offices located in Austin, the Lindendale School located on FM 1888, and the Stonewall Volunteer Fire Department. The purpose of the meetings was to inform the landowners or their representatives about the proposed Blumenthal Project, the transmission line routing process, the PUC process, and to gather information from the landowners/representatives about potential routing constraints on their property and issues/concerns the landowners had about potential route segments, tap points, or substation locations on or near their property.

Some of the more common concerns or issues presented by the landowners at the open house and afterwards during individual and group meetings held with LCRA staff included, but are not limited to, the following: proximity of the routes, tap points and substation locations to homes; potential environmental impacts such as impacts to wildlife habitat, trees and streams; aesthetic or visual impacts caused by visibility of the substation/transmission lines/tap points; impacts to property values; impacts on agricultural, retail, recreational, tourism and other businesses; and impacts to properties protected with conservation easements.

In addition to the individual and group meetings held with landowners, LCRA staff participated in a landowner workshop hosted by the Hill Country Alliance [HCA] in Fredericksburg on Saturday, September 6, 2014. Approximately 100 landowners and interested parties attended the HCA event. LCRA staff provided a presentation on the Blumenthal Project, including information on the purpose/need of the project, status of the project, the transmission line routing process, and the PUC's process for selecting the route for new electric transmission line projects. After the presentation, LCRA staff addressed several questions from the landowners.

4.3.2.3 Internet Website

To better communicate with the public and provide up-to-date project information, LCRA TSC created a section on LCRA's main website that included project-specific information regarding the Blumenthal Substation and 138-kV Transmission Line Project (http://www.lcra.org/energy/electric-transmission/transmission-line-routing/pages/blumenthal-substation-and-138kv-transmission-line-project.aspx). Project information available on the website included:

- Project Questionnaire
- Aerial photography and topographic maps depicting the study area, alternative routes, and substation locations
- Exhibits from the open house meeting

- Photo simulation of the proposed structures options
- Property ownership maps
- Open house invitations/ads
- Interactive mapping tool
- Frequently Asked Questions

4.3.2.4 Comments from Agencies and Officials

The following local, state, and federal agencies and officials were contacted by letter in July 2013 by LCRA TSC and/or POWER to solicit comments, concerns, and information regarding potential environmental impacts, permits, or approvals for the construction of the proposed 138-kV transmission line in central Texas. Maps of the study area were included with each letter. Sample copies of the letters, and responses received as of the date of this report are included in Appendix A.

Contacts Made by POWER:

- U.S. Army Corps of Engineers (USACE) – Fort Worth District
- U.S. Environmental Protection Agency (USEPA)
- U.S. Fish and Wildlife Service (USFWS)
- Federal Aviation Administration (FAA)
- Federal Emergency Management Agency (FEMA)
- National Parks Service (NPS)
- Natural Resource Conservation Service (NRCS)
- Railroad Commission of Texas (RRC)
- Texas Commission on Environmental Quality (TCEQ) – Austin Region
- TCEQ – San Antonio Region
- Texas Department of Transportation (TxDOT) – Aviation Division
- TxDOT - Environmental Affairs Division
- TxDOT – Planning and Programming
- Texas General Land Office (GLO)
- Texas Historical Commission (THC)
- Texas Parks and Wildlife Department (TPWD)
- Texas Water Development Board (TWDB)
- Blanco County Historical Commission
- Gillespie County Historical Commission

- Kendall County Historical Commission
- Alamo Area Council of Governments
- Capital Area Council of Governments

Contacts Made by LCRA TSC:

- Central Texas Electric Cooperative
- Pedernales Electric Cooperative
- United States Senate
- United States House of Representatives
- Texas Senate
- Texas House of Representatives
- Blanco County Officials
- Gillespie County Officials
- Kendall County Officials
- City of Fredericksburg
- Blanco Independent School District (ISD)
- Comfort ISD
- Fredericksburg ISD
- Johnson City ISD
- Blanco County Economic Development Corporation
- Gillespie County Economic Development Commission
- Kendall County Economic Development Corporation
- Fredericksburg Chamber of Commerce
- Stonewall Chamber of Commerce
- Save Our Hill Country Environment

The comments from the meetings, website, and agencies were evaluated, considered, and factored into the overall evaluation of the preliminary alternative route segments and development of the alternative routes. POWER reviewed and considered all comments received during the routing process of the proposed project. As a result some modifications, deletions and/or additions were made to complete the preliminary alternative route segments and substation locations.

4.4 ADDITIONS TO THE PRELIMINARY ALTERNATIVE SUBSTATION SITES

Information received by LCRA TSC and POWER from the public and agencies resulted in adding two additional substation sites to the seven original substation sites presented at the open house in May 2014. Comments were received requesting placement of substation sites away from US Hwy 290 in order to minimize potential aesthetics impacts along US Hwy 290. In response to public comment, Substation Site 8 was added to the west side of Luckenbach Road, approximately 0.9 mile south of US Hwy 290 and Substation Site 9 was added to the east side of Jenschke Lane, approximately 0.4 mile south of US Hwy 290 (Figure 4-2). Minor adjustments to the preliminary alternative segments in the vicinity of the new substation sites were made and are described below.

4.5 MODIFICATIONS TO THE PRELIMINARY ALTERNATIVE ROUTE SEGMENTS

Information received by LCRA TSC and POWER from the public and agencies resulted in modifications to the preliminary alternative route segments as well as the identification of new route segments as described in detail below. The preliminary alternative segments are presented in Figure 4-1 and the revisions are reflected in Figures 4-2 through 4-6.

4.5.1 New Segments

Segment I2 was added to the east of FM 1376 in order to parallel FM 1376 and to connect Segment L2 to the alternative route network to the south (see Figure 4-2).

Segment L2 was added to the south of South Grape Creek and east of FM 1376. This segment was added to parallel the creek and FM 1376, which is the landowner's property boundary (see Figure 4-2).

Segment M1 was added to the north side of FM 1888 in order to parallel FM 1888 and to connect the node for Segments I, L1 and M to the node for Segments I2 and L2 (see Figure 4-2).

Segment R1 was added east of Luckenbach Road in order to connect new Substation Site 8 to the alternative route network to the east and to provide an alternative to Segment R that would be located further from US Hwy 290 (see Figure 4-3).

Segment Z2 was added to the west of FM 1623 and south of Segment Z1. Following the open house meeting, LCRA was made aware that a grass airstrip (Otte) was located south of Segment Z1. As a result, Segment Z2 was added to avoid this area (see Figure 4-4).

4.5.2 Segment Modifications

The southern portion of Segment G was relabeled as Segment G3 due to the addition of new Substation Site 8 and Segment R1 (see Figure 4-3).

The southern portion of Segment H was relabeled as Segment L1 due to the addition of Segment L2 (see Figure 4-2).

The southern portion of Segment I was relabeled as Segment I3 due to the addition of Segment I2 (see Figure 4-5).

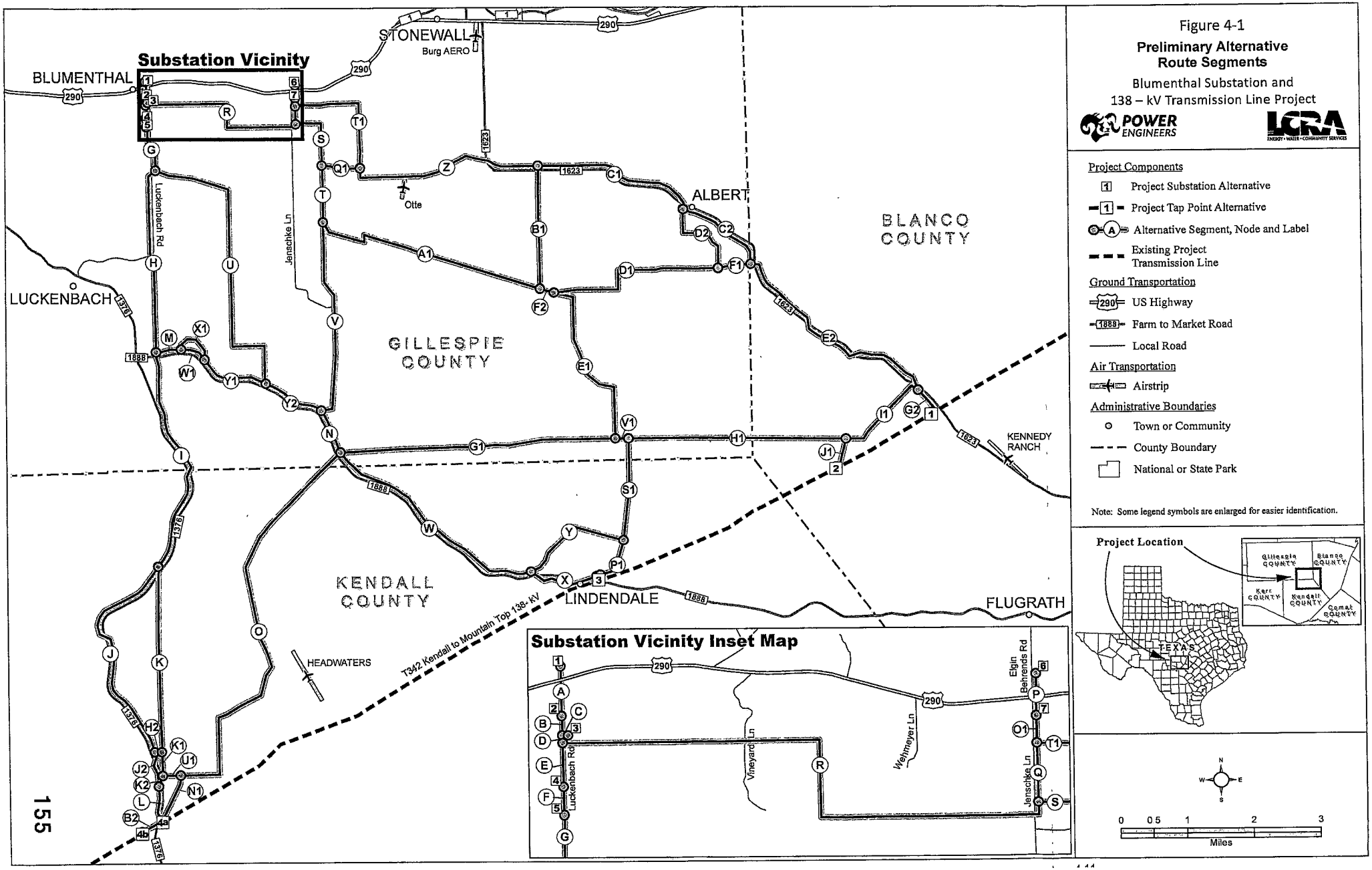
In response to public comment, Segment R was modified to avoid a cemetery and the southern portion was relabeled as Segment R2 due to the addition of Segment R1 (see Figure 4-3).

Segment Y was modified by shifting it to the south to parallel FM 1888. This modification resulted in shifting the node location to the south and the southern portion of Segment X being relabeled as Segment X2 (see Figure 4-6).

The east-west portion of Segment Z was relabeled as Segments Z1 and Z3 due to the addition of Segment Z2 (see Figure 4-4).

4.5.3 Deleted Segment

Segment X1 was originally proposed to extend out from FM 1888, around the back of a habitable structure and back down to rejoin FM 1888. Following the open house meeting, and based on public comment, Segment X1 was deleted to avoid this area (see Figure 4-2).


Substation Vicinity
STONEWALL
Burg AERO
BLUMENTHAL
290
Luckenbach Rd
Jenschke Ln
Otte
1623
ALBERT
BLANCO COUNTY
LUCKENBACH
1376
1888
GILLESPIE COUNTY
KENNEDY RANCH
KENDALL COUNTY
LINDENDALE
FLUGRATH
HEADWATERS
T342 Kendall to Mountain Top 138- kV
Substation Vicinity Inset Map
Elgin Behrends Rd
Vineyard Ln
Wehmeyer Ln
Figure 4-1
Preliminary Alternative Route Segments
Blumenthal Substation and
138 – kV Transmission Line Project
POWER ENGINEERS
LCRA
Project Components
Project Substation Alternative
Project Tap Point Alternative
Alternative Segment, Node and Label
Existing Project Transmission Line
Ground Transportation
US Highway
Farm to Market Road
Local Road
Air Transportation
Airstrip
Administrative Boundaries
Town or Community
County Boundary
National or State Park
Note: Some legend symbols are enlarged for easier identification.
Project Location
Gillespie COUNTY
Blanco COUNTY
Kerr COUNTY
Kendall COUNTY
Comal COUNTY
TEXAS
N
W
E
S
0 0.5 1 2 3
Miles

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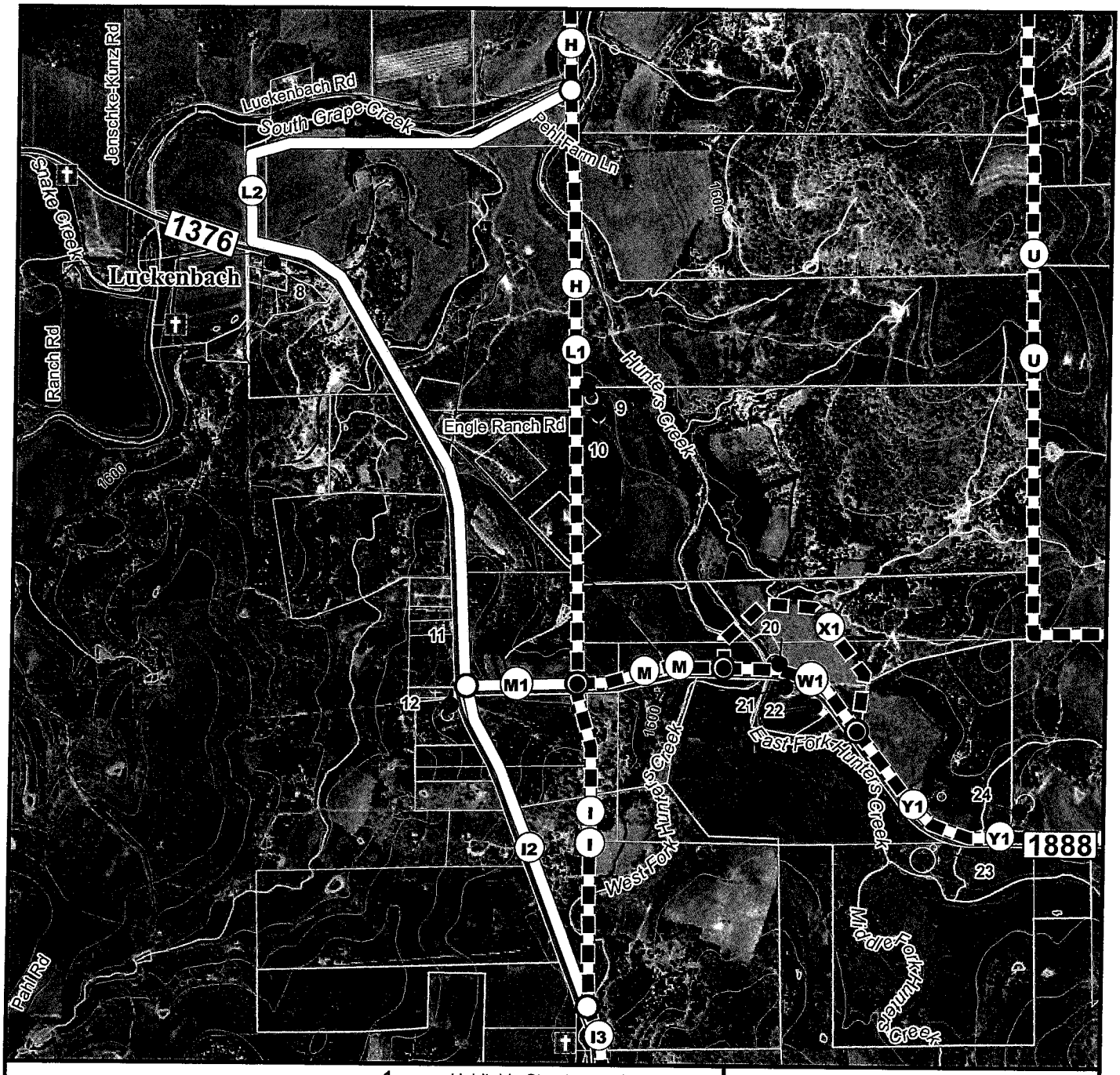

