenterPoint Energy's existing 345 kV transmission line will be crossed by Segments H, L, R, and AJ. All of the primary transmission line routes include at least one of these segments resulting in each primary transmission line route crossing the existing 345 kV transmission line at least once. Primary Transmission Line Routes 6 and 7 cross the existing 345 kV transmission line in three instances, each. Based on the current configuration of an existing 138 kV transmission line, Primary Transmission Line Routes 1, 2, 3, and 4 cross an existing 138 kV transmission line near the existing Zenith substation. Temporary disruption of service to the existing 345 kV and 138 kV lines is anticipated during construction in order to arrange construction for circuit crossings. No disruption of electrical service to retail customers is anticipated as a result of this construction requirement.

Routes that are proposed parallel to existing roadways, such as FM 529, offer an opportunity to overbuild the existing distribution lines where feasible. The primary transmission line route with the longest length for overbuilding existing CenterPoint Energy distribution lines is Primary Transmission Line Route 14 with 8,319 feet. Primary Transmission Line Routes 1, 3, 5, 6, 8, and 11 do not include any overbuild of existing CenterPoint Energy distribution lines. The primary transmission line routes that are proposed to overbuild existing CenterPoint Energy distribution lines are listed in descending order of their length of proposed overbuild:

- Primary Transmission Line Route 14 at 8,319 feet
- Primary Transmission Line Route 12 at 5,943 feet
- Primary Transmission Line Route 9 at 5,874 feet
- Primary Transmission Line Route 15 at 5,298 feet
- Primary Transmission Line Route 7 at 5,116 feet
- Primary Transmission Line Route 10 at 3,932 feet
- Primary Transmission Line Route 2 at 3,444 feet
- Primary Transmission Line Route 13 at 1,695 feet
- Primary Transmission Line Route 4 at 512 feet

In locations proposed for distribution overbuild, portions of the distribution lines will be relocated to the new 138 kV structures. The distribution circuit may be taken out of service for short periods of time during construction. Customers likely to be affected by outages during construction will be notified at least 24 hours prior to the outage. The loss of electrical service during construction, if necessary, is anticipated to be temporary and short term.

4.1.7 Communication Towers

No AM radio towers are located within 10,000 feet of the centerline of any primary transmission line routes. Other communication towers located within the study area include microwave relay stations and cellular communication towers (Table 4-3). The distance of each communication tower from the centerline of each primary transmission line route was measured using aerial photograph interpretation (Table 4-1, Appendix C).

Table 4-3 Communication Towers

Tower Map ID	Type	Nearest Primary Transmission Line Segment	Primary Transmission Line Routes within CCN Inventory Distance*	Approximate Distance (feet) to Centerline**
301	Microwave	B	All Routes	411
302	Cellular	K	11, 14, 15	109
303	Microwave	AA	8, 9, 10	1,137
304	Cellular	X	1, 2, 3, 4, 5, 6, 7, 8, 10	375

* CCN inventory distance: Commercial AM ≤ 10,000 feet or FM radio transmitters, microwave relay stations, or other similar electronic installations ≤ 2,000 feet

** Source: HDR; Aerial Photo, and USGS Interpretation, FCC

4.1.8 Socioeconomics

Construction and operation of the proposed transmission line will not result in a significant change in the population or employment rate within the study area. Construction workers for the project would commute to the work site on a daily or weekly basis, instead of permanently relocating to the area. The presence of additional workers would likely result in a temporary increase in local retail sales due to purchases of food, fuel, and other merchandise. No additional staff will be necessary for line operations and maintenance.

4.2 RECREATIONAL AND PARK AREAS

Impacts to community resources, whether direct or indirect, can be gauged as they affect community recreational and park areas. Potential impacts to recreation include the disruption or preemption of recreational activities. There were 26 parks or recreational areas identified within the study area.

None of the primary transmission line routes directly cross any existing parks or recreational areas. No adverse impacts to the use or enjoyment of recreational and park facilities located within the study area are anticipated from construction of any of the primary transmission line routes. Primary Transmission Line Route 1 has five park and recreational areas located within 1,000 feet of the centerline. The primary transmission line routes are listed in descending order of the number of parks and recreational areas located within 1,000 feet of their centerlines:

- Primary Transmission Line Route 1 with five parks and recreational areas
- Primary Transmission Line Route 2 with four parks and recreational areas
- Primary Transmission Line Route 3 with four parks and recreational areas
- Primary Transmission Line Route 4 with four parks and recreational areas
- Primary Transmission Line Route 5 with four parks and recreational areas
- Primary Transmission Line Route 6 with four parks and recreational areas
- Primary Transmission Line Route 7 with four parks and recreational areas
- Primary Transmission Line Route 8 with four parks and recreational areas
- Primary Transmission Line Route 9 with three parks and recreational areas
- Primary Transmission Line Route 11 with three parks and recreational areas
- Primary Transmission Line Route 12 with three parks and recreational areas
- Primary Transmission Line Route 13 with three parks and recreational areas
- Primary Transmission Line Route 14 with three parks and recreational areas
- Primary Transmission Line Route 10 with two parks and recreational areas
- Primary Transmission Line Route 15 with two parks and recreational areas

4.3 HISTORICAL AND AESTHETIC VALUES

Methods for identifying, evaluating, and mitigating impacts to cultural resources have been established for federal projects or permitting actions, primarily for purposes of compliance with the National Historic Preservation Act ("NHPA"). Similar methods are often used when considering cultural resources affected by state-regulated actions. In either case, this process generally involves: (1) identifying significant (i.e., national or state-designated) cultural resources within 1,000 feet of the centerline of each routing alternative; (2) determining the potential impacts of the project on those resources; and (3) implementing, where appropriate, measures to avoid, minimize, or mitigate those impacts.

Impacts associated with the construction, operation, and maintenance of transmission lines can affect cultural resources either directly or indirectly. Construction activities associated with any proposed project can adversely impact cultural resources if those activities alter the integrity of key characteristics that contribute to a property's significance as defined by the standards of the NRHP or the Texas State Antiquities Code. These characteristics might include location, design, setting, materials, workmanship, feeling, or association for architectural and engineering resources, or archeological information potential for archeological resources.

Direct impacts are those effects that physically or visually alter the integrity of key aspects or qualities that define the historical significance of the resource. Typically, direct impacts are caused by the actual construction of the line or through increased vehicular traffic during the construction phase.

Indirect impacts include those effects caused by the Project that are farther removed in distance or that occur later in time but are reasonably foreseeable. These indirect impacts might include introduction of visual or audible elements that are out of character with the resource or its setting. Indirect impacts might also occur as a result of alterations in the pattern of land use, changes in population density, accelerated growth rates, or increased pedestrian or vehicular traffic after construction. Historic buildings, structures, landscapes, and districts are among the types of resources that might be adversely impacted by the indirect impact of the proposed transmission structures and wires.

Mitigation for direct and indirect impacts to cultural resources may be achieved, where appropriate, by avoidance through project design. Additional mitigation measures for direct impacts may include implementing a program for data recovery excavations if an archeological site cannot be avoided. Indirect impacts on historical properties and landscapes can be lessened through careful design and landscaping considerations, such as using vegetation screens or berms where practicable. Additionally, relocation might be possible for some historic structures.

Eighteen cultural resource surveys have been previously undertaken within a one-mile radius of the study area (Table 4-4). Previous cultural resource surveys associated with John Paul Landing Park, FM 529, and Grand Parkway (SH 99) are proximate to Segments B, C, D, F, I, J, M, O, P, R, S, T, W, AJ, and AI. Relevant findings are discussed in Section 4.3.1.1.

Table 4-4. Previous Cultural Resource Surveys within a One-Mile Radius of the Study Area.

Object ID	Report Title	Contractor	Agency	Comments	Year	Segments Proximate to Survey
13356	Phase I Cultural Resources Survey on the Proposed John Paul Landing Park, Harris County, Texas	Perennial Environmental	HCFCD	Work performed under TAC permit #3884	2005	B
14979	Archaeological Testing of Site 41HR1002, John Paul's Landing, Harris County, Texas	Gulf Coast Archeology Group	HCFCD	Work performed under TAC permit #4662	2007	B
16292	A Cultural Resources Survey of the Preferred Alignment for Segment E of the Grand Parkway Project, Harris County, Texas	PBS&J	TxDOT	Work performed under TAC permit #5274	2009	C, D, F, I, J, M, O P, S, W, AJ, AI
13711	Intensive Pedestrian Survey of Approximately 4 miles of FM 529 for Roadway Expansion in Harris County Texas	HRA Gray and Pape	TxDOT	Work performed under TAC permit #4230	2006	-
13901	An Archeological Assessment Survey of 0.47-acre of Property Associated with South Mayde Creek Channel in Harris County, Texas	HRA Gray and Pape	HCFCD	Work performed under TAC permit #4329	2007	R, S, T
1142	–	–	TxDOT	–	1996	-
313	–	–	HCFCD	–	1994	-
13620	Phase I Cultural Resources Survey on the Hornberger Tract Harris County Flood Control District, Harris County, Texas	Gulf Coast Archeology Group	HCFCD	Work performed under TAC permit #4234	2006	-
58	–	–	COE-VD	–	1994	-
16300	A Cultural Resources Survey for the Detention and Mitigation Basins, Outfall Easements, and Remaining Portions of Segment E of the Grand Parkway Project, Harris County, Texas	PBS&J	TxDOT/Harris County Toll Road Authority	Work performed under TAC permit #5343	2009	-
18438	–	HRA Gray and Pape	COE-Galveston	–	2010	-
12369	Intensive Pedestrian Survey of the Proposed Fry Road Expansion Project Area in Harris County, Texas	HRA Gray and Pape	COE-VD/Harris County Public Infrastructure	Work performed under TAC permit #3320	2004	-
2182	–	–	COE-VD	–	1978	-
2183	–	–	COE-VD	–	1978	-
11390	Intensive Cultural Resource Survey of 58.2 Acres of Langham Creek for the Langham Creek Flood Bypass Project, Harris County, Texas	Horizon	Harris County MUD	Work performed under TAC permit #4223	2006	-
11922	Archeological Survey of the Katy Hockley Road Expansion, Harris County, Texas	MAC, Inc.	Harris County	Work performed under TAC permit #3828	2005	-
10581	–	HRA Gray and Pape	FERC	–	2003	-
10804	–	HRA Gray and Pape	FERC	–	2003	-

Due to the lack of additional cultural resource surveys proximate to the remaining primary transmission line segments, the possibility of impacting undiscovered cultural resources exists. Areas with a high probability for prehistoric archeological sites include floodplains and secondary terraces of perennial stream channels, as well as areas near wetlands, and are discussed in the following section.

4.3.1 Historical Values

4.3.1.1 Archeological Sites

The file review, including data from TARL, THSA, and TASA, indicated that there are four documented archaeological sites within one mile of the study area (Table 4-5). These are archeological sites 41HR730, 41HR975, 41HR1002, and 41HR1084. None of these sites are eligible for inclusion in the NRHP.

Table 4-5. Previously Recorded Archaeological Sites within a One-Mile Radius of the Study Area.

Site Number	Cultural Affiliation	Features/ Function	NRHP Eligibility	Comments/ Recommendations	Segments Proximate to Site
41HR730	Prehistoric; Paleoindian	Unknown	Not Eligible within ROW	Unknown	-
41HR975	Historic; mid-twentieth century	Three pier and beam structures, well pump, windmill	Not Eligible	No further work recommended	W
41HR1002	Prehistoric; Late Prehistoric/Neo-American	Possible campsite; three chert flakes, charcoal lense	Not Eligible	Further testing recommended in 2005; determined not eligible in 2008	-
41HR1084	Unknown Prehistoric	Sparse lithic scatter; two chert flakes	Not Eligible	No further work recommended	-

Site 41HR730 is a Paleoindian site but no further information concerning the site was available. 41HR1002, a Late Prehistoric / Neo-American campsite, consisting of lithic debitage and a charcoal lens. Site 41HR1084 is recorded to be a sparse prehistoric lithic scatter. One historic site (41HR975) was recorded within 1,000 feet of the preliminary transmission line routes. This site is located 341 feet west of Segment W and consists of three pier and beam structures, an agricultural well pump, and a windmill. This site is not eligible for inclusion in the NRHP, no impacts to the site are anticipated as a result of the proposed project.

The primary transmission line routes are listed below, in ascending order, based on the length of HPA crossed by each route. All primary transmission line routes follow existing linear

features (i.e., roads or transmission lines) where prior construction activities had the potential to expose archaeological features. Primary Transmission Line Route 12 crosses the least HPA with 5,118 feet. Primary Transmission Line Route 6 crosses the most HPA with 10,040 feet. The primary transmission line routes are listed in ascending order of their length of HPA crossed:

- Primary Transmission Line Route 12 with 5,118 feet
- Primary Transmission Line Route 1 with 5,318 feet
- Primary Transmission Line Route 11 with 5,875 feet
- Primary Transmission Line Route 14 with 5,875 feet
- Primary Transmission Line Route 15 with 5,875 feet
- Primary Transmission Line Route 13 with 6,370 feet
- Primary Transmission Line Route 9 with 6,587 feet
- Primary Transmission Line Route 7 with 7,424 feet
- Primary Transmission Line Route 2 with 7,756 feet
- Primary Transmission Line Route 4 with 8,087 feet
- Primary Transmission Line Route 3 with 8,648 feet
- Primary Transmission Line Route 10 with 9,214 feet
- Primary Transmission Line Route 8 with 9,309 feet
- Primary Transmission Line Route 5 with 9,853 feet
- Primary Transmission Line Route 6 with 10,040 feet

4.3.1.2 Cemeteries

No cemeteries are located within one mile of the study area.

4.3.1.3. Architectural Sites

There are no architectural resources within one mile of any of the primary transmission line routes documented in the TASA or THSA. Furthermore, no OTHMs are located within one mile of the project area.

4.3.1.4 Summary

While portions of various segments have been surveyed as a result of previous efforts on unrelated projects, none of the primary transmission line routes have been systematically

surveyed for cultural resources; therefore, the potential for undiscovered cultural resources exists. HPAs have been designated within the study area and the primary transmission line route length crossing these areas varies from 5,118 to 10,040 feet. There is the possibility that unknown prehistoric cultural resources and architectural resources may be located along all of the primary transmission line routes.

As discussed above, there are four archeological sites located within one mile of the study area for which the nature of the deposits of one site and the size of all four sites are unknown. Site 41HR975 is located 341 feet west of the centerline of Primary Transmission Line Routes 2 through 7. It is anticipated that any sites discovered during engineering or construction phases of the project would be avoided by spanning or minor route adjustments. While none of the primary transmission line routes are anticipated to have an adverse physical or visual impact on any known cultural resources, the potential for undiscovered cultural resources necessitates additional investigation, and potentially, coordination with the THC.

4.3.2 Aesthetic Values

Aesthetic impacts, or impacts to visual resources, occur when the ROW, transmission line, or structures of a transmission line create an intrusion into or substantially alter the character of the existing view. The significance of the impact is directly related to the quality of the view, in the case of natural scenic areas, or to the importance of the existing setting in the use and enjoyment of an area, in the case of valued community resources and recreational areas.

Because no rare, unique, pristine, or very high quality landscapes, landscapes protected by legislation, or landscapes protected from most forms of development were identified within the study area, potential visibility impacts were evaluated by tabulating the linear feet of each primary transmission line route that would potentially create a new or additional impact to potential sensitive viewers. The length of each primary transmission line route within the foreground visual zone of the following viewpoints or corridors was tabulated:

- State and U.S. Highways within one-half mile with unobstructed views
- Farm-to-Market and county roads within one-half mile with unobstructed views
- Parks and recreational areas within one-half mile with unobstructed views.

The primary transmission line route with the longest length located within the foreground visual zone of any U.S. or State highways is Primary Transmission Line Route 3 with 35,745 feet. Primary Transmission Line Routes 11, 12, and 13 are not located within the foreground visual zone of any U.S. or State highways. The primary transmission line routes are listed in descending order of their length within the foreground visual zone of any U.S. or State highways:

- Primary Transmission Line Route 3 with 35,745 feet
- Primary Transmission Line Route 4 with 35,743 feet
- Primary Transmission Line Route 5 with 32,435 feet
- Primary Transmission Line Route 2 with 30,067 feet
- Primary Transmission Line Route 6 with 27,091 feet
- Primary Transmission Line Route 1 with 25,827 feet
- Primary Transmission Line Route 7 with 21,860 feet
- Primary Transmission Line Route 10 with 8,872 feet
- Primary Transmission Line Route 8 with 7,830 feet
- Primary Transmission Line Route 9 with 1,044 feet
- Primary Transmission Line Route 14 with 1,044 feet
- Primary Transmission Line Route 15 with 1,044 feet
- Primary Transmission Line Route 11 with zero feet
- Primary Transmission Line Route 12 with zero feet
- Primary Transmission Line Route 13 with zero feet

The primary transmission line route with the longest length within the foreground visual zone of any farm-to-market or county roads is Primary Transmission Line Route 6 with 32,646. Primary Transmission Line Route 1 has the shortest length within the foreground visual zone with 23,095 feet. The primary transmission line routes are listed in descending order of their length within the foreground visual zone of any farm-to-market or county roads:

- Primary Transmission Line Route 6 with 32,646 feet
- Primary Transmission Line Route 7 with 32,099 feet
- Primary Transmission Line Route 14 with 31,319 feet
- Primary Transmission Line Route 15 with 31,281 feet

- Primary Transmission Line Route 10 with 30,404 feet
- Primary Transmission Line Route 9 with 29,589 feet
- Primary Transmission Line Route 13 with 28,347 feet
- Primary Transmission Line Route 4 with 27,334 feet
- Primary Transmission Line Route 12 with 27,217 feet
- Primary Transmission Line Route 8 with 26,949 feet
- Primary Transmission Line Route 3 with 26,787 feet
- Primary Transmission Line Route 5 with 26,787 feet
- Primary Transmission Line Route 11 with 25,994 feet
- Primary Transmission Line Route 2 with 25,451 feet
- Primary Transmission Line Route 1 with 23,095 feet

The primary transmission line route with the longest length located within the foreground visual zone of any park and recreational areas is Primary Transmission Line Route 14 with 14,539 feet. Primary Transmission Line Routes 11, 12, and 13 have the shortest length within the foreground visual zone with 7,877 feet. The primary transmission line routes are listed in descending order of their length within the foreground visual zone of any park and recreational areas:

- Primary Transmission Line Route 14 with 14,539 feet
- Primary Transmission Line Route 5 with 14,360 feet
- Primary Transmission Line Route 9 with 13,385 feet
- Primary Transmission Line Route 6 with 13,073 feet
- Primary Transmission Line Route 7 with 13,073 feet
- Primary Transmission Line Route 1 with 13,020 feet
- Primary Transmission Line Route 15 with 11,816 feet
- Primary Transmission Line Route 2 with 11,517 feet
- Primary Transmission Line Route 3 with 11,517 feet
- Primary Transmission Line Route 4 with 11,517 feet
- Primary Transmission Line Route 10 with 9,166 feet
- Primary Transmission Line Route 8 with 8,222 feet
- Primary Transmission Line Route 11 with 7,877 feet
- Primary Transmission Line Route 12 with 7,877 feet

- Primary Transmission Line Route 13 with 7,877 feet

Construction of the proposed 138 kV transmission line could have both temporary and permanent aesthetic effects. Temporary impacts would include views of the actual assembly and erection of the tower structures or concrete poles. Where wooded areas are cleared, the brush and wood debris could have an additional temporary negative impact on the local visual environment. Permanent impacts from the project would result from visibility of the lattice tower or concrete pole structures, conductors, and cleared ROW.

4.4 ENVIRONMENTAL INTEGRITY

4.4.1 Physiography and Geology

Construction of the proposed transmission line is not anticipated to have any significant adverse effects on the physiographic or geologic features and resources of the area. Erection of the towers or monopole structures will require the excavation or minor disturbance of small quantities of near-surface materials, but should have no measurable impacts on the geologic resources or features along any of the primary transmission line routes. No geologic hazards are anticipated to be encountered or created during construction. No hazardous waste or leaking underground storage tank sites were identified within the study area. No oil and gas wells were located within the ROWs of any of the primary transmission line routes.

4.4.2 Soils

Activities associated with the construction, operation, and maintenance of electrical transmission lines typically do not adversely impact soils when appropriate mitigation measures are implemented during the construction phase as required. Potential impacts to soils include erosion, compaction, and conversion of prime farmland soils.

The highest risk for soil erosion and compaction is primarily associated with the construction phase of a project. In accordance with CenterPoint Energy standard construction specifications, ROW clearing of woody vegetation including trees, brush, and undergrowth will be conducted within the ROW area, if required. Areas with total vegetation removal will have the highest potential for soil erosion, and the movement of heavy equipment in the ROW creates the greatest potential for soil compaction. A determination of the need for a SWPPP will be made after approval of the route for the line. Prior to construction, CenterPoint Energy will develop a SWPPP if required to minimize potential impacts associated with soil erosion, compaction, and

off ROW sedimentation. The native herbaceous layer of vegetation will be maintained, to the extent feasible, during construction and most bare areas with a low erosion potential will be allowed to re-vegetate with native herbaceous species. Areas with a high erosion potential, including any steep slopes and areas with shallow topsoil, may require seeding or implementation of permanent BMPs (i.e., soil berms or interceptor slopes) to stabilize disturbed areas and minimize soil erosion potential during the post construction phase.

Prime farmland soils presently account for 76.9 percent of soils within the study area. Potential impacts to soils are primarily erosion and compaction that will be minimized with the development and implementation of the SWPPP. The magnitude of potential soil impacts are considered equivalent for all of the primary transmission line routes. No conversions of prime or state important soils are anticipated related to project activities for any of the primary transmission line routes.

4.4.3 Water Resources

The minimization of potential impacts to surface waters and associated wetlands was considered throughout the routing process. Surface waters identified within the study area include streams, ponds, and ditches. Primary transmission line routes crossing these open water areas were minimized to the extent feasible by maintaining a perpendicular angle.

4.4.3.1 Surface Water

No surface waters or open water areas crossed by the primary transmission line routes exceed the typical spanning distance for a 138 kV transmission line. CenterPoint Energy proposes to span all surface waters crossed by the primary transmission line routes with the structure foundations located outside of the ordinary high water mark. No proposed construction activities will significantly impede the flow of water within these watersheds. Selective cutting of vegetation at these crossings will be implemented and limited to the removal of woody vegetation having the potential to exceed 10 feet in height. The shorter understory and herbaceous layers of vegetation will remain, where allowable. BMPs will be implemented in accordance with an SWPPP, if required, to reduce the potential for sedimentation outside of the ROW.

Bear Creek and South Mayde Creek are the only streams crossed by the primary transmission line routes. Additionally, small ponds, likely resulting from borrow, are also crossed by the

primary transmission line routes. Primary Transmission Line Routes 8, 9, 10, and 13 cross open water areas for 177 feet. Primary Transmission Line Routes 2, 3, 4, 5, 6, and 7 cross open water areas for 88 feet. No other primary transmission line routes cross open water areas.

Primary Transmission Line Routes 1 and 7 parallel streams within 100 feet of a stream for 130 feet and 329 feet, respectively. None of the remaining primary transmission line routes have any portion of their length parallel to streams.

4.4.3.2 Floodplains

As stated in Section 2.4.3.3, the FEMA-mapped 100-year floodplain within the study area accounts for 9,034 acres. Primary transmission line routes range from 8,189 feet (Primary Transmission Line Route 4) to 27,422 feet (Primary Transmission Line Route 13) for length across the FEMA-mapped 100-year floodplain. Construction of the proposed project should not have a significant impact on the overall function of the floodplain, nor adversely affect adjacent or downstream properties. If structures are proposed within the floodplain, then additional coordination with the appropriate local floodplain administrators may be required to determine any permit conditions.

4.4.3.3 Groundwater

The construction, operation, and maintenance of the proposed project are not anticipated to adversely affect groundwater resources within the study area. No measurable decrease of aquifer recharge capacity should occur, and groundwater contamination is not anticipated from construction activities. During construction activities, another potential impact for both surface water and groundwater resources is related to potential fuel and other chemical spills. CenterPoint Energy has standard operating procedures and response specifications relating to petroleum product storage, refueling, and maintenance activities of equipment to avoid and minimize potential contamination to groundwater resources.

4.4.4 Ecological Resources

4.4.4.1 Vegetation Types

The native vegetation within the study area has been altered to various degrees due to the extent of agriculture and residential, commercial, and industrial developments. Potential impacts to native vegetation will result from clearing the ROW of woody vegetation or mowing and clearing herbaceous vegetation. These activities facilitate access for structure construction,

conductor installation, and future maintenance activities. Removal of woody vegetation within the ROW will be required within upland, riparian, and bottomland woodland areas, including wetlands, along fence lines with trees greater in height than 10 feet, and within open pasture areas. Prior to construction, mowing or shredding of herbaceous vegetation will occur within pasture areas. Mowing activities will continue periodically within the ROW for maintenance purposes.

Clearing trees and shrubs from woodland areas may generate an additional degree of habitat fragmentation. Habitat fragmentation is reduced when a proposed route parallels an existing linear feature such as a pipeline, electrical transmission line, or roadway. During the routing process consideration was given to avoid extensive woodland and riparian areas, and to maximize the length of the routes within or parallel to existing linear corridors.

Impacts to vegetation will be limited to that necessary for the construction, operation, and maintenance of the proposed project. ROW clearing activities will be completed with minimal vegetation impacts and the existing herbaceous layer or groundcover will be maintained to the extent practical. All of the primary transmission line routes cross areas of upland woodlands. Primary Transmission Line Route 1 has the longest length across upland woodlands with 9,794 feet. The primary transmission line routes are listed in ascending order of their length across upland woodlands:

- Primary Transmission Line Route 11 with 172 feet
- Primary Transmission Line Route 12 with 172 feet
- Primary Transmission Line Routes 13 with 375 feet
- Primary Transmission Line Route 14 with 614 feet
- Primary Transmission Line Route 15 with 614 feet
- Primary Transmission Line Route 8 with 680 feet
- Primary Transmission Line Route 9 with 682 feet
- Primary Transmission Line Route 10 with 1,122 feet
- Primary Transmission Line Route 7 with 4,195 feet
- Primary Transmission Line Route 3 with 5,469 feet
- Primary Transmission Line Route 6 with 5,546 feet
- Primary Transmission Line Route 4 with 5,735 feet

- Primary Transmission Line Route 5 with 6,157 feet
- Primary Transmission Line Route 2 with 9,688 feet
- Primary Transmission Line Route 1 with 9,794 feet

4.4.4.2 Wetlands

Potential impacts to wetlands include the temporary or permanent fill associated with structure construction and temporary impacts associated with access. Mapped wetland information was derived from digital copies of the NWI maps (USFWS, 2014a) and supplemented with aerial photograph interpretation. CenterPoint Energy proposes to span any wetland areas where practical and hand clear any trees located within the wetland area to minimize potential impacts. The use of equipment mats during construction within emergent herbaceous wetland areas minimizes potential impacts by limiting the level of soil disturbance. Additional coordination may be required with the USACE-Galveston District to determine any Section 404 permitting requirements after the PUC issues an order in the proceeding.

