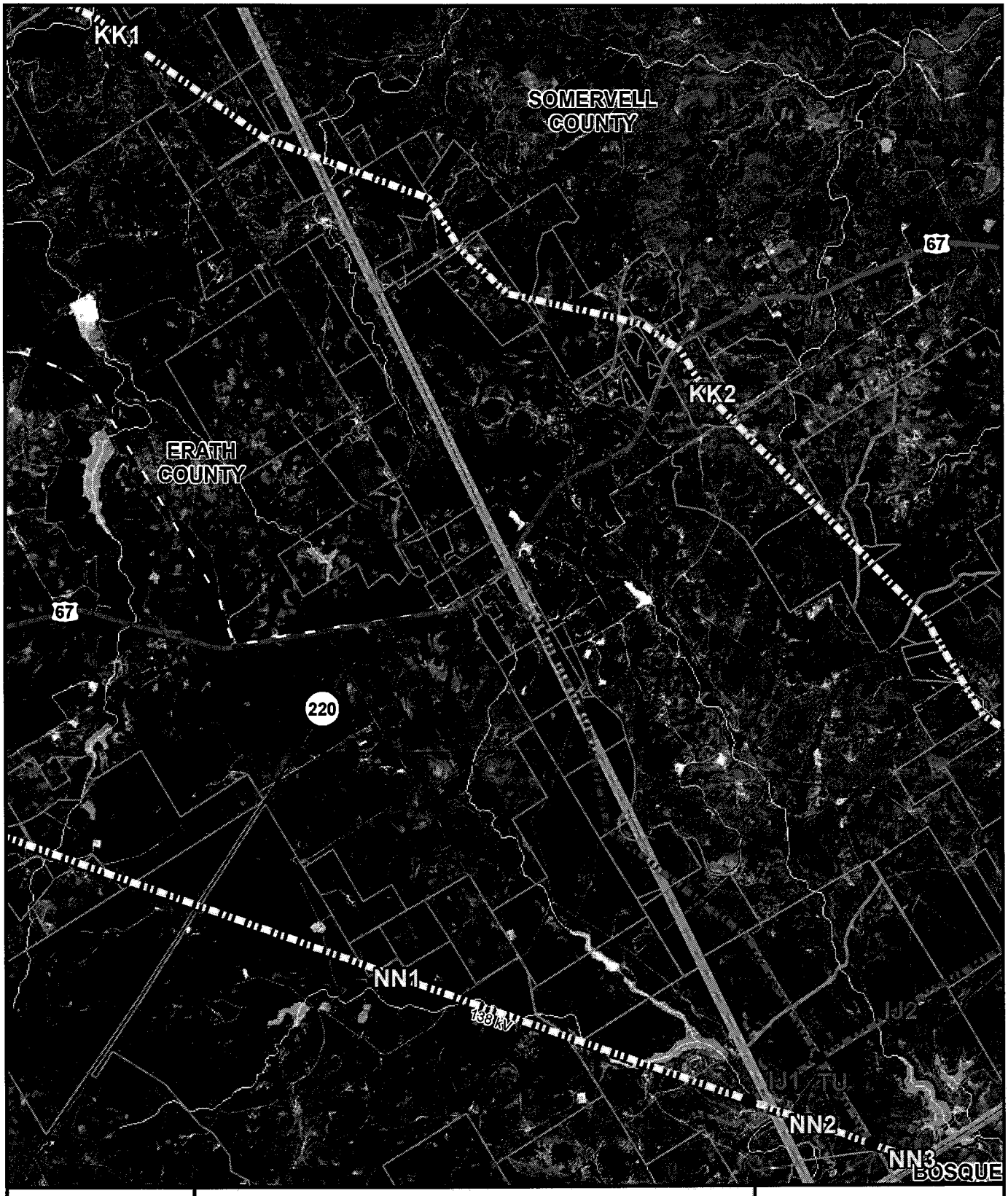

NORTH

0 5,000

Feet

Aerials Flown by SAM Inc. 5/19/09

LEGEND

Preliminary Alternative Routes as Shown at Open House Meetings

New Alternative Route (Following Open House Meetings)

Existing Transmission Line

Apparent Property Boundary

AA Link Identifier

Figure 6-50
Links ST & TU
Following Open Houses
Central A to Navarro
345 kV Transmission
Line Project