Legend

- Revised or New Alternative Segment
- Unchanged Portion of Preliminary Alternative Segment Shown at Open House Meeting
- Removed Portion of Preliminary Alternative Segment Shown at Open House Meeting
- Revised or New Alternative Segment Node
- Unchanged Alternative Segment Node Shown at Open House Meeting
- Preliminary Alternative Segment Node Shown at Open House Meeting
- (A) Resulting Alternative Segment Label
- (A) Preliminary Alternative Segment Label Shown at Open House Meeting
- 1 Habitable Structure and Map ID within 300 feet of a Segment
- Cemetery
- Farm to Market Road
- Local Road
- Property Group Boundary
- Property Boundary
- Stream
- Lake or Pond
- 200 ft Contour Line
- 40 ft Contour Line

Figure 4-2

Addition of Segments L2, I2, and M1, Relabel of Southern Portion of H as L1, and Elimination of Segment X1 Following the Open House Meeting

Blumenthal Substation and 138-kV Transmission Line Project

LCRA ENERGY • WATER • COMMUNITY SERVICES

POWER ENGINEERS

0 2,000 4,000 Feet

9/12/2014

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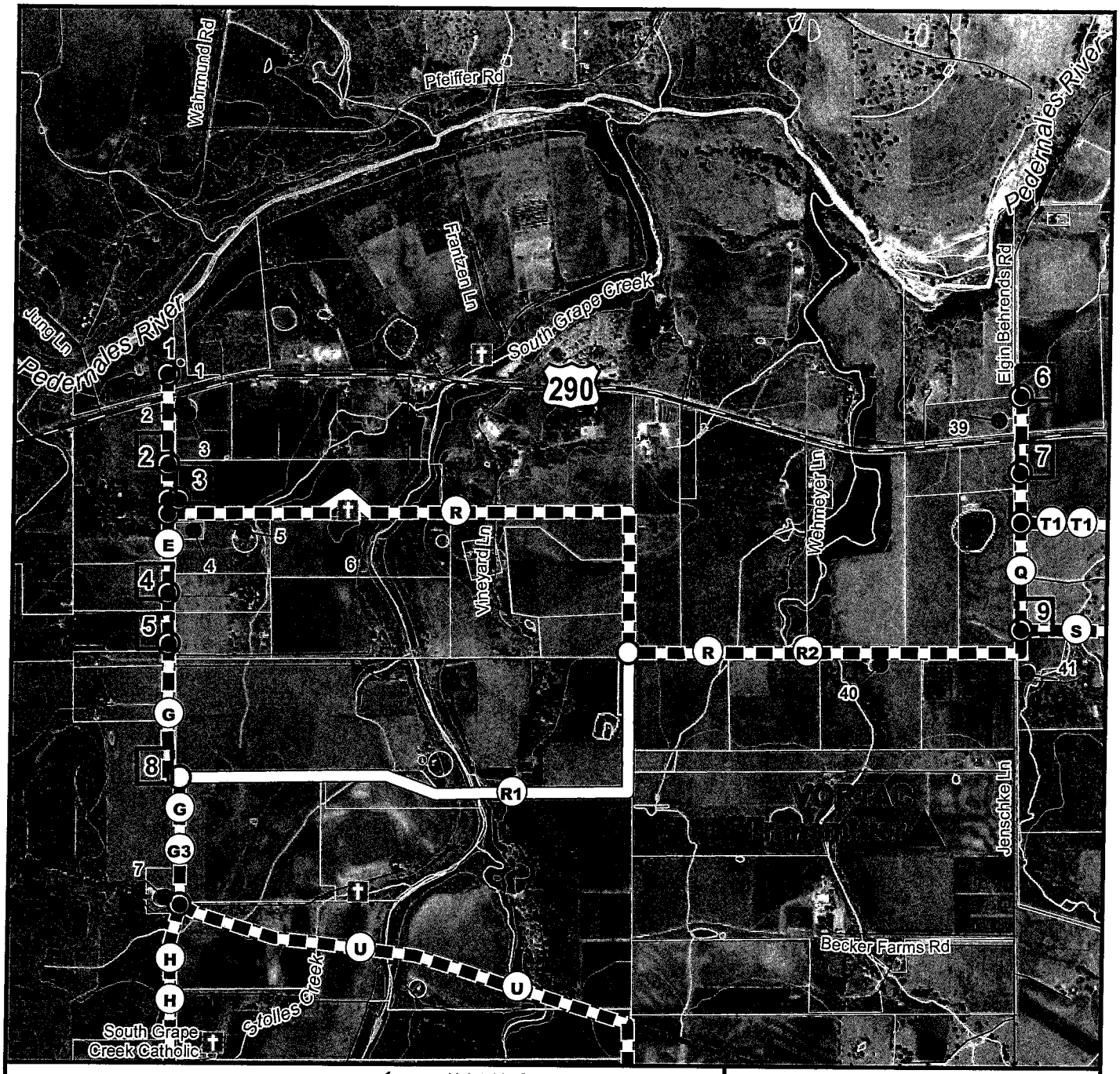

Legend

- Revised or New Alternative Segment
- Unchanged Portion of Preliminary Alternative Segment Shown at Open House Meeting
- Removed Portion of Preliminary Alternative Segment Shown at Open House Meeting
- Revised or New Alternative Segment Node
- Unchanged Alternative Segment Node Shown at Open House Meeting
- Preliminary Alternative Segment Node Shown at Open House Meeting
- (A) Resulting Alternative Segment Label
- (A) Preliminary Alternative Segment Label Shown at Open House Meeting
- Project Substation Alternative
- 1 Habitable Structure and Map ID within 300 feet of a Segment
- Navigation Beacon
- Cemetery
- US Highway
- Local Road
- Abandoned Pipeline
- Property Group Boundary
- Property Boundary
- Stream
- River
- Lake or Pond
- SwampMarsh
- 200 ft Contour Line
- 40 ft Contour Line

Figure 4-3

Addition of Segment R1 and Modification of Segment R and Relabel of Southern Portion of R as R2 and Southern Portion of Segment G as G3 Following the Open House Meeting

Blumenthal Substation and 138-kV Transmission Line Project

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N

POWER ENGINEERS

0 2,000 4,000

Feet

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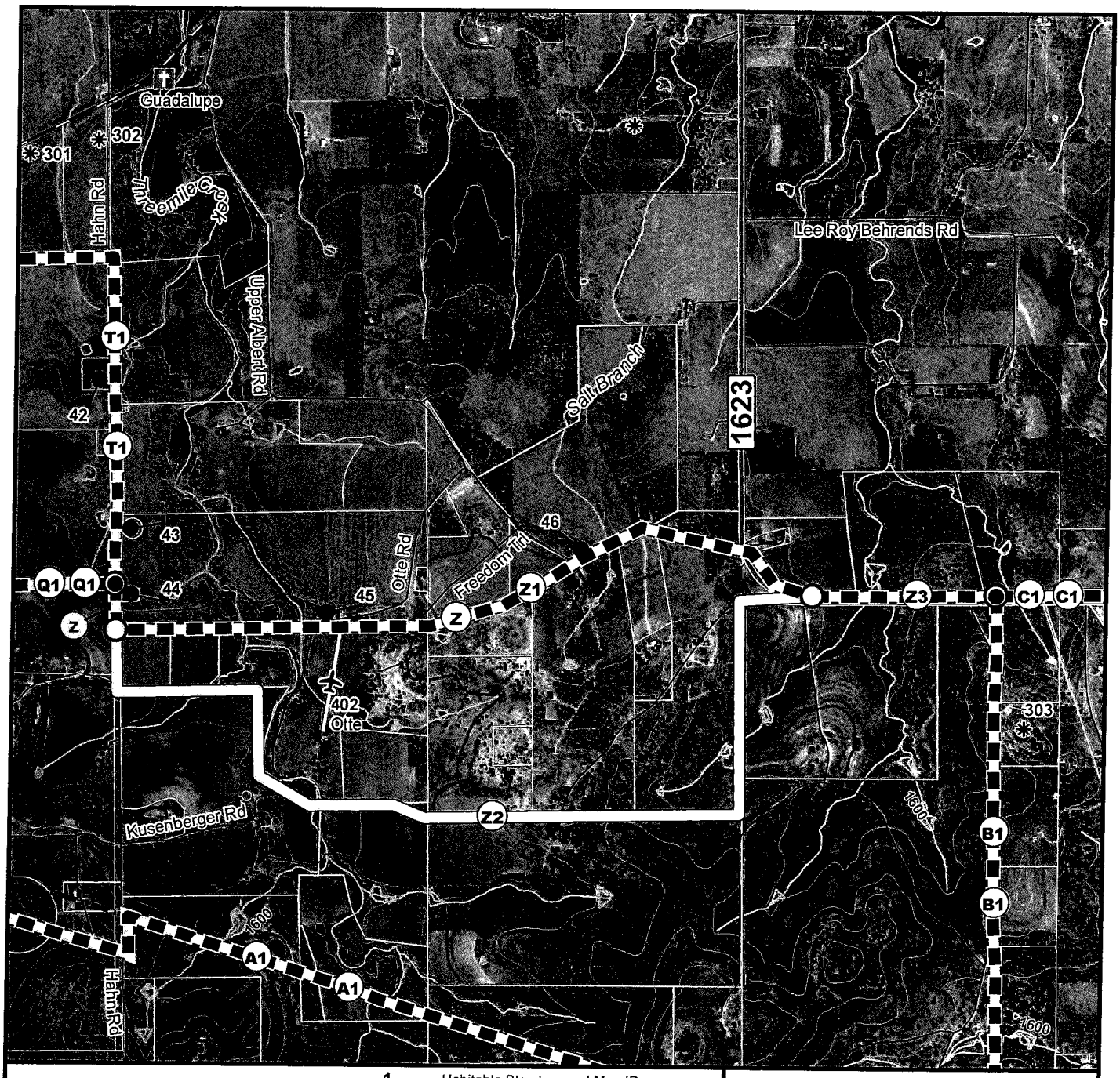

Legend

- Revised or New Alternative Segment
- Unchanged Portion of Preliminary Alternative Segment Shown at Open House Meeting
- Removed Portion of Preliminary Alternative Segment Shown at Open House Meeting
- Revised or New Alternative Segment Node
- Unchanged Alternative Segment Node Shown at Open House Meeting
- Preliminary Alternative Segment Node Shown at Open House Meeting
- (A) Resulting Alternative Segment Label
- (A) Preliminary Alternative Segment Label Shown at Open House Meeting
- 1 Habitable Structure and Map ID within 300 feet of a Segment
- Airstrip
- Communication Tower
- Cemetery
- Airstrip
- US Highway
- Farm to Market Road
- Local Road
- Abandoned Pipeline
- Property Group Boundary
- Property Boundary
- Stream
- Lake or Pond
- SwampMarsh
- 200 ft Contour Line
- 40 ft Contour Line

Figure 4-4

Addition of Segment Z2 and Relabel of East-West Portion of Segment Z as Z1 and Z3 Following the Open House Meeting

Blumenthal Substation and 138-kV Transmission Line Project

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POWER ENGINEERS

0 2,400 4,800

Feet

9/15/2014

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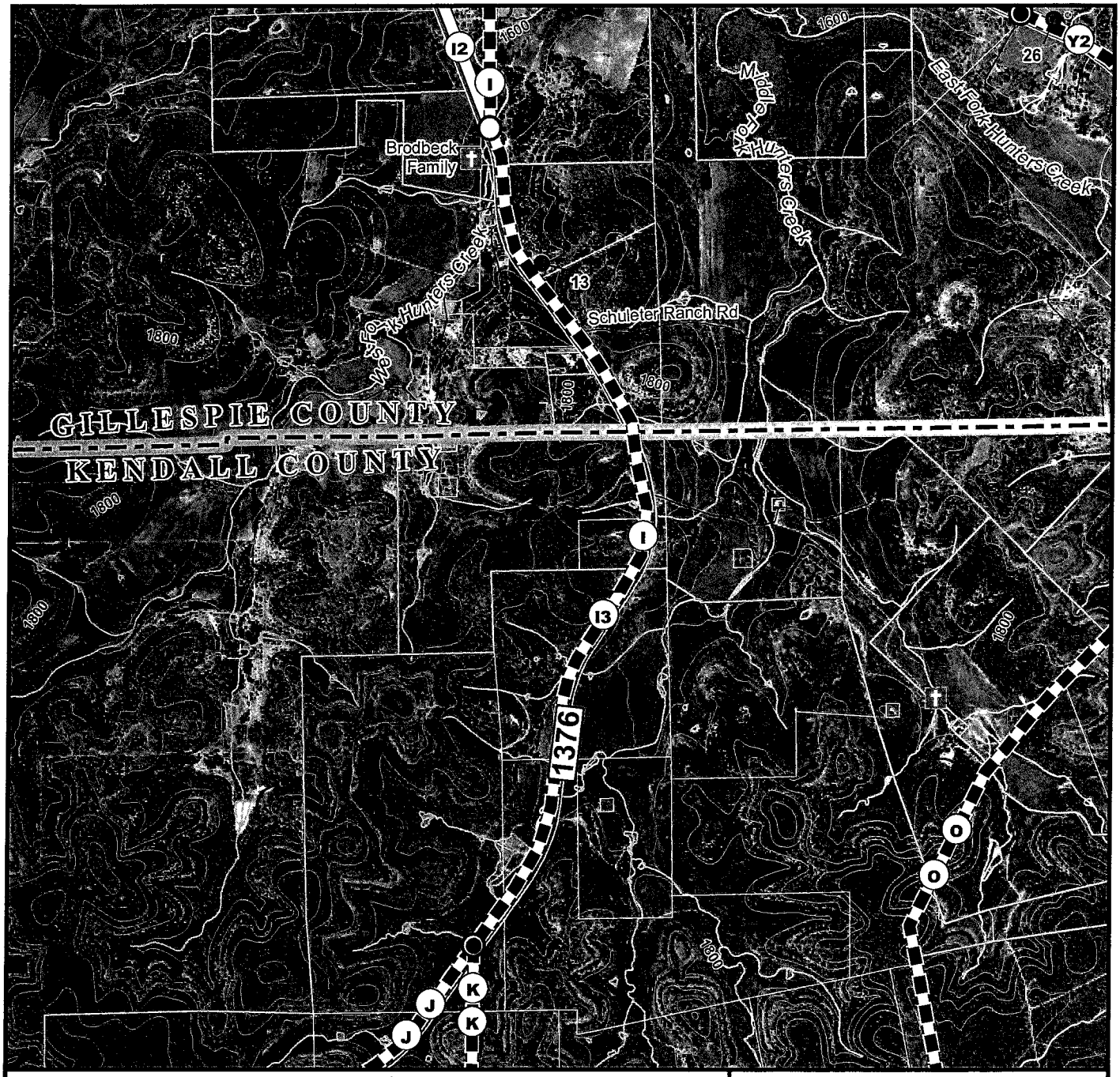

Legend

- Revised or New Alternative Segment
- Unchanged Portion of Preliminary Alternative Segment Shown at Open House Meeting
- Removed Portion of Preliminary Alternative Segment Shown at Open House Meeting
- Revised or New Alternative Segment Node
- Unchanged Alternative Segment Node Shown at Open House Meeting
- Preliminary Alternative Segment Node Shown at Open House Meeting
- (A) Resulting Alternative Segment Label
- (A) Preliminary Alternative Segment Label Shown at Open House Meeting
- 1 Habitable Structure and Map ID within 300 feet of a Segment
- Cemetery
- Farm to Market Road
- Local Road
- Property Group Boundary
- Property Boundary
- Stream
- Lake or Pond
- 200 ft Contour Line
- 40 ft Contour Line