The lengths of each primary transmission line route across potential wetlands range from 732 feet for Primary Transmission Line Routes 11, 14, and 15, to 2,157 feet on Primary Transmission Line Route 7. The primary transmission line routes are listed in ascending order of their length across potential wetlands:

- Primary Transmission Line Route 11 with 732 feet
- Primary Transmission Line Route 14 with 732 feet
- Primary Transmission Line Route 15 with 732 feet
- Primary Transmission Line Route 8 with 1,036 feet
- Primary Transmission Line Route 9 with 1,036 feet
- Primary Transmission Line Route 10 with 1,036 feet
- Primary Transmission Line Route 5 with 1,052 feet
- Primary Transmission Line Route 13 with 1,169 feet
- Primary Transmission Line Route 1 with 1,192 feet
- Primary Transmission Line Route 12 with 1,229 feet
- Primary Transmission Line Route 2 with 1,438 feet
- Primary Transmission Line Route 3 with 1,438 feet
- Primary Transmission Line Route 6 with 1,651 feet

- Primary Transmission Line Route 4 with 1,845 feet
- Primary Transmission Line Route 7 with 2,157 feet

The length of bottomland or riparian woodland vegetation crossed by each route was primarily associated areas near the two named streams within the study area. Any vegetation clearing within these areas will be limited to hand cutting only to minimize potential impacts. Primary Transmission Line Routes 11, 14, and 15 cross the least amount of bottomland or riparian woodland areas with 518 feet. Primary Transmission Line Route 1 crosses 4,686 feet of bottomland or riparian woodland areas. The primary transmission line routes are listed in ascending order of their length across bottomland or riparian woodland vegetation:

- Primary Transmission Line Route 11 with 518 feet
- Primary Transmission Line Route 14 with 518 feet
- Primary Transmission Line Route 15 with 518 feet
- Primary Transmission Line Route 9 with 654 feet
- Primary Transmission Line Route 2 with 719 feet
- Primary Transmission Line Route 3 with 719 feet
- Primary Transmission Line Route 5 with 719 feet
- Primary Transmission Line Route 6 with 719 feet
- Primary Transmission Line Route 13 with 1,014 feet
- Primary Transmission Line Route 12 with 1,216 feet
- Primary Transmission Line Route 4 with 1,343 feet
- Primary Transmission Line Route 7 with 1,363 feet
- Primary Transmission Line Route 8 with 1,436 feet
- Primary Transmission Line Route 10 with 1,436 feet
- Primary Transmission Line Route 1 with 4,686 feet

4.4.4.3 Wildlife and Fisheries

The impact of construction activities on terrestrial wildlife species will be associated with temporary disturbances of construction activities and with the removal of vegetation, which is considered habitat modification or fragmentation. Increased noise and equipment movement during construction may temporarily displace mobile wildlife species from the immediate workspace area. These impacts will be short-term and normal wildlife movements would be expected to resume to previous levels after construction is completed. Potential long-term

impacts include impacts resulting from habitat modifications or fragmentation. Native habitats have historically been modified to a high degree to support historical and present land uses.

Construction activities may also impact small, immobile, or fossorial (living underground) animal species through incidental takes or the alteration of local habitats. Incidental takes of these species may occur due to equipment or vehicular movement on the ROW by direct impact or due to the compaction of the soil if the species is fossorial. Potential impacts of this type are not typically considered significant and are not likely to have an adverse effect on any species population dynamics.

If ROW clearing occurs during the nesting season, potential impacts could occur within the ROW related to takes of migratory bird eggs or nestlings. Increases in noise and activity levels during construction could also potentially disturb breeding or other activities of species nesting in areas immediately adjacent to the ROW.

Measures can be implemented to minimize the risk for electrocution or collisions of birds with tower structure design and additional mitigation measures. The danger of electrocution to birds should be insignificant, because the distance between conductors, conductor to structure, or conductor to ground wire for the proposed 138 kV transmission line is greater than the wingspan of most birds in the area. The tower structures and lines may be a collision hazard to birds in flight. The study area is located within the Central Migratory Flyway for neo-tropical migratory birds. The risk for bird strikes increases in the fall migration period when low visibility is common due to inclement weather conditions. CenterPoint Energy has an established avian program implemented through the Company's Environmental department. CenterPoint Energy's Environmental department will evaluate avian habitats, populations, and activities within the final CCN route, and work with Transmission Operations to identify and implement appropriate avian protection measures, where necessary.

Potential permanent impacts to wildlife may result from the clearing of upland and bottomland, including wetlands and woodland habitats. Because a large percentage of the native vegetation has previously been modified due to developments, the remnant woodland vegetation often serves as habitat or a travel corridor for many woodland habitat species. By utilizing or paralleling existing linear features to the greatest extent reasonable or minimizing the route

lengths within wooded areas, the potential impacts to wildlife and habitat fragmentation is reduced.

Potential impacts to aquatic systems may include effects of erosion, siltation, and sedimentation. The clearing of vegetation from the ROW could result in temporary increase of suspended solids entering surface waters. Increases in suspended solids may adversely affect aquatic organisms that require relatively clear water for foraging or reproduction. Physical aquatic habitat loss or alteration may result wherever riparian vegetation is removed or at any temporary crossings required for access. Increased levels of siltation or sedimentation may also potentially impact downstream areas primarily affecting filter feeding benthic and other aquatic invertebrates. No significant adverse impacts are anticipated to any aquatic habitats crossed or located adjacent to the ROW for any of the primary transmission line routes.

4.4.4.4 Threatened and Endangered Species

No known occurrences of any federal or state listed threatened or endangered plant or animal species or USFWS designated critical habitat areas were indicated within the study area. A rookery was noted by TPWD along the western boundary of the study area, which was avoided during routing. Construction of any of the primary transmission line routes are not anticipated to adversely impact any federal or state listed species. When the PUC approves a route, CenterPoint Energy will consult with USFWS, if necessary, to determine the need for any additional field surveys or Section 7 permits.

5.0 PROPOSED ALTERNATIVE ROUTE SELECTION

5.1 EVALUATION OF PROPOSED ALTERNATIVE ROUTES

CenterPoint Energy and HDR have selected 15 forward progressing primary transmission line routes that provide geographic diversity and are feasible from a potential impact, engineering, and cost perspective. As mentioned earlier, multiple unique segment combinations are possible from which a set of proposed alternative routes could be developed. Non-forward progressing primary transmission line routes were not considered. For example, numerous potential primary transmission line routes could be formed using Segments A-C-E near the existing substation site. Segments A-C-E, when combined, are not forward progressing, because the route formed by them heads north and east along Segment A, south along Segment C, and then west along Segment E. Segment B leads to the same node as the above combination by heading south from the existing substation. Routes including Segments A-C-E would be unnecessarily long and require more 90 degree angles, contributing to higher costs (see Figure 3-3). As a result, routes including this segment combination and others with similar shortcomings were not included within the set of 15 primary transmission line routes identified by CenterPoint Energy and HDR for further analysis.

To facilitate the comparison and selection of the proposed alternative routes for inclusion in the PUC CCN Application, the 15 primary transmission line routes were divided into three geographically diverse route families: the Eastern, Central, and Western Route Families. Primary transmission line routes within each route family were subjected to a quantitative comparison, and the selection of proposed alternative routes within each route family were recommended through a consensus process. The proposed alternative routes selected from each family were then compared for recommendation of the route that best addresses the requirements of PURA and the PUC Substantive Rules.

Eastern Route Family (Primary Transmission Line Routes 1, 2, 3, 4, 5, 6, and 7)

Primary transmission line routes that include Segment AJ are grouped into the Eastern Route Family, which includes Primary Transmission Line Routes 1 through 7. Transmission line routes in the eastern route family parallel Grand Parkway (SH 99) for various distances.

Central Route Family (Primary Transmission Line Routes 8, 9, and 10)

Primary transmission line routes that include Segment AA are grouped into the Central Route Family, which includes Primary Transmission Line Routes 8 through 10. Transmission line

routes in the Central Route Family are proposed to utilize an existing transmission line easement for a large majority of the overall length.

Western Route Family (Primary Transmission Line Routes 11, 12, 13, 14, and 15)

Primary transmission line routes that include Segment Z are grouped into the Western Route Family, which includes Primary Transmission Line Routes 11 through 15. Transmission line routes in the Western Route Family are proposed to parallel Porter Road for a portion of their length.

Based on the results of the data tabulation for the primary transmission line routes completed in Section 4.0, many of the evaluation criteria did not capture data that helped facilitate a qualitative or quantitative comparison between the primary transmission line routes. This is due to the environmental and land use setting within the study area. The absence of certain features in the study area or within the specified distances often resulted in zeros in the data table for all or the majority of the primary transmission line routes. See Tables 4-1 and 4-2 in Appendix C. This was the case for the following evaluation criteria:

- length of route across mobile irrigated cropland or pastureland;
- length of route across known habitat of federal endangered or threatened species of plants or animals;
- number of archeological sites crossed within ROW;
- number of National Register of Historic Places listed or determined-eligible properties within ROW; and
- length of route across areas of high archaeological/historic site potential.

Analysis of other evaluation criteria generated quantitative results, but do not provide a qualitative comparison between alternative routes. For example, the number of county roadways crossed by each primary transmission line route ranged from one to six. Because these areas will be spanned by the transmission line route, the significance between one and six crossings for each primary transmission line route would not be considered a key evaluation criterion when evaluating other criterion.

To facilitate the comparison and selection of the recommended proposed alternative routes within each route family and the selection of the proposed alternative route that best addresses

the requirements of PURA and the PUC Substantive Rules, Key Evaluation Criteria (see Table 5-1) were derived from the evaluation criteria results presented in Tables 4-1 and 4-2 (Appendix C). The Key Evaluation Criteria in Table 5-1 were used for the consensus process.

Table 5-1 Key Evaluation Criteria

Category	Evaluation Criteria
Land Use	Length of route (miles)
	Number of habitable structures within 300 feet of route centerline
	Number of habitable structures in previous criterion currently "directly affected" by an existing transmission line
	Length of route using existing transmission line easement and/or CenterPoint-owned property
	Length of new ROW required for route
	Length of route parallel to existing transmission line ROW
	Length of route parallel to other existing ROW (roadway, canals, etc.)
	Number of additional parks/recreational areas within 1,000 feet of route centerline
	Length of route across residential areas
	Length of route across commercial/industrial areas
Aesthetics	Estimated length of route within foreground visual zone of U.S./State highways
	Estimated length of route within foreground visual zone of FM and county roads
	Estimated length of route within foreground visual zone of park and recreational areas
Ecology	Length across upland woodlands
	Length of route across bottomland/riparian woodlands
	Length of route across potential wetlands
	Length of route across open water (lakes or ponds)
Cultural Resources	Number of additional archeological sites within 1,000 feet of route centerline
Cost	Estimated Construction Cost

For comparison purposes, CenterPoint Energy provided construction cost estimates, excluding ROW acquisition, substation construction, distribution underbuild, and supplemental system improvements or reconfigurations, for each primary transmission line route. For cost comparison purposes, concrete monopoles are estimated for segments within all ROW types with lattice towers or steel monopoles at the angles. The estimated construction costs for the 15 primary transmission line routes are summarized in Table 5-2.

Table 5-2 Summary of Cost Estimates

Primary Transmission Line Route	Inclusive Segments	Family/Location[1]	Total Length (Miles)	Estimated Construction Cost[2]
1	A-D-G-X-AJ-AM	Eastern	9.39	$18,889,000
2	A-D-G-T-W-AJ-AM	Eastern	8.47	$11,895,000
3	A-D-J-P-W-AJ-AM	Eastern	7.27	$11,239,000
4	A-C-I-O-S-W-AJ-AM	Eastern	7.27	$12,506,000
5	B-E-F-J-P-W-AJ-AM	Eastern	7.38	$11,662,000
6	B-H-L-M-P-W-AJ-AM	Eastern	7.25	$11,618,000
7	B-H-N-R-S-W-AJ-AM	Eastern	7.14	$11,725,000
8	B-H-N-V-AA-AF-AI-AM	Central	6.16	$8,976,000
9	B-H-N-V-AA-AC-AE-AL	Central	6.66	$10,966,000
10	B-H-N-V-AA-AF-AH-AL	Central	6.82	$11,721,000
11	B-H-K-U-Z-AD-AK	Western	6.97	$11,603,000
12	B-H-N-Q-U-Z-AD-AK	Western	7.21	$11,743,000
13	B-H-N-V-Y-Z-AD-AK	Western	7.43	$11,826,000
14	B-H-K-U-Z-AB-AE-AL	Western	7.98	$12,719,000
15	B-H-K-U-Z-AD-AG-AL	Western	7.98	$13,188,000

[1] Family/Location defined by the use of specific segments: AJ = Eastern, AA = Central, Z = Western
[2] Does not include ROW acquisition, substation construction, distribution underbuild, or supplemental system improvements/reconfigurations

HDR, with CenterPoint Energy input and review, completed a comparison of the primary transmission line routes within each route family, as discussed below, culminating in the selection of the recommended Proposed Alternative Routes within that family. Proposed Alternative Route selection was completed in compliance with Section 37.056(c)(4)(A)-(D) of PURA, P.U.C. Procedural Rule 22.52(a)(4), P.U.C. Substantive Rule 25.101(b)(3)(B), and the PUC's policy of prudent avoidance.

5.2 SELECTION OF PROPOSED ALTERNATIVE ROUTES

5.2.1 Eastern Route Family (Primary Transmission Line Routes 1, 2, 3, 4, 5, 6, and 7)

Of the four primary transmission line routes that utilize Segment A, Primary Transmission Line Route 3, which parallels Grand Parkway (SH 99) for the majority of the route and was also the least costly, was selected for further consideration as a proposed alternative route. Primary Transmission Line Route 1 is the longest of primary transmission line routes and has a greater than 50% higher cost than the other routes that utilize Segment A. As a result Primary Transmission Line Route 1 was removed from further consideration. Of all primary transmission line routes, Primary Transmission Line Route 2 is the second longest primary transmission line route and would require the second largest amount of new ROW to be acquired. As a result, Primary Transmission Line Route 2 was removed from further consideration. Primary

Transmission Line Route 4 is the second most expensive route when compared to other primary transmission line routes that utilize Segment A. As a result, Primary Transmission Line Route 4 was removed from further consideration.

Among the three additional eastern family routes that utilize Segment B, Primary Transmission line Route 6 was selected for further consideration as a proposed alternative route. Primary Transmission Line route 5 when compared with Primary Transmission Line Route 6 would require 22% more new ROW. As a result, Primary Transmission Line Route 5 was removed from further consideration. Primary Transmission Line Route 7 does not offer sufficient geographic diversity from the other eastern and central routes and has an additional habitable structure within 300 feet of the centerline when compared with Primary Transmission Line Route 6. As a result, Primary Transmission Line Route 7 was removed from further consideration.

5.2.1.1 Land Use

Of the two remaining Eastern Family Routes, Primary Transmission Line Route 6 is the shorter at 7.25 miles, whereas Primary Transmission Line Route 3 is longer, measuring approximately 7.27 miles in length. Primary Transmission Line Routes 3 and 6 have four parks or recreational areas located within 1,000 feet of their centerlines. Primary Transmission Line Route 3 parallels existing features for 98% of its total length, and Primary Transmission Line Route 6 parallels existing features for 97% of its length.

5.2.1.2 Historical and Aesthetic Values

Primary Transmission Line Routes 3 and 6 have one known archeological site located within 1,000 feet of their centerlines; however, that site is not eligible for NRHP listing. Primary Transmission Line Routes 3 and 6 have 35,745 feet and 27,091 feet of centerline within the foreground visual zone of a U.S. or State highway with, respectively. Primary Transmission Line Route 3 has the shorter length within the foreground visual zone of farm-to-market and county roads, with 26,787 feet. Primary Transmission Line Route 6 has 32,646 feet of length located within this zone.

5.2.1.3 Ecology

Primary Transmission Line Route 3 crosses approximately 1,438 feet of potential wetlands. Primary Transmission Line Routes 6 has the longer length across potential wetland areas with 1,651 feet. Primary Transmission Line Routes 3 and 6 cross equivalent lengths of bottomland

or riparian woodlands with 719 feet. Primary Transmission Line Routes 3 and 6 also cross equivalent lengths of open water, such as lakes and ponds, with 88 feet. Primary Transmission Line Route 6 crosses the shorter length of 100-year floodplain with 8,594 feet. Primary Transmission Line Route 3 has the longer length across 100-year floodplain with 17,024 feet.

5.2.1.4 Estimated Cost

Based on the cost estimates provided by CenterPoint Energy, Primary Transmission Line Route 3 will be slightly less expensive to construct at approximately $11.2 million (see Table 5-2). Primary Transmission Line Route 6 will be more expensive to construct at approximately $11.6 million.

5.2.2 Central Route Family (Primary Transmission Line Routes 8, 9, and 10)

After considering and comparing the key evaluation criteria for the primary transmission line routes within the Central Route Family, it was concluded that Primary Transmission Line Route 9 would be removed from further consideration due to its higher number of habitable structures within 300 feet of the route centerline. Primary Transmission Line Route 9 would result in 29 newly directly affected habitable structures while Primary Transmission Line Routes 8 and 10 would not result in any newly directly affected habitable structures. Primary Transmission Line Routes 8 and 10 were further evaluated as proposed alternative routes.

5.2.2.1 Land Use

Of the two remaining Central Family Routes, Primary Transmission Line Route 8 is the shortest of all primary transmission line routes at 6.2 miles in length, whereas Primary Transmission Line Route 10 is longer, measuring approximately 6.8 miles in length. Primary Transmission Line Route 8 follows the most direct pathway to CenterPoint Energy's existing 138 kV transmission line connection corridor and utilizes an existing transmission line easement or CenterPoint-owned property for the entire length of the route.

5.2.2.2 Historical and Aesthetic Values

Primary Transmission Line Routes 8 and 10 do not have any known archeological sites located within 1,000 feet of their centerlines. Primary Transmission Line Routes 8 and 10 have similar portions of their lengths within the foreground visual zone of a U.S. or State highway with 7,830 feet and 8,872 feet, respectively. Primary Transmission Line Route 8 has the shorter length

within the foreground visual zone of farm-to-market and county roads, with 26,949 feet. Primary Transmission Line Route 10 has 30,404 feet of length located within this zone.

5.2.2.3 Ecology

Primary Transmission Line Routes 8 and 10 cross equivalent lengths of potential wetlands with 1,036 feet. Primary Transmission Line Routes 8 crosses approximately 680 feet of upland woodlands. Primary Transmission Line Routes 10 crosses approximately 1,122 feet of upland woodlands. Primary Transmission Line Route 8 crosses 1,436 of bottomland/riparian woodlands, while Primary Transmission Line Route 10 crosses 177 feet.

5.2.2.4 Estimated Cost

Based on the cost estimates provided by CenterPoint Energy, Primary Transmission Line Route 8 will be the least expensive primary transmission line route to construct at approximately $9.0 million (see Table 5-2). Primary Transmission Line Route 10 is estimated to be $2.7 million more expensive to construct at approximately $11.7 million.

5.2.3 Western Route Family (Primary Transmission Line Routes 11, 12, 13, 14, and 15)

After considering and comparing the key evaluation criteria for the primary transmission line routes within the Western Route Family, it was concluded that Primary Transmission Line Route 14 would be removed from further consideration due to the higher number of habitable structures within 300 feet of the route centerline. Additionally, Primary Transmission Line Route 13 does not offer sufficient geographic diversity from the other western and central routes and has four additional habitable structures within 300 feet of the route centerline when compared with a very similar Primary Transmission Line Route 12. As a result, Primary Transmission Line Route 13 was removed from further consideration as a proposed alternative. Primary Transmission Line Routes 11, 12, and 15 were further evaluated as proposed alternative routes.

5.2.3.1 Land Use

Of the three remaining Western Family Routes, Primary Transmission Line Route 11 is the shortest with 7.0 miles, and Primary Transmission Line Routes 12 and 15 are longer with approximately 7.2 miles and 8.0 miles, respectively. Primary Transmission Line Route 12 has the fewest habitable structures located within 300 feet of the centerline with two. Primary Transmission Line Routes 11 and 15 have 11 and nine habitable structures within 300 feet of the proposed centerlines, respectively. Primary Transmission Line Routes 11, 12, and 15 do

not cross any residential areas. Primary Transmission Line Route 15 has two parks or recreational areas within 1,000 feet of its centerline, while Primary Transmission Line Routes 11 and 12 have three parks or recreational areas located within 1,000 feet of their centerlines. Primary Transmission Line Route 15 parallels apparent features, property lines, or existing ROW for 94% of the total length, while Primary Transmission Line Routes 11 and 12 parallel apparent features, property lines, or existing ROW for 97% of their total lengths.

5.2.3.2 Historical and Aesthetic Values

Primary Transmission Line Routes 11, 12, and 15 do not have any known archeological sites located within 1,000 feet of their centerlines. Between the three remaining primary transmission line routes, Primary Transmission Line Route 15 has the longest length within the foreground visual zone of U.S. or State highways with 1,044 feet. Primary Transmission Line Routes 11 and 12 are not located within the visual zone of U.S. or State highways. Primary Transmission Line Route 11 has the shortest length within the foreground visual zone of farm-to-market and county roads with 25,994 feet. Primary Transmission Line Routes 12 and 15 have 27,217 feet and 31,281 feet of length located within this zone, respectively.

5.2.3.3 Ecology

Between the three remaining primary transmission line routes, Primary Transmission Line Route 15 has the longest length across upland woodlands with 614 feet. Primary Transmission Line Routes 12 and 15 both cross upland woodlands for 172 feet. Primary Transmission Line Route 12 has the longest length across bottomland/riparian woodlands with 1,216 feet. Primary Transmission Line Routes 11 and 15 both cross bottomland/riparian woodlands for 518 feet. Primary Transmission Line Route 12 has the longest length across potential wetlands with 1,229 feet. Primary Transmission Line Routes 11 and 15 both cross potential wetlands for 732 feet. Primary Transmission Line Routes 11, 12, and 15 do not cross any open water areas.

5.2.3.4 Estimated Cost

Based on the cost estimates provided by CenterPoint Energy, Primary Transmission Line Routes 11 and 12 will be less expensive to construct at approximately $11.6 million and $11.7 million, respectively (see Table 5-2). Primary Transmission Line Route 15 will be more expensive to construct at approximately $13.2 million.

5.3 SELECTION OF THE ROUTE WHICH BEST ADDRESSES THE REQUIREMENTS OF PURA AND PUC SUBSTANTIVE RULES

Based on the comparison discussed in the previous section, seven Proposed Alternative Routes, 3, 6, 8, 10, 11, 12, and 15, were selected. A discussion on the rationale for the recommendation of a proposed alternative route by consensus that best addresses the requirements of PURA and the PUC Substantive Rules is provided. The proposed alternative routes are depicted in Figure 5-1 (in the Map Pocket in Appendix D). Table 5-3 summarizes the data tabulated for the Key Evaluation Criteria and also provides refined cost estimates based on the proposed structure types and ROW acquisition provided by CenterPoint Energy for the seven alternative routes. The seven proposed alternative routes provide geographic diversity within the project study area and comply with Section 37.056(c)(4)(A)-(D) of PURA, P.U.C. Procedural Rule 22.52(a)(4), P.U.C. Substantive Rule 25.101(b)(3)(B), and the PUC's Policy of Prudent Avoidance.

Proposed Alternative Route 8 (Segments: B-H-N-V-AA-AF-AI-AM) is recommended as the route that best addresses the requirements of PURA and the PUC Substantive Rules. It is the shortest route and represents the most direct pathway possible between the project endpoints. The entire route is located within CenterPoint-owned property or an existing transmission line easement. The avoidance and minimization of potential impacts to community values and environmental integrity are maximized with this route due to the utilization of the existing transmission line easement. Proposed Alternative Route 8 parallels existing transmission line ROW the most of all proposed alternative routes, which also results in no newly directly affected habitable structures. Proposed Alternative Route 8 is tied for least number of transmission line crossings. Proposed Alternative Route 8 has no private airstrips within 10,000 feet of the route centerline. Additionally, no new ROW will be required for construction of this route. This route is the most economical of the seven alternative routes.

Table 5-3 Key Criteria and Data Tabulation for the Proposed Alternative Routes

Category	Key Evaluation Criteria[1]	Proposed Alternative Route						
		3	6	8	10	11	12	15
Land Use	Length of route (miles)	7.27	7.25	6.16	6.82	6.97	7.21	7.98
	Number of habitable structures within 300 feet of route centerline	13	13	20	7	11	2	9
	Number of habitable structures in previous criterion currently "directly affected" by an existing transmission line	13	13	20	7	1	1	0
	Length of route using existing transmission line easement and/or CenterPoint-owned property	8,008	10,639	32,532	29,132	8,258	13,579	8,254
	Length of new ROW required for route	30,374	27,614	0	6,545	28,522	24,421	33,813
	Length of route parallel to existing transmission line ROW	6,773	8,468	30,590	27,423	6,325	11,666	6,325
	Length of route parallel to other existing ROW (roadway, canals, etc.)	30,721	27,874	0	3,423	17,942	13,841	19,856
	Number of additional parks/recreational areas within 1,000 feet of route centerline	4	4	4	2	3	3	2
	Length of route across residential areas	912	912	1,716	804	0	0	0
	Length of route across commercial/industrial areas	799	1,616	1,846	1,846	1,616	1,846	1,616
Aesthetics	Estimated length of route within foreground visual zone of U.S./State highways	35,745	27,091	7,830	8,872	0	0	1,044
	Estimated length of route within foreground visual zone of FM and county roads	26,787	32,646	26,949	30,404	25,994	27,217	31,281
	Estimated length of route within foreground visual zone of parks and recreational areas	11,517	13,073	8,222	9,166	7,877	7,877	11,816
Ecology	Length across upland woodlands	5,469	5,546	680	1,122	172	172	614
	Length of route across bottomland/riparian woodlands	719	719	1,436	1,436	518	1,216	518
	Length of route across potential wetlands	1,438	1,651	1,036	1,036	732	1,229	732
	Length of route across open water	88	88	177	177	0	0	0
Cultural Resources	Number of additional cultural resource sites within 1,000 feet of route centerline	1	1	0	0	0	0	0
Cost	Estimated Construction Cost[2] (million)	$16.9	$16.4	$9.9	$12.8	$13.9	$13.7	$17.6

[1] All measurements are in feet unless otherwise noted.