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NORTH

0 2,000

Feet

Aerials Flown by SAM Inc 5/19/09

LEGEND

Preliminary Alternative Routes as Shown at the Open House Meetings

Adjusted Alternative Route (Following Open House Meetings)

Apparent Property Boundary

AA Link Identifier

Figure 6-51
Link BBB Adjustment
Following Open Houses
Central A to Navarro
345 kV Transmission
Line Project

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NORTH

0 3,000

Feet

Aerials Flown by SAM Inc 5/19/09

LEGEND

Preliminary Alternative Routes as Shown at the Open House Meetings

Adjusted Alternative Route (Following Open House Meetings)

Apparent Property Boundary

AA Link Identifier

Figure 6-52
Link EEE Adjustment
Following Open Houses
Central A to Navarro
345 kV Transmission
Line Project

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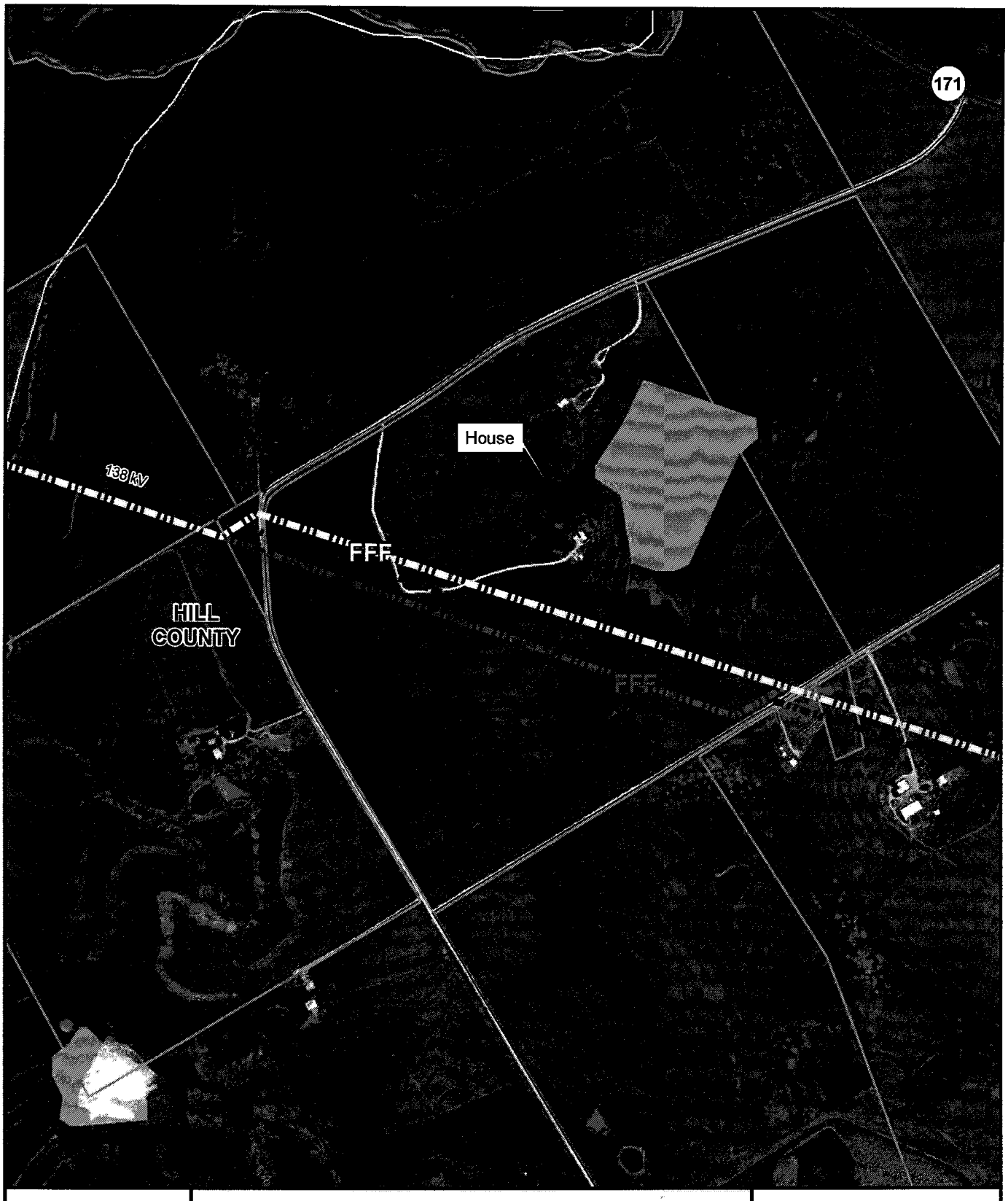