Figure 4-5

Relabel of Southern Portion of I as I3 Following the Open House Meeting

Blumenthal Substation and 138-kV Transmission Line Project

LCRA ENERGY • WATER COMMUNITY SERVICES

POWER ENGINEERS

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Feet

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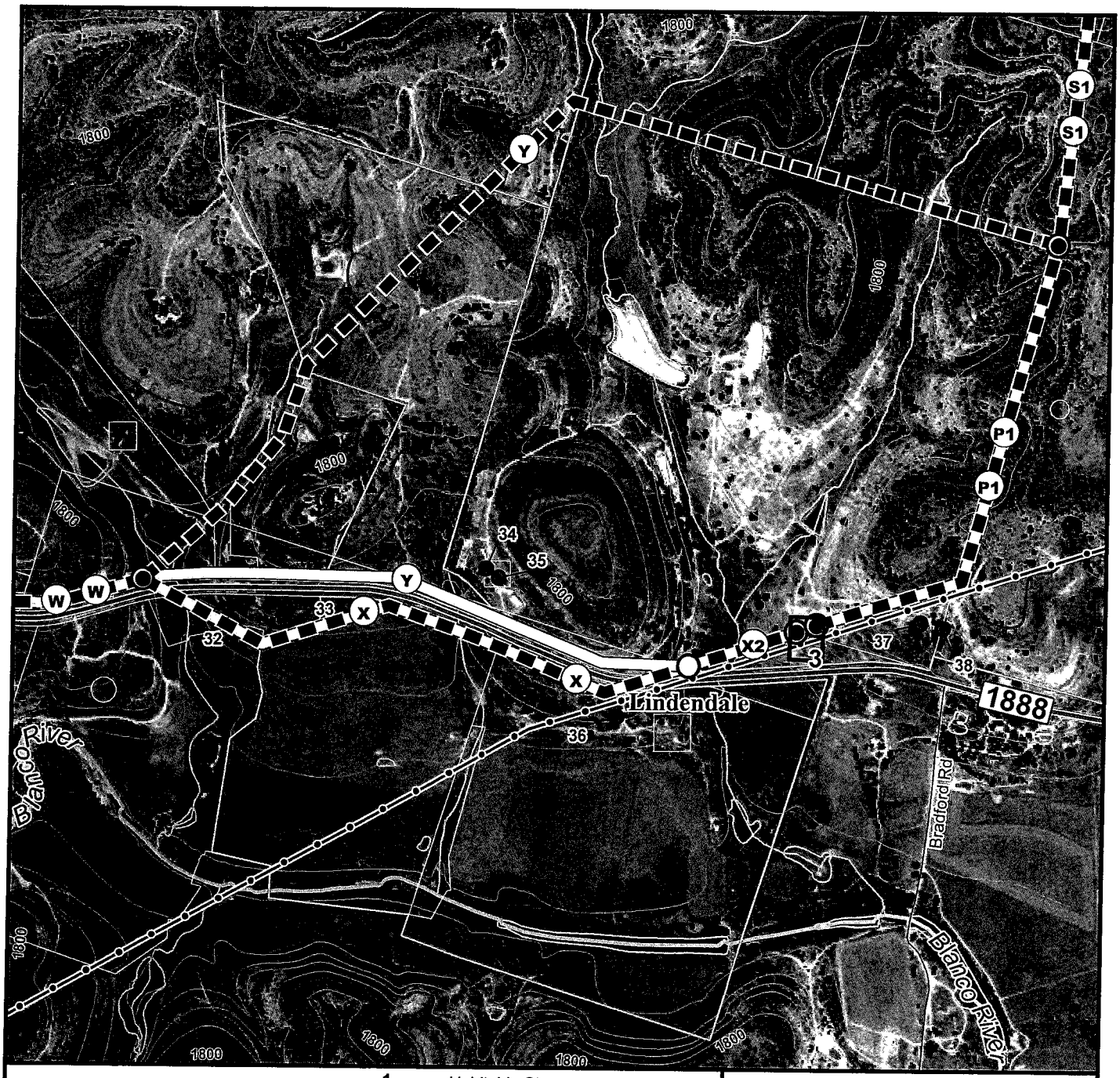

Legend

- Revised or New Alternative Segment
- Unchanged Portion of Preliminary Alternative Segment Shown at Open House Meeting
- Removed Portion of Preliminary Alternative Segment Shown at Open House Meeting
- Revised or New Alternative Segment Node
- Unchanged Alternative Segment Node Shown at Open House Meeting
- Preliminary Alternative Segment Node Shown at Open House Meeting
- (A) Resulting Alternative Segment Label
- (A) Preliminary Alternative Segment Label Shown at Open House Meeting
- Project Tap Point Alternative
- 1 Habitable Structure and Map ID within 300 feet of a Segment
- Existing 138 kV Transmission Line
- Farm to Market Road
- Local Road
- Property Group Boundary
- Property Boundary
- Stream
- River
- Lake or Pond
- 200 ft Contour Line
- 40 ft Contour Line

Figure 4-6

Modification of Segment Y and Relabel of the Eastern Portion of Segment X as X2 Following the Open House Meeting

Blumenthal Substation and 138-kV Transmission Line Project

LCRA ENERGY • WATER • COMMUNITY SERVICES

N

POWER ENGINEERS

0 1,200 2,400

Feet

9/12/2014

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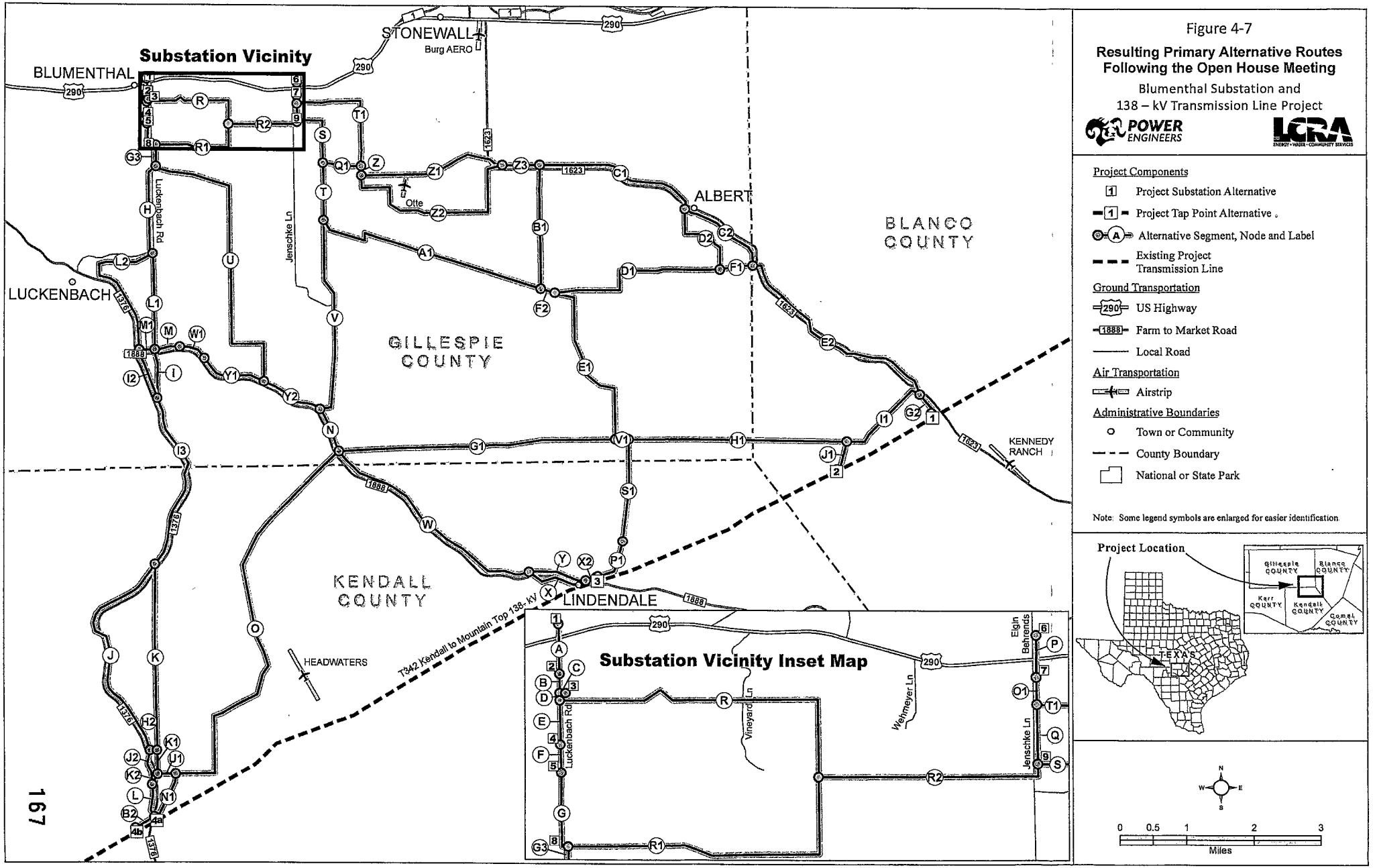

Figure 4-7

Resulting Primary Alternative Routes Following the Open House Meeting

Blumenthal Substation and
138 – kV Transmission Line Project

POWER ENGINEERS

LCRA
ENERGY • WATER • COMMUNITY SERVICES

Project Components
- Project Substation Alternative
- Project Tap Point Alternative
- Alternative Segment, Node and Label
- Existing Project Transmission Line

Ground Transportation
- US Highway
- Farm to Market Road
- Local Road

Air Transportation
- Airstrip

Administrative Boundaries
- Town or Community
- County Boundary
- National or State Park

Note: Some legend symbols are enlarged for easier identification.

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Following the addition of two substation sites (Sites 8 and 9), modifications to the 58 preliminary alternative route segments, and identification of the new alternative route segments, 69 primary alternative route segments resulted. Numerous possible alternative routes using these 69 primary alternative route segments exist. POWER and LCRA TSC identified a total of 20 primary alternative routes for comparison that utilize all of the alternative route segments and also provide geographic diversity. Of course, many more alternate routes may be formed by reconnecting the segments in various combinations. Table 4-2 details the route segment composition and overall length of the 20 primary alternative routes (routes). See Figure 4-8 in Appendix D for more detail on the location of the resulting routes.

TABLE 4-2 PRIMARY ALTERNATIVE ROUTES

PRIMARY ALTERNATIVE ROUTES	SEGMENT COMBINATION	TOTAL LENGTH IN MILES	SUBSTATION ALTERNATIVE	TAP POINT ALTERNATIVE
1	A-B-D-E-F-G-G3-H-L2-I2-I3-J-J2-L-B2	13.4	1	4b
2	A-B-D-R-R2-S-Q1-Z-Z1-Z3-C1-C2-E2-G2	15.2	1	1
3	B-D-E-F-G-G3-H-L1-I-I3-K-K1-K2-L	11.2	2	4a
4	B-D-E-F-G-R1-R2-S-Q1-Z-Z2-Z3-B1-F2-E1-V1-S1-P1	16.2	2	3
5	C-D-E-F-G-G3-H-L1-M1-I2-I3-K-H2-J2-L-B2	12.0	3	4b
6	C-D-E-F-G-G3-U-Y2-N-G1-V1-H1-I1-G2	17.0	3	1
7	F-G-G3-H-L1-I-I3-K-K1-U1-N1-B2	11.6	4	4b
8	F-G-R1-R2-S-T-A1-F2-D1-F1-E2-G2	15.8	4	1
9	G-G3-H-L1-M-W1-Y1-Y2-N-W-X-X2	11.6	5	3
10	G-R1-R2-S-Q1-Z-Z2-Z3-C1-D2-F1-E2-G2	16.6	5	1
11	G3-H-L1-I-I3-K-K1-K2-L	10.4	8	4a
12	R1-R2-S-T-A1-F2-E1-V1-H1-J1	15.0	8	2
13	P-O1-Q-S-T-V-N-W-Y-X2	10.9	6	3
14	P-O1-T1-Z-Z1-Z3-C1-C2-E2-G2	12.9	6	1
15	O1-Q-S-T-V-N-O-N1	13.3	7	4a
16	O1-Q-S-T-A1-F2-E1-V1-H1-J1	12.8	7	2
17	S-T-V-N-W-X-X2	10.4	9	3
18	S-Q1-Z-Z2-Z3-B1-F2-D1-F1-E2-G2	14.7	9	1
19	G3-U-Y2-N-W-Y-X2	11.2	8	3
20	R2-R1-G3-H-L1-I-I3-K-K1-K2-L-B2	13.3	9	4b

4.6 PRIMARY ALTERNATIVE ROUTE EVALUATION

POWER conducted a thorough evaluation of the 20 primary routes, which is further discussed in Section 5.0. The evaluation of the routes involved quantifying 42 land use and environmental criteria. These criteria are presented in Table 4-3.

TABLE 4-3 LAND USE AND ENVIRONMENTAL CRITERIA FOR ALTERNATIVE ROUTE EVALUATION OF THE BLUMENTHAL PROJECT

	LAND USE
1.	Length of primary alternative route (miles)
2.	Number of habitable structures[1] within 300 feet of ROW centerline
3.	Number of newly affected habitable structures[1] within 300 feet of ROW centerline
4.	Length of ROW using existing transmission line ROW
5.	Length of ROW parallel to existing transmission line ROW
6.	Length of ROW utilizing abandoned pipeline corridor
7.	Length of ROW parallel to other existing ROW (roadways, pipelines, railways, etc.)
8.	Length of ROW parallel to apparent property lines[2]
9.	Length of ROW through parks/recreational areas[3]
10.	Number of additional parks/recreational areas[3] within 1,000 feet of ROW centerline
11.	Length of ROW through cropland
12.	Length of ROW through pasture/rangeland
13.	Length of ROW through land irrigated by traveling systems (rolling or pivot type)
14.	Number of pipeline crossings
15.	Number of transmission line crossings
16.	Number of U.S. and State highway crossings
17.	Number of FM road crossings
18.	Number of cemeteries within 1,000 feet of the ROW centerline
19.	Number of private airstrips within 10,000 feet of the ROW centerline
20.	Number of heliports within 5,000 feet of the ROW centerline
21.	Number of FAA registered airports with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline
22.	Number of FAA registered airports having no runway more than 3,200 feet in length located within 10,000 feet of ROW centerline
23.	Number of commercial AM radio transmitters within 10,000 feet of the ROW centerline
24.	Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline
	AESTHETICS
25.	Estimated length of ROW within foreground visual zone[4] of U.S. and State highways
26.	Estimated length of ROW within foreground visual zone[4] of FM roads
27.	Estimated length of ROW within foreground visual zone[5] of parks/recreational areas[3]
	ECOLOGY
28.	Length of ROW through upland woodlands/brushland
29.	Length of ROW through bottomland/riparian woodlands
30.	Length of ROW across NWI mapped wetlands
31.	Length of ROW across known habitat of federally listed endangered or threatened species
32.	Length of ROW through modeled potentially suitable habitat for Golden-cheeked warbler
33.	Length of ROW across open water (lakes, ponds)
34.	Number of stream crossings
35.	Number of river crossings
36.	Length of ROW parallel (within 100 feet) to streams or rivers
37.	Length of ROW across 100-year floodplains

TABLE 4-3 LAND USE AND ENVIRONMENTAL CRITERIA FOR ALTERNATIVE ROUTE EVALUATION OF THE BLUMENTHAL PROJECT

	CULTURAL RESOURCES
38.	Number of recorded historic or prehistoric sites crossed by ROW
39.	Number of additional recorded historic or prehistoric sites within 1,000 feet of ROW centerline
40.	Number of National Register listed or determined eligible sites crossed by ROW
41.	Number of additional National Register listed or determined eligible sites within 1,000 feet of ROW centerline
42.	Length of ROW through areas of high archaeological/historic site potential

[1] Single-family and multi-family dwellings, and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline of a transmission project of 230 kV or less.
[2] Property lines created by existing roads, highway, or railroad ROW are not "double-counted" in the length of ROW parallel to apparent property boundaries criteria. Property boundaries provided by LCRA TSC.
[3] Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church within 1,000 feet of the center line of the project.
[4]One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of Interstates, U.S. and State Highways criteria are not "double-counted" in the length of ROW within the visual foreground zone of FM Roads criteria.
[5] One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of parks/recreational areas may overlap with the total length of ROW within the visual foreground zone of Interstates, U.S. and State Highways criteria and/or with the total length of ROW within the visual foreground zone of FM Roads criteria.