[2] Does not include substation construction, distribution underbuild, or supplemental system improvements/reconfigurations.

Alternative Route 3: A-D-J-P-W-AJ-AM
Alternative Route 6: B-H-L-M-P-W-AJ-AM
Alternative Route 8: B-H-N-V-AA-AF-AI-AM
Alternative Route 10: B-H-N-V-AA-AF-AH-AL
Alternative Route 11: B-H-K-U-Z-AD-AK
Alternative Route 12: B-H-N-Q-U-Z-AD-AK
Alternative Route 15: B-H-K-U-Z-AD-AG-AL

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Appendix A

Agency Correspondence

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June 11, 2014
(*via mail*)

Ms. Edith Erfling
Houston ESFO Field Supervisor
United States Fish and Wildlife Service
17629 El Camino Real, Suite 211
Houston, TX 77058

Re: CenterPoint Energy's Proposed 138 kV Zenith to Franz Project
Harris County, Texas
HDR Project No. 232718

Dear Ms. Erfling,

CenterPoint Energy Houston Electric, LLC (CenterPoint Energy) proposes to construct a 138 kilovolt (kV) double-circuit transmission line located in Harris County, Texas. The new transmission line will connect the existing Zenith Substation located approximately 2.5 miles northwest of the intersection of Grand Parkway (State Highway 99) and Farm-to-Market 529 in Harris County to the existing 138 kV transmission system. Please refer to the attached exhibit depicting the project study area.

HDR Engineering, Inc. (HDR) is preparing an Environmental Assessment (EA) and Alternative Route Analysis to support an application for a Certificate of Convenience and Necessity (CCN) from the Public Utility Commission of Texas (PUCT). HDR is currently in the process of gathering environment data and identifying environmental and land use constraints within the project study area that will be used in the creation of an environmental and land use constraints map. HDR will identify potential alternative routes that consider environmental and land use constraints.

We are requesting that your office provide information concerning environmental and land use constraints regarding threatened/endangered species, wetlands, or other areas of interest to the United States Fish and Wildlife Service. Your comments will be an important consideration in the evaluation of alternative routes and in the assessment of impacts. Upon approval of a final route for the proposed project by the PUCT, CenterPoint Energy will determine the need for other approvals and/or permits. If your jurisdiction has approvals and/or permits that would apply to this project, please identify them in response to this inquiry. If permits are required from your office, CenterPoint Energy will contact your office following approval of a final route.

Thank you for your assistance with this electric transmission line project. Please contact me at 713-425-0165 or by email, Kyle.Clark@hdrinc.com, if you have any questions or require additional information. We would appreciate receiving your reply by June 25, 2014.

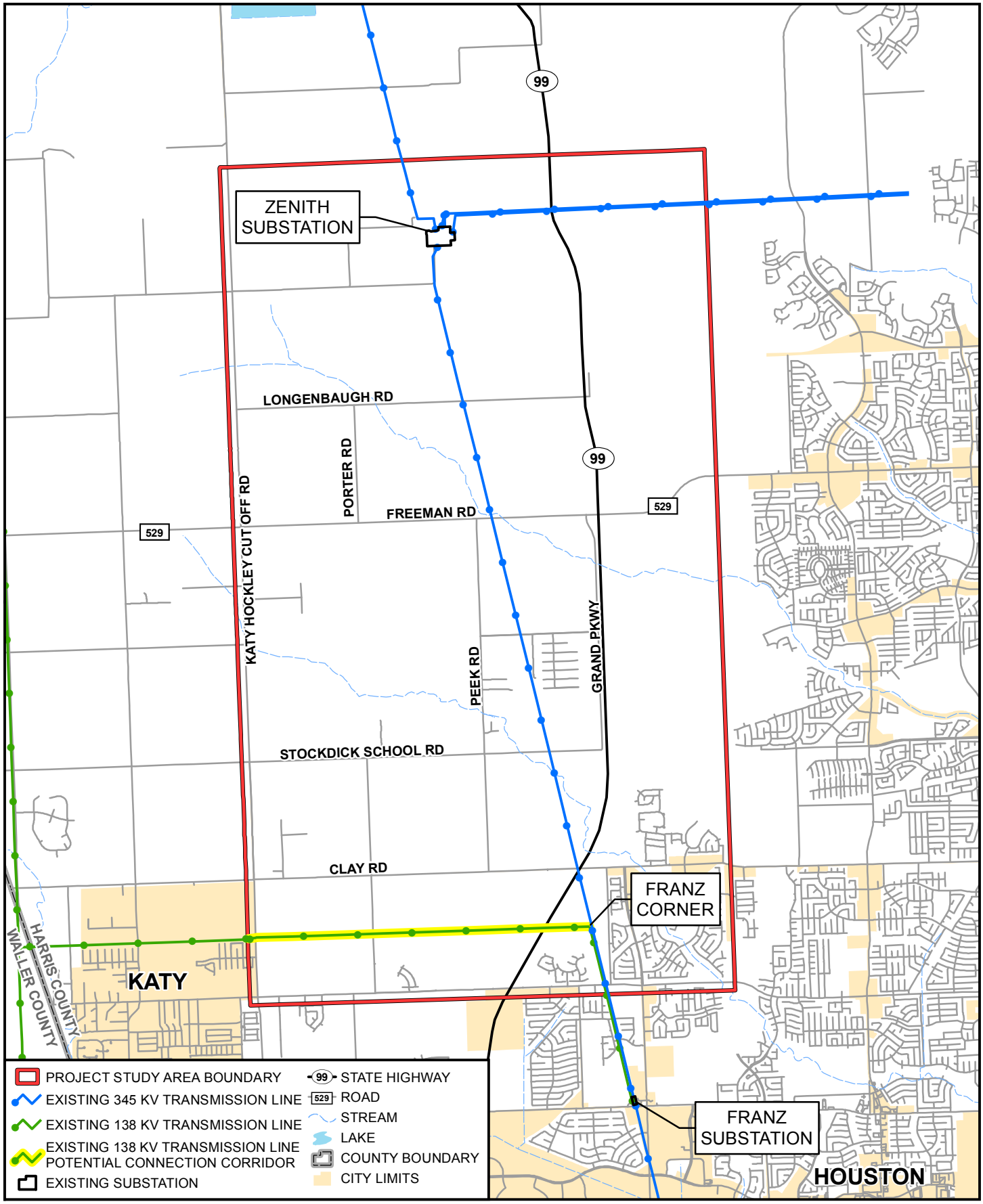
Sincerely,

Kyle Clark
Project Manager

Attachment

hdrinc.com

4635 Southwest Freeway, Suite 1000, Houston, TX 77027
T 713.622.9264 **F** 713.622.9265



PROJECT STUDY AREA MAP

138 KV ZENITH TO FRANZ PROJECT

N

0 0.5 1 MILES

CenterPoint Energy

HDR

JUNE 2014

138kV ZENITH-FRANZ PROJECT
FEDERAL, STATE AND LOCAL AGENCIES

To Whom it May Concern
Department of Defense Siting Clearinghouse
3400 Defense Pentagon, Room 5C646
Washington, D.C. 20301

Ms. Teresa Bruner
Southwest Region Regional Administrator
Federal Aviation Administration
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Fort Worth, TX 76137

Mr. Tony Robinson
Regional Administrator
Federal Emergency Management Agency
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Denton, TX 76209

Mr. Salvador Salinas
State Conservationist
Natural Resource Conservation Service
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Temple, TX 76501

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District Engineer
United States Army Corps of Engineers
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Galveston, TX 77553

Mr. Ron Curry
Region 6 Administrator
United States Environmental Protection Agency
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Houston ESFO Field Supervisor
United States Fish and Wildlife Service
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138kV ZENITH-FRANZ PROJECT
FEDERAL, STATE AND LOCAL AGENCIES

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138kV ZENITH-FRANZ PROJECT
FEDERAL, STATE AND LOCAL AGENCIES

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138kV ZENITH-FRANZ PROJECT
FEDERAL, STATE AND LOCAL AGENCIES

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Director
TxDOT Division of Aviation
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Mr. Carlos Swonke
Director
TxDOT Environmental Affairs Division
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Parks and Recreation
City of Katy
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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Ecological Services
17629 El Camino Real, Suite 211
Houston, Texas 77058
281/286-8282 / (FAX) 281/488-5882

In Reply Refer To:
FWS/R2/CLES/

March 2013

Thank you for your request for threatened and endangered species, fish and wildlife, environmental, and/or aquatic resources information, comments, and/or recommendations within the United States Fish and Wildlife Service (Service) Clear Lake Ecological Service's area of responsibility. Our comments are provided in accordance with the provisions of the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.), the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703 et seq.), the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668 et seq.), the Fish and Wildlife Coordination Act (16 U.S.C. 661-667(e)), and the National Environmental Policy Act (42 U.S.C. §4321-4347 et seq.).

Endangered Species Act

The ESA and Federal regulations prohibit "take" of threatened or endangered species of fish and wildlife within the U.S. or its territorial waters. Please note that "take" is defined to mean "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." A county-by-county listing of federally listed threatened and endangered species that occur within this office's work area can be found at http://www.fws.gov/southwest /es/ ES_Lists_Main.cfm.

Section 7 of the ESA
According to Section 7(a)(2) of the ESA, it is the responsibility of each Federal agency to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any federally listed species. As such, Federal agencies are required to consult with the Service if it appears that any action they are proposing "may affect" a listed species.

To evaluate a project for its potential effect(s) to listed species, project proponents should use the county-by-county listing and other current species information[1] to determine whether habitat for a listed species is present at the project site. If potential habitat is present, a qualified individual should conduct surveys to determine whether a listed species is present. After completing a habitat evaluation and/or any necessary surveys, project proponents should evaluate the project for potential effects[2] to listed species and make one of the following determinations:

No effect – the proposed action will not affect federally listed species or critical habitat (i.e., suitable habitat for the species occurring in the project county is not present in or adjacent to the action area). No coordination or contact with the Service is necessary. However, if the project changes or

[1] For information regarding habitat requirements of federally listed species please visit http://ecos.fws.gov/.
[2] The effects of any action under Section 7 should be analyzed together with the effects of other activities that are interrelated to, or interdependent with, that action. Therefore, if your proposed action(s) is part of and depends on a separate action for its justification, or has no independent utility apart from the separate action, then it should be considered interrelated or interdependent and should be analyzed under Section 7 of the ESA.

additional information on the distribution of listed or proposed species becomes available, the project should be reanalyzed for effects not previously considered.

Is not likely to adversely affect – the project may affect listed species and/or critical habitat; however, the effects are expected to be discountable (extremely unlikely to occur), insignificant (can't be measured or detected), or completely beneficial. Certain avoidance and minimization measures may need to be implemented in order to reach this level of effect. You should seek written concurrence from the Service that adverse effects have been eliminated. Be sure to include all of the information and documentation used to reach your decision with your request for concurrence. The Service must have this documentation before issuing a concurrence.

Is likely to adversely affect – adverse effects to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. If the overall effect of the proposed action is beneficial to the listed species but also is likely to cause some adverse effects to individuals of that species, then the proposed action "is likely to adversely affect" the listed species. An "is likely to adversely affect" determination requires the Federal action agency to initiate formal Section 7 consultation with the Service.

Regardless of the determination, the Service recommends developing a complete record of the evaluation, including steps leading to the determination of effect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related articles.

Please be advised that while a Federal agency may designate a non-Federal representative to conduct informal consultations with the Service, assess project effects, or prepare a biological assessment, the Federal agency must notify the Service in writing of such a designation. The Federal agency shall also independently review and evaluate the scope and contents of a biological assessment prepared by their designated non-Federal representative before that document is submitted to the Service.

The Service's Consultation Handbook is available online to assist you with further information on definitions, process, and fulfilling ESA requirements for your projects at http://www.fws.gov/endangered/esa-library/pdf/esa_section7_handbook.pdf.

Section 10 of the ESA
Projects that do not involve a federal nexus can be evaluated under Section 10 of the ESA. If "incidental take" of a listed species is likely to occur during a proposed non-federal activity, then the project sponsor or landowner may apply for an incidental take permit under Section 10 of the ESA. Please see the following links for further guidance on Section 10 http://www.fws.gov/endangered/permits/index.html and http://www.fws.gov/southwest/es/AustinTexas/ESA_HCP_FAQs.html.

Candidate Species

Freshwater Mussels
The following species of mussels occur in Texas and are candidates for listing under the ESA: Texas fatmucket *Lampsiilis bracteata*, golden orb *Quadrula aurea*, smooth pimpleback *Quadrula houstonensis*, Texas pimpleback *Quadrula petrina*, and Texas fawnsfoot *Truncilla macrodon*. We are also reviewing the status of six other species for potential listing under the ESA. One of the main contributors to mussel die offs is sedimentation, which smothers and suffocates mussels. To reduce sedimentation within rivers, streams, and tributaries crossed by a project, the Service recommends

that that you implement the best management practices within the enclosed document entitled *Best Management Practices for Projects Affecting, Rivers, Streams and Tributaries.*

Candidate Conservation Agreements
Candidate Conservation Agreements (CCAs) or Candidate Conservation Agreements with Assurances (CCAAs) are voluntary agreements between the Service and public or private entities to implement conservation measures to address threats to candidate species. Implementing conservation efforts before species are listed increases the likelihood that simpler, flexible, and more cost-effective conservation options are available. A CCAA can provide participants with assurances that if they engage in conservation actions, they will not be required to implement additional conservation measures beyond those in the agreement. For additional information on CCAs/CCAAs please visit the Service's website at http://www.fws.gov/endangered/what-we-do/cca.html.

Migratory Birds

The MBTA protects all native migratory birds and prohibits the taking, killing, possession, and transportation (among other actions) of migratory birds, their eggs, and parts, except when specifically permitted by regulations for specific intentional uses. A list of birds protected under the MBTA can be found in 50 CFR 10 of the MBTA and at http://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/mbtandx.html. Activities that have the potential to take migratory birds as well as recommendations for reducing such take include:

Utility Lines
The construction of overhead power lines creates threats of avian collision and electrocution. The Service recommends the installation of underground rather than overhead power lines whenever possible. For new lines and/or the modification, maintenance, and update of old lines, we recommend that you implement the Avian Protection Plan guidelines for power lines found at http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/BirdHazards.html.

Communication Towers
Telecommunication towers are estimated to kill millions of birds per year. We recommend that you implement the guidance in *Service Guidance on Siting, Construction, Operation, and Decommissioning of Communication Towers*. This guidance can be found at http://www.fws.gov/habitatconservation/communicationtowers.html.

We request that you provide us with the final location and specifications of your proposed towers, as well as the recommendations implemented. A Tower Site Evaluation Form is also available via the above website; we recommend you complete this form and keep it in your files.

Land Clearing
Land clearing work can destroy active nests (eggs or young present) and kill birds. The Service recommends you review and implement the conservation actions for migratory birds outlined in the enclosed document entitled *Suggested Priority for Migratory Bird Conservation Actions for Projects.*

Colonial Water Bird Rookeries

Disturbance from construction activities and project operations can adversely affect breeding bird use of nesting sites and can result in nest abandonment and loss of reproduction. We recommend that

project activities do not occur within 1,000 feet of colonial waterbird rookeries during the nesting season from February 15 to September 1.

Bald Eagles

The bald eagle *Haliaeetus leucocephalus* is protected by the BGEPA and the MBTA. Accordingly, the Service recommends that project proponents use the *National Bald Eagle Management Guidelines* to avoid and minimize harm and disturbance of bald eagles. These guidelines can be found at http://www.fws.gov/migratorybirds/BaldAndGoldenEagleManagement.htm. Eagles are particularly vulnerable to disturbance throughout the nesting season, which in Texas is generally from October 1 to May 30.

Wetlands, Streams, and Other Aquatic Resources

Numerous projects along the Texas coast often impact wetlands, streams, or other aquatic resources or require work in a navigable waterway. Section 404 of the Clean Water Act regulates the discharge of fill material into waters of the U.S. (e.g., wetlands and streams) and Section 10 of the Rivers and Harbors Act of 1899 regulates work and/or structures within navigable waterways. The U.S. Army Corps of Engineers (Corps) is tasked with administering these regulations and we recommend that you coordinate your activities with the Corps for proper permitting and compliance with these regulations.

Thank you for the opportunity to provide comments on your project. If you need any additional information, you can contact one of our biologists (Donna Anderson, Moni Belton, Kelsey Gocke, Jeff Hill, Charrish Stevens, or Arturo Vale) at 281/286-8282.

Sincerely,

Edith Erfling

Edith Erfling
Field Supervisor

Enclosures

Suggested Priority of Migratory Bird Conservation Actions for Projects
U.S. Fish and Wildlife Service (USFWS), Migratory Bird Management

March 9, 2010

1. Avoid any take of migratory birds and/or minimize the loss, destruction, or degradation of migratory bird habitat while completing the proposed project or action.

2. Determine if the proposed project or action will involve below- and/or above-ground construction activities since recommended practices and timing of surveys and clearances could differ accordingly.

3. If the proposed project or action includes a reasonable likelihood that take of migratory birds will occur, then complete actions that could take migratory birds outside of their nesting season. This includes clearing or cutting of vegetation, grubbing, etc. The primary nesting season for migratory birds varies greatly between species and geographic location, but generally extends from early April to mid-July. However, the maximum time period for the migratory bird nesting season can extend from early February through late August. Also, eagles may initiate nesting as early as late December or January depending on the geographic area. Due to this variability, project proponents should consult with the appropriate Regional Migratory Bird Program (USFWS) for specific nesting seasons. Strive to complete all disruptive activities outside the peak of migratory bird nesting season to the greatest extent possible. Always avoid any habitat alteration, removal, or destruction during the primary nesting season for migratory birds. Additionally, clearing of vegetation in the year prior to construction (but not within the nesting season) may discourage birds from attempting to nest in the proposed construction area, thereby decreasing chance of take during construction activities.

4. If a proposed project or action includes the potential for take of migratory birds and/or the loss or degradation of migratory bird habitat and work cannot occur outside the migratory bird nesting season (either the primary or maximum nesting season), project proponents will need to provide the USFWS with an explanation for why work has to occur during the migratory bird nesting season. Further, in these cases, project proponents also need to demonstrate that all efforts to complete work outside the migratory bird nesting season were attempted, and that the reasons work needs to be completed during the nesting season were beyond the proponent's control.

   Also, where project work cannot occur outside the migratory bird nesting season, project proponents must survey those portions of the project area during the nesting season prior to construction occurring to determine if migratory birds are present and nesting in those areas. In addition to conducting surveys during the

nesting season/construction phase, companies may also benefit from conducting surveys during the prior nesting season Such surveys will assist the company in any decisions about the likely presence of nesting migratory birds or sensitive species in the proposed project or work area. While individual migratory birds will not necessarily return to nest at the exact site as in previous years, a survey in the nesting season in the year before construction allows the company to become familiar with species and numbers present in the project area well before the nesting season in the year of construction. Bird surveys should be completed during the nesting season in the best biological timeframe for detecting the presence of nesting migratory birds, using accepted bird survey protocols. USFWS Offices can be contacted for recommendations on appropriate survey guidance. Project proponents should also be aware that results of migratory bird surveys are subject to spatial and temporal variability. Finally, project proponents will need to conduct migratory bird surveys during the actual year of construction, if they cannot avoid work during the primary nesting season (see above) and if construction will impact habitats suitable for supporting nesting birds.

5. If no migratory birds are found nesting in proposed project or action areas immediately prior to the time when construction and associated activities are to occur, then the project activity may proceed as planned.

6. If migratory birds are present and nesting in the proposed project or action area, contact your nearest USFWS Ecological Services Field Office and USFWS Region Migratory Birds Program for guidance as to appropriate next steps to take to minimize impacts to migratory birds associated with the proposed project or action.

* Note: these proposed conservation measures assume that there are no Endangered or Threatened migratory bird species present in the project/action area, or any other Endangered or Threatened animal or plant species present in this area. If Endangered or Threatened species are present, or they could potentially be present, and the project/action may affect these species, then consult with your nearest USFWS Ecological Services Office before proceeding with any project/action.

** The Migratory Bird Treaty Act prohibits the taking, killing, possession, and transportation, (among other actions) of migratory birds, their eggs, parts, and nests, except when specifically permitted by regulations. While the Act has no provision for allowing unauthorized take, the USFWS realizes that some birds may be killed during construction and operation of energy infrastructure, even if all known reasonable and effective measures to protect birds are used. The USFWS Office of Law Enforcement carries out its mission to protect migratory birds through investigations and enforcement, as well as by fostering relationships with individuals, companies, and industries that have taken effective steps to avoid take of migratory birds, and by encouraging others to implement measures to avoid take of migratory birds. It is not possible to absolve

individuals, companies, or agencies from liability even if they implement bird mortality avoidance or other similar protective measures. However, the Office of Law Enforcement focuses its resources on investigating and prosecuting individuals and companies that take migratory birds without identifying and implementing all reasonable, prudent and effective measures to avoid that take. Companies are encouraged to work closely with Service biologists to identify available protective measures when developing project plans and/or avian protection plans, and to implement those measures prior to/during construction or similar activities.

*** Also note that Bald and Golden Eagles receive additional protection under the Bald and Golden Eagle Protection Act (BGEPA). BGEPA prohibits the take, possession, sale, purchase, barter, offer to sell, purchase, or barter, transport, export or import, of any Bald or Golden Eagle, alive or dead, including any part, nest, or egg, unless allowed by permit. Further, activities that would disturb Bald or Golden Eagles are prohibited under BGEPA. "Disturb" means to agitate or bother a Bald or Golden Eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an Eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. If a proposed project or action would occur in areas where nesting, feeding, or roosting eagles occur, then project proponents may need to take additional conservation measures to achieve compliance with BGEPA. New regulations (50 CFR § 22.26 and § 22.27) allow the take of bald and golden eagles and their nests, respectively, to protect interests in a particular locality. However, consultation with the Migratory Bird, Ecological Services, and Law Enforcement programs of the Service will be required before a permit may be issued.

BEST MANAGEMENT PRACTICES FOR PROJECTS AFFECTING RIVERS, STREAMS AND TRIBUTARIES

The project crosses or potentially affects river, stream or tributary aquatic habitat. Therefore the Service recommends implementing the following applicable Best Management Practices:

1. Construct stream crossings during a period of low streamflow (e.g., July - September);
2. Cross streams, stream banks and riparian zones at right angles and at gentle slopes;
3. When feasible, directionally bore under stream channels;
4. Disturb riparian and floodplain vegetation only when necessary;
5. Construction equipment should cross the stream at one confined location over an existing bridge, equipment pads, clean temporary native rock fill, or over a temporary portable bridge;
6. Limit in-stream equipment use to that needed to construct crossings;
7. Place trench spoil at least 25 feet away landward from streambanks;
8. Use sediment filter devices to prevent movement of spoil off right-of-way when standing or flowing water is present;
9. Trench de-watering, as necessary, should be conducted to prevent discharge of silt laden water into the stream channel;
10. Maintain the current contours of the bank and channel bottom;
11. Do not store hazardous materials, chemicals, fuels, lubricating oils, and other such substances within 100 feet of streambanks;
12. Refuel construction equipment at least 100 feet from streambanks;
13. Revegetate all disturbed areas as soon as possible after construction to prevent unnecessary soil erosion. Use only native riparian plants to help prevent the spread of exotics;
14. Maintain sediment filters at the base of all slopes located adjacent to the streams until right-of-way vegetation becomes established;
15. Maintain a vegetative filtration strip adjacent to streams and wetlands. The width of a filter strip is based on the slope of the banks and the width of the stream. Guidance to determine the appropriate filter strip (stream management zone, SMZ) width is provided below; and
16. Direct water runoff into vegetated areas.

BEST MANAGEMENT PRACTICES FOR PROJECTS AFFECTINGRIVERS, STREAMS AND TRIBUTARIES. Document prepared by the U.S. Fish and Wildlife Service, Oklahoma Ecological Services Field Office, 9014 East 21st Street, Tulsa, Oklahoma 74129-1428. For the most recent information visit our website, http://www.fws.gov/southwest/es/oklahoma/default.htm, write, or call (918) 581-7458. 1/24/2007

SMZ widths should consider watershed characteristics, risk of erosion, soil type, and stream width. SMZ widths are measured from the top of each bank and established on each side of the stream. Erosion risk is increased with sandy soil, steep slopes, large watersheds and increasing stream widths. Recommended primary and secondary SMZ widths are provided in the table below.

Stream Width (Feet)	Slope (Percent)	Primary SMZ (Feet)	Secondary SMZ (Feet)
<20	<7	35	0
<20	7-20	35	50
<20	>20	Top of slope or 150	75
20-50	<7	50	0
20-50	7-20	50	50
20-50	>20	Top of slope or 150	75
>50	<7	Width of stream or 100 max.	0
>50	7-20	Width of stream or 100 max.	50
>50	>20	Top of slope or 150	75

Reference

Arkansas Forestry Commission. 2001. Draft Arkansas Forestry Best Management Practices for Water Quality Protection.