NORTH

0 750

Feet

Aerials Flown by SAM Inc 5/19/09

LEGEND

Preliminary Alternative Routes as Shown at the Open House Meetings

Adjusted Alternative Route (Following Open House Meetings)

Existing Transmission Line

Apparent Property Boundary

AA Link Identifier

Figure 6-53
Link FFF Adjustment
Following Open Houses
Central A to Navarro
345 kV Transmission
Line Project

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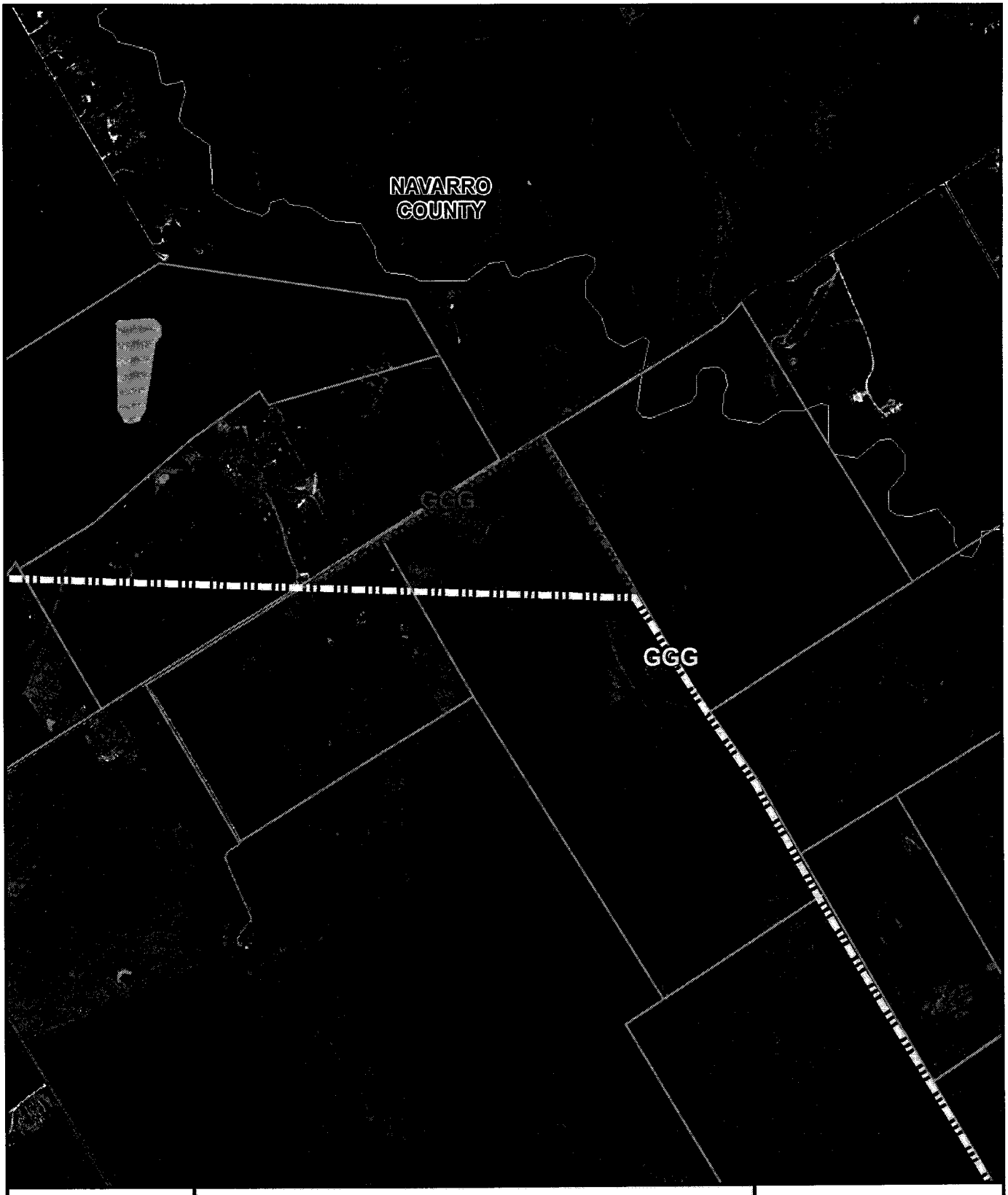