The analysis of each route involved tabulation of the number of or the length of each land use or environmental criteria traversed by or located along each of the routes (e.g., number of habitable structures within 300 feet, the length of woodlands crossed). The number or length of each criterion traversed by or along each of the routes was determined using GIS and reviewing the data collected by the POWER Team that is represented on the constraints map (Figure 5-1). Section 5.0 presents a comparative discussion of the potential land use and environmental impacts of each route.

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5.0 ENVIRONMENTAL IMPACT OF THE PRIMARY ALTERNATIVE ROUTES

The evaluation and comparison of potential impacts for each primary alternative route (route or Route) is based upon the consideration of the requirements of Section 37.056(c)(4)(A)-(D) of the Texas Utilities Code, the PUCT's Substantive Rule 25.101, including the PUCT's policy of prudent avoidance, comments from the public open house meeting, field reconnaissance, and the information and responses received from local officials and state/federal regulatory agencies. Measurements for the majority of the environmental criteria were obtained from aerial photography flown in August 2013 and from available digital resource layers using GIS software and programs.

POWER professionals with expertise in different environmental disciplines (geology/soils, hydrology, terrestrial ecology, wetland ecology, land use/aesthetics, socioeconomics, cultural resources [archaeological and historical]) and GIS evaluated the routes based upon environmental conditions present along each route (augmented by aerial photo interpretation and field reconnaissance) and the general routing criteria developed by LCRA TSC and POWER. Each POWER expert independently analyzed the routes and the environmental and land use data presented in Table 5-1 (Primary Alternative Route Data) and Table 5-2 (Primary Segment Data) for their technical discipline. A summary of potential impacts to environmental, community, and land use resources is provided in the following sections.

5.1 NATURAL RESOURCES IMPACTS

5.1.1 Impacts on Geological Resources

Construction of the proposed transmission line is not anticipated to have any significant adverse effects on the physiographic or geologic features/resources of the area. Erection of the structures will require the excavation and/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 alternative routes. Although karst features and formations may occur within this geologic region, no geologic hazards are anticipated to be created.

5.1.2 Impacts on Soils

Activities associated with the construction, operation and maintenance of electrical transmission lines typically do not adversely impact soils when appropriate mitigative measures are implemented during the construction phase. 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. Prior to construction, LCRA TSC would develop a Stormwater Pollution Prevention Plan (SWPPP) to minimize potential impacts associated with soil erosion, and off ROW sedimentation. Implementation of this plan would incorporate Best Management Practices (BMPs), including erosion control devices to minimize soil erosion on the ROW during significant rainfall events. The SWPPP would also establish the criteria for re-vegetation to ensure adequate soil stabilization during the construction and post construction phases. The native herbaceous layer of vegetation would be maintained, to the extent practical, during construction and most denuded areas with a low erosion potential would be allowed to re-vegetate with native herbaceous species. Areas with a higher erosion potential, including steep slopes and areas with shallow topsoil, may require seeding and/or matting to stabilize disturbed areas and minimize soil erosion potential during the post construction phase. The ROW will be inspected during and after construction to ensure that potential high erosion areas are identified and appropriate BMPs are implemented and maintained.

The northern portion of the study area supports crops and pastureland, and many of the soils are designated by the USDA as "Prime Farmlands." As discussed in Section 2.0 the NRCS does not typically consider the construction of a transmission line to be a significant conversion of these soils. Agricultural activities are typically still practiced around the base of the structures after construction is completed. No significant conversions of prime farmland or state important soils are anticipated related to project activities for any of the primary alternative routes.

Table 5-1
Land Use and Environmental Data For Primary Route Evaluation
Primary Alternative Routes 10/21/2014

	Evaluation Criteria	1	2	3	4	5	6	7	8	9	10	11	12
	Land Use												
1	Length of primary alternative route (miles)	13.4	15.2	11.2	16.2	12.0	17.0	11.6	15.8	11.6	16.6	10.4	15.0
2	Number of habitable structures[1] within 300 feet of ROW centerline	12	19	9	6	10	6	7	6	19	7	9	4
3	Number of newly affected habitable structures[2] within 300 feet of ROW centerline	12	19	9	4	10	6	7	6	18	7	9	4
4	Length of ROW using existing transmission line ROW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Length of ROW parallel and adjacent to existing transmission line ROW	0.3	0.0	0.0	0.2	0.3	0.0	0.3	0.0	0.3	0.0	0.0	0.1
6	Length of ROW utilizing abandoned pipeline corridor	0.0	1.5	0.0	0.5	0.0	1.6	0.0	4.5	0.0	1.5	0.0	3.3
7	Length of ROW parallel to other existing ROW (roadways, pipelines, railways, etc.)	11.3	7.5	5.2	1.7	6.6	2.6	4.5	2.6	8.8	5.9	4.4	0.6
8	Length of ROW parallel to apparent property lines[3]	0.3	4.5	2.6	9.6	2.4	6.0	3.0	6.0	0.5	6.0	2.5	6.5
9	Length of ROW across parks/recreational areas[4]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	Number of additional parks/recreational areas[4] within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
11	Length of ROW through cropland	3.2	4.5	2.1	3.6	2.1	2.2	1.9	4.0	2.4	4.4	1.4	2.7
12	Length of ROW through pasture/rangeland	0.5	1.4	0.6	0.9	0.9	0.1	0.6	1.0	0.6	1.7	0.6	0.4
13	Length of ROW through land irrigated by traveling systems (rolling or pivot type)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	Number of pipeline crossings	0	0	0	0	0	0	0	0	0	0	0	0
15	Number of transmission line crossings	0	0	0	0	0	0	0	0	0	0	0	0
16	Number of U.S. and State highway crossings	1	1	0	0	0	0	0	0	0	0	0	0
17	Number of farm-to-market (FM) crossings	6	6	5	2	6	0	4	4	2	6	5	0
18	Number of cemeteries within 1,000 feet of the ROW centerline	2	2	2	0	2	1	2	0	1	0	2	0
19	Number of FAA registered public/military airports with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
20	Number of FAA registered public/military airports having no runway more than 3,200 feet in length located within 10,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
21	Number of private airstrips within 10,000 feet of the ROW centerline	0	3	0	2	0	1	0	2	0	3	0	1
22	Number of heliports within 5,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
23	Number of commercial AM radio transmitters within 10,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
24	Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline	0	0	0	1	0	0	0	0	2	0	0	0
	Aesthetics												
25	Estimated length of ROW within foreground visual zone[5] of Interstate, U.S. and State highways	0.6	2.2	0.4	0.8	0.3	0.3	0.0	0.5	0.0	0.4	0.0	0.4
26	Estimated length of ROW within foreground visual zone[5] of FM roads	10.5	9.0	7.1	2.4	7.9	3.9	7.8	4.2	9.1	9.2	7.1	0.0
27	Estimated length of ROW within foreground visual zone[6] of parks/recreational areas[4]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ecology												
28	Length of ROW through upland woodlands/brushlands	9.0	8.8	7.9	11.4	8.3	14.4	8.4	10.3	8.2	9.8	7.8	11.5
29	Length of ROW through bottomland/riparian woodlands	0.4	0.1	0.3	0.1	0.3	0.2	0.3	0.2	0.1	0.2	0.3	0.1
30	Length of ROW across NWI mapped wetlands	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0
31	Length of ROW across known habitat of federally listed endangered or threatened species	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	Area of ROW across golden-cheeked warbler modeled habitat where three models agree (acres)	1.9	6.3	3.2	1.6	4.6	9.5	3.2	0.0	2.3	5.2	3.2	0.5
33	Length of ROW across open water (lakes, ponds)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	Number of stream crossings	18	23	22	27	21	34	23	28	19	26	22	32
35	Number of river crossings	0	0	0	0	0	0	0	0	0	0	0	0
36	Length of ROW parallel (within 100 feet) to streams or rivers	1.0	1.1	0.6	0.8	0.6	1.1	0.6	0.9	0.1	1.1	0.6	0.8
37	Length of ROW across 100-year floodplain	0.1	0.0	0.1	0.0	0.1	0.0	0.2	0.0	0.2	0.0	0.1	0.0
	Cultural Resources												
38	Number of recorded archeological sites crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0
39	Number of additional archeological sites within 1,000 feet of ROW centerline	3	1	1	0	1	0	1	3	0	3	1	1
40	Number of National Register of Historic Places listed properties crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0
41	Number of additional National Register of Historic Places listed properties within 1,000 feet of ROW centerline	0	1	0	0	0	0	0	0	0	0	0	0
42	Length of ROW through areas of high archaeological/historic site potential	10.8	10.6	8.3	12.1	8.7	12.7	8.8	9.9	9.5	12.3	8.3	12.1

[1] Single-family and multi-family dwellings, and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline of a transmission project of 230-kV or less.

[2] Newly affected habitable structures are habitable structures within 300 feet of an alternative route that are currently not already within 300 feet of an existing transmission line.

[3] Property lines created by existing roads, highway, or railroad ROW are not "double-counted" in the length of ROW parallel to apparent property boundaries criteria. Property boundaries provided by LCRA TSC.

[4] Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church within 1,000 feet of the centerline of the project.

[5] One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of Interstates, U.S. and State Highways criteria are not "double-counted" in the length of ROW within the visual foreground zone of FM Roads criteria.

[6] One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of parks/recreational areas may overlap with the total length of ROW within the visual foreground zone of Interstates, U.S. and State Highways criteria and/or with the total length of ROW within the visual foreground zone of FM Roads criteria.

Note: All length measurements in miles unless noted otherwise. All linear measurements were obtained from aerial photography flown August, 2013 with the exception of high probability areas for archeological historical/resources which were measured from the USGS Topographic Quadrangles. The aerial photography was orthorectified to National Map Accuracy Standards of +/- 2 feet.

Table 5-1
Land Use and Environmental Data For Primary Route Evaluation
Primary Alternative Routes 10/21/2014

	Evaluation Criteria	13	14	15	16	17	18	19	20
	Land Use								
1	Length of primary alternative route (miles)	10.9	12.9	13.3	12.8	10.4	14.7	11.2	13.3
2	Number of habitable structures[1] within 300 feet of ROW centerline	10	14	3	2	8	5	11	11
3	Number of newly affected habitable structures[2] within 300 feet of ROW centerline	10	14	3	2	7	5	11	11
4	Length of ROW using existing transmission line ROW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Length of ROW parallel and adjacent to existing transmission line ROW	0.2	0.0	0.0	0.1	0.3	0.0	0 2	0.3
6	Length of ROW utilizing abandoned pipeline corridor	0.0	1.5	0.0	3.3	0.0	1.7	1.2	0 0
7	Length of ROW parallel to other existing ROW (roadways, pipelines, railways, etc.)	5.3	8.4	1.1	0.9	4.2	2.9	6.0	4.5
8	Length of ROW parallel to apparent property lines[3]	3.4	1.9	8.6	4.3	3.5	7.2	2.1	4.7
9	Length of ROW across parks/recreational areas[4]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	Number of additional parks/recreational areas[4] within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0
11	Length of ROW through cropland	1.7	2.6	1.6	1.6	1.2	2.2	1.6	3.0
12	Length of ROW through pasture/rangeland	0.2	1.4	0.9	0.3	0.4	1.2	0.1	0 7
13	Length of ROW through land irrigated by traveling systems (rolling or pivot type)	0.0	0.0	0.0	0.0	0 0	0.0	0.0	0.0
14	Number of pipeline crossings	0	0	0	0	0	0	0	0
15	Number of transmission line crossings	0	0	0	0	0	0	0	0
16	Number of U.S. and State highway crossings	1	1	0	0	0	0	0	0
17	Number of farm-to-market (FM) crossings	0	6	1	0	2	6	0	6
18	Number of cemeteries within 1,000 feet of the ROW centerline	0	1	0	0	0	0	1	2
19	Number of FAA registered public/military airports with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline	0	0	0	0	0	0	0	0
20	Number of FAA registered public/military airports having no runway more than 3,200 feet in length located within 10,000 feet of ROW centerline	0	0	0	0	0	0	0	0
21	Number of private airstrips within 10,000 feet of the ROW centerline	1	3	2	1	1	3	0	1
22	Number of heliports within 5,000 feet of the ROW centerline	0	0	0	0	0	0	0	0
23	Number of commercial AM radio transmitters within 10,000 feet of the ROW centerline	0	0	0	0	0	0	0	0
24	Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline	2	2	0	0	2	1	2	0
	Aesthetics								
25	Estimated length of ROW within foreground visual zone[5] of Interstate, U.S. and State highways	1.0	1.4	0.8	0.8	0.4	0.4	0.0	0.0
26	Estimated length of ROW within foreground visual zone[5] of FM roads	5.9	9.0	2.8	0.0	5.9	6.0	6.8	7.4
27	Estimated length of ROW within foreground visual zone[6] of parks/recreational areas[4]	0 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ecology								
28	Length of ROW through upland woodlands/brushlands	8.9	8.4	10 6	10.8	8.6	10 8	9.4	8.6
29	Length of ROW through bottomland/riparian woodlands	0.0	0 1	0 1	0.1	0.0	0.1	0 0	0.4
30	Length of ROW across NWI mapped wetlands	0.0	0.0	0.0	0 0	0.0	0 0	0.0	0.1
31	Length of ROW across known habitat of federally listed endangered or threatened species	0.0	0.0	0.0	0 0	0.0	0.0	0.0	0.0
32	Area of ROW across golden-cheeked warbler modeled habitat where three models agree (acres)	0.0	5.1	2.9	0.5	0.0	1.1	6.2	3.2
33	Length of ROW across open water (lakes, ponds)	0 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	Number of stream crossings	20	21	20	25	19	19	21	30
35	Number of river crossings	0	0	0	0	0	0	0	0
36	Length of ROW parallel (within 100 feet) to streams or rivers	0.4	1 2	0.6	0.5	0.4	0 6	0.4	0.9
37	Length of ROW across 100-year floodplain	0.2	0.0	0.1	0.0	0.2	0.0	0.2	0.1
	Cultural Resources								
38	Number of recorded archeological sites crossed by ROW	0	0	0	0	0	0	0	0
39	Number of additional archeological sites within 1,000 feet of ROW centerline	0	1	0	1	0	2	0	1
40	Number of National Register of Historic Places listed properties crossed by ROW	0	0	0	0	0	0	0	0
41	Number of additional National Register of Historic Places listed properties within 1,000 feet of ROW centerline	0	1	0	0	0	0	0	0
42	Length of ROW through areas of high archaeological/historic site potential	9.1	9.0	10.5	10 1	8.9	8.6	9.0	10.8

[1] Single-family and multi-family dwellings, and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline of a transmission project of 230-kV or less.

[2] Newly affected habitable structures are habitable structures within 300 feet of an alternative route that are currently not already within 300 feet of an existing transmission line.

[3] Property lines created by existing roads, highway, or railroad ROW are not "double-counted" in the length of ROW parallel to apparent property boundaries criteria. Property boundaries provided by LCRA TSC.

[4] Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church within 1,000 feet of the centerline of the project.

[5] One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of Interstates, U.S. and State Highways criteria are not "double-counted" in the length of ROW within the visual foreground zone of FM Roads criteria.

[6] One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of parks/recreational areas may overlap with the total length of ROW within the visual foreground zone of Interstates, U.S. and State Highways criteria and/or with the total length of ROW within the visual foreground zone of FM Roads criteria.

Note: All length measurements in miles unless noted otherwise. All linear measurements were obtained from aerial photography flown August, 2013 with the exception of high probability areas for archeological historical/resources which were measured from the USGS Topographic Quadrangles. The aerial photography was orthorectified to National Map Accuracy Standards of +/- 2 feet.