RECEIVED 7/28/2014

United States Department of Agriculture

NRCS
Natural Resources Conservation Service
101 South Main Street
Temple, Texas 76501-7602
Telephone: 254-742-9800 Fax: 254-742-9819

June 30, 2014

HDR Engineering
4635 Southwest Freeway
Suite 1000
Houston, TX 77027

Attention: Kyle Clark

Subject: LNU-Farmland Protection
Proposed 138 kV Zenith to Franz Transmission Line Project
Harris County, Texas

We have reviewed the information provided in your correspondence dated June 11, 2014 concerning the transmission line in Harris County, Texas. This review is part of the National Environmental Policy Act (NEPA) evaluation for Public Utility Commission of Texas (PUCT). We have evaluated the proposed site as required by the Farmland Protection Policy Act (FPPA).

The proposed project is exempt because transmission lines are not a conversion of Important Farmlands and the site can still be used after construction. The Farmland Conversion Impact Rating (Form AD-1006) indicating the exemption is enclosed. We encourage the use of accepted erosion control methods during the construction of this project.

If you have any questions, please contact me at (254) 742-9826, Fax (254) 742-9859 or by email at micki.yoder@tx.usda.gov.

Sincerely,

Micki Yoder

Micki Yoder
NRCS Soil Conservationist

Attachment

Helping People Help the Land

An Equal Opportunity Provider and Employer

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request June 11, 2014
Name of Project138 kV Zenith to Franz Transmission Line	Federal Agency Involved PUCT
Proposed Land Use	County and State Harris County, Texas
PART II *(To be completed by NRCS)*	Date Request Received By NRCS June 30, 2014

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☐	NO ☒	Acres Irrigated / Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %		Amount of Farmland As Defined in FPPA Acres: %
Name of Land Evaluation System Used	Name of State or Local Site Assessment System		Date Land Evaluation Returned by NRCS 7-21-14

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly				
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site				
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide Important or Local Important Farmland				
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value				
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)				

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	**Maximum Points**	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)				
2. Perimeter In Non-urban Use	(10)				
3. Percent Of Site Being Farmed	(20)				
4. Protection Provided By State and Local Government	(20)				
5. Distance From Urban Built-up Area	(15)				
6. Distance To Urban Support Services	(15)				
7. Size Of Present Farm Unit Compared To Average	(10)				
8. Creation Of Non-farmable Farmland	(10)				
9. Availability Of Farm Support Services	(5)				
10. On-Farm Investments	(20)				
11. Effects Of Conversion On Farm Support Services	(10)				
12. Compatibility With Existing Agricultural Use	(10)				
TOTAL SITE ASSESSMENT POINTS	160				
PART VII ***(To be completed by Federal Agency)***					
Relative Value Of Farmland *(From Part V)*	100				
Total Site Assessment *(From Part VI above or local site assessment)*	160				
TOTAL POINTS ***(Total of above 2 lines)***	260				

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ☐

Reason For Selection:

Name of Federal agency representative completing this form:	Date:

(See Instructions on reverse side)

Form AD-1006 (03-02)

RECEIVED 6/25/2014

Region VI
Federal Insurance and Mitigation Administration

Public Notice Review

Re: Harris County, TX
CenterPoint Energy's Proposed 138 kV Zenith to Franz Project

- We offer the following comments:

  Please contact the appropriate local Floodplain Administrator for a determination as to whether a Floodplain Development Permit is needed.

If further information is required, please write to the address above or call (940) 898-5463.

RECEIVED 7/28/2014

United States Department of Agriculture

NRCS
Natural Resources Conservation Service
101 South Main Street
Temple, Texas 76501-7602
Telephone: 254-742-9800 Fax: 254-742-9819

June 30, 2014

HDR Engineering
4635 Southwest Freeway
Suite 1000
Houston, TX 77027

Attention: Kyle Clark

Subject: LNU-Farmland Protection
Proposed 138 kV Zenith to Franz Transmission Line Project
Harris County, Texas

We have reviewed the information provided in your correspondence dated June 11, 2014 concerning the transmission line in Harris County, Texas. This review is part of the National Environmental Policy Act (NEPA) evaluation for Public Utility Commission of Texas (PUCT). We have evaluated the proposed site as required by the Farmland Protection Policy Act (FPPA).

The proposed project is exempt because transmission lines are not a conversion of Important Farmlands and the site can still be used after construction. The Farmland Conversion Impact Rating (Form AD-1006) indicating the exemption is enclosed. We encourage the use of accepted erosion control methods during the construction of this project.

If you have any questions, please contact me at (254) 742-9826, Fax (254) 742-9859 or by email at micki.yoder@tx.usda.gov.

Sincerely,

Micki Yoder

Micki Yoder
NRCS Soil Conservationist

Attachment

Helping People Help the Land

An Equal Opportunity Provider and Employer

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request June 11, 2014
Name of Project138 kV Zenith to Franz Transmission Line	Federal Agency Involved PUCT
Proposed Land Use	County and State Harris County, Texas
PART II *(To be completed by NRCS)*	Date Request Received By NRCS June 30, 2014

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☐	NO ☒	Acres Irrigated	Average Farm Size

Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %	Amount of Farmland As Defined in FPPA Acres: %
Name of Land Evaluation System Used	Name of State or Local Site Assessment System	Date Land Evaluation Returned by NRCS 7-21-14

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly				
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site				
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide Important or Local Important Farmland				
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value				
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)				

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	**Maximum Points**	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)				
2. Perimeter In Non-urban Use	(10)				
3. Percent Of Site Being Farmed	(20)				
4. Protection Provided By State and Local Government	(20)				
5. Distance From Urban Built-up Area	(15)				
6. Distance To Urban Support Services	(15)				
7. Size Of Present Farm Unit Compared To Average	(10)				
8. Creation Of Non-farmable Farmland	(10)				
9. Availability Of Farm Support Services	(5)				
10. On-Farm Investments	(20)				
11. Effects Of Conversion On Farm Support Services	(10)				
12. Compatibility With Existing Agricultural Use	(10)				
TOTAL SITE ASSESSMENT POINTS	160				
PART VII ***(To be completed by Federal Agency)***					
Relative Value Of Farmland *(From Part V)*	100				
Total Site Assessment *(From Part VI above or local site assessment)*	160				
TOTAL POINTS ***(Total of above 2 lines)***	260				

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ☐

Reason For Selection:

Name of Federal agency representative completing this form:	Date:

(See Instructions on reverse side)

Form AD-1006 (03-02)

RECEIVED 6/20/2014

Texas Department of Transportation

AVIATION DIVISION
125 E. 11TH STREET • AUSTIN, TEXAS 78701-2483 • 512/416-4500 • FAX 512/416-4510

Mr. Kyle Clark
HDR, Inc.
4635 Southwest Freeway
Suite 1000
Houston, Texas 77027

June 17, 2014

Dear Mr. Clark:

I received your letter dated June 11, 2014 concerning HDR project number 232718.

Title 14, US Code, Part 77 of the Federal Aviation Administration's (FAA) Federal Aviation Regulations (FAR) requires notice to the FAA if the facility to be constructed fits either of the below listed conditions:

77.9 a. Any construction or alteration that is more than 200 ft. AGL (Above Ground Level) at its site.

77.9 b.(1) 100 to 1 for a horizontal distance of 20,000 ft. from the nearest point of the nearest runway of each airport described in paragraph (d) of this section with its longest runway more than 3,200 ft. in actual length, excluding heliports.

(2) 50 to 1 for a horizontal distance of 10,000 ft. from the nearest point of the nearest runway of each airport described in paragraph (d) of this section with its longest runway no more than 3,200 ft. in actual length, excluding heliports.

(3) 25 to 1 for a horizontal distance of 5,000 ft. from the nearest point of the nearest landing and takeoff area of each heliport described in paragraph (d) of this section

There is only one public use airport or heliport near the study area, Sack-O-Grande Airport (9X9) located at airport reference point 29-54-45.8100N / 095-49-35.8230W. The single runway is 3950 feet long. If the criterion of FAR 77.9 is met, the FAA must be notified in four copies using FAA Form 7460-1, "Notice of Proposed Construction or Alteration". This form, supporting documents, and how to file electronically are available at http://oeaaa.faa.gov

Sincerely,

William B. Gunn
Compliance

Received 6/24/2014

TEXAS GENERAL LAND OFFICE

JERRY PATTERSON, COMMISSIONER

June 18, 2014

Kyle Clark
HDR Engineering, Inc.
4635 Southwest Freeway, Suite 1000
Houston, Texas 77027-1232

Re: CenterPoint Energy's Proposed 138 kV Zenith to Franz Project
Harris County, Texas
HDR Project No. 232718

Dear Mr. Clark:

On behalf of Commissioner Patterson, I would like to thank you for your letter concerning the above referenced project.

Using your map depicting the project preliminary study area, it does not appear that the General Land Office will have any environmental issues or land use constraints at this time.

When a final route for this proposed project has been determined, please contact me and we can assess the route and determine if the project will cross any streambeds or Permanent School Fund (PSF) land that would require an easement from our agency.

In the interim, if you would like to speak to me further on this project, I can be reached by email at glenn.rosenbaum@glo.texas.gov or by phone at (512) 463-8180.

Again, thank you for your inquiry.

Sincerely,

Glenn Rosenbaum

Glenn Rosenbaum
Team Leader, Right-of-Way Department
Asset Inspection-Professional Services Program

Texas General Land Office
Stephen F. Austin Building • 1700 North Congress Avenue, Texas 78701-1495
Post Office Box 12873 • Austin, Texas 78711-2873
Phone: 512-463-5001 • 800-998-4GLO
www.glo.state.tx.us

June 11, 2014
(*via mail*)

Mr. Mark Wolfe
Executive Director
Texas Historical Commission
P.O. Box 12276
Austin, TX 78711

Re: CenterPoint Energy's Proposed 138 kV Zenith to Franz Project
Harris County, Texas
HDR Project No. 232718

Dear Mr. Wolfe,

CenterPoint Energy Houston Electric, LLC (CenterPoint Energy) proposes to construct a 138 kilovolt (kV) double-circuit transmission line located in Harris County, Texas. The new transmission line will connect the existing Zenith Substation located approximately 2.5 miles northwest of the intersection of Grand Parkway (State Highway 99) and Farm-to-Market 529 in Harris County to the existing 138 kV transmission system. Please refer to the attached exhibit depicting the project study area.

HDR Engineering, Inc. (HDR) is preparing an Environmental Assessment (EA) and Alternative Route Analysis to support an application for a Certificate of Convenience and Necessity (CCN) from the Public Utility Commission of Texas (PUCT). HDR is currently in the process of gathering environment data and identifying environmental and land use constraints within the project study area that will be used in the creation of an environmental and land use constraints map. HDR will identify potential alternative routes that consider environmental and land use constraints.

We are requesting that your office provide information concerning environmental and land use constraints regarding known or recorded cultural resources or other areas of interest to the Texas Historical Commission. Your comments will be an important consideration in the evaluation of alternative routes and in the assessment of impacts. Upon approval of a final route for the proposed project by the PUCT, CenterPoint Energy will determine the need for other approvals and/or permits. If your jurisdiction has approvals and/or permits that would apply to this project, please identify them in response to this inquiry. If permits are required from your office, CenterPoint Energy will contact your office following approval of a final route.

Thank you for your assistance with this electric transmission line project. Please contact me at 713-425-0165 or by email, Kyle.Clark@hdrinc.com, if you have any questions or require additional information. We would appreciate receiving your reply by June 25, 2014.

Sincerely,

Kyle Clark
Project Manager

Attachment

NO HISTORIC PROPERTIES AFFECTED
PROJECT MAY PROCEED
by
for Mark Wolfe
State Historic Preservation Officer
Date 7/9/14
Track#

hdrinc.com
4635 Southwest Freeway, Suite 1000, Houston TX 77027
T 713 622 9264 F 713 622 9265

July 30, 2014

Kyle Clark
HDR
4635 Southwest Freeway, Suite 1000
Houston, Texas 77027

RE: CenterPoint Energy Houston Electric, LLC.
Zenith to existing transmission system 138-kV transmission line project
Harris County.

Dear Mr. Clark:

Texas Parks and Wildlife Department (TPWD) received the preliminary information request regarding the above-referenced proposed transmission line project. TPWD staff has reviewed the information provided and offers the following comments concerning this project.

Please be aware that a written response to a TPWD recommendation or informational comment received by a state governmental agency may be required by state law. For further guidance, see the Texas Parks and Wildlife Code, Section 12.0011, which can be found online at http://www.statutes.legis.state.tx.us/Docs/PW/htm/PW.12.htm#12.0011. For tracking purposes, please refer to TPWD project number ERCS-9271 in any return correspondence regarding this project.

Project Description

CenterPoint Energy Houston Electric, LLC (CenterPoint Energy) proposes to construct a new 138 kV double-circuit transmission line located in Harris County, Texas. The new transmission line will connect the existing Zenith Substation located approximately 2.5 miles northwest of the intersection of Grand Parkway (SH 99) and FM 529 in Harris County to the existing 138 kV transmission system.

Pre-Construction Recommendations

Federal Laws

Endangered Species Act (ESA)

Federally-listed animal species and their habitat are protected from "take" on any property by the ESA. Take of a federally-listed species can be allowed if it is "incidental" to an otherwise lawful activity and must be permitted in accordance with Section 7 or 10 of the ESA. Federally-listed plants are not protected from take except on lands under federal/state jurisdiction or for which a federal/state nexus (i.e., permits or funding) exists. Any take of a federally listed species/ or its habitat without the required take permit (or allowance) from the U.S. Fish and Wildlife Service (USFWS) is a violation of the ESA.

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.texas.gov

Recommendation: TPWD recommends that if rare species or their habitat would be impacted by the proposed project, the applicant should coordinate with TPWD and the USFWS, as appropriate, to determine avoidance, minimization, and mitigation strategies.

Migratory Bird Treaty Act (MBTA)

The Migratory Bird Treaty Act (MBTA) prohibits taking, attempting to take, capturing, killing, selling/purchasing, possessing, transporting, and importing of migratory birds, their eggs, parts and nests, except when specifically authorized by the Department of the Interior. This protection applies to most native bird species, including ground nesting species. The USFWS office can be contacted at (505) 248-7882 for more information on potential impacts to migratory birds.

Recommendation: TPWD recommends vegetation clearing or trampling be scheduled to occur outside of the March to August nesting season. If this is not feasible and clearing must occur within the nesting season, vegetation should be surveyed for nests prior to construction. If nests are observed during surveys, an area of buffer vegetation at least 25 feet in all directions should remain around the nest until the eggs have hatched and the young have fledged or the nest is abandoned. If there are abandoned nests in the area they should be removed prior to construction to prevent reoccupation.

In addition, since raptors nest in late winter and early spring, all construction activities as identified above should be excluded from a minimum zone of 100 meters around any raptor nest during the period of February 1- July 15. Please contact the USFWS at the number listed above for further information

Please note that birds typically establish flight corridors along and within river and creek drainages, and these systems are important habitat features used by a host of wildlife species, including large numbers of waterfowl and predator species. There is potential for electrocution and collision of large-bodied avian species and avian predators with electrical wires near these systems. Direct loss to wildlife from collisions with wires or from electrocution may be less significant than the potential for disease created by decomposition after these fatalities. Indirect adverse impacts imposed by these collisions and subsequent decomposition of animal tissue within a water regime significantly contributes to the concentration of botulism bacteria that is highly toxic and often fatal to wildlife.

Recommendation: TPWD recommends that lines that cross or are located near creeks, and drainages should have line markers installed at the crossings or closest points to the drainages to reduce potential collisions by birds flying along or near the drainages.

For additional information, please see the guidelines published by USFWS and the Avian Power Lines Interaction Committee (APLIC) in the updated state-of-the-art guidance document *Reducing Avian Collisions with Power Lines: State of the Art in 2012*. This manual, released on December 20, 2012, identifies best practices and provides specific guidance to help electric utilities and cooperatives reduce bird collisions with power lines. A companion document, *Suggested Practices for Avian Protection on Power Lines*, was published by APLIC and the USFWS in 2006. For more information on both documents, please visit www.aplic.org.

If migratory bird species are found nesting on or adjacent to the project area, they must be dealt with in a manner consistent with the MBTA.

Wetland Impacts

The Clean Water Act (CWA) sets the basic regulatory framework for regulating discharges of pollutants to U.S. waters. Section 404 of the CWA establishes a federal program to regulate the discharge of dredged and fill material into waters of the U.S., including wetlands. The U.S. Army Corps of Engineers (USACE) and the Environmental Protection Agency (EPA) are responsible for making jurisdictional determinations and regulating wetlands under Section 404 of the CWA. The USACE also makes jurisdictional determinations under Section 10 of the Rivers and Harbors Act of 1899.

Recommendation: TPWD recommends avoiding adverse impacts to the wetlands in the project area to the extent feasible. Unavoidable impacts to these sensitive features should be mitigated by compensating for the loss of wetland habitat.

Recommendation: If the proposed project would impact waterways or associated wetlands, TPWD recommends CenterPoint Energy consult with the USACE for potential impacts to waters of the U.S. including jurisdictional determinations, delineations, and mitigation. All waterways and associated floodplains, riparian corridors, and wetlands provide valuable wildlife habitat and should be protected to the maximum extent possible. Natural buffers contiguous to any wetlands or aquatic systems should remain undisturbed to preserve wildlife cover, food sources, and travel corridors. During construction, trucks and equipment should use existing bridge or culvert structures to cross creeks. Destruction of inert microhabitats in waterways such as snags, brush piles, fallen logs, creek banks, pools, and gravel stream bottoms should be avoided, as these provide habitat for a variety of fish and wildlife species and their food sources. Erosion controls and sediment runoff control measures should be installed prior to construction and maintained until disturbed areas are permanently revegetated using site specific native vegetation. Measures should be properly installed in order to effectively minimize the amount of sediment and other debris entering the waterway.

Recommendation: TPWD recommends using existing facilities whenever possible. Where new construction is the only feasible option, TPWD recommends routing new

transmission lines along existing roads, pipelines, transmission lines, or other utility right-of-ways (ROW) and easements to reduce habitat fragmentation. By utilizing existing utility corridors, county roads and highway ROWs, adverse impacts to fish and wildlife resources would be mitigated by avoiding and/or minimizing the impacts to undisturbed habitats. *TPWD Recommendations for Electrical Transmission/Distribution Line Design and Construction* can be found at http://www.tpwd.state.tx.us/huntwild/wild/wildlife_diversity/habitat_assessment/media/tpwd_electrical_transmission.pdf. Please review the recommendations and incorporate these measures into design and construction plans.

Construction Recommendations

State Law

Parks and Wildlife Code, Section 68.015

Section 68.015 of the Parks and Wildlife Code regulates state listed species. Please note that there is no provision for take (incidental or otherwise) of state-listed species. Information related to the *TPWD Guidelines for Protection of State-Listed Species*, which includes a list of penalties for take of state-listed species, can be found at: http://www.tpwd.state.tx.us/huntwild/wild/wildlife_diversity/habitat_assessment/media/tpwd_statelisted_species.pdf. State-listed species may only be handled by persons with a scientific collection permit obtained through TPWD. For more information on this permit, please contact the Wildlife Permits Office at (512) 389-4647.

Recommendation: TPWD recommends CenterPoint Energy survey potentially disturbed areas for state listed species habitat prior to construction. If suitable habitat for species is observed in the area, disturbance of the habitat should be avoided to the extent feasible.

Rare Resources

Determining the actual presence of a species in a given area depends on many variables including daily and seasonal activity cycles, environmental activity cues, preferred habitat, transiency and population density (both wildlife and human). The absence of a species can be demonstrated only with great difficulty and then only with repeated negative observations, taking into account all the variable factors contributing to the lack of detectable presence.

The Texas Natural Diversity Database (TXNDD) is intended to assist users in avoiding harm to rare species or significant ecological features. Given the small proportion of public versus private land in Texas, the TXNDD does not include a representative inventory of rare resources in the state. Absence of information in the database does not imply that a species is absent from that area. Although it is based on the best data available to TPWD regarding rare species, the data from the TXNDD do not provide a definitive

statement as to the presences, absence or condition of special species, natural communities, or other significant features within your project area. These data are not inclusive and **cannot be used as presence/absence data**. They represent species that could potentially be in your project area. This information cannot be substituted for on-the-ground surveys. The TXNDD is updated continuously based on new, updated and undigitized records; for questions regarding a record, please contact TexasNatural.DiversityDatabase@tpwd.texas.gov.

The following occurrences of rare and protected species within project boundaries were documented:

Species of Concern
Plains Spotted Skunk (*Spilogale putorius interrupta*)

Mitigation for Regulated and Unregulated Resources

TPWD recommends CenterPoint Energy prepare a mitigation plan to provide compensatory mitigation for those habitats where impacts from the transmission line cannot be avoided or minimized. This would include impacts to species and habitats covered under federal law (wetlands and associated habitats, threatened or endangered species) and state resource habitat types not covered by state or federal law (riparian areas, native prairies). At a minimum, TPWD recommends a replacement ratio of 1:1 for state resource habitat types.

Mitigation plans can be developed after the selection of a route, when the acres of impact and the value of impacted habitats can be evaluated on-the-ground. However, mitigation costs and opportunities should be considered when selecting a route. Impact to federally-listed species and their habitats will need to be coordinated with the USFWS, and impact to wetlands will need to be coordinated with the USACE.

Please provide a copy of the Environmental Assessment (EA) to TPWD for review and comment prior to application to the PUC for a CCN. I appreciate the opportunity to provide preliminary input on potential impacts related to this project, and I look forward to reviewing the EA. If you have any questions, please contact me at (361) 576-0022.

Sincerely,

Amy Turner

Amy Turner, Ph.D.
Wildlife Habitat Assessment Program
Wildlife Division

/ajt:ERCS-9271

cc: Mohammed Ally, Public Utility Commission of Texas

Texas Water Development Board

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

June 24, 2014

Mr. Kyle Clark
Project Manager
HDR Engineers
4635 Southwest Freeway, Suite 1000
Houston, TX 77027

Re: CenterPoint Energy's Proposed 138 kV Zenith to Franz Project
Harris County, Texas
HDR Project No. 232718

Dear Mr. Clark:

We received your letter dated June 11, 2014 requesting information concerning environmental assessment and land use restraints for the proposed new 138 kilovolt (kV) transmission line that would connect the existing Zenith Substation to the existing 138kV transmission system in Harris County. This project area is approximately 2.5 miles northwest of the intersection of Grand Parkway and Farm to Market 529.

To plan for the state's water resources and provide affordable water and wastewater services, the Texas Water Development Board (TWDB) provides planning, geographic data collection and dissemination, and financial and technical assistance services. TWDB is not a regulatory agency and does not issue any permits. Based on the map and information provided, it appears that the proposed transmission line would not conflict with any recommended water management strategies in the regional or state water plans. Therefore, we have no specific comments in regard to the proposed project.

If you have any further questions, please contact Lann Bookout of my staff at (512) 936-9439.

Sincerely,

Jeff Walker
Deputy Executive Administrator
Water Supply and Infrastructure

Clark, Kyle

From: Messen, Dmitry <Dmitry.Messen@h-gac.com>
Sent: Tuesday, June 17, 2014 9:18 AM
To: Clark, Kyle
Subject: CenterPoint Energy's Project

Kyle,
In response to your letter from 6/11/2014 , we can tell you that H-GAC doesn't have any permitting or regulatory authority. With respect to land use, you may find our web mapping application (www.h-gac.com/go/rluis) useful for your purposes.

Thanks.

Clark, Kyle

From: Kohnen, Greg (Engineering) <greg.kohnen@hcpid.org>
Sent: Tuesday, June 24, 2014 10:19 AM
To: Clark, Kyle
Cc: Morales, Jesse (Engineering); Sturhan, Shawn (Engineering); Schilhab, Randy (Commissioner Pct. 3)
Subject: centerpoint's proposed 138 kv zentih to Franz project

Kyle,

In response to our phone conversation. I agree with you on scheduling a meeting after you develop some actual/potential route options. Feel free to contact me when you wish to schedule a meeting. At that time we should be able to provide better feedback on any county concerns or issues regarding those route locations. Please consider this email as our offices response to your mailed request.

Sincerely,

Greg Kohnen, P.E.
Manager Commercial Review
HCPID-AED, Permits
10555 NW Fwy, Suite 100
Houston, Texas 77092
PHONE: (713) 956-3014

Clark, Kyle

From: Hernandez, Margarita, T <MargaritaTHernandez@KATYISD.ORG>
Sent: Tuesday, June 24, 2014 11:15 AM
To: Clark, Kyle
Cc: Alvarez, BJ
Subject: CenterPoint Energy's Proposed 138kV Zenith to Franz Project

6/24/14
Mr. Clark,
Katy ISD superintendent, Mr. Alton Frailey, forwarded your email to my attention regarding the above mentioned project. Katy ISD anticipates no environmental or school related developments for your proposed project study.

Thank you.

Tom Gunnell
By:

Margarita T. Hernandez
Assistant to Thomas J. Gunnell
Chief Operations Officer
Katy ISD
Phone: 281.396.2348
Fax: 281.644.1801
Email: margaritathernandez@katyisd.org

Clark, Kyle

From: Deshotel, Sandra - PWE <Sandra.Deshotel@houstontx.gov>
Sent: Tuesday, June 17, 2014 3:11 PM
To: Clark, Kyle
Subject: CenterPoint Energy's Proposed 138 kV Zenith to Franz Project

Mr. Clark

This email is response to your letter date June 11, to the Mayor's office, regarding HDR Project No. 232718.. This project is not in the City of Houston and right now we have no comment.

Sandra Deshotel, MBA

Department of Public Works and Engineering
Planning and Development Services Division
611 Walker, 18th Floor, Houston, TX 77002
sandra.deshotel@houstontx.gov
832-395-3098

RECEIVED 6/19/2014

CITY OF HOUSTON

Department of Public Works & Engineering

Annise D. Parker
Mayor

Daniel W. Krueger, P.E., Director
P.O. Box 1562
Houston, Texas 77251-1562

T. 832 395-2500
F. Fax Number
www.houstontx.gov

June 11, 2014

Mr. Kyle Clark
4635 Southwest Freeway
Suite 1000
Houston, TX 77027

Dear Mr. Clark:

This is to acknowledge that your letter/email **(dated 6/11/2014)** was received by the City of Houston's Public Works and Engineering Department and your concern was assigned to the appropriate division for a response.