NORTH

0 1,000

Feet

Aerials Flown by SAM Inc 5/19/09

LEGEND

Preliminary Alternative Routes as Shown at the Open House Meetings

Adjusted Alternative Route (Following Open House Meetings)

Apparent Property Boundary

AA Link Identifier

Figure 6-54
Link GGG Adjustment #1
Following Open Houses
Central A to Navarro
345 kV Transmission
Line Project

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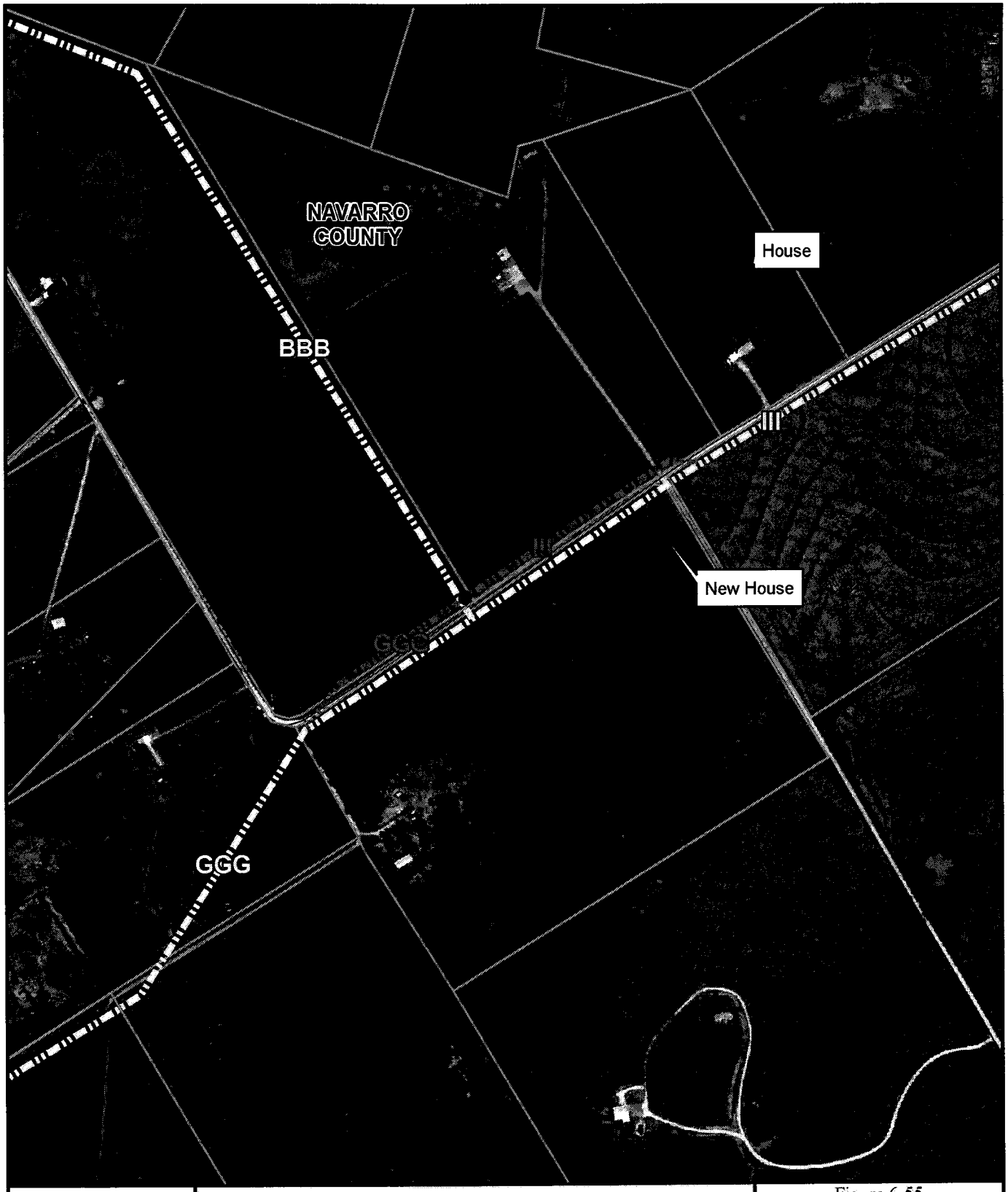