Table 5-2
Land Use and Environmental Data For Primary Route Evaluation (Primary Segments)
Primary Alternative Segments 10/21/2014

	Evaluation Criteria	A	A1	B	B1	B2	C	C1	C2	D	D1	D2	E
	Land Use												
1	Length of primary alternative segment (miles)	0.2	3.6	0.1	1.8	0.3	0.0	2.4	1.5	0.0	2.8	1.4	0.2
2	Number of habitable structures[1] within 300 feet of ROW centerline	3	0	0	0	0	0	0	4	0	0	0	0
3	Number of newly affected habitable structures[2] within 300 feet of ROW centerline	3	0	0	0	0	0	0	4	0	0	0	0
4	Length of ROW using existing transmission line ROW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Length of ROW parallel and adjacent to existing transmission line ROW	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Length of ROW utilizing abandoned pipeline corridor	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Length of ROW parallel to other existing ROW (roadways, pipelines, railways, etc.)	0.2	0.1	0.1	0.0	0.0	0.0	2.4	1.3	0.0	0.0	0.3	0.2
8	Length of ROW parallel to apparent property lines[3]	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.1	0.0	2.3	0.3	0.0
9	Length of ROW across parks/recreational areas[4]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	Number of additional parks/recreational areas[4] within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
11	Length of ROW through cropland	0.2	0.2	0.1	0.0	0.2	0.0	0.2	0.5	0.0	0.3	0.5	0.1
12	Length of ROW through pasture/rangeland	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.3	0.0
13	Length of ROW through land irrigated by traveling systems (rolling or pivot type)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	Number of pipeline crossings	0	0	0	0	0	0	0	0	0	0	0	0
15	Number of transmission line crossings	0	0	0	0	0	0	0	0	0	0	0	0
16	Number of U.S and State highway crossings	1	0	0	0	0	0	0	0	0	0	0	0
17	Number of farm-to-market (FM) crossings	0	0	0	1	1	0	1	0	0	0	0	0
18	Number of cemeteries within 1,000 feet of the ROW centerline	0	0	0	0	0	0	0	1	0	0	0	0
19	Number of FAA registered public/military airports with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
20	Number of FAA registered public/military airports having no runway more than 3,200 feet in length located within 10,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
21	Number of private airstrips within 10,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
22	Number of heliports within 5,000 feet of the ROW centerline	0	1	0	0	0	0	0	0	0	0	0	0
23	Number of commercial AM radio transmitters within 10,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
24	Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
	Aesthetics	0	0	0	1	0	0	0	0	0	0	0	0
25	Estimated length of ROW within foreground visual zone[5] of interstate, U.S. and State highways												
26	Estimated length of ROW within foreground visual zone[5] of FM roads	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
27	Estimated length of ROW within foreground visual zone[6] of parks/recreational areas[4]	0.0	0.0	0.0	0.5	0.3	0.0	2.4	1.5	0.0	0.0	1.3	0.0
	Ecology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	Length of ROW through upland woodlands/brushlands												
29	Length of ROW through bottomland/riparian woodlands	0.0	3.4	0.0	1.7	0.1	0.0	1.8	0.9	0.0	2.2	0.6	0.1
30	Length of ROW across NWI mapped wetlands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
31	Length of ROW across known habitat of federally listed endangered or threatened species	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	Area of ROW across golden-cheeked warbler modeled habitat where three models agree (acres)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33	Length of ROW across open water (lakes, ponds)	0.0	0.0	0.0	0.0	0.0	0.0	1.5	2.4	0.0	0.0	2.6	0.0
34	Number of stream crossings	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35	Number of river crossings	0	7	0	1	1	0	2	1	0	4	3	0
36	Length of ROW parallel (within 100 feet) to streams or rivers	0	0	0	0	0	0	0	0	0	0	0	0
37	Length of ROW across 100-year floodplain	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
	Cultural Resources	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38	Number of recorded archeological sites crossed by ROW												
39	Number of additional archeological sites within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
40	Number of National Register of Historic Places listed properties crossed by ROW	0	1	0	0	0	0	1	1	0	2	3	0
41	Number of additional National Register of Historic Places listed properties within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
42	Length of ROW through areas of high archaeological/historic site potential	0	0	0	0	0	0	0	1	0	0	0	0
		0.2	3.3	0.0	1.1	0.3	0.0	1.8	0.4	0.0	0.0	0.8	0.0

[1] Single-family and multi-family dwellings, and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline of a transmission project of 230-kV or less.

[2] Newly affected habitable structures are habitable structures within 300 feet of an alternative route that are currently not already within 300 feet of an existing transmission line.

[3] Property lines created by existing roads, highway, or railroad ROW are not "double-counted" in the length of ROW parallel to apparent property boundaries criteria. Property boundaries provided by LCRA TSC.

[4] Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church within 1,000 feet of the centerline of the project.

[5] One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of Interstates, U.S and State Highways criteria are not "double-counted" in the length of ROW within the visual foreground zone of FM Roads criteria.

[6] One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of parks/recreational areas may overlap with the total length of ROW within the visual foreground zone of Interstates, U.S. and State Highways criteria and/or with the total length of ROW within the visual foreground zone of FM Roads criteria.

Note: All length measurements in miles unless noted otherwise. All linear measurements were obtained from aerial photography flown August, 2013 with the exception of high probability areas for archeological historical/resources which were measured from the USGS Topographic Quadrangles. The aerial photography was orthorectified to National Map Accuracy Standards of +/- 2 feet.

Table 5-2
Land Use and Environmental Data For Primary Route Evaluation (Primary Segments)
Primary Alternative Segments 10/21/2014

	Evaluation Criteria	E1	E2	F	F1	F2	G	G1	G2	G3	H	H1	H2
	Land Use												
1	Length of primary alternative segment (miles)	2.7	3.3	0.1	0.5	0.2	0.4	4.2	0.5	0.3	1.3	3.3	0.2
2	Number of habitable structures[1] within 300 feet of ROW centerline	1	4	0	0	0	0	0	0	1	1	1	0
3	Number of newly affected habitable structures[2] within 300 feet of ROW centerline	1	4	0	0	0	0	0	0	1	1	1	0
4	Length of ROW using existing transmission line ROW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Length of ROW parallel and adjacent to existing transmission line ROW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Length of ROW utilizing abandoned pipeline corridor	0.3	1.1	0.0	0.0	0.2	0.0	0.0	0.4	0.0	0.0	0.0	0.0
7	Length of ROW parallel to other existing ROW (roadways, pipelines, railways, etc.)	0.0	2.0	0.1	0.0	0.0	0.3	0.0	0.0	0.3	1.1	0.0	0.0
8	Length of ROW parallel to apparent property lines[3]	1.7	0.0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	0.1	0.9	0.2
9	Length of ROW across parks/recreational areas[4]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	Number of additional parks/recreational areas[4] within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
11	Length of ROW through cropland	0.0	0.3	0.1	0.2	0.0	0.4	0.0	0.0	0.3	0.7	0.0	0.0
12	Length of ROW through pasture/rangeland	0.1	0.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	Length of ROW through land irrigated by traveling systems (rolling or pivot type)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	Number of pipeline crossings	0	0	0	0	0	0	0	0	0	0	0	0
15	Number of transmission line crossings	0	0	0	0	0	0	0	0	0	0	0	0
16	Number of U.S. and State highway crossings	0	0	0	0	0	0	0	0	0	0	0	0
17	Number of farm-to-market (FM) crossings	0	4	0	0	0	0	0	0	0	0	0	0
18	Number of cemeteries within 1,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	1	0	0
19	Number of FAA registered public/military airports with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
20	Number of FAA registered public/military airports having no runway more than 3,200 feet in length located within 10,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
21	Number of private airstrips within 10,000 feet of the ROW centerline	0	1	0	0	0	0	0	1	0	0	0	0
22	Number of heliports within 5,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
23	Number of commercial AM radio transmitters within 10,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
24	Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
	Aesthetics												
25	Estimated length of ROW within foreground visual zone[5] of Interstate, U.S. and State highways	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	Estimated length of ROW within foreground visual zone[5] of FM roads	0.0	3.3	0.0	0.5	0.0	0.0	0.6	0.5	0.0	0.0	0.0	0.2
27	Estimated length of ROW within foreground visual zone[6] of parks/recreational areas[4]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ecology												
28	Length of ROW through upland woodlands/brushlands	2.6	2.4	0.0	0.2	0.2	0.0	4.1	0.5	0.0	0.6	3.2	0.2
29	Length of ROW through bottomland/riparian woodlands	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0
30	Length of ROW across NWI mapped wetlands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	Length of ROW across known habitat of federally listed endangered or threatened species	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	Area of ROW across golden-cheeked warbler modeled habitat where three models agree (acres)	0.5	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	1.4
33	Length of ROW across open water (lakes, ponds)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	Number of stream crossings	10	6	0	0	0	0	15	0	0	3	4	0
35	Number of river crossings	0	0	0	0	0	0	0	0	0	0	0	0
36	Length of ROW parallel (within 100 feet) to streams or rivers	0.2	0.1	0.0	0.0	0.0	0.0	0.4	0.2	0.0	0.0	0.0	0.0
37	Length of ROW across 100-year floodplain	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Cultural Resources												
38	Number of recorded archeological sites crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0
39	Number of additional archeological sites within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
40	Number of National Register of Historic Places listed properties crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0
41	Number of additional National Register of Historic Places listed properties within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
42	Length of ROW through areas of high archaeological/historic site potential	2.3	2.4	0.0	0.0	0.0	0.0	3.8	0.5	0.0	1.3	2.2	0.2

[1] Single-family and multi-family dwellings, and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline of a transmission project of 230-kV or less.

[2] Newly affected habitable structures are habitable structures within 300 feet of an alternative route that are currently not already within 300 feet of an existing transmission line.

[3] Property lines created by existing roads, highway, or railroad ROW are not "double-counted" in the length of ROW parallel to apparent property boundaries criteria. Property boundaries provided by LCRA TSC.

[4] Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church within 1,000 feet of the centerline of the project.

[5] One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of Interstates, U.S. and State Highways criteria are not "double-counted" in the length of ROW within the visual foreground zone of FM Roads criteria.

[6] One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of parks/recreational areas may overlap with the total length of ROW within the visual foreground zone of Interstates, U.S. and State Highways criteria and/or with the total length of ROW within the visual foreground zone of FM Roads criteria.

Note: All length measurements in miles unless noted otherwise. All linear measurements were obtained from aerial photography flown August, 2013 with the exception of high probability areas for archeological historical/resources which were measured from the USGS Topographic Quadrangles. The aerial photography was orthorectified to National Map Accuracy Standards of +/- 2 feet.

178

Table 5-2
Land Use and Environmental Data For Primary Route Evaluation (Primary Segments)
Primary Alternative Segments 10/21/2014

	Evaluation Criteria	I	I1	I2	I3	J	J1	J2	K	K1	K2	L	L1
	Land Use												
1	Length of primary alternative segment (miles)	0 8	1.5	0.9	2.7	3.4	0.5	0 5	2.7	0.4	0.2	0.5	1.5
2	Number of habitable structures[1] within 300 feet of ROW centerline	0	1	2	1	0	0	1	0	2	0	3	2
3	Number of newly affected habitable structures[2] within 300 feet of ROW centerline	0	1	2	1	0	0	1	0	2	0	3	2
4	Length of ROW using existing transmission line ROW	0 0	0 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Length of ROW parallel and adjacent to existing transmission line ROW	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0 0	0.0	0.0	0.0
6	Length of ROW utilizing abandoned pipeline corridor	0 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Length of ROW parallel to other existing ROW (roadways, pipelines, railways, etc.)	0 0	0.0	0.9	2 6	3.3	0.4	0 4	0.0	0.0	0.0	0.4	0.0
8	Length of ROW parallel to apparent property lines[3]	0.0	1 0	0.0	0.0	0.0	0.0	0.0	1.8	0.4	0.0	0.0	0 3
9	Length of ROW across parks/recreational areas[4]	0.0	0 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0	0.0	0.0
10	Number of additional parks/recreational areas[4] within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
11	Length of ROW through cropland	0.0	0.0	0 0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.1
12	Length of ROW through pasture/rangeland	0.0	0.0	0 0	0.3	0.0	0.0	0.1	0.0	0.0	0.0	0 0	0 2
13	Length of ROW through land irrigated by traveling systems (rolling or pivot type)	0.0	0 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0	0.0	0.0
14	Number of pipeline crossings	0	0	0	0	0	0	0	0	0	0	0	0
15	Number of transmission line crossings	0	0	0	0	0	0	0	0	0	0	0	0
16	Number of U.S. and State highway crossings	0	0	0	0	0	0	0	0	0	0	0	0
17	Number of farm-to-market (FM) crossings	1	0	1	1	1	0	1	1	0	1	1	0
18	Number of cemeteries within 1,000 feet of the ROW centerline	1	0	1	1	0	0	0	0	0	0	0	0
19	Number of FAA registered public/military airports with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
20	Number of FAA registered public/military airports having no runway more than 3,200 feet in length located within 10,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
21	Number of private airstrips within 10,000 feet of the ROW centerline	0	1	0	0	0	0	0	0	0	0	0	0
22	Number of heliports within 5,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
23	Number of commercial AM radio transmitters within 10,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
24	Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
	Aesthetics												
25	Estimated length of ROW within foreground visual zone[5] of Interstate, U.S. and State highways	0.0	0.0	0.0	0.0	0.0	0.0	0 0	0.0	0 0	0.0	0.0	0.0
26	Estimated length of ROW within foreground visual zone[5] of FM roads	0.8	0.7	0.9	2.7	3.4	0.0	0.5	1.6	0.4	0.2	0.5	1.0
27	Estimated length of ROW within foreground visual zone[6] of parks/recreational areas[4]	0.0	0.0	0.0	0.0	0.0	0.0	0 0	0.0	0.0	0 0	0.0	0.0
	Ecology												
28	Length of ROW through upland woodlands/brushlands	0.8	1.5	0.8	2.2	3.1	0.5	0 3	2.7	0.2	0.0	0.3	1.1
29	Length of ROW through bottomland/riparian woodlands	0.0	0.0	0 0	0.1	0 2	0.0	0 0	0.0	0.0	0.0	0.0	0.1
30	Length of ROW across NWI mapped wetlands	0.0	0.0	0 0	0 0	0.0	0.0	0.0	0.0	0.0	0.0	0 0	0 0
31	Length of ROW across known habitat of federally listed endangered or threatened species	0.0	0 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	Area of ROW across golden-cheeked warbler modeled habitat where three models agree (acres)	0.0	0.0	0.0	1.1	0.7	0.0	0.0	1.3	0.0	0 0	0.0	0.9
33	Length of ROW across open water (lakes, ponds)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	Number of stream crossings	2	3	0	8	3	0	0	5	0	0	1	3
35	Number of river crossings	0	0	0	0	0	0	0	0	0	0	0	0
36	Length of ROW parallel (within 100 feet) to streams or rivers	0.0	0.2	0.0	0.3	0.4	0.0	0 0	0.1	0.0	0.0	0 0	0 1
37	Length of ROW across 100-year floodplain	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
	Cultural Resources												
38	Number of recorded archeological sites crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0
39	Number of additional archeological sites within 1,000 feet of ROW centerline	0	0	0	1	2	0	0	0	0	0	0	0
40	Number of National Register of Historic Places listed properties crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0
41	Number of additional National Register of Historic Places listed properties within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
42	Length of ROW through areas of high archaeological/historic site potential	0.7	1.5	0.4	2.4	3.4	0.5	0 5	1 7	0.4	0.2	0.5	1 1

[1] Single-family and multi-family dwellings, and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline of a transmission project of 230-kV or less.

[2] Newly affected habitable structures are habitable structures within 300 feet of an alternative route that are currently not already within 300 feet of an existing transmission line.

[3] Property lines created by existing roads, highway, or railroad ROW are not "double-counted" in the length of ROW parallel to apparent property boundaries criteria. Property boundaries provided by LCRA TSC.