A Rep from **Planning Development Division** will communicate with you after your concern is investigated. Your Case # is **1410810.**

Jacqueline Harvey
Public Works & Engineering
Office of the Director
832-395-2512

RECEIVED 6/19/2014

CITY OF HOUSTON

Department of Public Works & Engineering

Annise D. Parker
Mayor

Daniel W. Krueger, P.E., Director
P.O. Box 1562
Houston, Texas 77251-1562

T. 832 395-2500
F. Fax Number
www.houstontx.gov

June 11, 2014

Mr. Kyle Clark
4635 Southwest Freeway
Suite 1000
Houston, TX 77027

Dear Mr. Clark:

This is to acknowledge that your letter/email **(dated 6/11/2014)** was received by the City of Houston's Public Works and Engineering Department and your concern was assigned to the appropriate division for a response.

A Rep from **Planning Development Division** will communicate with you after your concern is investigated. Your Case # is **1410810.**

Jacqueline Harvey
Public Works & Engineering
Office of the Director
832-395-2512

Clark, Kyle

From: Byron Hebert <bhebert@cityofkaty.com>
Sent: Thursday, June 19, 2014 11:22 AM
To: Clark, Kyle
Subject: 138kv Zenith to Franz

Mr. Clark,
At this time there are no concerns that the City of Katy has about your project. The project study area is located outside the city of Katy.
Thank you from informing the City of this project.

Byron Hebert
City Administrator
City of Katy
910 Avenue C
Katy TX 77493
281-391-4811 w
281-391-4813 f
bhebert@cityofkaty.com

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Appendix B

Public Meeting Information

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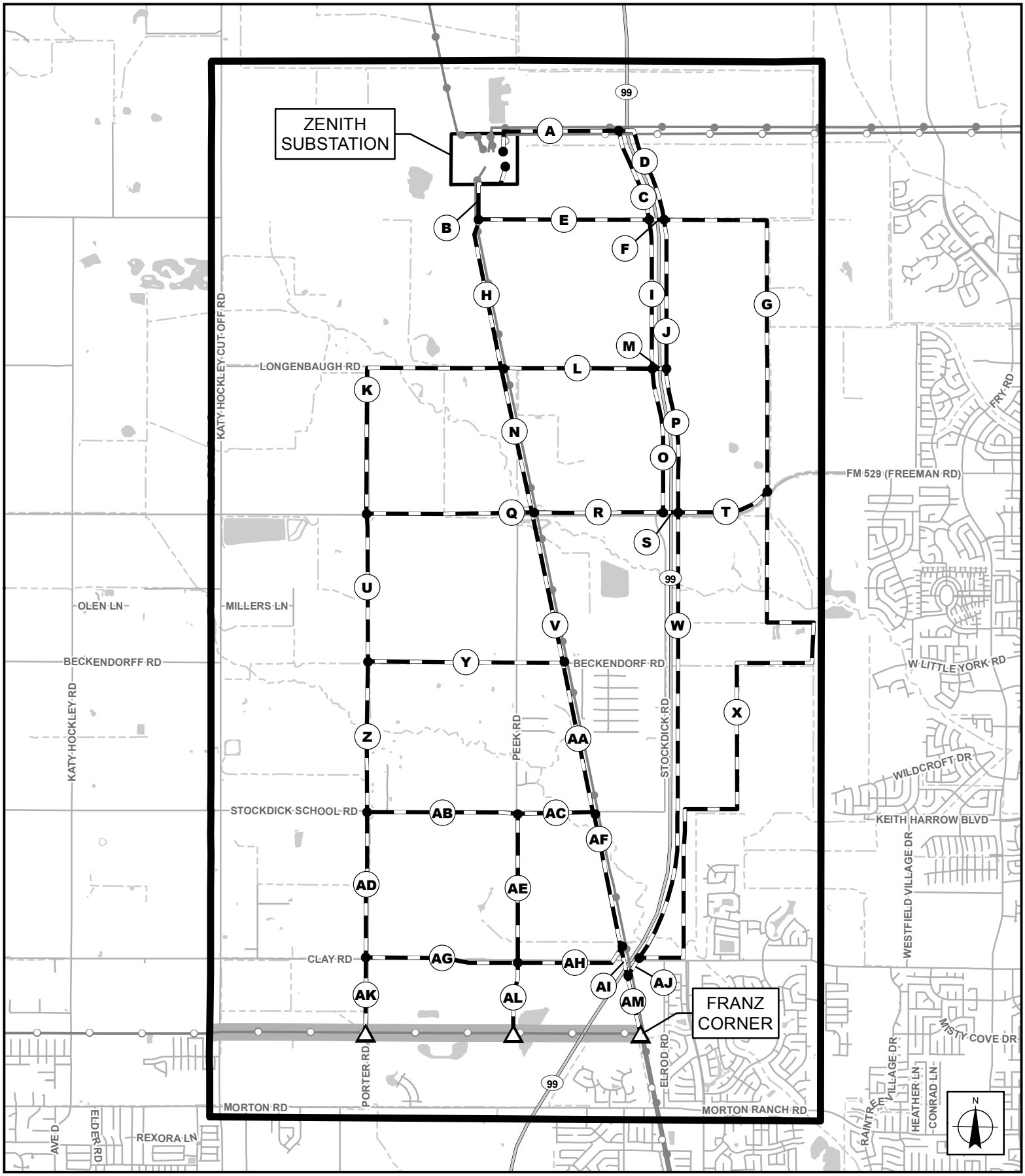
CenterPoint Energy to host
Public Meeting for a proposed 138 kV Transmission Line in
Harris County

CenterPoint Energy Houston Electric, LLC will hold a public open house meeting on Tuesday, August 26, 2014, at the Lone Star College CyFair Campus, College Center Building, located at 9191 Barker Cypress Road in Cypress, Texas 77433 from 5:00 p.m. to 8:00 p.m. The purpose of the public meeting is to share information as well as gather input from the public on the yet-to-be-determined route of a proposed 138 kV transmission line in Harris County that will improve the electric reliability of the transmission system in the Katy area and serve projected load growth. The proposed construction includes a 138 kV double-circuit transmission line connecting an existing 138 kV transmission line to the existing CenterPoint Energy Zenith Substation located in northwest Harris County.

The map below illustrates the proposed preliminary transmission line segments. All of the proposed preliminary segments shown on the map are under consideration at this time; however, not all of the segments will be constructed. The Public Utility Commission of Texas will determine the final route in a proceeding to consider an Application for a Certificate of Convenience and Necessity that will be filed by CenterPoint Energy.

There will be a formal presentation about the project from 6:00 p.m. to 7:00 p.m. followed by answers to questions submitted by the audience. Information stations with representatives from CenterPoint Energy and environmental specialists from HDR Engineering, Inc. will be available before and after the formal presentation to share information about the project. Individuals who attend the meeting will have an opportunity to ask questions and express any concerns about the proposed project. A questionnaire will be provided by the Company for individuals to complete regarding their preferences and to provide comments. Refreshments will be provided.

For more information about the proposed project and the public meeting, please visit our Zenith-Franz Project website at www.centerpointenergy.com/zenithfranz, or contact Mr. Steven Fox at 713-207-4985 or email at zenithfranz@centerpointenergy.com.



138 KV ZENITH-FRANZ PROJECT
PRELIMINARY TRANSMISSION LINE SEGMENTS

CenterPoint Energy

HDR

August 5, 2014

<Name>
<Address1>
<Address2>
<City, State Zip>

Property ID Number: <PID>

Dear <Name>,

You are invited to a public meeting hosted by CenterPoint Energy Houston Electric, LLC ("CenterPoint Energy") on Tuesday, August 26, 2014, from 5:00 p.m. to 8:00 p.m. at the Lone Star College CyFair Campus, College Center Building. At the public meeting, CenterPoint Energy will discuss and gather input on potential routes for a proposed electric transmission line in Harris County.

The proposed transmission line is required to improve the electric reliability of the transmission system in the Katy area and serve projected load growth. The proposed construction includes a 138 kV double-circuit transmission line, located along a yet-to-be-determined route, connecting an existing 138kV transmission line to the existing CenterPoint Energy Zenith Substation located in northwest Harris County.

You have received this invitation in accordance with P.U.C. Proc. R. §22.52(a)(4) because tax records indicate that you own property within 300 feet of one of the proposed preliminary transmission line segments shown on the enclosed map. Your name and address were collected from the tax records at the county appraisal district in which your property is located. All of the proposed preliminary segments shown on the map are under consideration at this time; however, not all of the segments will be constructed. The Public Utility Commission of Texas will determine the final route in a proceeding to consider an Application for a Certificate of Convenience and Necessity that will be filed by CenterPoint Energy.

The public meeting gives area landowners and other interested parties the opportunity to provide input regarding the preliminary transmission line segments that are under consideration. You will be given a questionnaire about the project and will have the opportunity to make comments on the project, ask questions, and express any concerns you might have about the proposed preliminary transmission line segments that are under consideration.

There will be a formal presentation about the project from 6:00 p.m. to 7:00 p.m. followed by answers to questions submitted by the audience. Information stations with representatives from CenterPoint Energy and environmental specialists from HDR Engineering, Inc. will be available before and after the formal presentation to share information about the need for the transmission project, the type of structures proposed for the new transmission line, construction methods to be used, and transmission right-of-way requirements. Refreshments will be provided.

The Lone Star College CyFair Campus is located at 9191 Barker Cypress Road in Cypress, Texas 77433. The College Center Building is accessible from the North Parking Area. For more information about the public meeting, please visit our Zenith-Franz Project website www.centerpointenergy.com/zenithfranz, or contact Mr. Steven Fox at 713-207-4985 or email at zenithfranz@centerpointenergy.com.

Sincerely,

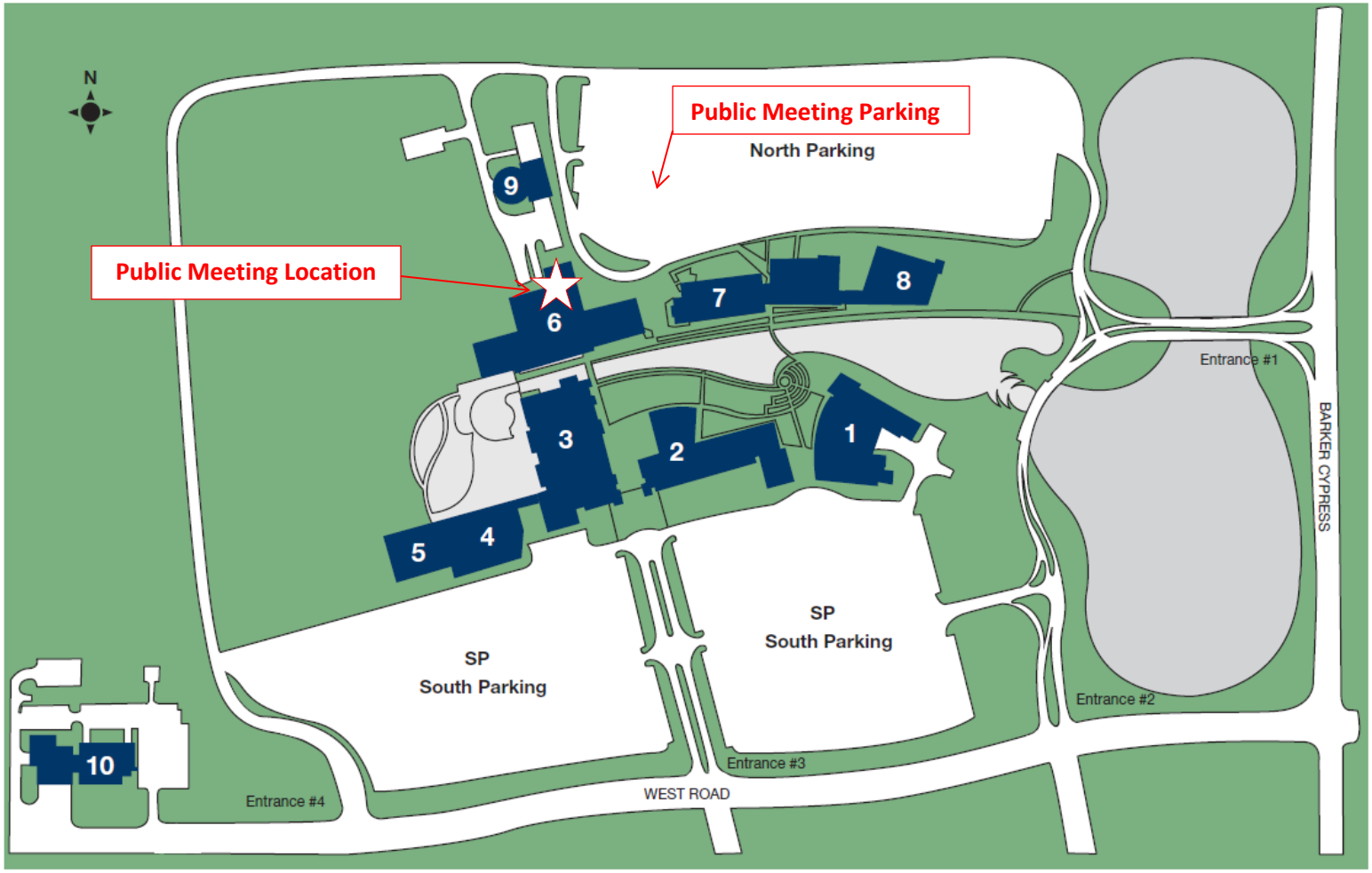
Michael J. Pakeltis

Michael J. Pakeltis
Director, Transmission Operations

Enclosures

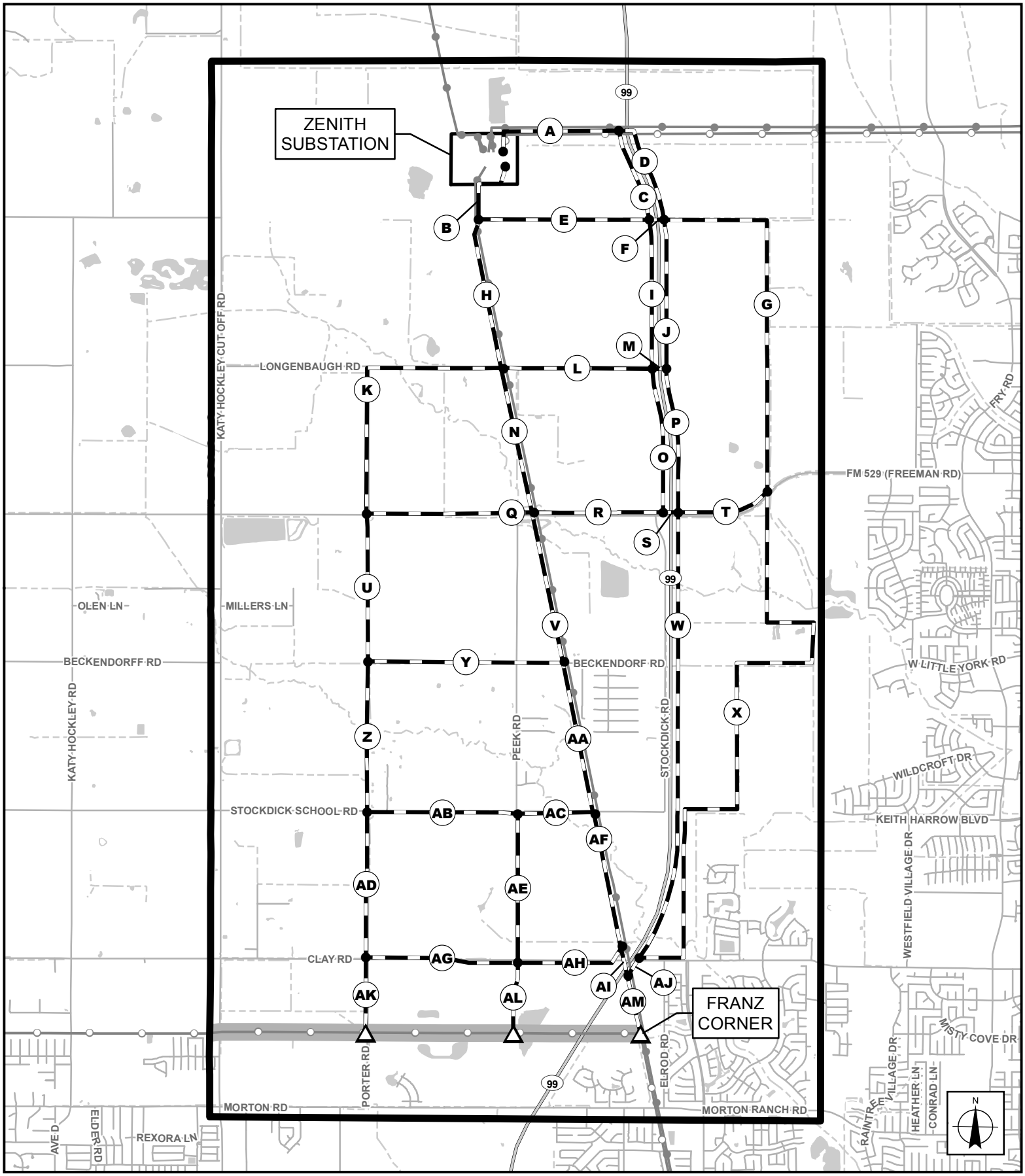
138 kV Zenith-Franz Project Public Meeting Location
9191 Barker Cypress Road, Cypress, Texas 77433

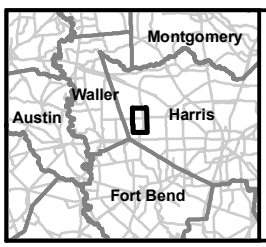
LONE STAR COLLEGE-CYFAIR



1: Center for the Arts (ART)
2: Technology Center (TECH)
3: Learning Commons/College and Harris County Public Library (LRNC)
4: Student Services/Admissions/Financial Aid (CASA)
5: Instructional Building (CASA)
6: College Center/Food Service/Bookstore/ Fitness Center (CENT)
7: Health Science Center (HSC)
8: Science Laboratory Building (HSC)
9: Central Plant
10: Emergency Service Education Center (ESEC)
SP: Student Parking

Public Meeting Location





STUDY AREA
PRELIMINARY TIE POINT
EXISTING SUBSTATION
99 STATE HIGHWAY
LOCAL ROAD

A PRELIMINARY TRANSMISSION LINE SEGMENT
EXISTING 345 KV TRANSMISSION LINE
EXISTING 138 KV TRANSMISSION LINE
EXISTING 138 KV TRANSMISSION LINE POTENTIAL CONNECTION CORRIDOR
STREAM / DRAINAGE
OPEN WATER

138 KV ZENITH-FRANZ PROJECT
PRELIMINARY TRANSMISSION LINE SEGMENTS

CenterPoint Energy

HDR

138 kV Zenith-Franz Project
Public Meeting Questionnaire

1. How did you learn of this public meeting?

_____ Newspaper Notice _____ Invitation Letter

_____ Other (please specify) _____

2. In your opinion, has the need for the project been adequately explained to you?

Yes_____ No_____ If no, Please explain _____

_____

_____

_____

3. Please rank from **1 to 11** the following land uses that you believe should be considered of greatest concern (avoided if possible) to least concern in routing the transmission line. Please use each number only once. **(1** =greatest concern; **11** =least concern)

_____Agricultural land _____Schools

_____Floodplains or wetlands _____Churches

_____Recreational or park areas _____Cemeteries

_____Residential areas or subdivisions _____Historic Sites

_____Commercial areas _____Wildlife

_____Other (please specify) _____

_____

4. Please rank from 1 to 7 the following linear facilities that you believe should be considered of greatest importance to least importance for the transmission line route to follow. Please use each number only once. (**1** =most important; **7** =least important)

_____Roads _____Electrical lines

_____Pipelines _____Railroads

_____Property lines _____Ditches

_____Other (please specify) _____

_____

5. In your opinion, are there any other factors or features that should be considered in determining the routing of the proposed transmission line?

Yes_____ No_____

If yes, please list them below and briefly explain why they are important to you.

_____

_____

6. The following features are noted on the Constraints Map at the Routing/Environmental station:

- Churches, schools, nursing homes, hospitals, and cemeteries
- Commercial AM and FM radio transmitters, microwave relay stations, or other similar electronic installations
- Airports and landing strips
- Pastures or cropland irrigated by traveling irrigation systems
- Parks and recreational areas
- Historical and archaeological sites
- Environmentally sensitive areas
- Floodplain and floodway boundaries

Are any of these features incorrectly shown on the map, or are you aware of any additional features that were not included?
Yes_____ No_____

If yes, did you speak with a representative and indicate the corrections needed to the map?
Yes_____ No_____

If you were not able to speak to a representative, please identify the approximate location of any missing or incorrectly located features on the Constraints Map by describing the feature and location below.

7. If you have a concern with a particular preliminary transmission line segment(s) shown on the exhibits or the attached map, please indicate the segment letter and describe your concern.

8. Do you have a preference on the type of transmission structures being proposed?
Yes_____ No_____

If so, please explain the type of transmission structures you prefer and why?

9. Which of the following applies to you? Please include the segment(s) letters. (See attached map.)

_____ A preliminary transmission line segment is near my home.
Applicable Segment(s) _____
_____ A preliminary transmission line segment is near my business.
Applicable Segment(s) _____
_____ A preliminary transmission line segment is on my land.
Applicable Segment(s) _____
_____ None of the above

Other (please specify)_____

10. Did the information provided and exhibits displayed at the public meeting meet your needs?
Yes_____ No_____

If no, please explain: _____

11. Have you visited the Zenith-Franz Project website (www.centerpointenergy.com/zenithfranz) to view information about the project?
Yes_____ No_____

12. **Your name and contact information are optional,** unless you have a question that you would like for us to answer.
Name _____

☐ Do Not Contact Me ☐ Contact me regarding the following question (please specify)

_____
_____
_____
_____

I prefer to be contacted by: (choose all that apply)

☐ U.S. Mail Address_____
City_____State_____ Zip _____
☐ Telephone (home)_____(work)_____(cell)_____

☐ Email Address _____

13. Additional comments (please specify):

_____
_____
_____
_____

THANK YOU FOR COMPLETING THE QUESTIONNAIRE. WE APPRECIATE YOUR INPUT.

Please drop off your completed questionnaire at the registration table as you leave the public meeting. If you need to take it with you to complete later, please mail or email it within 5 days to:

Steven Fox, Zenith-Franz CCN Project Manager
CenterPoint Energy
Transmission Operations, CNP-T 14th Floor
P.O. Box 1700
Houston, TX 77251-1700
Phone: (713) 207-4985
Email: zenithfranz@centerpointenergy.com

From 6:00 p.m. to 7:00 p.m., there will be a formal presentation about the project followed by answers to questions submitted by the audience on this form. You may submit questions in advance or at the end of the presentation. Question forms may be returned to the Registration and Information table in advance of the presentation or, after the presentation, to the CenterPoint Energy attendants in the presentation area.

Name:_____(Optional)

Contact Information:_____(Optional)

☐telephone ☐cell ☐fax ☐email

Question: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

WELCOME TO CENTERPOINT ENERGY'S PUBLIC MEETING
138 kV ZENITH-FRANZ PROJECT
August 26, 2014

Thank you for attending CenterPoint Energy's public meeting for the 138 kV Zenith-Franz Project. The purpose of the public meeting is to share information as well as gather input from the public on the yet-to-be-determined route of a proposed 138 kV transmission line in Harris County that will improve the electric reliability of the transmission system in the Katy area and serve the projected load growth. The proposed construction includes a 138 kV double-circuit transmission line connecting an existing 138 kV transmission line to the existing CenterPoint Energy Zenith Substation located in northwest Harris County. The information gathered will be used to help formulate alternate routes for consideration by the Public Utility Commission of Texas.

From 6:00 p.m. to 7:00 p.m., there will be a formal presentation about the project followed by answers to questions submitted by the audience. Information stations and exhibits staffed by knowledgeable CenterPoint Energy representatives and environmental specialists from HDR Engineering, Inc. will be available before and after the formal presentation to explain the project and answer questions. Please visit the stations that are of interest to you; they include the following:

1. **Registration and Information:** You will be asked to sign in so that we may get an accurate count of tonight's participants. You will receive an information packet about the project and a questionnaire. The questionnaire is used to help CenterPoint Energy better understand any concerns you may have regarding the project and to provide information about any special circumstances. It is important that you complete this questionnaire to ensure that your comments and concerns about the project are taken into account.

2. **Project Need:** CenterPoint Energy representatives are available to discuss the need and the schedule for the project. An electrical schematic of the transmission system in the vicinity of the project is displayed there. The Public Utility Commission of Texas certification process flowchart for new transmission lines is also located there.

3. **Right-Of-Way/Construction:** Photographs and drawings of typical transmission structures for the proposed project are available for viewing. A right-of-way agent is on hand to answer questions about the land requirements for the project and the process used when necessary to obtain easements across private property. In addition, transmission experts will address design and construction questions, including construction methods and materials.

4. **EMF Information:** Information regarding electric and magnetic fields (EMF) is available at this station from a CenterPoint Energy representative familiar with EMF issues.

5. **Routing/Environmental:** Evaluation criteria to be used in routing the transmission line as well as the governmental agencies and organizations that have already been contacted about this project are listed. Aerial photographic maps are available that depict the existing CenterPoint Energy transmission lines, pipelines, roadways, and property lines along with the proposed preliminary transmission line segments. Maps depicting known constraint areas are also available for viewing. Environmental specialists from HDR Engineering, Inc. will address routing and environmental questions.

6. **GIS Computer Stations:** Geographic Information System (GIS) computer stations with expert operators from HDR Engineering, Inc. are available to visually display and print specific land parcels and area properties in relation to the proposed preliminary transmission line segments.

7. **Refreshments:** Snacks and drinks are available while completing the questionnaire.

8. **Questionnaire Drop Off:** Please drop off the completed questionnaire at the registration table as you leave the public meeting. If you need to take it with you to complete later, please mail or email it within 5 days to:

Steven Fox, Zenith-Franz CCN Project Manager
CenterPoint Energy, CNP-T 14th Floor
P.O. Box 1700
Houston, TX 77251-1700
Phone: 713-207-4985, Email: ZenithFranz@CenterPointEnergy.com

1. **Who is CenterPoint Energy Houston Electric, LLC?**

   CenterPoint Energy Houston Electric, LLC (CenterPoint Energy or the Company) is an electric utility that maintains the wires, towers, poles, and electric infrastructure serving more than two million end-use customers in a 5,000-square-mile electric service territory in the Houston metropolitan area. While CenterPoint Energy's employees ensure the reliable delivery of power from power plants to homes and businesses, the Company neither generates power nor sells it to customers.

2. **What is the Public Utility Commission of Texas (PUCT)?**

   The PUCT is the state agency that was created by the Texas Legislature to provide statewide regulation of the rates and services of electric and telecommunications utilities.

3. **What is the Electric Reliability Council of Texas (ERCOT)?**

   ERCOT manages the flow of electric power to 23 million Texas customers - representing 85 percent of the state's electric load. As the independent system operator for the region, ERCOT oversees activities related to the reliable and safe transmission of electricity by scheduling power on an electric grid that connects 40,500 miles of transmission lines and more than 550 generation units. ERCOT is a membership-based nonprofit corporation, governed by a board of directors and subject to oversight by the PUCT and the Texas Legislature. ERCOT's members include consumers, cooperatives, generators, power marketers, retail electric providers, investor-owned electric utilities (transmission and distribution providers), and municipal-owned electric utilities.

4. **Why is CenterPoint Energy holding a public meeting?**

   CenterPoint Energy is proposing to build a new electric transmission line in Harris County. The Company is regulated by the Public Utility Commission of Texas (PUCT). Under PUCT Procedural Rule §22.52(a)(4), an electric utility must hold at least one public meeting for new transmission line projects that meet certain criteria. CenterPoint Energy typically schedules one or more public meetings to share and gather information as well as address any concerns or questions from landowners and other interested parties about the routing of a proposed transmission line. Individuals attending the public meeting will have an opportunity to make comments, ask questions, and express any concerns that they might have about the routes under consideration. Representatives from CenterPoint Energy and HDR Engineering, Inc. will be available to answer questions.

5. **What are electric transmission lines?**

   Electric transmission lines are a part of the interconnected power system that moves electricity from all generating stations to substations, where the electricity is reduced in voltage and then delivered to end-use consumers over the distribution system that connects to businesses and homes. Electric transmission lines are larger, operate at higher voltages, and typically convey electricity over larger distances. Electric distribution

lines are smaller, operate at lower voltages, and convey electricity over shorter distances within cities and neighborhoods.

6. Why is a new electric transmission line needed?

In order to continue providing reliable electric transmission service to the Katy area and serve the projected load growth, significant electrical infrastructure improvements are required, which includes constructing a new proposed 138 kilovolt (kV) transmission line connecting an existing 138 kV transmission line to the existing CenterPoint Energy Zenith Substation located in northwest Harris County.

7. Where will the transmission line be located?

The exact route of the transmission line has not been determined. CenterPoint Energy is gathering input from the community and other sources for its routing study and environmental assessment. All of the proposed preliminary segments shown on the map are under consideration at this time; however, not all of the segments will be constructed. The PUCT regulates CenterPoint Energy and will determine the final route in a proceeding to consider an Application for a Certificate of Convenience and Necessity that will be filed by CenterPoint Energy. The routing study and environmental assessment will be included in CenterPoint Energy's application. The PUCT has one year to make a decision after the application is submitted.

8. What are the considerations involved in selecting a route for the transmission line?

The PUCT considers many factors in deciding whether to approve a proposed electric transmission line including community values, recreational and park areas, historic and aesthetic values, and environmental integrity. They also consider specific routing criteria for new lines including whether the route utilizes or parallels compatible rights-of-way such as following existing electric transmission lines, roads, pipelines, property lines, natural features, and cultural features. CenterPoint Energy will gather these routing factors and provide them in the Application for a Certificate of Convenience and Necessity for a Proposed Transmission Line that will be filed with the PUCT.

9. What type of structures will be used on the new transmission line?

In locations where the route segments are not adjacent to public roads, the proposed construction for the transmission line will utilize approximately 106 foot tall double-circuit steel lattice towers in a vertical configuration in a new right-of-way that will be approximately 80 foot wide or approximately 85 foot to 100 foot tall concrete monopoles in a vertical configuration in a right-of-way that is approximately 60 foot wide. Where the proposed line follows an existing public road, the proposed construction will utilize approximately 100 foot tall concrete monopoles in a vertical configuration located inside the edge of the road right-of-way and will require a new aerial easement adjacent to the road that will be approximately 25 foot wide. Where the proposed line follows an existing 345 kV transmission line, the structures will be located inside the existing right-of-way.

10. When will construction tentatively begin, and when will the project be completed?

CenterPoint Energy plans to file the CCN application with the PUCT in November of 2014. The PUCT has one year to make a decision on the project; however, the PUCT can issue an order prior to that time. The Company will begin construction upon final approval by the PUCT. CenterPoint Energy anticipates that the project will be completed no later than May of 2017.

11. How will CenterPoint Energy compensate landowners if it is necessary for the transmission line to cross their property?

CenterPoint Energy will make a bona fide offer to the landowner when purchasing right-of-way following the requirements of Texas law and will provide landowners with a copy of the State of Texas Landowner's Bill of Rights. In cases where the parties do not agree on the value of the property, the land value will be determined in a condemnation proceeding where special commissioners, appointed by a judge, will determine the value of the property following a hearing where all interested parties are entitled to provide evidence of valuation.

Public Utility Commission

Certification Process for Transmission Lines

Define Project

- Identify beginning and end points for project

Environmental Assessment And Routing Analysis

- Identify study area based on project definition.
- Gather data about study area.
- Map environmental and land use constraints in study area.
- Determine preliminary transmission line segments based on maps, aerial photos, constraints data, and field visits.

YOU ARE HERE

- Hold open house to gather public input.
- Analyze preliminary transmission line segments to develop the alternative routes.

PUC Application Process

- Submit an application to the PUC to amend CenterPoint Energy's Certificate of Convenience and Necessity (CCN).
- Upon filing of the application, notices will be sent to landowners whose property may be crossed or is within 300 feet of any alternative route.
- Notices also will be sent to municipalities and electric utilities that are within five miles of the project and to municipal and county governments where the project is located.
- Following the filing of the application, there will be an intervention and comment opportunity for interested parties.
- Approval of a CCN application gives CenterPoint Energy the authorization to build the new transmission project along the route approved by the PUC.

Intervention?

NO

PUC Staff Review

PUC staff conducts review and makes recommendation to approve project as submitted or approve with modifications.

YES

Administrative Hearing

- Technical review of project routing
- Testimony filed by all parties
- Administrative hearing
- Administrative Law Judge prepares proposed final order

Within 12 months after application is submitted.

PUC Makes Decision

- Approve application
- Approve application with modifications
- Deny

CenterPoint Energy

138 kV Zenith – Franz Project Anticipated Schedule

Transmission Line Project Phases	Duration	Start	Finish
Submit Study to ERCOT	COMPLETE	December 2013	December 2013
ERCOT Review of Project	COMPLETE	January 2014	May 2014
Routing Study, Environmental Assessment, and Public Meeting	7 Months	May 2014	November 2014
File CCN/PUC Review	12 Months	November 2014	November 2015
PUC Approval		November 2015	November 2015
ROW Activities	12 Months	November 2015	November 2016
Transmission Construction	10 Months	August 2016	May 2017

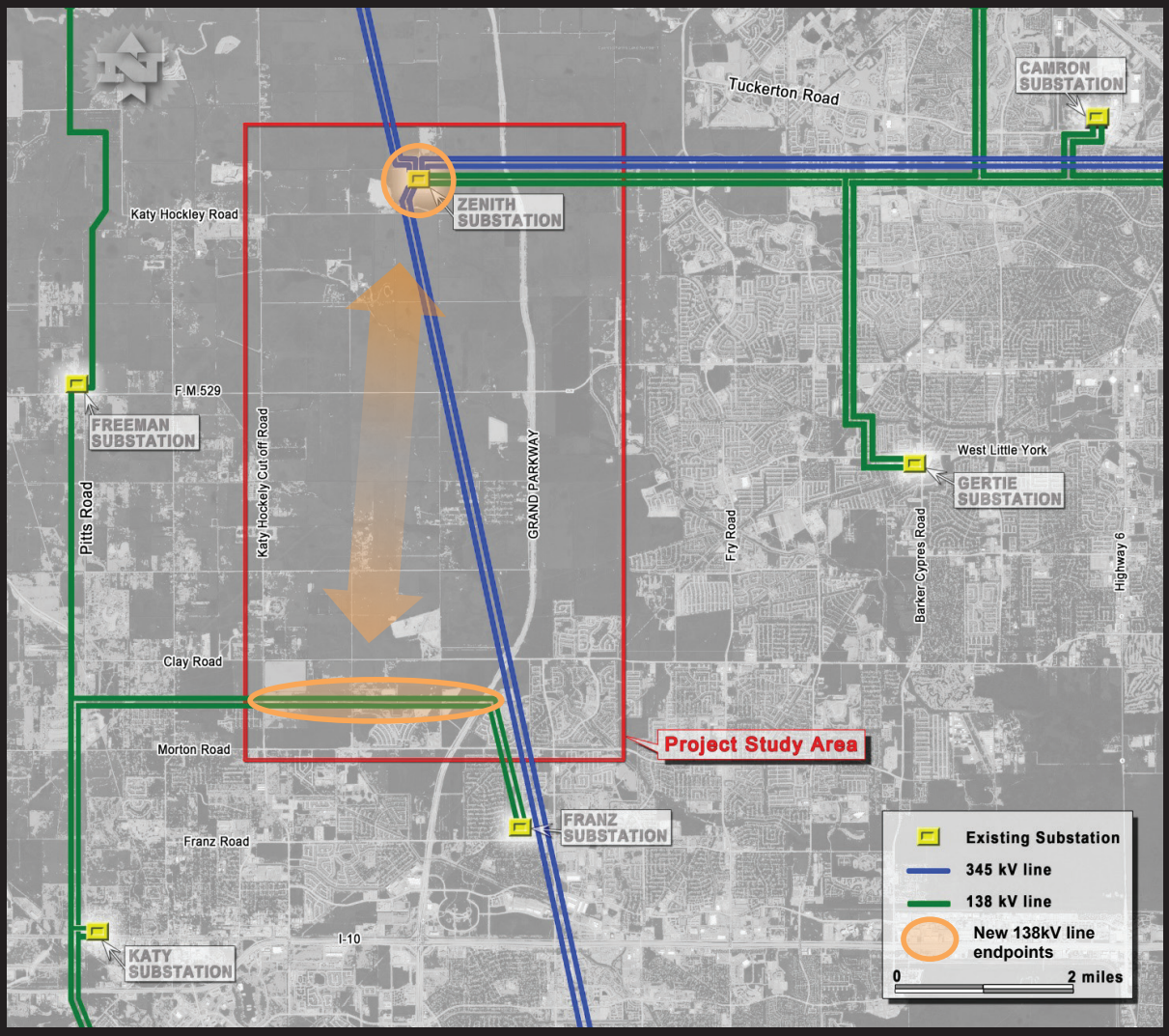
Acronyms

ERCOT	Electric Reliability Council of Texas
CCN	Certificate of Convenience and Necessity
PUC	Public Utility Commission of Texas
ROW	Right-of-Way

CenterPoint Energy

Project Need – Transmission

Zenith-Franz Project: Potential 138 kV Connections

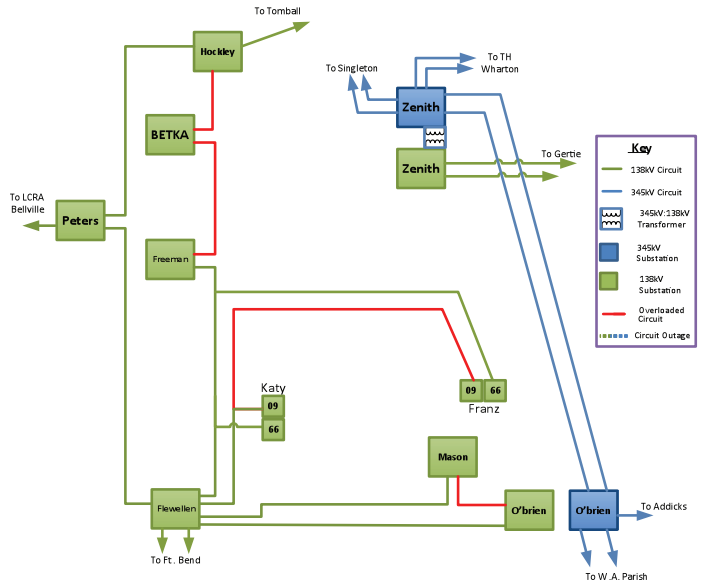


- A new 138 kV transmission line is needed to improve the electric reliability of the transmission system in the Katy area and to serve the projected load growth.
- There are multiple routes available for the new 138 kV line within the Project Study Area.

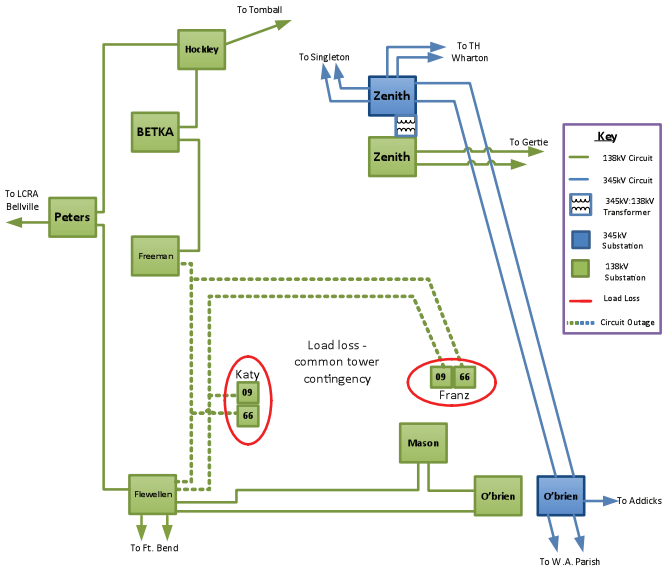
CenterPoint Energy

Project Need – 138 kV Zenith to Franz Project

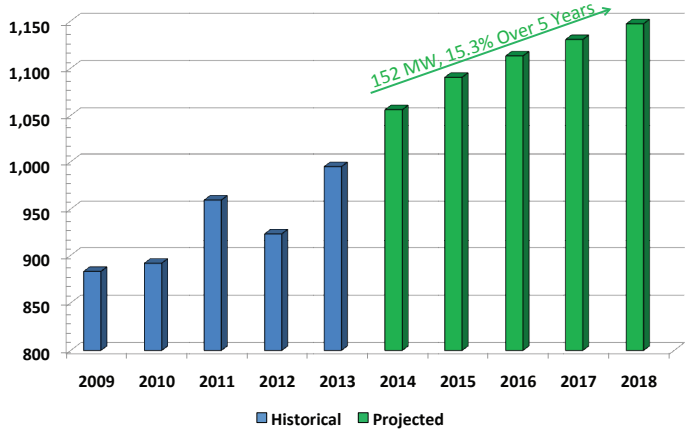
Current Configuration – Overloaded Circuits



Current Configuration – Load Loss

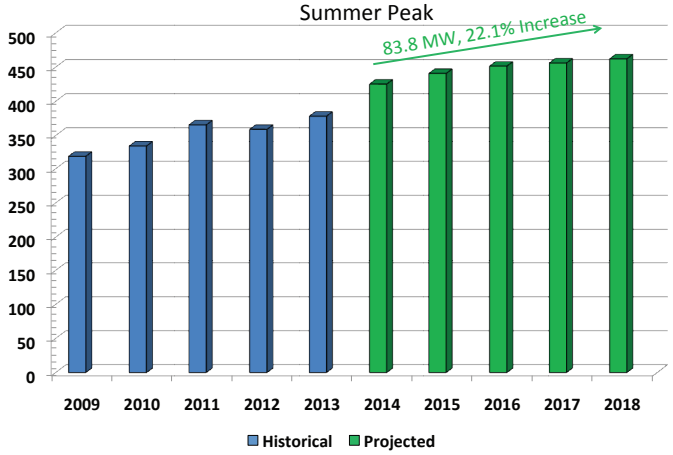


Local Area Loads, MW Summer Peak



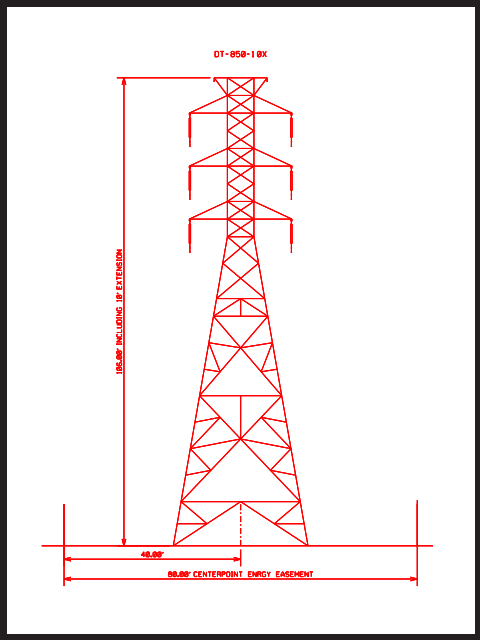
Note Local Area Loads Include: Hockley, BETKA, Freeman, Franz, Katy, Flewellen, Mason Road, and O'Brien

Katy and Franz Substation Load, MW Summer Peak



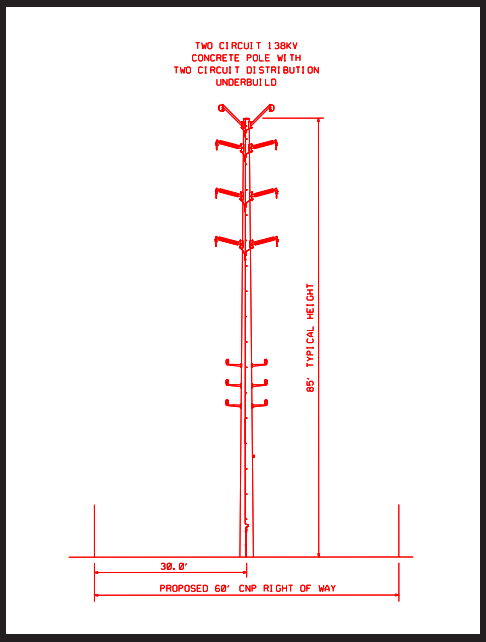
CenterPoint Energy

Typical 138 kV Construction
New 80' Right-of-Way
Steel Tower Construction



CenterPoint Energy

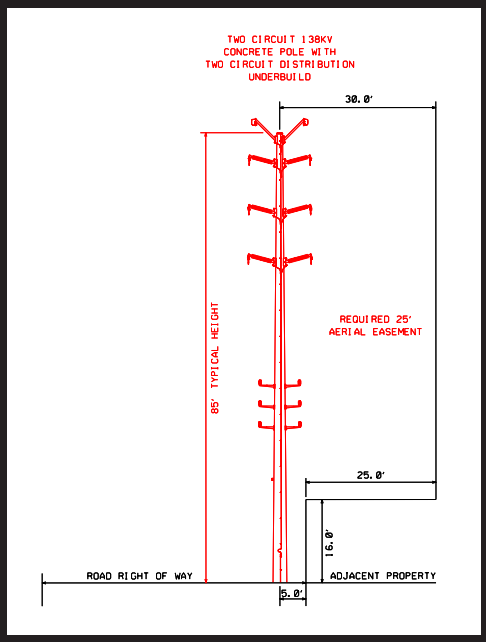
Typical 138 kV Construction
New 60' Right-of-Way
Concrete Pole Construction



CenterPoint Energy

Typical 138 kV Construction Road Right-of-Way

Concrete Pole Construction with Distribution Underbuild – New 25′ Aerial Easement

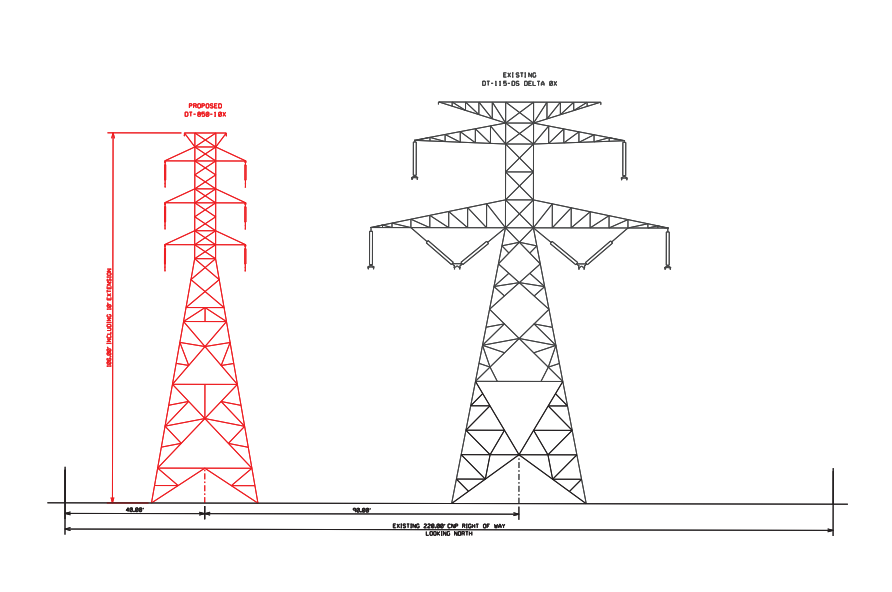


CenterPoint Energy

Existing Zenith-Franz Right-of-Way

Lattice Tower Option

Segments: V, AA, AF

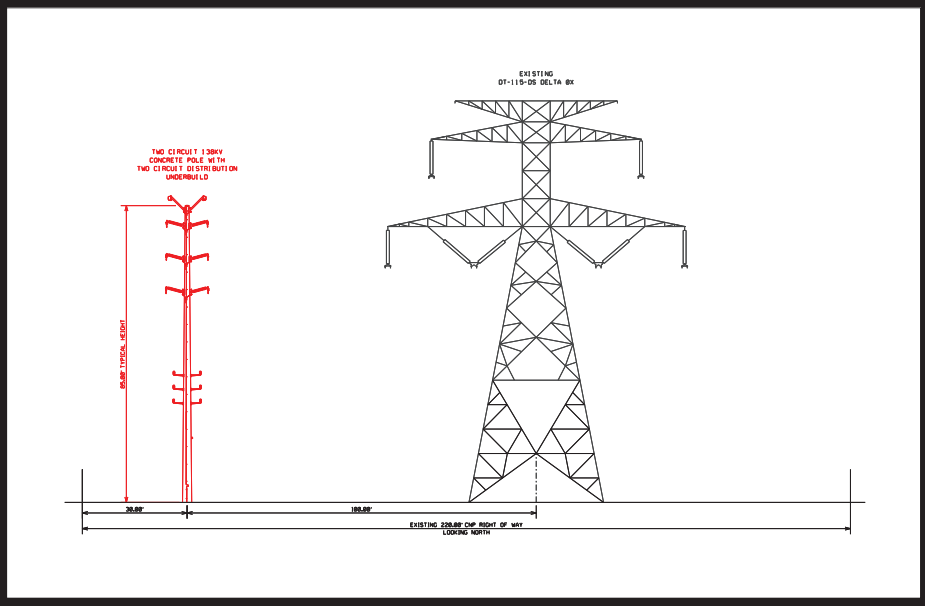


CenterPoint Energy

Existing Zenith-Franz Right-of-Way

Concrete Pole Option

Segments: V, AA, AF



CenterPoint Energy

Landowners and Transmission Line Cases at the PUC

Public Utility Commission of Texas

1701 N. Congress Avenue
P.O. Box 13326
Austin, Texas 78711-3326
(512) 936-7261
www.puc.state.tx.us

Effective: June 1, 2011

Purpose of This Brochure

This brochure is intended to provide landowners with information about proposed new transmission lines and the Public Utility Commission's ("PUC" or "Commission") process for evaluating these proposals. At the end of the brochure is a list of sources for additional information.

The following topics are covered in this brochure:

- How the PUC evaluates whether a new transmission line should be built,
- How you can participate in the PUC's evaluation of a line, and
- How utilities acquire the right to build a transmission line on private property.

You are receiving the enclosed formal notice because one or more of the routes for a proposed transmission line may require an easement or other property interest across your property, or the centerline of the proposed project may come within 300 feet of a house or other habitable structure on your property. This distance is expanded to 500 feet if the proposed line is greater than 230 kilovolts (kV). For this reason, your property is considered **directly affected land.** This brochure is being included as part of the formal notice process.

If you have questions about the proposed routes for a transmission line, you may contact the applicant. The applicant also has a more detailed map of the proposed routes for the transmission line and nearby habitable structures. The applicant may help you understand the routing of the project and the application approval process in a transmission line case but cannot provide legal advice or represent you. ***The applicant cannot predict which route may or may not be approved by the PUC. The PUC decides which route to use for the transmission line, and the applicant is not obligated to keep you informed of the PUC's proceedings. The only way to fully participate in the PUC's decision on where to locate the transmission line is to intervene, which is discussed below.***

The PUC is sensitive to the impact that transmission lines have on private property. At the same time, transmission lines deliver electricity to millions of homes and businesses in Texas, and new lines are sometimes needed so that customers can obtain reliable, economical power.

The PUC's job is to decide whether a transmission line application should be approved and on which route the line should be constructed. The PUC values input from landowners and encourages you to participate in this process by intervening in the docket.

PUC Transmission Line Case

Texas law provides that most utilities must file an application with the PUC to obtain or amend a Certificate of Convenience and Necessity (CCN) in order to build a new transmission line in Texas. The law requires the PUC to consider a number of factors in deciding whether to approve a proposed new transmission line.

The PUC may approve an application to obtain or amend a CCN for a transmission line after considering the following factors:

- Adequacy of existing service;
- Need for additional service;
- The effect of approving the application on the applicant and any utility serving the proximate area;
- Whether the route utilizes existing compatible rights-of-way, including the use of vacant positions on existing multiple-circuit transmission lines;
- Whether the route parallels existing compatible rights-of-way;
- Whether the route parallels property lines or other natural or cultural features;
- Whether the route conforms with the policy of prudent avoidance (which is defined as the limiting of exposures to electric and magnetic fields that can be avoided with reasonable investments of money and effort); and
- Other factors such as community values, recreational and park areas, historical and aesthetic values, environmental integrity, and the probable improvement of service or lowering of cost to consumers in the area.