[4] Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church within 1,000 feet of the centerline of the project.

[5] One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of Interstates, U.S. and State Highways criteria are not "double-counted" in the length of ROW within the visual foreground zone of FM Roads criteria.

[6] One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of parks/recreational areas may overlap with the total length of ROW within the visual foreground zone of Interstates, U.S. and State Highways criteria and/or with the total length of ROW within the visual foreground zone of FM Roads criteria.

Note: All length measurements in miles unless noted otherwise. All linear measurements were obtained from aerial photography flown August, 2013 with the exception of high probability areas for archeological historical/resources which were measured from the USGS Topographic Quadrangles. The aerial photography was orthorectified to National Map Accuracy Standards of +/- 2 feet.

Table 5-2
Land Use and Environmental Data For Primary Route Evaluation (Primary Segments)
Primary Alternative Segments 10/21/2014

	Evaluation Criteria	L2	M	M1	N	N1	O	O1	P	P1	Q	Q1	R
	Land Use												
1	Length of primary alternative segment (miles)	2.4	0.4	0.3	0.7	0.8	6.4	0.1	0.2	0.8	0.3	0.6	1.6
2	Number of habitable structures[1] within 300 feet of ROW centerline	2	0	1	2	1	0	0	1	2	0	1	3
3	Number of newly affected habitable structures[2] within 300 feet of ROW centerline	2	0	1	2	1	0	0	1	0	0	1	3
4	Length of ROW using existing transmission line ROW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Length of ROW parallel and adjacent to existing transmission line ROW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
6	Length of ROW utilizing abandoned pipeline corridor	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Length of ROW parallel to other existing ROW (roadways, pipelines, railways, etc.)	1.4	0.4	0.3	0.7	0.0	0.0	0.1	0.2	0.0	0.3	0.0	0.0
8	Length of ROW parallel to apparent property lines[3]	0.2	0.0	0.0	0.0	0.2	5.0	0.0	0.0	0.0	0.0	0.3	1.4
9	Length of ROW across parks/recreational areas[4]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	Number of additional parks/recreational areas[4] within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
11	Length of ROW through cropland	0.9	0.2	0.0	0.0	0.0	0.2	0.1	0.2	0.0	0.3	0.2	1.2
12	Length of ROW through pasture/rangeland	0.0	0.1	0.2	0.0	0.0	0.7	0.0	0.0	0.1	0.0	0.0	0.0
13	Length of ROW through land irrigated by traveling systems (rolling or pivot type)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	Number of pipeline crossings	0	0	0	0	0	0	0	0	0	0	0	0
15	Number of transmission line crossings	0	0	0	0	0	0	0	0	0	0	0	0
16	Number of U.S. and State highway crossings	0	0	0	0	0	0	0	1	0	0	0	0
17	Number of farm-to-market (FM) crossings	0	0	0	0	0	1	0	0	0	0	0	0
18	Number of cemeteries within 1,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	1
19	Number of FAA registered public/military airports with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
20	Number of FAA registered public/military airports having no runway more than 3,200 feet in length located within 10,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
21	Number of private airstrips within 10,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
22	Number of heliports within 5,000 feet of the ROW centerline	0	0	0	0	0	1	0	0	0	1	1	0
23	Number of commercial AM radio transmitters within 10,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
24	Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
	Aesthetics												
25	Estimated length of ROW within foreground visual zone[5] of Interstate, U.S. and State highways	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.3	0.0	1.4
26	Estimated length of ROW within foreground visual zone[5] of FM roads	2.1	0.4	0.3	0.7	0.8	0.7	0.0	0.0	0.6	0.0	0.0	0.0
27	Estimated length of ROW within foreground visual zone[6] of parks/recreational areas[4]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ecology												
28	Length of ROW through upland woodlands/brushlands	1.5	0.1	0.1	0.6	0.7	5.5	0.0	0.0	0.6	0.0	0.3	0.3
29	Length of ROW through bottomland/riparian woodlands	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
30	Length of ROW across NWI mapped wetlands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	Length of ROW across known habitat of federally listed endangered or threatened species	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	Area of ROW across golden-cheeked warbler modeled habitat where three models agree (acres)	0.1	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	1.2
33	Length of ROW across open water (lakes, ponds)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	Number of stream crossings	2	0	0	1	0	9	0	0	0	0	0	2
35	Number of river crossings	0	0	0	0	0	0	0	0	0	0	0	0
36	Length of ROW parallel (within 100 feet) to streams or rivers	0.3	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
37	Length of ROW across 100-year floodplain	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
	Cultural Resources												
38	Number of recorded archeological sites crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0
39	Number of additional archeological sites within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
40	Number of National Register of Historic Places listed properties crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0
41	Number of additional National Register of Historic Places listed properties within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
42	Length of ROW through areas of high archaeological/historic site potential	1.6	0.3	0.2	0.6	0.6	5.2	0.0	0.0	0.8	0.2	0.5	0.6

[1] Single-family and multi-family dwellings, and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline of a transmission project of 230-kV or less.

[2] Newly affected habitable structures are habitable structures within 300 feet of an alternative route that are currently not already within 300 feet of an existing transmission line.

[3] Property lines created by existing roads, highway, or railroad ROW are not "double-counted" in the length of ROW parallel to apparent property boundaries criteria. Property boundaries provided by LCRA TSC.

[4] Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church within 1,000 feet of the centerline of the project.

[5] One-half mile, unobstructed Lengths of ROW within the visual foreground zone of Interstates, U.S. and State Highways criteria are not "double-counted" in the length of ROW within the visual foreground zone of FM Roads criteria.

[6] One-half mile, unobstructed Lengths of ROW within the visual foreground zone of parks/recreational areas may overlap with the total length of ROW within the visual foreground zone of Interstates, U.S. and State Highways criteria and/or with the total length of ROW within the visual foreground zone of FM Roads criteria.

Note: All length measurements in miles unless noted otherwise. All linear measurements were obtained from aerial photography flown August, 2013 with the exception of high probability areas for archeological historical/resources which were measured from the USGS Topographic Quadrangles. The aerial photography was orthorectified to National Map Accuracy Standards of +/- 2 feet.

Table 5-2
Land Use and Environmental Data For Primary Route Evaluation (Primary Segments)
Primary Alternative Segments 10/21/2014

	Evaluation Criteria	R1	R2	S	S1	T	T1	U	U1	V	V1	W	W1
	Land Use												
1	Length of primary alternative segment (miles)	1.5	1.0	1.1	1.5	0.9	2.0	4.6	0.3	3.1	0.2	3.6	0.4
2	Number of habitable structures[1] within 300 feet of ROW centerline	0	2	0	0	0	3	1	0	0	0	3	3
3	Number of newly affected habitable structures[2] within 300 feet of ROW centerline	0	2	0	0	0	3	1	0	0	0	3	3
4	Length of ROW using existing transmission line ROW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Length of ROW parallel and adjacent to existing transmission line ROW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Length of ROW utilizing abandoned pipeline corridor	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0
7	Length of ROW parallel to other existing ROW (roadways, pipelines, railways, etc.)	0.0	0.1	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	3.2	0.4
8	Length of ROW parallel to apparent property lines[3]	1.2	1.0	0.7	0.7	0.9	0.7	2.1	0.3	1.9	0.2	0.0	0.0
9	Length of ROW across parks/recreational areas[4]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	Number of additional parks/recreational areas[4] within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
11	Length of ROW through cropland	1.0	0.4	0.7	0.0	0.5	0.7	1.2	0.1	0.0	0.0	0.1	0.2
12	Length of ROW through pasture/rangeland	0.0	0.1	0.1	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.1
13	Length of ROW through land irrigated by traveling systems (rolling or pivot type)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	Number of pipeline crossings	0	0	0	0	0	0	0	0	0	0	0	0
15	Number of transmission line crossings	0	0	0	0	0	0	0	0	0	0	0	0
16	Number of U.S. and State highway crossings	0	0	0	0	0	0	0	0	0	0	0	0
17	Number of farm-to-market (FM) crossings	0	0	0	0	0	0	0	0	0	0	0	0
18	Number of cemeteries within 1,000 feet of the ROW centerline	0	0	0	0	0	0	1	0	0	0	0	0
19	Number of FAA registered public/military airports with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
20	Number of FAA registered public/military airports having no runway more than 3,200 feet in length located within 10,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
21	Number of private airstrips within 10,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
22	Number of heliports within 5,000 feet of the ROW centerline	0	1	1	0	1	1	0	0	1	0	0	0
23	Number of commercial AM radio transmitters within 10,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
24	Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
	Aesthetics												
25	Estimated length of ROW within foreground visual zone[5] of Interstate, U.S. and State highways	0.0	0.0	0.4	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0
26	Estimated length of ROW within foreground visual zone[5] of FM roads	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.6	0.0	3.6	0.4
27	Estimated length of ROW within foreground visual zone[6] of parks/recreational areas[4]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ecology												
28	Length of ROW through upland woodlands/brushlands	0.3	0.5	0.3	1.5	0.4	1.0	3.3	0.2	3.1	0.2	3.5	0.1
29	Length of ROW through bottomland/riparian woodlands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	Length of ROW across NWI mapped wetlands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	Length of ROW across known habitat of federally listed endangered or threatened species	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	Area of ROW across golden-cheeked warbler modeled habitat where three models agree (acres)	0.0	0.0	0.0	0.0	0.0	0.0	6.2	0.0	0.0	0.0	0.0	0.2
33	Length of ROW across open water (lakes, ponds)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	Number of stream crossings	4	3	3	1	1	6	9	1	6	0	5	1
35	Number of river crossings	0	0	0	0	0	0	0	0	0	0	0	0
36	Length of ROW parallel (within 100 feet) to streams or rivers	0.1	0.2	0.1	0.0	0.0	0.3	0.4	0.0	0.2	0.0	0.0	0.0
37	Length of ROW across 100-year floodplain	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0
	Cultural Resources												
38	Number of recorded archeological sites crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0
39	Number of additional archeological sites within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
40	Number of National Register of Historic Places listed properties crossed by ROW	0	0	0	0	0	0	0	0	0	0	0	0
41	Number of additional National Register of Historic Places listed properties within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0	0	0	0
42	Length of ROW through areas of high archaeological/historic site potential	1.3	0.9	1.1	1.1	0.6	1.8	3.5	0.3	2.4	0.0	3.3	0.4

[1] Single-family and multi-family dwellings, and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline of a transmission project of 230-kV or less.

[2] Newly affected habitable structures are habitable structures within 300 feet of an alternative route that are currently not already within 300 feet of an existing transmission line.

[3] Property lines created by existing roads, highway, or railroad ROW are not "double-counted" in the length of ROW parallel to apparent property boundaries criteria. Property boundaries provided by LCRA TSC.

[4] Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church within 1,000 feet of the centerline of the project.

[5] One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of Interstates, U.S. and State Highways criteria are not "double-counted" in the length of ROW within the visual foreground zone of FM Roads criteria.

[6] One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of parks/recreational areas may overlap with the total length of ROW within the visual foreground zone of Interstates, U.S. and State Highways criteria and/or with the total length of ROW within the visual foreground zone of FM Roads criteria.

Note: All length measurements in miles unless noted otherwise. All linear measurements were obtained from aerial photography flown August, 2013 with the exception of high probability areas for archeological historical/resources which were measured from the USGS Topographic Quadrangles. The aerial photography was orthorectified to National Map Accuracy Standards of +/- 2 feet.

Table 5-2
Land Use and Environmental Data For Primary Route Evaluation (Primary Segments)
Primary Alternative Segments 10/21/2014

	Evaluation Criteria	X	X2	Y	Y1	Y2	Z	Z1	Z2	Z3
	Land Use									
1	Length of primary alternative segment (miles)	0.9	0.2	0.9	1.1	0.9	0.1	2.2	3.2	0.6
2	Number of habitable structures[1] within 300 feet of ROW centerline	3	0	4	4	1	1	2	0	0
3	Number of newly affected habitable structures[2] within 300 feet of ROW centerline	2	0	4	4	1	1	2	0	0
4	Length of ROW using existing transmission line ROW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Length of ROW parallel and adjacent to existing transmission line ROW	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Length of ROW utilizing abandoned pipeline corridor	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Length of ROW parallel to other existing ROW (roadways, pipelines, railways, etc.)	0.4	0.0	0.9	1.1	0.9	0.1	0.8	0.2	0.6
8	Length of ROW parallel to apparent property lines[3]	0.1	0.0	0.0	0.0	0.0	0.0	1.0	2.5	0.0
9	Length of ROW across parks/recreational areas[4]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	Number of additional parks/recreational areas[4] within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0
11	Length of ROW through cropland	0.0	0.0	0.0	0.5	0.0	0.1	0.6	0.4	0.0
12	Length of ROW through pasture/rangeland	0.2	0.1	0.0	0.0	0.0	0.0	0.4	0.2	0.1
13	Length of ROW through land irrigated by traveling systems (rolling or pivot type)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	Number of pipeline crossings	0	0	0	0	0	0	0	0	0
15	Number of transmission line crossings	0	0	0	0	0	0	0	0	0
16	Number of U.S. and State highway crossings	0	0	0	0	0	0	0	0	0
17	Number of farm-to-market (FM) crossings	2	0	0	0	0	0	1	1	0
18	Number of cemeteries within 1,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0
19	Number of FAA registered public/military airports with at least one runway more than 3,200 feet in length located within 20,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0
20	Number of FAA registered public/military airports having no runway more than 3,200 feet in length located within 10,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0
21	Number of private airstrips within 10,000 feet of the ROW centerline	0	0	0	0	0	1	2	2	2
22	Number of heliports within 5,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0
23	Number of commercial AM radio transmitters within 10,000 feet of the ROW centerline	0	0	0	0	0	0	0	0	0
24	Number of FM radio transmitters, microwave towers, and other electronic installations within 2,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0
	Aesthetics									
25	Estimated length of ROW within foreground visual zone[5] of Interstate, U.S. and State highways	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
26	Estimated length of ROW within foreground visual zone[5] of FM roads	0.9	0.2	0.9	1.1	0.9	0.0	0.8	0.7	0.6
27	Estimated length of ROW within foreground visual zone[6] of parks/recreational areas[4]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ecology									
28	Length of ROW through upland woodlands/brushlands	0.6	0.1	0.9	0.6	0.9	0.0	1.3	2.5	0.4
29	Length of ROW through bottomland/riparian woodlands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	Length of ROW across NWI mapped wetlands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
31	Length of ROW across known habitat of federally listed endangered or threatened species	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
32	Area of ROW across golden-cheeked warbler modeled habitat where three models agree (acres)	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0	1.1
33	Length of ROW across open water (lakes, ponds)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	Number of stream crossings	2	1	3	1	2	0	4	3	2
35	Number of river crossings	0	0	0	0	0	0	0	0	0
36	Length of ROW parallel (within 100 feet) to streams or rivers	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.0
37	Length of ROW across 100-year floodplain	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
	Cultural Resources									
38	Number of recorded archeological sites crossed by ROW	0	0	0	0	0	0	0	0	0
39	Number of additional archeological sites within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0
40	Number of National Register of Historic Places listed properties crossed by ROW	0	0	0	0	0	0	0	0	0
41	Number of additional National Register of Historic Places listed properties within 1,000 feet of ROW centerline	0	0	0	0	0	0	0	0	0
42	Length of ROW through areas of high archaeological/historic site potential	0.9	0.2	0.9	0.9	0.6	0.1	1.5	2.4	0.6

[1] Single-family and multi-family dwellings, and related structures, mobile homes, apartment buildings, commercial structures, industrial structures, business structures, churches, hospitals, nursing homes, schools, or other structures normally inhabited by humans or intended to be inhabited by humans on a daily or regular basis within 300 feet of the centerline of a transmission project of 230-kV or less.

[2] Newly affected habitable structures are habitable structures within 300 feet of an alternative route that are currently not already within 300 feet of an existing transmission line.

[3] Property lines created by existing roads, highway, or railroad ROW are not "double-counted" in the length of ROW parallel to apparent property boundaries criteria. Property boundaries provided by LCRA TSC.