If the PUC decides an application should be approved, it will grant to the applicant a CCN or CCN amendment to allow for the construction and operation of the new transmission line.

Application to Obtain or Amend a CCN:

An application to obtain or amend a CCN describes the proposed line and includes a statement from the applicant describing the need for the line and the impact of building it. In addition to the routes proposed by the applicant in its application, the possibility exists that additional routes may be developed, during the course of a CCN case, that could affect property in a different manner than the original routes proposed by the applicant.

The PUC conducts a case to evaluate the impact of the proposed line and to decide which route should be approved. Landowners who would be affected by a new line can:

- informally file a protest, or
- formally participate in the case as an intervenor.

Filing a Protest (informal comments):

If you do not wish to intervene and participate in a hearing in a CCN case, you may file **comments.** An individual or business or a group who files only comments for or against any aspect of the transmission line application is considered a "protestor."

Protestors make a written or verbal statement in support of or in opposition to the utility's application and give information to the PUC staff that they believe supports their position.

Protestors are ***not*** parties to the case, however, and *do* ***not*** *have the right to*:

- Obtain facts about the case from other parties;
- Receive notice of a hearing, or copies of testimony and other documents that are filed in the case;
- Receive notice of the time and place for negotiations;
- File testimony and/or cross-examine witnesses;
- Submit evidence at the hearing; or
- Appeal P.U.C. decisions to the courts.

If you want to make comments, you may either send written comments stating your position, or you may make a statement on the first day of the hearing. If you have not intervened, however, you will not be able to participate as a party in the hearing. Only parties may submit evidence and ***the PUC must base its decision on the evidence.***

Intervening in a Case:

To become an intervenor, you must file a statement with the PUC, no later than the date specified in the notice letter sent to you with this brochure, requesting intervenor status (also referred to as a party). This statement should describe how the proposed transmission line would affect your property. Typically, intervention is granted only to directly affected landowners. However, any landowner may request to intervene and obtain a ruling on his or her specific fact situation and concerns. A sample form for intervention and the filing address are attached to this brochure, and may be used to make your filing. A letter requesting intervention may also be used in lieu of the sample form for intervention.

If you decide to intervene and become a party in a case, you will be required to follow certain procedural rules:

- You are required to timely respond to requests for information from other parties who seek information.
- If you file testimony, you must appear at a hearing to be cross-examined.
- If you file testimony or any letters or other documents in the case, you must send copies of the documents to every party in the case and you must file multiple copies with the PUC.
- If you intend to participate at the hearing and you do not file testimony, you must at least file a statement of position, which is a document that describes your position in the case.
- Failure to comply with these procedural rules may serve as grounds for you to be dismissed as an intervenor in the case.
- If you wish to participate in the proceedings it is very important to attend any prehearing conferences.

Intervenors may represent themselves or have an attorney to represent them in a CCN case. If you intervene in a case, you may want an attorney to help you understand the PUC's procedures and the laws and rules that the PUC applies in deciding whether to approve a transmission line. The PUC encourages landowners to intervene and become parties.

Stages of a CCN Case:

If there are persons who intervene in the case and oppose the approval of the line, the PUC may refer the case to an administrative law judge (ALJ) at the State Office of Administrative Hearings (SOAH) to conduct a hearing, or the Commission may elect to conduct a hearing itself. The hearing is a formal proceeding, much like a trial, in which testimony is presented. In the event the case is referred to SOAH, the ALJ makes a recommendation to the PUC on whether the application should be approved and where and how the line should be routed.

There are several stages of a CCN case:

- The ALJ holds a prehearing conference (usually in Austin) to set a schedule for the case.
- Parties to the case have the opportunity to conduct discovery; that is, obtain facts about the case from other parties.
- A hearing is held (usually in Austin), and parties have an opportunity to cross-examine the witnesses.
- Parties file written testimony before the date of the hearing. Parties that do not file written testimony or statements of position by the deadline established by the ALJ may not be allowed to participate in the hearing on the merits.
- Parties may file written briefs concerning the evidence presented at the hearing, but are not required to do so.
- In deciding where to locate the transmission line and other issues presented by the application, the ALJ and Commission rely on factual information submitted as evidence at the hearing by the parties in the case. In order to submit factual information as evidence (other than through cross-examination of other parties' witnesses), a party must have intervened in the docket and filed written testimony on or before the deadline set by the ALJ.
- The ALJ makes a recommendation, called a **proposal for decision**, to the Commission regarding the case. Parties who disagree with the ALJ's recommendation may file exceptions.
- The Commissioners discuss the case and decide whether to approve the application. The Commission may approve the ALJ's recommendation, approve it with specified changes, send the case back to the ALJ for further consideration, or deny the application. The written decision rendered by the Commission is called a **final order**. Parties who believe that the Commission's decision is in error may file motions for rehearing, asking the Commission to reconsider the decision.
- After the Commission rule on the motion for rehearing, parties have the right to appeal the decision to district court in Travis County.
-

Right to Use Private Property

The Commission is responsible for deciding whether to approve a CCN application for a proposed transmission line. If a transmission line route is approved that impacts your property, the electric utility must obtain the right from you to enter your property and to build, operate, and maintain the transmission line. This right is typically called an easement.

Utilities may buy easements through a negotiated agreement, but they also have the power of eminent domain (condemnation) under Texas law. Local courts, not the PUC, decide issues concerning easements for rights-of-way. The PUC does not determine the value of property.

The PUC final order in a transmission case normally requires a utility to take certain steps to minimize the impact of the new transmission line on landowners' property and on the environment. For example, the order normally requires steps to minimize the possibility of erosion during construction and maintenance activities.

HOW TO OBTAIN MORE INFORMATION

The PUC's online filings interchange on the PUC website provides free access to documents that are filed with the Commission in Central Records. The docket number, also called a control number on the PUC website, of a case is a key piece of information used in locating documents in the case. You may access the Interchange by visiting the PUC's website home page at www.puc.state.tx.us and navigate the website as follows:

- Select "Interchange Retrieval."
- Select "Retrieve Filings."
- Select "Filings Search"
- Enter 5-digit Control (Docket) Number. *No other information is necessary*.
- Select "Search." *All of the filings in the docket will appear in order of date filed.*
- Scroll down to select desired filing.
- Click on a blue "Item" number at left.
- Click on a "Download" icon at left.

Documents may also be purchased from and filed in Central Records. For more information on how to purchase or file documents, call Central Records at the PUC at 512-936-7180.

PUC Substantive Rule 25.101, Certification Criteria, addresses transmission line CCNs and is available on the PUC's website, or you may obtain copies of PUC rules from Central Records.

Always include the docket number on all filings with the PUC. You can find the docket number on the enclosed formal notice. Send documents to the PUC at the following address.

Public Utility Commission of Texas
Central Records
Attn: Filing Clerk
1701 N. Congress Avenue
P.O. Box 13326
Austin, TX 78711-3326

The information contained within this brochure is not intended to provide a comprehensive guide to landowner rights and responsibilities in transmission line cases at the PUC. This brochure should neither be regarded as legal advice nor should it be a substitute for the PUC's rules. However, if you have questions about the process in transmission line cases, you may call the PUC's Legal Division at 512-936-7261. The PUC's Legal Division may help you understand the process in a transmission line case but cannot provide legal advice or represent you in a case. You may choose to hire an attorney to decide whether to intervene in a transmission line case, and an attorney may represent you if you choose to intervene.

Communicating with Decision-Makers

Do not contact the ALJ or the Commissioners by telephone or email. They are not allowed to discuss pending cases with you. They may make their recommendations and decisions only by relying on the evidence, written pleadings, and arguments that are presented in the case.

Request to Intervene in PUC Docket No. _____

The following information must be submitted by the person requesting to intervene in this proceeding. This completed form will be provided to all parties in this docket. **If you DO NOT want to be an intervenor, but still want to file comments, please complete the "Comments" page.**

Mail this completed form and 10 copies to:

Public Utility Commission of Texas
Central Records
Attn: Filing Clerk
1701 N. Congress Ave.
P.O. Box 13326
Austin, TX 78711-3326

First Name: _____ Last Name: _____

Phone Number: _____ Fax Number: _____

Address, City, State: _____

I am requesting to intervene in this proceeding. As an INTERVENOR, I understand the following:

- I am a party to the case;
- I am required to respond to all discovery requests from other parties in the case;
- If I file testimony, I may be cross-examined in the hearing;
- If I file any documents in the case, I will have to provide a copy of that document to every other party in the case; and
- I acknowledge that I am bound by the Procedural Rules of the Public Utility Commission of Texas (PUC) and the State Office of Administrative Hearings (SOAH).

Please check one of the following:

☐ I own property with a habitable structure located near one or more of the utility's proposed routes for a transmission line.

☐ One or more of the utility's proposed routes would cross my property.

☐ Other. Please describe and provide comments. You may attach a separate page, if necessary. _____

_____

_____

_____

_____

Signature of person requesting intervention:

_____ Date: _____

Comments in Docket No. _____

If you want to be a PROTESTOR only, please complete this form. Although public comments are not treated as evidence, they help inform the PUC and its staff of the public concerns and identify issues to be explored. The PUC welcomes such participation in its proceedings.

Mail this completed form and 10 copies to:

Public Utility Commission of Texas
Central Records
Attn: Filing Clerk
1701 N. Congress Ave.
P.O. Box 13326
Austin, TX 78711-3326

First Name: _____ Last Name: _____

Phone Number: _____ Fax Number: _____

Address, City, State: _____

I am NOT requesting to intervene in this proceeding. As a PROTESTOR, I understand the following:

- I am NOT a party to this case;
- My comments are not considered evidence in this case; and
- I have no further obligation to participate in the proceeding.

Please check one of the following:

☐ I own property with a habitable structure located near one or more of the utility's proposed routes for a transmission line.

☐ One or more of the utility's proposed routes would cross my property.

☐ Other. Please describe and provide comments. You may attach a separate page, if necessary. _____

_____

_____

_____

_____

Signature of person submitting comments:

_____ Date: _____

THE STATE OF TEXAS

LANDOWNER'S BILL OF RIGHTS

PREPARED BY THE

OFFICE OF THE
ATTORNEY GENERAL OF TEXAS

STATE OF TEXAS LANDOWNER'S BILL OF RIGHTS

This Landowner's Bill of Rights applies to any attempt by the government or a private entity to take your property. The contents of this Bill of Rights are prescribed by the Texas Legislature in Texas Government Code Sec. 402.031 and Chapter 21 of the Texas Property Code.

1. You are entitled to receive adequate compensation if your property is taken for a public use.

2. Your property can only be taken for a public use.

3. Your property can only be taken by a governmental entity or private entity authorized by law to do so.

4. The entity that wants to take your property must notify you that it wants to take your property.

5. The entity proposing to take your property must provide you with a written appraisal from a certified appraiser detailing the adequate compensation you are owed for your property.

6. The entity proposing to take your property must make a bona fide offer to buy the property before it files a lawsuit to condemn the property – which means the condemning entity must make a good faith offer that conforms with Chapter 21 of the Texas Property Code.

7. You may hire an appraiser or other professional to determine the value of your property or to assist you in any condemnation proceeding.

8. You may hire an attorney to negotiate with the condemning entity and to represent you in any legal proceedings involving the condemnation.

9. Before your property is condemned, you are entitled to a hearing before a court appointed panel that includes three special commissioners. The special commissioners must determine the amount of compensation the condemning entity owes for the taking of your property. The commissioners must also determine what compensation, if any, you are entitled to receive for any reduction in value of your remaining property.

10. If you are unsatisfied with the compensation awarded by the special commissioners, or if you question whether the taking of your property was proper, you have the right to a trial by a judge or jury. If you are dissatisfied with the trial court's judgment, you may appeal that decision.

CONDEMNATION PROCEDURE

Eminent domain is the legal authority that certain entities are granted that allows those entities to take private property for a public use. Private property can include land and certain improvements that are on that property.

Private property may only be taken by a governmental entity or private entity that is authorized by law to do so. Your property may be taken only for a public purpose. That means it can only be taken for a purpose or use that serves the general public. Texas law prohibits condemnation authorities from taking your property to enhance tax revenues or foster economic development.

Your property cannot be taken without adequate compensation. Adequate compensation includes the market value of the property being taken. It may also include certain damages if your remaining property's market value is diminished by the acquisition itself or by the way the condemning entity will use the property.

HOW THE TAKING PROCESS BEGINS

The taking of private property by eminent domain must follow certain procedures. First, the entity that wants to condemn your property must provide you a copy of this Landowner's Bill of Rights before - or at the same time - the entity first represents to you that it possesses eminent domain authority.

Second, if it has not been previously provided, the condemning entity must send this Landowner's Bill of Rights to the last known address of the person who is listed as the property owner on the most recent tax roll. This requirement stipulates that the Landowner's Bill of Rights must be provided to the property owner at least seven days before the entity makes a final offer to acquire the property.

Third, the condemning entity must make a bona fide offer to purchase the property. The requirements for a bona fide offer are contained in Chapter 21 of the Texas Property Code. At the time a purchase offer is made, the condemning entity must disclose any appraisal reports it produced or acquired that relate specifically to the property and were prepared in the ten years preceding the date of the purchase offer. You have the right to discuss the offer with others and to either accept or reject the offer made by the condemning entity.

CONDEMNATION PROCEEDINGS

If you and the condemning entity do not agree on the value of your property, the entity may begin condemnation proceedings. Condemnation is the legal process that eligible entities utilize to take private property. It begins with a condemning entity filing a claim for your property in court. If you live in a county where part of the property being condemned is located, the claim must be filed in that county. Otherwise, the condemnation claim can be filed in any county where at least part of the property being condemned is located. The claim must describe the property being condemned, state with specificity the public use, state the name of the landowner, state that the landowner and the condemning entity were unable to agree on the value of the property, state that the condemning entity provided the landowner with the Landowner's Bill of Rights, and state that the condemning entity made a bona fide offer to acquire the property from the property owner voluntarily.

SPECIAL COMMISSIONERS' HEARING

After the condemning entity files a condemnation claim in court, the judge will appoint three local landowners to serve as special commissioners. The judge will give you a reasonable period to strike one of the special commissioners. If a commissioner is struck, the judge will appoint a replacement. These special commissioners must live in the county where the condemnation proceeding is filed, and they must take an oath to assess the amount of adequate compensation fairly, impartially, and according to the law. The special commissioners are not legally authorized to decide whether the condemnation is necessary or if the public use is proper. Their role is limited to assessing adequate compensation for you. After being appointed, the special commissioners must schedule a hearing at the earliest practical time and place. The special commissioners are also required to give you written notice of the condemnation hearing.

You are required to provide the condemning entity any appraisal reports that were used to determine your claim about adequate compensation for the condemned property. Under a new law enacted in 2011, landowners' appraisal reports must be provided to the condemning entity either ten days after the landowner receives the report or three business days before the special commissioners' hearing - whichever is earlier. You may hire an appraiser or real estate professional to help you determine the value of your private property. Additionally, you can hire an attorney to represent you during condemnation proceedings.

At the condemnation hearing, the special commissioners will consider your evidence on the value of your condemned property, the damages to remaining property, any value added to the remaining property as a result of the condemnation, and the condemning entity's proposed use of your condemned property.

SPECIAL COMMISSIONERS' AWARD

After hearing evidence from all interested parties, the special commissioners will determine the amount of money that you should be awarded to adequately compensate you for your property. The special commissioners' decision is significant to you not only because it determines the amount that qualifies as adequate compensation, but also because it impacts who pays for the cost of the condemnation proceedings. Under the Texas Property Code, if the special commissioners' award is less than or equal to the amount the condemning entity offered to pay before the proceedings began, then you may be financially responsible for the cost of the condemnation proceedings. However, if the special commissioners' award is more than the condemning entity offered to pay before the proceedings began, then the condemning entity will be responsible for the costs associated with the proceedings.

The special commissioners are required to provide the court that appointed them a written decision. That decision is called the "Award." The Award must be filed with the court and the court must send written notice of the Award to all parties. After the Award is filed, the condemning entity may take possession of the property being condemned, even if either party appeals the Award of the special commissioners. To take possession of the property, the condemning entity must either pay the amount of the Award or deposit the amount of the Award into the court's registry. You have the right to withdraw funds that are deposited into the registry of the court.

OBJECTION TO THE SPECIAL COMMISSIONERS' AWARD

If either the landowner or the condemning entity is dissatisfied with the amount of the Award, either party can formally object to the Award. In order to successfully make this valuation objection, it must be filed in writing with the court. If neither party timely objects to the special commissioners' Award, the court will adopt the Award as the final judgment of the court.

If a party timely objects to the special commissioners' Award, the court will hear the case in the same manner that other civil cases are heard. Landowners who object to the Award and ask the court to hear the matter have the right to a trial and can elect whether to have the case decided by a judge or jury. The allocation of any trial costs is decided in the same manner that costs are allocated with the special commissioners' Award. After trial, either party may appeal any judgment entered by the court.

DISMISSAL OF THE CONDEMNATION ACTION

A condemning entity may file a motion to dismiss the condemnation proceeding if it decides it no longer needs your condemned property. If the court grants the motion to dismiss, the case is over and you are entitled to recover reasonable and necessary fees for attorneys, appraisers, photographers, and for other expenses incurred to the date of the hearing on the motion to dismiss.

If you wish to challenge the condemning entity's authority to take your property, you can lodge that challenge by filing a motion to dismiss the condemnation proceeding. Such a motion to dismiss would allege that the condemning entity did not have the right to condemn your property. For example, a landowner could challenge the condemning entity's claim that it seeks to take the property for a public use. If the court grants the landowner's motion, the court may award the landowner reasonable and necessary fees for attorneys, appraisers, photographers, and for other expenses incurred to the date of the hearing or judgment.

RELOCATION COSTS

If you are displaced from your residence or place of business, you may be entitled to reimbursement for reasonable expenses incurred while moving personal property from the residence or relocating the business to a new site. However, during condemnation proceedings, reimbursement for relocation costs may not be available if those costs are separately recoverable under another law. Texas law limits the total amount of available relocation costs to the market value of the property being moved. Further, the law provides that moving costs are limited to the amount that a move would cost if it were within 50 miles.

RECLAMATION OPTIONS

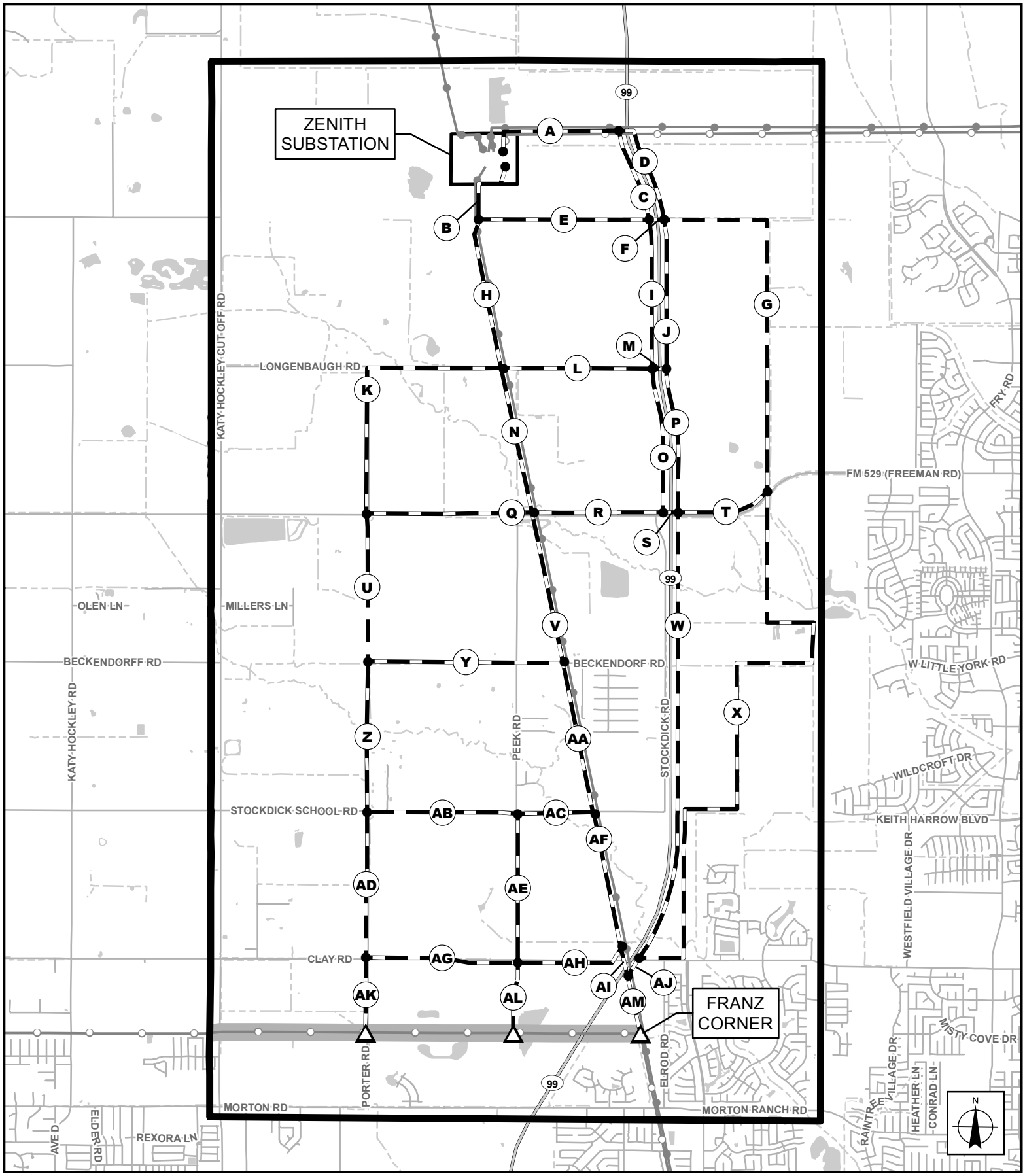
If private property was condemned by a governmental entity, and the public use for which the property was acquired is canceled before that property is used for that public purpose, no actual progress is made toward the public use within ten years or the property becomes unnecessary for public use within ten years, landowners may have the right to repurchase the property for the price paid to the owner by the entity at the time the entity acquired the property through eminent domain.

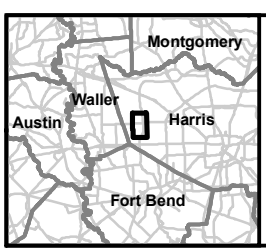
DISCLAIMER

The information in this statement is intended to be a summary of the applicable portions of Texas state law as required by HB 1495, enacted by the 80th Texas Legislature, Regular Session. This statement is not legal advice and is not a substitute for legal counsel.

ADDITIONAL RESOURCES

Further information regarding the procedures, timelines and requirements outlined in this document can be found in Chapter 21 of the Texas Property Code.





STUDY AREA
PRELIMINARY TIE POINT
EXISTING SUBSTATION
STATE HIGHWAY
LOCAL ROAD

PRELIMINARY TRANSMISSION LINE SEGMENT
EXISTING 345 KV TRANSMISSION LINE
EXISTING 138 KV TRANSMISSION LINE
EXISTING 138 KV TRANSMISSION LINE POTENTIAL CONNECTION CORRIDOR
STREAM / DRAINAGE
OPEN WATER

138 KV ZENITH-FRANZ PROJECT
PRELIMINARY TRANSMISSION LINE SEGMENTS

CenterPoint Energy
HDR

CenterPoint Energy Electric Transmission & Distribution

Electric Market in Houston
Power Quality & Reliability
News & Information
Tariffs
Wholesale Transmission
Oyster Creek Transmission Project
Zenith-Franz Transmission Project
Brazos Valley Connection

Zenith-Franz Project

Proposed 138 kV Transmission Line in Harris County

Why is the proposed transmission line needed?
The Zenith-Franz project is part of an interrelated set of improvements that are needed to improve the reliability of the electric transmission system and serve the projected load growth in the Katy area located in Harris County near the interchange of Interstate Highway (IH) 10 and State Highway (SH) 99, known as the Grand Parkway.

Proposed Project
CenterPoint Energy proposes to construct a new 138 kV double-circuit transmission line, connecting an existing 138 kV transmission line to the existing CenterPoint Energy Zenith Substation located in northwest Harris County.

Who must approve this project before it is constructed?
CenterPoint Energy will file an application for a Certificate of Convenience and Necessity (CCN) with the Public Utility Commission of Texas (PUCT) which regulates CenterPoint Energy, and the PUCT will decide whether the application should be approved and on which route the transmission line should be constructed.

The page was last updated August 27, 2014. Additional information related to the project will be added to this page as it becomes available. Please check back regularly for updates.

CCN Application Preparatory Phase Documents

- Newspaper Notice for Public Meeting
- Landowner Notice Letter for Public Meeting
- FAQs
- Welcome to Zenith-Franz Public Meeting
- Zenith-Franz Public Meeting Presentation New
- PUC Certification Process Display
- Zenith-Franz Project Schedule Display
- Zenith-Franz Project Need Displays
- Transmission Construction Displays
- Preliminary Transmission Line Segments & Constraints Map Overview
- Preliminary Transmission Line Segments & Constraints Map Pg. 1
- Preliminary Transmission Line Segments & Constraints Map Pg. 2
- Evaluation Criteria Display
- List of Agencies Contacted Display
- Zenith-Franz Questionnaire (Respond by August 31, 2014)
- Example Letter – Federal
- Example Letter – State
- Example Letter – Regional
- Example Letter - Local

PUCT Documents

- Landowners and Transmission Line Cases at the PUC
- Landowner Protestor form
- Request to Intervene form

Transmission System Electrical Studies

- CNP Study
- CNP Submittal Letter to ERCOT
- ERCOT Independent Study
- ERCOT Acceptance Letter

Electric and Magnetic Fields (EMF)

- CenterPoint Energy EMF Information
- PUC Study on EMF

Other Related Links

- Public Utility Commission of Texas
- The State of Texas Landowner's Bill of Rights

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Appendix C

Environmental Data for Primary Transmission Line Segments and Routes

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Table 4-1
ENVIRONMENTAL DATA FOR 138 KV ZENITH-FRANZ PRIMARY TRANSMISSION LINE SEGMENTS

	Evaluation Criteria	Primary Transmission Line Segments														
	Land Use	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**
1	Length of route (feet)	4,998	2,858	3,369	3,878	6,103	488	13,417	5,409	5,276	5,279	10,044	5,320	487	5,341	5,247
2	Length of route (miles)	0.95	0.54	0.64	0.73	1.16	0.09	2.54	1.02	1.00	1.00	1.90	1.01	0.09	1.01	0.99
3	Number of habitable structures[1] within 300 feet of route centerline	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0
4	Number of habitable structures[1] in previous criterion also currently "directly affected" by an existing transmission line	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Length of route using existing transmission line easement and/or CenterPoint-owned property[2]	4,998	2,857	72	591	37	15	0	5,363	0	0	0	0	0	5,321	0
6	Length of new ROW required for route[2]	0	0	3,298	3,287	6,066	473	13,417	0	5,276	5,279	10,044	5,320	487	0	5,247
7	Length of route proposed to overbuild existing distribution	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Length of route not proposed to overbuild existing distribution	4,998	2,858	3,369	3,878	6,103	488	13,417	5,409	5,276	5,279	10,044	5,320	487	5,341	5,247
9	Length of route parallel to existing transmission line ROW	4,110	1,267	0	520	0	0	0	5,058	0	0	0	0	0	5,341	0
10	Length of route not utilizing/paralleling existing transmission line ROW	888	1,591	3,369	3,358	6,103	488	13,417	352	5,276	5,279	10,044	5,320	487	0	5,247
11	Length of route paralleling apparent property lines	0	793	0	0	6,103	0	13,389	0	0	0	0	0	0	0	0
12	Length of route parallel to other existing ROW (roadway, canals, etc.)	0	0	3,369	3,358	0	0	0	0	5,276	5,279	10,044	5,320	471	0	5,247
13	Length of route not parallel to existing ROW	888	798	0	0	0	488	28	352	0	0	0	0	16	0	0
14	Percent of route parallel with apparent features, property lines, or an existing ROW	82	72	100	100	100	0	100	94	100	100	100	100	97	100	100
15	Length of route across parks/recreational areas[3]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	Number of additional parks/recreational areas[3] within 1,000 feet of route centerline	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0
17	Length of route across residential areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	Length of route across commercial/industrial areas	799	1,616	0	0	0	0	0	0	0	0	0	0	0	230	0
19	Length of route across agricultural land/cropland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Length of route across pastureland	0	1,242	3,190	3,165	6,103	83	8,641	4,852	5,217	4,986	0	3,389	0	1,271	4,882
21	Length of route across mobile irrigated cropland or pastureland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	Number of pipeline crossings	0	0	0	0	0	0	4	0	0	0	0	0	0	0	4
23	Number of transmission line crossings	0	0	1	1	0	0	0	1	0	0	0	1	0	0	0
24	Number of U.S. and state highway crossings	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0
25	Number of F.M. road crossings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Number of county road crossings	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0
27	Number of cemeteries within 1,000 feet of the route centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	Number of heliports within 5,000 feet of route centerline	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
29	Number of private airstrips within 10,000 feet of route centerline	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
30	Number of FAA-listed airfields within 10,000 feet of route centerline having no runway more than 3,200 feet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	Number of FAA-listed airfields within 20,000 feet of route centerline having at least one runway more than 3,200 feet	1	1	1	1	1	1	0	1	1	0	1	1	0	1	0
32	Number of commercial AM radio transmitters within 10,000 feet of route centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	Number of FM radio transmitters, microwave relay stations, and other electronic installations etc. within 2,000 feet of route centerline	1	1	0	0	1	0	0	1	0	0	1	0	0	0	0
	Aesthetics															
34	Estimated length of route within foreground visual zone of U.S. and state highways[4]	2,362	0	3,369	3,878	2,441	488	2,431	0	5,276	5,279	0	2,377	487	0	5,247
35	Estimated length of route within foreground visual zone of FM and county roads[4]	2,362	0	3,369	3,878	2,441	488	5,497	2,718	5,276	5,279	10,044	5,320	487	5,324	5,247
36	Estimated length of route within foreground visual zone of park and recreational areas[3][4]	3,990	2,858	0	0	3,976	0	0	2,688	0	0	0	0	0	0	0
	Ecology															
37	Length of route across upland woodlands	0	0	0	0	688	0	4,578	0	1,013	0	0	77	0	0	527
38	Length of route across bottomland/riparian woodlands	0	0	0	0	0	0	0	0	0	0	0	0	0	401	624
39	Length of route across potential wetlands	386	0	0	0	0	0	0	599	0	0	0	0	0	144	407
40	Length of route across known habitat of federal endangered/threatened species of plants or animals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41	Length of route across open water (lakes or ponds)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	Number of stream crossings	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
43	Length of route parallel to streams within 100 feet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	Length of route across 100-year floodplains	0	0	174	1,423	1,854	0	0	5,355	0	0	10,044	4,498	0	5,341	1,067
	Cultural Resources															
45	Number of recorded cultural resource sites crossed within ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	Number of additional recorded cultural resource sites within 1,000 feet of route centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47	Number of National Register of Historic Places listed or determined-eligible properties within ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	Number of additional National of Register Historic Places listed or determined-eligible properties within 1,000 feet of route centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	Length of route across areas of high archaeological/historic site potential	421	0	2,450	2,692	3,830	488	0	4,505	0	0	1,370	0	0	0	2,287

[1] Single-family and multi-family dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a regular basis.
[2] Apparent property boundaries created by existing roads, highway, or railroad ROW are not "double counted" in the length of ROW parallel to apparent property boundaries criteria. Appraisal district information was readily availabel for Harris County.
[3] Park and recreation areas owned by a governmental body or an organized group, club, or church.
[4] Half mile, unobstructed.

Note: All measurements in feet unless noted otherwise. All linear measurements were obtained from aerial photography flown in 2013, with the exception of high probability areas for archaeological historical/resources which were measured from USGS Topographic Quadrangles using GIS software.

Table 4-1
ENVIRONMENTAL DATA FOR 138 KV ZENITH-FRANZ PRIMARY TRANSMISSION LINE SEGMENTS

	Evaluation Criteria	Primary Transmission Line Segments														
	Land Use	**P**	**Q**	**R**	**S**	**T**	**U**	**V**	**W**	**X**	**Y**	**Z**	**AA**	**AB**	**AC**	**AD**
1	Length of route (feet)	5,255	5,943	4,604	512	3,444	5,326	5,422	16,167	24,501	7,007	5,309	5,446	5,328	2,802	5,238
2	Length of route (miles)	1.00	1.13	0.87	0.10	0.65	1.01	1.03	3.06	4.64	1.33	1.01	1.03	1.01	0.53	0.99
3	Number of habitable structures[1] within 300 feet of route centerline	0	0	1	0	0	0	1	0	0	4	0	7	7	8	0
4	Number of habitable structures[1] in previous criterion also currently "directly affected" by an existing transmission line	0	0	0	0	0	0	1	0	0	1	0	7	0	0	0
5	Length of route using existing transmission line easement and/or CenterPoint-owned property[2]	0	0	186	0	0	0	5,291	0	0	86	0	5,344	0	0	0
6	Length of new ROW required for route[2]	5,255	5,943	4,409	512	3,444	5,326	0	16,167	24,501	6,922	5,309	0	5,328	2,802	5,238
7	Length of route proposed to overbuild existing distribution	0	5,943	4,604	512	3,444	0	0	0	0	1,695	0	0	5,247	2,802	0
8	Length of route not proposed to overbuild existing distribution	5,255	0	0	0	0	5,326	5,422	16,167	24,501	5,312	5,309	5,446	81	0	5,238
9	Length of route parallel to existing transmission line ROW	0	0	0	0	0	0	5,422	0	0	0	0	5,446	0	0	0
10	Length of route not utilizing/paralleling existing transmission line ROW	5,255	5,943	4,604	512	3,444	5,326	0	16,167	24,501	7,007	5,309	0	5,328	2,802	5,238
11	Length of route paralleling apparent property lines	0	0	0	0	0	5,326	0	0	24,162	5,262	5,292	0	0	0	0
12	Length of route parallel to other existing ROW (roadway, canals, etc.)	5,255	5,943	4,604	512	3,444	0	0	16,167	0	1,700	17	0	5,328	2,802	5,238
13	Length of route not parallel to existing ROW	0	0	0	0	0	0	0	0	339	45	0	0	0	0	0
14	Percent of route parallel with apparent features, property lines, or an existing ROW	100	100	100	100	100	100	100	100	99	99	100	100	100	100	100
15	Length of route across parks/recreational areas[3]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	Number of additional parks/recreational areas[3] within 1,000 feet of route centerline	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
17	Length of route across residential areas	0	0	0	0	0	0	0	0	0	0	0	804	0	0	0
18	Length of route across commercial/industrial areas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	Length of route across agricultural land/cropland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Length of route across pastureland	2,616	5,875	8	0	0	5,226	3,178	7,864	7,531	4,595	5,273	0	0	0	0
21	Length of route across mobile irrigated cropland or pastureland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	Number of pipeline crossings	4	0	4	0	0	0	4	7	7	4	7	4	1	0	4
23	Number of transmission line crossings	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
24	Number of U.S. and state highway crossings	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
25	Number of F.M. road crossings	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0
26	Number of county road crossings	0	1	0	0	0	0	0	0	0	1	1	2	2	0	0
27	Number of cemeteries within 1,000 feet of the route centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	Number of heliports within 5,000 feet of route centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	Number of private airstrips within 10,000 feet of route centerline	0	1	0	0	0	2	0	0	0	2	2	0	1	1	1
30	Number of FAA-listed airfields within 10,000 feet of route centerline having no runway more than 3,200 feet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	Number of FAA-listed airfields within 20,000 feet of route centerline having at least one runway more than 3,200 feet	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
32	Number of commercial AM radio transmitters within 10,000 feet of route centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	Number of FM radio transmitters, microwave relay stations, and other electronic installations etc. within 2,000 feet of route centerline	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0
	Aesthetics															
34	Estimated length of route within foreground visual zone of U.S. and state highways[4]	5,255	0	2,371	512	2,419	0	0	16,167	14,352	0	0	0	0	0	0
35	Estimated length of route within foreground visual zone of FM and county roads[4]	5,255	5,943	4,604	512	3,444	2,693	5,422	16,167	20,100	4,344	4,215	5,446	5,328	2,802	5,238
36	Estimated length of route within foreground visual zone of park and recreational areas[3][4]	0	0	0	0	0	0	0	4,723	6,226	0	0	0	1,154	0	0
	Ecology															
37	Length of route across upland woodlands	1,274	0	0	0	915	91	0	4,195	5,215	294	81	239	0	0	0
38	Length of route across bottomland/riparian woodlands	0	296	243	0	0	0	95	719	4,686	0	518	158	0	0	0
39	Length of route across potential wetlands	0	354	362	0	0	0	294	1,052	806	0	133	0	0	0	0
40	Length of route across known habitat of federal endangered/threatened species of plants or animals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41	Length of route across open water (lakes or ponds)	0	0	0	0	0	0	177	88	0	0	0	0	0	0	0
42	Number of stream crossings	0	0	0	0	0	0	0	2	2	0	1	0	0	1	0
43	Length of route parallel to streams within 100 feet	0	0	331	0	0	0	0	0	130	0	0	0	0	0	0
44	Length of route across 100-year floodplains	695	5,943	4,479	466	596	5,326	5,422	6,457	7,779	7,007	4,278	2,773	1,612	1,982	18
	Cultural Resources															
45	Number of recorded cultural resource sites crossed within ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	Number of additional recorded cultural resource sites within 1,000 feet of route centerline	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
47	Number of National Register of Historic Places listed or determined-eligible properties within ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	Number of additional National of Register Historic Places listed or determined-eligible properties within 1,000 feet of route centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	Length of route across areas of high archaeological/historic site potential	2,616	613	0	0	1,724	0	1,865	2,582	1,868	0	0	217	0	0	0

[1] Single-family and multi-family dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a regular basis.
[2] Apparent property boundaries created by existing roads, highway, or railroad ROW are not "double counted" in the length of ROW parallel to apparent property boundaries criteria. Appraisal district information was readily availabel for Harris County.
[3] Park and recreation areas owned by a governmental body or an organized group, club, or church.
[4] Half mile, unobstructed.

Note: All measurements in feet unless noted otherwise. All linear measurements were obtained from aerial photography flown in 2013, with the exception of high probability areas for archaeological historical/resources which were measured from USGS Topographic Quadrangles using GIS software.

Table 4-1
ENVIRONMENTAL DATA FOR 138 KV ZENITH-FRANZ PRIMARY TRANSMISSION LINE SEGMENTS

	Evaluation Criteria	Primary Transmission Line Segments								
	Land Use	**AE**	**AF**	**AG**	**AH**	**AI**	**AJ**	**AK**	**AL**	**AM**
1	Length of route (feet)	5,309	4,889	5,361	4,053	1,024	661	2,643	2,569	2,143
2	Length of route (miles)	1.01	0.93	1.02	0.77	0.19	0.13	0.50	0.49	0.41
3	Number of habitable structures[1] within 300 feet of route centerline	25	0	0	0	0	0	2	0	13
4	Number of habitable structures[1] in previous criterion also currently "directly affected" by an existing transmission line	0	0	0	0	0	0	1	0	13
5	Length of route using existing transmission line easement and/or CenterPoint-owned property[2]	0	4,878	0	43	961	276	38	34	2,143
6	Length of new ROW required for route[2]	5,309	0	5,361	4,010	0	385	2,605	2,535	0
7	Length of route proposed to overbuild existing distribution	3,073	0	5,298	3,932	0	0	0	0	0
8	Length of route not proposed to overbuild existing distribution	2,236	4,889	63	121	1,024	661	2,643	2,569	2,143
9	Length of route parallel to existing transmission line ROW	0	4,889	0	0	1,024	0	0	0	2,143
10	Length of route not utilizing/paralleling existing transmission line ROW	5,309	0	5,361	4,053	0	661	2,643	2,569	0
11	Length of route paralleling apparent property lines	0	0	0	460	0	0	0	1,969	0
12	Length of route parallel to other existing ROW (roadway, canals, etc.)	5,309	0	4,557	3,423	0	661	2,643	0	0
13	Length of route not parallel to existing ROW	0	0	804	170	0	0	0	600	0
14	Percent of route parallel with apparent features, property lines, or an existing ROW	100	100	85	96	100	100	100	77	100
15	Length of route across parks/recreational areas[3]	0	0	0	0	0	0	0	0	0
16	Number of additional parks/recreational areas[3] within 1,000 feet of route centerline	1	0	0	0	0	0	1	0	2
17	Length of route across residential areas	0	0	0	0	0	0	0	0	912
18	Length of route across commercial/industrial areas	0	0	0	0	0	0	0	0	0
19	Length of route across agricultural land/cropland	0	0	0	0	0	0	0	0	0
20	Length of route across pastureland	0	2,177	0	484	0	224	0	0	0
21	Length of route across mobile irrigated cropland or pastureland	0	0	0	0	0	0	0	0	0
22	Number of pipeline crossings	3	3	0	0	0	0	0	0	0
23	Number of transmission line crossings	0	0	0	0	0	1	0	0	0
24	Number of U.S. and state highway crossings	0	0	0	0	1	0	0	0	0
25	Number of F.M. road crossings	0	0	0	0	0	0	0	0	0
26	Number of county road crossings	1	0	2	1	1	1	1	0	0
27	Number of cemeteries within 1,000 feet of the route centerline	0	0	0	0	0	0	0	0	0
28	Number of heliports within 5,000 feet of route centerline	0	0	0	0	0	0	0	0	0
29	Number of private airstrips within 10,000 feet of route centerline	1	0	1	1	0	0	1	1	0
30	Number of FAA-listed airfields within 10,000 feet of route centerline having no runway more than 3,200 feet	0	0	0	0	0	0	0	0	0
31	Number of FAA-listed airfields within 20,000 feet of route centerline having at least one runway more than 3,200 feet	0	0	0	0	0	0	0	0	0
32	Number of commercial AM radio transmitters within 10,000 feet of route centerline	0	0	0	0	0	0	0	0	0
33	Number of FM radio transmitters, microwave relay stations, and other electronic installations etc. within 2,000 feet of route centerline	0	1	0	1	1	1	0	0	1
	Aesthetics									
34	Estimated length of route within foreground visual zone of U.S. and state highways[4]	0	4,663	0	3,164	1,024	661	0	1,044	2,143
35	Estimated length of route within foreground visual zone of FM and county roads[4]	5,309	4,889	5,361	4,053	1,024	661	2,643	2,569	2,143
36	Estimated length of route within foreground visual zone of park and recreational areas[3][4]	5,270	0	3,701	1,051	533	661	2,332	2,569	2,143
	Ecology									
37	Length of route across upland woodlands	0	440	0	0	0	0	0	442	0
38	Length of route across bottomland/riparian woodlands	0	782	0	0	0	0	0	0	0
39	Length of route across potential wetlands	0	0	0	0	0	0	0	0	0
40	Length of route across known habitat of federal endangered/threatened species of plants or animals	0	0	0	0	0	0	0	0	0
41	Length of route across open water (lakes or ponds)	0	0	0	0	0	0	0	0	0
42	Number of stream crossings	0	1	0	0	0	0	0	0	0
43	Length of route parallel to streams within 100 feet	0	0	0	0	0	0	0	0	0
44	Length of route across 100-year floodplains	0	3,035	0	0	0	19	0	0	0
	Cultural Resources									
45	Number of recorded cultural resource sites crossed within ROW	0	0	0	0	0	0	0	0	0
46	Number of additional recorded cultural resource sites within 1,000 feet of route centerline	0	0	0	0	0	0	0	0	0
47	Number of National Register of Historic Places listed or determined-eligible properties within ROW	0	0	0	0	0	0	0	0	0
48	Number of additional National of Register Historic Places listed or determined-eligible properties within 1,000 feet of route centerline	0	0	0	0	0	0	0	0	0
49	Length of route across areas of high archaeological/historic site potential	0	2,080	0	547	642	336	0	0	0

[1] Single-family and multi-family dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a regular basis.
[2] Apparent property boundaries created by existing roads, highway, or railroad ROW are not "double counted" in the length of ROW parallel to apparent property boundaries criteria. Appraisal district information was readily availabel for Harris County.
[3] Park and recreation areas owned by a governmental body or an organized group, club, or church.
[4] Half mile, unobstructed.

Note: All measurements in feet unless noted otherwise. All linear measurements were obtained from aerial photography flown in 2013, with the exception of high probability areas for archaeological historical/resources which were measured from USGS Topographic Quadrangles using GIS software.

Table 4-2
ENVIRONMENTAL DATA FOR 138 KV ZENITH-FRANZ PRIMARY TRANSMISSION LINE ROUTES

	Evaluation Criteria	Primary Transmission Line Routes														
	Land Use	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
1	Length of route (feet)	49,599	44,714	38,381	38,379	38,955	38,300	37,701	32,532	35,156	35,987	36,826	38,067	39,227	42,151	42,114
2	Length of route (miles)	9.39	8.47	7.27	7.27	7.38	7.25	7.14	6.16	6.66	6.82	6.97	7.21	7.43	7.98	7.98
3	Number of habitable structures[1] within 300 feet of route centerline	13	13	13	13	13	13	14	20	36	7	11	2	6	37	9
4	Number of habitable structures[1] in previous criterion also currently "directly affected" by an existing transmission lin	13	13	13	13	13	13	13	20	7	7	1	1	2	0	0
5	Length of route using existing transmission line easement and/or CenterPoint-owned property[2	8,008	8,008	8,008	7,488	5,329	10,639	16,146	32,532	24,210	29,132	8,258	13,579	18,956	8,254	8,254
6	Length of new ROW required for route[2]	41,591	36,706	30,374	30,890	33,625	27,614	21,474	0	10,645	6,545	28,522	24,421	20,159	33,851	33,813
7	Length of route proposed to overbuild existing distributior	0	3,444	0	512	0	0	5,116	0	5,874	3,932	0	5,943	1,695	8,319	5,298
8	Length of route not proposed to overbuild existing distributior	49,599	41,270	38,381	37,867	38,955	38,300	32,585	32,532	29,282	32,055	36,826	32,124	37,532	33,832	36,816
9	Length of route parallel to existing transmission line ROW	6,773	6,773	6,773	6,254	3,410	8,468	13,809	30,590	22,534	27,423	6,325	11,666	17,088	6,325	6,325
10	Length of route not utilizing/paralleling existing transmission line ROW	42,826	37,941	31,608	32,125	35,545	29,832	23,892	1,942	12,622	8,564	30,501	26,401	22,139	35,826	35,789
11	Length of route paralleling apparent property lines	37,551	13,389	0	0	6,896	793	793	793	2,762	3,222	11,411	11,411	11,347	13,380	13,380
12	Length of route parallel to other existing ROW (roadway, canals, etc.	4,019	23,631	30,721	31,233	27,363	27,874	21,945	0	8,110	3,423	17,942	13,841	9,598	20,698	19,856
13	Length of route not parallel to existing ROW	1,256	921	887	892	1,286	1,165	1,154	1,149	1,750	1,919	1,148	1,149	1,194	1,748	2,553
14	Percent of route parallel with apparent features, property lines, or an existing ROW	97	98	98	98	97	97	97	96	95	95	97	97	97	96	94
15	Length of route across parks/recreational areas[3]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	Number of additional parks/recreational areas[3] within 1,000 feet of route centerline	5	4	4	4	4	4	4	4	3	2	3	3	3	3	2
17	Length of route across residential areas	912	912	912	912	912	912	912	1,716	804	804	0	0	0	0	0
18	Length of route across commercial/industrial areas	799	799	799	799	1,616	1,616	1,846	1,846	1,846	1,846	1,616	1,846	1,846	1,616	1,616
19	Length of route across agricultural land/cropland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Length of route across pastureland	19,562	19,895	18,856	21,377	23,119	20,187	15,461	12,719	10,542	13,203	16,593	23,739	20,411	16,593	16,593
21	Length of route across mobile irrigated cropland or pasturelanc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	Number of pipeline crossings	11	11	11	11	11	11	11	11	11	11	11	11	17	11	11
23	Number of transmission line crossings	2	2	2	2	1	3	3	1	1	1	1	1	1	1	1
24	Number of U.S. and state highway crossings	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
25	Number of F.M. road crossings	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
26	Number of county road crossings	1	1	1	2	1	2	2	4	4	4	4	4	4	6	5
27	Number of cemeteries within 1,000 feet of the route centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	Number of heliports within 5,000 feet of route centerline	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
29	Number of private airstrips within 10,000 feet of route centerline	0	0	0	0	0	0	0	0	1	0	2	2	1	2	2
30	Number of FAA-listed airfields within 10,000 feet of route centerline having no runway more than 3,200 fee	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	Number of FAA-listed airfields within 20,000 feet of route centerline having at least one runway more than 3,200 fee	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
32	Number of commercial AM radio transmitters within 10,000 feet of route centerline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
33	Number of FM radio transmitters, microwave relay stations, and other electronic installations etc. within 2,000 feet of route centerlin	2	2	2	2	2	2	2	3	2	3	2	1	1	2	2
	Aesthetics															
34	Estimated length of route within foreground visual zone of U.S. and state highways[4	25,827	30,067	35,745	35,743	32,435	27,091	21,860	7,830	1,044	8,872	0	0	0	1,044	1,044
35	Estimated length of route within foreground visual zone of FM and county roads[4	23,095	25,451	26,787	27,334	26,787	32,646	32,099	26,949	29,589	30,404	25,994	27,217	28,347	31,319	31,281
36	Estimated length of route within foreground visual zone of park and recreational areas[3][4	13,020	11,517	11,517	11,517	14,360	13,073	13,073	8,222	13,385	9,166	7,877	7,877	7,877	14,539	11,816
	Ecology															
37	Length of route across upland woodlands	9,794	9,688	5,469	5,735	6,157	5,546	4,195	680	682	1,122	172	172	375	614	614
38	Length of route across bottomland/riparian woodlands	4,686	719	719	1,343	719	719	1,363	1,436	654	1,436	518	1,216	1,014	518	518
39	Length of route across potential wetlands	1,192	1,438	1,438	1,845	1,052	1,651	2,157	1,036	1,036	1,036	732	1,229	1,169	732	732
40	Length of route across known habitat of federal endangered/threatened species of plants or animal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41	Length of route across open water (lakes or ponds)	0	88	88	88	88	88	88	177	177	177	0	0	177	0	0
42	Number of stream crossings	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
43	Length of route parallel to streams within 100 feet	130	0	0	0	0	0	329	0	0	0	0	0	0	0	0
44	Length of route across 100-year floodplains	9,221	8,500	8,594	8,189	9,025	17,024	22,123	21,926	20,874	21,926	25,021	26,261	27,422	26,615	25,021
	Cultural Resources															
45	Number of recorded cultural resource sites crossed within ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	Number of additional recorded cultural resource sites within 1,000 feet of route centerline	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
47	Number of National Register of Historic Places listed or determined-eligible properties within ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	Number of additional National of Register Historic Places listed or determined-eligible properties within 1,000 feet of route centerlin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	Length of route across areas of high archaeological/historic site potentia	5,318	7,756	8,648	8,087	9,853	10,040	7,424	9,309	6,587	9,214	5,875	5,118	6,370	5,875	5,875

[1] Single-family and multi-family dwellings and related structures, mobile homes, apartment buildings, commercial structures, industrial structures business structures, churches, hospitals, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on regular basis.
[2] Apparent property boundaries created by existing roads, highway, or railroad ROW are not "double counted" in the length of ROW parallel t apparent property boundaries criteria. Appraisal district information was readily availabel for Harris County
[3] Park and recreation areas owned by a governmental body or an organized group, club, or church
[4] Half mile, unobstructed.

Note: All measurements in feet unless noted otherwise. All linear measurements were obtained from aerial photography flown in 2013, with th exception of high probability areas for archaeological historical/resources which were measured from USGS Topographic Quadrangles using GI software.

Appendix D

Habitable Structures and Other Land Use Features in the Vicinity of the Proposed Alternative Routes (Figure 5-1)

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