[4] Defined as parks and recreational areas owned by a governmental body or an organized group, club, or church within 1,000 feet of the centerline of the project.

[5] One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of Interstates, U.S. and State Highways criteria are not "double-counted" in the length of ROW within the visual foreground zone of FM Roads criteria.

[6] One-half mile, unobstructed. Lengths of ROW within the visual foreground zone of parks/recreational areas may overlap with the total length of ROW within the visual foreground zone of Interstates, U.S. and State Highways criteria and/or with the total length of ROW within the visual foreground zone of FM Roads criteria.

Note: All length measurements in miles unless noted otherwise. All linear measurements were obtained from aerial photography flown August, 2013 with the exception of high probability areas for archeological historical/resources which were measured from the USGS Topographic Quadrangles. The aerial photography was orthorectified to National Map Accuracy Standards of +/- 2 feet.

182

5.1.3 Impacts on Water Resources

Throughout the routing process, consideration was provided towards minimizing potential impacts to surface waters and associated NWI mapped wetlands. For example, POWER attempted to minimize length of ROW parallel to streams or rivers. TPWD recommended crossing streams at right angles at their narrowest sections to avoid potential impacts. Crossings of these areas were minimized by maintaining a perpendicular angle at each crossing where practical. Additional TPWD guidelines reviewed for construction and clearing within riparian areas are provided in Appendix A.

5.1.3.1 Floodplains

Based on available FEMA data, designated 100-year floodplains are associated with low lying creek/river bottoms, and associated depressional areas within the study area. Structures may be located within these floodplains; however, engineering considerations and proper structure placement should alleviate the potential for adverse impacts of floodwater flow by minimizing impedance. Construction of the proposed project should not have any significant impacts on the overall function of the floodplain, nor adversely affect adjacent or downstream properties. If structures are to be located within the floodplain, LCRA will coordinate with the appropriate county floodplain administrators. The length of ROW across the 100-year floodplain was tabulated and ranges from 0.0 mile for Routes 2, 4, 6, 8, 10, 12, 14, 16, and 18 to 0.2 mile for Routes 7, 9, 13, 17, and 19.

5.1.3.2 Surface Water

Surface waters typically include intermittent or perennial streams and lakes or ponds. If surface waters are crossed, the proposed transmission line would span all surface water crossings, with the structure foundations located outside of the ordinary high water lines. No construction activities would be allowed that would significantly impede the flow of water within these watersheds. Vegetation removal at these surface water crossings would be performed in a manner to diminish damage to the natural condition of the area and in accordance with USACE requirements. Erosion control devices would be implemented in accordance with the SWPPP to reduce the potential for sedimentation outside of the ROW. The proper inspection and maintenance of these erosion control devices will minimize the potential for erosion of exposed soils on the ROW and deposition of sediments into surface waters.

All 20 of the Routes cross streams. These streams are calculated from the NHD database and the hydrology of some of these streams may have been altered or affected by construction of drainage ditches/canals, levees, impoundments, residential areas, etc. The number of stream crossings range from 18 for Route 1 to 34 crossings for Route 6. No rivers are crossed by any of the 20 Routes. No significant length of ROW of any of the Routes was identified to cross open waters (lakes or ponds). Routes 1, 3, 5, 7, 11, 14, 15 and 20 cross less than 0.049 mile (258.72 feet) of open waters and were tabulated as zero.

All 20 of the primary alternative routes parallel (within 100 feet) streams or rivers for some distance. The length of ROW parallel (within 100 feet) to streams or rivers ranges from 0.1 mile for Route 9 to 1.2 miles for Route 14.

As discussed in Section 2.6.3, NWI maps are based on topography and interpretation of infrared satellite data and color aerial photographs. As such, NWI data is useful for planning and comparative analysis purposes, but should not be relied upon for determining USACE jurisdiction. NWI wetland types identified within the study area include palustrine forested, palustrine shrub/scrub, and palustrine emergent wetlands that are associated with the streams, creeks, rivers and depressional areas. The length of ROW across potential NWI mapped wetlands ranges from 0.0 mile for Routes 9 and 19 to 0.1 mile for Routes 3, 5, 7, 11, and 20. The remaining Routes cross less than 0.049 mile (258.72 feet) of NWI mapped wetlands and are tabulated as zero.

5.1.3.3 Ground Water

The construction, operation and maintenance of the proposed transmission line is 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 with the implementation of a SWPPP. During construction activities, another potential impact for both surface water and groundwater resources is related to potential fuel and/or other chemical spills. As a component of the SWPPP, standard operating procedures and response specifications relating to petroleum product storage, refueling, and maintenance activities of equipment are provided to avoid and minimize potential contamination to these resources.

5.1.4 Impacts on Ecosystems

5.1.4.1 Vegetation

Potential impacts to native vegetation would result from clearing the new ROW of woody vegetation and/or clearing herbaceous vegetation. These activities facilitate access for structure construction, line stringing and maintenance activities. Vegetation removal will be performed in accordance with natural and cultural resource regulations, in a manner that will diminish marring and scarring of the landscape, while ensuring that the line can be constructed, operated, and maintained safely and in accordance with state and federal regulations governing utility construction. Prior to construction, removal of woody vegetation within new ROW would be required within upland forested, bottomland/riparian and wetland areas. Mowing and/or shredding of herbaceous vegetation may be required within pasture/rangeland. Future ROW maintenance activities may include periodic mowing and/or herbicide applications to maintain the herbaceous vegetation layer within the ROW.

Clearing trees and shrubs from woodland areas would generate an additional degree of habitat fragmentation. The degree of habitat fragmentation is typically reduced when a primary alternative route parallels an existing linear feature such as a pipeline, transmission line or roadway. During the route development process consideration was provided to avoid extensive woodland and riparian areas and to maximize the length of the routes parallel and adjacent to existing linear corridors.

Commercially important vegetation species within the study area primarily include hay, row crops, peach orchards, and grape vineyards. Typically the construction of a new transmission line is not considered a conversion of Prime and Important Farmlands because the area within the ROW between the transmission line structures can still be used for agricultural purposes after construction. Minimal impacts to agricultural production may occur during the construction process.

Impacts to vegetation would be limited to that necessary for the construction, operation and maintenance of the proposed transmission line. ROW clearing activities would be completed with minimal vegetation impacts and the existing groundcover would be maintained when practical. The most common land use types within the study area are pasture/rangeland, cropland, residential, and commercial/industrial. While the TPWD (see Appendix A) recommends implementing practices to prevent establishment of invasive plant species and

sustain native species, the native vegetation within these areas has likely been previously modified. LCRA TSC's vegetation management activities are described in Section 1.0 of this document.

All of the primary alternative routes parallel existing linear corridors for some portion of their lengths (including parcel boundaries) which may minimize potential impacts to the vegetation and minimize habitat fragmentation (see Table 5-1). This is discussed further in Sections 5.2.3.2, 5.2.3.3, and 5.2.3.4.

The study area is primarily comprised of cropland, upland woodland/brushland vegetation, and pasture/rangeland. Bottomland/riparian woodlands are typically limited to narrow corridors near streams and rivers. Primary alternative route lengths within cropland areas range from approximately 1.2 miles for Route 17 to approximately 4.5 miles for Route 2. Primary alternative route lengths proposed within pasture/rangeland areas varies from 0.1 mile for Routes 6 and 19 to approximately 1.7 miles for Route 10. None of the primary alternative routes cross land with known mobile irrigation systems. Temporary impacts to row crop species would be the greatest during the growing season and these could be minimized with the seasonal timing of construction activities. Permanent impacts (loss of production areas) would be limited to the footprint of the transmission structures since these areas are inaccessible with large farming or cultivating equipment.

Upland woodland/brushland vegetation would also be impacted where clearing is required for the ROW. The length of ROW across upland woodland/brushland vegetation ranges from 7.8 miles for Route 11 to 14.4 miles for Route 6. Bottomland/riparian woodland areas are crossed by 17 of 20 alternative routes. The length of ROW across bottomland/riparian woodlands ranges from 0.0 mile for Routes 13, 17, and 19 to 0.4 mile for Routes 1 and 20.

A summary of the TPWD recommendations (see Appendix A) include maximizing the use of existing electrical transmission facilities, and where new ROW construction is required, maximizing paralleling with existing linear corridors to minimize potential impacts to undisturbed habitats. Recommendations also included minimizing the clearing of sensitive vegetation types, including native grasslands, forest and woodland community areas, and riparian vegetation. These recommendations were considered and implemented where practical during the routing process.

Commercially important vegetation species within the study area are primarily agriculturally oriented including hay and row crops. Hay production from improved and unimproved pastures exists in extensive portions of the study area, operating in support of cattle production. Minimal impacts to hay-production may occur during the construction phase of the project.

5.1.4.2 Wildlife

The primary impact of construction activities on terrestrial wildlife species would be associated with temporary disturbances associated with construction activities and with removal of vegetation (habitat modification/fragmentation). Increased noise and equipment movement during construction may temporarily displace mobile wildlife species from the immediate workspace area. These impacts would be short-term and normal wildlife movements would be expected to resume after construction is completed. Potential long-term impacts include those resulting from habitat modifications and/or fragmentation. Most of the vegetation types encountered along the primary alternative routes are associated with upland woodland/brushland, cropland, or pasture/rangeland. Native habitats have historically been modified to a high degree to support various land uses. Most of the remnant native habitat remains in isolated patches and/or is associated with the stream corridors. These remnant habitats often serve as shelter and/or movement corridors for many species. By using existing ROWs or paralleling existing linear features such as a pipeline, transmission line or roadway, the degree of impact to wildlife and habitat fragmentation is typically reduced.

Construction activities may also impact small, immobile, or fossorial (living underground) animal species through accidental impacts or the alteration of local habitats. Impacts to 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 area related to potential takes of migratory bird eggs and/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. The TPWD recommends using practices to avoid harassment and harm to migratory birds, for vegetation removal, and that ground disturbing activities be done outside the nesting season (see Appendix A).

Measures can be implemented to minimize the risk for electrocution and/or collisions of birds with structure design and additional mitigative measures. The danger of electrocution to birds should be insignificant since the distance between conductors, from conductor to structure, and from conductor to ground wire for the proposed 138-kV transmission line is greater than the wingspan of any bird in the area. The structures and wires of the line could be a collision hazard to birds in flight. The study area is located within the Central Flyway for neo-tropical migratory birds and is also at the western edge of the migratory flyway for the federally endangered whooping crane. Normally these migratory birds fly at altitudes exceeding the tower structure heights and would be at risk only during periods of migratory fallout (inclement weather and/or high opposing direction winds forcing them to lower altitudes, including the ground level). The greatest potential risk to whooping cranes would occur during ascent/descent to nightly stopover areas during migration, although this risk is unlikely due to high levels of human activity within the study area.

The most likely potential permanent impact to wildlife would result from the clearing of upland and bottomland (including wetlands) woodland habitats. Since a large percentage of the native vegetation has previously been converted to residential, commercial, pastureland/rangeland, and cropland uses, the remnant woodland vegetation often serves as a habitat and/or a movement corridor for many species. By utilizing existing ROWs and/or paralleling existing linear features to the greatest reasonable extent, the potential impact to wildlife and habitat fragmentation are minimized.

Potential impacts to aquatic systems would include effects of erosion, siltation and sedimentation. Vegetation clearing of the ROW may result in increased suspended solids entering surface waters traversed by the transmission line. Increases in suspended solids may adversely affect aquatic organisms that require relatively clear water for foraging and/or reproduction. Implementation of the SWPPP and installation of erosion control devices would minimize these potential impacts as previously discussed in Section 5.1.3.2.

Physical aquatic habitat loss or alteration could result wherever riparian vegetation is removed and at temporary crossings for access roads. 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 adjacent to the ROW for any of the primary alternative routes. LCRA TSC's procedures to minimize sediment runoff are presented in Section 1.0 of this document.

Construction of the proposed transmission line is not expected to have significant impacts on commercially or recreationally important wildlife species occurring within the study area. Wildlife may temporarily be displaced from areas of activity during the construction phase but should return to normal movement patterns during the operation phase.

5.1.4.3 Threatened and Endangered Species

In order to determine potential impacts to threatened or endangered species, a review using available information was completed. Known element occurrence data for the study area were obtained from the TXNDD (2013, 2014). Current county listings for federal and state-listed threatened and endangered species and USFWS designated critical habitat locations were included in the review. A large portion of the habitat within the study area has previously been converted to pasture/rangeland or cropland. No known occurrences of any federal and state-listed species and/or designated critical habitat areas were identified for any of the federal/state-listed species during the TXNDD review. If present, species may be susceptible to minor temporary disturbance during construction efforts, but the proposed transmission line project is not anticipated to result in significant adverse impacts to these species.

Construction activities along the ROW may temporarily displace wildlife species. Although not anticipated to occur, if state-listed species are observed during construction, they would be relocated out of the construction area by a permitted individual or allowed to leave the area on their own. Overall, impacts of the proposed transmission line project are expected to be minimal and temporary; displaced organisms would be expected to return after construction or permanently relocate. Spanning surface waters, wetlands and implementing the SWPPP to the extent practicable, will avoid and minimize significant adverse impacts to aquatic species, such as salamanders and mollusks.

Golden-cheeked warbler and black-capped vireo nesting habitat may occur within the study area. For this project, potential golden-cheeked warbler breeding habitat was modeled using three published habitat models, as discussed in Section 2.6.4. The models identified potential oak-juniper woodland nesting habitats. Data retrieved from these habitat models were taken into consideration while developing potential route segments. Modeled habitat area was tabulated

where all three models overlapped the proposed 100 foot ROW. Of the 20 primary alternative routes, 17 cross modeled habitat where all three models agree. The area of ROW crossing modeled warbler habitat where three models agree range from 0.0 acres for Routes 8, 13, and 17 to 9.5 acres for Route 6.

Modeling potential black-capped vireo habitat is difficult and generally inaccurate because the land-use history, vegetation heights, and vegetation species composition cannot be accurately identified with aerial imagery or topographical imagery. If necessary, a pedestrian field survey for potential suitable habitat for all listed species will be completed after PUC approval of an alternative route. Additional consultation with USFWS and TPWD might be required if suitable habitat is observed during the field survey of the PUC approved route.

Other avian species such as the bald eagle, whooping crane, interior least tern, and peregrine falcon are not expected to occur except as possible migrants that pass through the study area and potentially occupy habitats temporarily or seasonally. These seasonal habitats may be spanned or avoided entirely; the proposed transmission line project is not anticipated to have any adverse impacts to these species. Listed mammalian species such as the gray wolf, red wolf, and black bear are not anticipated to occur within the study area due to a lack of suitable habitat or because they are extirpated from the area.

For TPWD recommendations regarding rare species within the study area, please refer to the TPWD letter in Appendix A. As stated in TPWD's response letter, a lack of site-specific records should not be interpreted as presence/absence data, but instead that limited information is available to TPWD at the time of their review (see Appendix A).

5.1.4.4 Summary of Natural Resources Impacts

Biological criteria primarily considered for the Blumenthal 138-kV Project included the length of ROW through upland woodland, riparian/bottomland woodland, potential wetlands, parallel to streams or rivers, 100-year floodplains, and area of ROW across golden-cheeked warbler modeled habitat, and number of stream crossings. Other ecological evaluation criteria were considered, but their quantitative differences were insignificant or had a zero value. The overall length of each route and length of each route utilizing existing transmission line ROW or paralleling other compatible ROW as a means to minimize fragmentation and clearing was also

considered. No significant impacts to biological resources are anticipated for any of the primary alternative routes.

- Route 11 has the shortest lengths of ROW through upland woodland/brushland, at 7.8 miles;
- Routes 13, 17, and 19 have the shortest lengths of ROW through bottomland/riparian woodlands, at 0.0 mile each;
- Routes 1, 2, 4, 6, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, and 19 each have less than 0.1 of a mile in length of ROW across mapped NWI wetlands;
- All Routes have less than 0.1 of a mile in length of ROW across open water;
- Routes 8, 13, and 17 have the least area of ROW across golden-cheeked warbler modeled habitat where 3 models agree, at 0.0 acres;
- Route 1 has the least amount of stream crossings with 18 crossings;
- No routes cross any rivers;
- Route 9 has the least length of ROW parallel to streams or rivers, at .0.1 mile; and
- Routes 2, 4, 6, 8, 10, 12, 14, 16, and 18 have the shortest length of ROW across 100-year floodplains, at 0.0 miles.

5.2 HUMAN RESOURCE IMPACTS

5.2.1 Socioeconomic Impacts

LCRA TSC uses its own employees or contractors during the clearing and construction phase of transmission line projects. However, a portion of the project costs will find their way into the local economy through purchases such as fuel, food, lodging, and possibly building materials. ROW easement payments will be made to individuals whose lands are crossed by the transmission line based on the appraised land value. LCRA TSC is also required to pay states and local sales tax on purchases and is subject to paying local property tax on land or improvements. Since LCRA TSC will only require easements for the proposed line, none of this land will be taken off the tax rolls. The cost of permitting, designing, and constructing the line will be paid for through revenue generated by the sale of electrical transmission service. Rates for LCRA TSC's electrical transmission service are regulated by the PUCT.

Potential long-term economic benefits to the community resulting from construction of this project are based on the requirement that electric utilities provide an adequate and reliable level of power throughout their service areas. Economic growth and development rely heavily on

adequate public utilities, including a reliable electrical power supply. Without this basic infrastructure a community's potential for economic growth is constrained.

5.2.2 Impacts on Community Values

The term "community values" is included as a factor for the consideration of transmission line certification under Section 37.056(c)(4) of the Texas Utilities Code. Impacts on community values can be classified into two types: 1) direct effects, or those effects which would occur if the location and construction of a transmission line results in the removal of, or loss of public access to, a valued resource; and 2) indirect effects, or those effects which would result from a loss in the enjoyment or use of a resource due to the characteristics (primarily aesthetic) of the proposed line, structures, or ROW. Impacts on community values, whether direct or indirect, can be more accurately gauged as they affect recreational areas or resources and the visual environment of an area (aesthetics). Impacts in these areas are discussed in detail in sections 5.2.5 and 5.2.7 of this report.

5.2.3 Impacts on Land Use

The magnitude of potential land use impacts resulting from the construction of a transmission line are determined by the amount of land burdened 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 could 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 to the ROW. Coordination between LCRA TSC, its contractors, and landowners regarding ROW access and construction scheduling should minimize these disruptions. The primary criteria considered to compare potential land use impacts for this project include proximity to habitable structures, length utilizing or parallel to existing ROW, length parallel to parcel lines, and overall route length. An analysis of the existing land use within and adjacent to the proposed ROW is required to evaluate the potential impacts.

5.2.3.1 Habitable Structures

One of the most important measures of potential land use impacts is the number of habitable structures located in the vicinity of each route. Habitable structure information for each primary alternative route is shown in Tables 5-3 through 5-22 (see Appendix C). POWER determined the number and distance to habitable structures within 300 feet of the route centerline of each

route through evaluation during field reconnaissance and from measurements obtained using GIS and aerial photographs.

All 20 of the Routes have habitable structures located within 300 feet of their centerlines. Route 16 has the least number of habitable structures located within 300 feet of its centerline at two. Route 2 has the most habitable structures located within 300 feet of its centerline at 19. The number of habitable structures located within 300 feet of each of the primary alternative route centerlines are presented in Table 5-1.

5.2.3.2 Utilizing/Paralleling Existing Transmission Line ROW

The least impact to land use generally results from locating new lines within or parallel to an existing transmission line ROW. PUCT Substantive Rule 25.101(b)(3)(B) states that (among others) the following factors shall be considered in the selection of the alternative routes:

- Whether the routes utilize existing compatible ROW, including the use of vacant positions on existing multiple-circuit transmission lines
- Whether the routes parallel existing compatible ROW
- Whether the routes parallel property lines or other natural or cultural features

Existing Transmission Line ROWs

POWER identified an existing transmission line corridor that the proposed transmission line project could potentially parallel during construction. The Kendall-to-Mountain Top 138-kV transmission line (T342) ROW extends across the southern boundary of the study area and is oriented in a northeast to southwest direction. The Kendall to Mountain Top transmission line is the line to be tapped by the new Blumenthal line and serves as one of the project endpoints. Thus paralleling this line for long distances does not make sense. The total alternative route lengths parallel to existing transmission line ROW vary from approximately zero (0) mile for nine of the primary alternative routes, to approximately 0.3 mile for Routes 1, 5, 7, 9, 17, and 20. The lengths parallel to existing transmission line ROW for each of the primary alternative routes are presented in Table 5-1.

There are no vacant or open positions on any transmission lines located in the study area. None of the identified routes utilize existing transmission line ROW.

5.2.3.3 Paralleling Other Existing Compatible ROW

Paralleling other existing compatible ROW (such as roadways, pipelines, railways, etc.) is also generally considered to be a favorable routing criterion, one that usually results in fewer impacts compared to establishing new ROW. It should be noted in some situations that paralleling pipelines can add additional costs associated with adding mitigation measures to pipelines to reduce potential impacts by the transmission line on the pipeline. POWER identified existing compatible ROWs as potential paralleling opportunities in accordance with the provisions of PUCT Substantive Rule 25.101(b)(3)(B). However, POWER deviated from paralleling some compatible ROWs to avoid other known visible constraints (e.g. existing habitable structures, water wells, waterways).

The routes with lengths paralleling other existing ROW range from approximately 0.6 mile for Route 12, to approximately 11.3 miles for Route 1. The lengths paralleling other existing ROW for each of the primary alternative routes are presented in Table 5-1.

Roadways ROWs

It should be noted that in most cases property lines are coincident with highways and other roads. So, in many cases, when routes parallel roads they are also parallel and adjacent property lines. POWER evaluated paralleling FM 1376, FM 1623, and FM 1888, and numerous other local roads. Many of the roadways are oriented in a north to south direction and presented acceptable paralleling opportunities. Where practicable and feasible, alternative route segments parallel these FM roads and other public roads such as Luckenbach Road, Jenschke Lane, Hahn Road, and Hershey Ranch Road. However, paralleling US Hwy 290 was not feasible due to the existing development, LBJ National Historic Park, public opinion, and the location of the project endpoints.

Existing Pipeline ROWs

POWER reviewed aerial photography and the RRC website to identify pipeline ROWs located within the study area. Verification was conducted during field reconnaissance where possible. POWER identified one abandoned pipeline ROW within the study area. It is oriented in a northwest to southeast direction and is located in the north central portion of the study area. The abandoned pipeline corridor presented a routing opportunity as an existing visible feature. If any portion of a primary segment or a primary alternative route utilizes the abandoned pipeline corridor it is denoted in Tables 5-1 and 5-2. A portion of Primary Segments U, A1, F2, G2, and

E2 utilizes the abandoned pipeline corridor. Primary Alternative Routes that include these segments utilize a portion of the abandoned pipeline corridor, Routes 2, 4, 6, 8, 10, 12, 14, 16, 18, and 19. The length of routes that utilize the abandoned pipeline corridor ranges from approximately zero (0) mile for ten of the alternative routes, to approximately 4.5 miles for Route 8.

No existing active oil or gas pipelines are paralleled or crossed by any of the primary alternative routes.

Railroad ROWs

No railroads were identified within the study area.

5.2.3.4 Paralleling Property Lines

Paralleling property lines is a favorable routing criteria and is also part of the PUCT's Substantive Rule 25.101(b)(3)(B). Paralleling property lines or fence lines may minimize the potential for disruption to agricultural activities and may create less of a constraint for future development of a tract of land. LCRA TSC provided POWER with updated parcel line data that was obtained from the Blanco, Gillespie and Kendall County Appraisal Districts in September 2014. There can be differences between property lines and parcel lines depending on how the information is organized at the county appraisal district. LCRA TSC grouped the updated appraisal district parcel data with identical first and last names in an effort to identify obvious aggregate ownership and apparent property lines. As a result, the parcel line data available at the time of the preparation of this EA corresponds to the current individual parcels of property but not necessarily all aggregated individual ownership. Each route was developed to parallel property lines where feasible, while also considering other important factors such as engineering constraints and costs.

All of the primary alternative routes parallel parcel lines and apparent property boundaries to the extent feasible in the absence of other existing linear corridors. The length of primary alternative routes that parallel parcel boundaries ranges from approximately 0.3 mile for Route 1, to approximately 9.6 miles for Route 4. The lengths paralleling parcel lines and apparent property boundaries for each of the primary alternative routes are presented in Table 5-1.

5.2.3.5 Overall Length of Routes

The overall length of a route can be an indicator of the relative level of potential land use and environmental impacts. Potential impacts to land use are typically minimized with routes that have shorter lengths, as less land surface area is required for the ROW. The total lengths of the routes vary from 10.4 miles for Routes 11 and 17, to 17.0 miles for Route 6. The differences in route lengths reflect the direct or indirect pathway of each route between the project endpoints. The length of the routes may also reflect the effort to parallel existing transmission lines, other existing linear features like highways, apparent property boundaries, and the geographic diversity of the primary alternative routes. The approximate lengths for each of the primary alternative routes are presented in Table 5-1.

5.2.4 Impacts on Transportation/Aviation

Potential impacts to transportation may include temporary disruption of traffic and/or conflicts with proposed roadway and/or utility improvements. Traffic disruptions would include those associated with the movement of construction equipment and materials to and from the ROW and increased traffic flow and/or periodic congestion during the construction phase of the proposed project. These impacts are typically considered minor, temporary, and short-term. No potentially conflicting future roadway or utility expansion projects were identified during the data collection phase of this study.

According to FAA Part 77 regulations (FAA, 2008), the construction of a transmission line requires FAA notification if structure heights exceed the height of an imaginary surface extending outward and upward at a slope of 100:1 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. The FAA also requires notification if the tower structure height exceeds 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 and if the tower structure height exceeds a 25:1 slope for a horizontal distance of 5,000 feet for heliports.

The review of federal and state aviation/airport maps and databases, aerial photo interpretation, TxDOT Division of Aviation information, and field reconnaissance were used to identify airports and airstrips located within the study area and within 20,000 feet of the primary alternative routes. There are no FAA registered public or military airports with runways longer than 3,200 feet identified within 20,000 feet of the routes. There are no FAA registered public or military

airports with runways shorter than 3,200 feet identified within 10,000 feet of the routes. No FAA registered public heliports were identified within 5,000 feet of the primary alternative routes (see Table 5-23). Four private airports were identified within 10,000 feet of the primary alternative routes. All airport locations are shown on Figure 5-1.

Table 5-23 AIRPORT FACILITIES AND RUNWAY LOCATIONS

Figure 5-1 Map ID	Airstrip	Nearest Route Segment	Primary Alternative Routes	Distance from Nearest Route Segment (ft)*	Estimated Runway Length (ft)*
401	BurgAERO – Non FAA	Z1	2, 4, 10, 14, 18	8,468	2,260
402	Otte – Non FAA	Z1	2, 4, 8, 10, 12, 13, 14, 15, 16, 17, 18, 20	0	1,730
403	Kennedy Ranch – Non FAA	G2	2, 6, 8, 10, 14, 18	4,985	3,500
404	Headwaters – Non FAA	O	15	1,952	4,400

*Source: FAA 2013b, POWER; Aerial Photo and USGS Interpretation

In addition to the previously discussed airport facilities and runways and as presented earlier in Section 2.8.4, an FAA regulated VORTAC facility was identified within the study area. After review of the potential impacts to the VORTAC facility, LCRA TSC and POWER considered structure location and ground elevation to avoid potential impacts to operation of the VORTAC facility. In some locations and along certain route segments (potentially but not limited to Segments Q1, S, T, U and V), only H-Frame structures can be used to avoid potential impacts to the VORTAC facility. No adverse impacts are anticipated to the VORTAC from any of the primary alternative routes. Once a route is approved by the Commission, LCRA TSC will coordinate with the FAA if required.

5.2.5 Impacts on Parks and Recreation

Potential impacts to recreation include the disruption or preemption of recreational activities. As previously mentioned, the study area contains recreation areas that consist of a national park, a state park, a school playground and hunting or fishing areas. As shown on Figure 5-1, none of the primary alternative routes directly cross any recreational areas. Also, there are no parks or recreational areas located within 1,000 feet of any of the primary alternative route centerlines. No significant impacts to the use or enjoyment of the parks and recreational facilities located within the study area are anticipated from any of the primary alternative routes. No adverse impacts are anticipated for any of the fishing or hunting areas from any of the primary alternative routes.

5.2.6 Impacts on Electronic Communication Facilities

No known AM radio transmitters were identified within the study area or within 10,000 feet of the primary alternative routes. As shown on Figure 5-1, there are five FM radio transmitters, microwave towers and other electronic communications towers located within 2,000 feet of any of the primary alternative routes. The distance of each communication tower from the nearest route segment was measured using GIS and aerial photograph interpretation (see Table 5-24). None of the routes are anticipated to have a significant impact on communication operations in the area.

Table 5-24 ELECTRONIC COMMUNICATION FACILITIES

Figure 5-1 Map ID	Tower Type	Nearest Route Segment	Primary Alternative Routes	Distance from Nearest Route Segment (ft)*
301	ASR Tower	T1	14	1,666
302	ASR Tower	T1	14	1,868
303	FM radio transmitter and ASR Tower	B1	4, 18	472
304	Microwave and ASR Tower	W	9, 13, 17, 19	1,399
305	ASR Tower	W	9, 13, 17, 19	446

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

5.2.7 Impacts on Aesthetics

Aesthetic impacts or impacts to visual resources exist when the ROW, lines and/or structures of a transmission line system 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 natural scenic areas, the importance of the existing setting in the use and/or enjoyment of an area, and in valued community resources in recreational areas.

Potential visibility impacts were evaluated by tabulating the linear feet of each route that would potentially create a new or additional impact to potential sensitive viewers. The length of each route within the foreground visual zone of parks/recreational areas (within one-half mile with unobstructed views), and the lengths within the foreground visual zone of FM roads, and State Highways (within one-half mile with unobstructed views) were tabulated.

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 structures. Where wooded areas are cleared, the brush and wood debris

could have an additional negative temporary impact on the local visual environment. Permanent impacts from the project would involve the views of the structures and lines. New visual impacts would be minimized by constructing the new transmission line within existing transmission line ROW or parallel to existing transmission lines.

Route 2 has the longest length within the foreground visual zone of US and State Highways, approximately 2.2 miles, while Routes 7, 9, 11, 19, and 20 have the shortest length, approximately zero (0) mile. The greatest length within the foreground visual zone of FM roads is associated with Route 1, approximately 10.5 miles, while Routes 12 and 16 have the shortest length, approximately zero (0) mile.

The evaluation of potential aesthetic impacts also included the primary alternative routes that would be within the foreground visual zone of parks and recreational areas. None of the primary alternative routes are within the foreground visual zone of a park and recreational area.

5.2.8 Summary of Human Resource Impacts

As mentioned in Sections 4.3.2.1 of the EA, respondents to questionnaires identified maximizing distances from residences as their primary routing concerns. Land use criteria that were primarily considered for the Blumenthal Substation and 138-kV Transmission Line Project were the number of habitable structures located within 300 feet of each primary alternative route centerline, the overall length of the primary alternative route, and the length that parallels existing compatible ROWs (roadways, etc.).

- Routes 15 and 16 have the fewest number of habitable structures located within 300 feet of their centerlines, with two each; Routes 7 and 12 have the second fewest number of habitable structures, with four each, and Route 18 has five habitable structures located within 300 feet of its centerline.
- Routes 11 and 17 have the shortest overall length, approximately 10.4 miles each, Route 13 is slightly longer at approximately 10.9 miles, and Routes 3 and 19 are both approximately 11.2 miles.
- Route 1 parallels a significant amount of existing compatible ROW (roadways, etc.), approximately 11.3 miles. Route 9 parallels approximately 8.8 miles and Route 14 parallels approximately 8.4 miles of existing compatible ROW.