NORTH

0 500

Feet

Aerials Flown by SAM Inc 5/19/09

LEGEND

Preliminary Alternative Routes as Shown at the Open House Meetings

Adjusted Alternative Route (Following Open House Meetings)

Apparent Property Boundary

AA Link Identifier

Figure 6-55
Link GGG Adjustment #2
& Link III Adjustment
Following Open Houses
Central A to Navarro
345 kV Transmission
Line Project

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After new links were added and modifications to the existing links were made, a total of nine alternative routes were identified for the Central A to Central C segment of the project, 265 alternative routes were identified for the Central C to Sam Switch segment of the project, and seven alternative routes were identified for the Sam Switch to Navarro segment of the project for further evaluation as discussed in Chapter 7.0. Tables 6-1, 6-2, and 6-3 detail the final composition of the alternative routes by link and Figure 3-2 and Figures 3-2A through 3-2F depict the location of the primary alternative routes.

Table 6-1 Central A to Central C Route Components

Route	Route Links
AC 1	A,G
AC 2	A,H,I,J
AC 3	A,H,I,K,L
AC 4	B,E,I,J
AC 5	B,E,I,K,L
AC 6	C,D,E,I,J
AC 7	C,D,E,I,K,L
AC 8	C,F,K,J
AC 9	C,F,L

Table 6-2 Central C to Sam Switch Route Components

Route	Route Links
CSS 1	AA,HH,KK1,KK2,KK3,KK4,VV1,VV2,AB1,AB2,HI
CSS 2	AA,HH,KK1,KK2,KK3,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 3	AA,HH,KK1,KK2,KK3,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 4	AA,HH,KK1,KK2,KK3,KK4,WW,VV2,AB1,AB2,HI
CSS 5	AA,HH,KK1,KK2,KK3,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 6	AA,HH,KK1,KK2,KK3,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 7	AA,HH,KK1,KK2,KK3,QR,TT2,TT3,HI
CSS 8	AA,HH,KK1,KK2,KK3,QR,TT2,PQ,CD2,GH
CSS 9	AA,HH,KK1,KK2,KK3,QR,RS,UU2,XX1,XX2,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 10	AA,HH,KK1,KK2,KK3,QR,RS,UU2,XX1,XX2,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 11	AA,HH,KK1,KK2,KK3,QR,RS,UU2,XX1,JK,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 12	AA,HH,KK1,KK2,KK3,QR,RS,UU2,XX1,JK,YY2,KL,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 13	AA,HH,KK1,KK2,KK3,QR,RS,UU2,YY1,YY2,YY3,YY4,YY5,ZZ,CD1,CD2,GH
CSS 14	AA,HH,KK1,ST,IJ2,KK3,KK4,VV1,VV2,AB1,AB2,HI
CSS 15	AA,HH,KK1,ST,IJ2,KK3,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 16	AA,HH,KK1,ST,IJ2,KK3,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 17	AA,HH,KK1,ST,IJ2,KK3,KK4,WW,VV2,AB1,AB2,HI
CSS 18	AA,HH,KK1,ST,IJ2,KK3,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 19	AA,HH,KK1,ST,IJ2,KK3,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 20	AA,HH,KK1,ST,IJ2,KK3,QR,TT2,TT3,HI

Route	Route Links
CSS 21	AA,HH,KK1,ST,IJ2,KK3,QR,TT2,PQ,CD2,GH
CSS 22	AA,HH,KK1,ST,IJ2,KK3,QR,RS,UU2,XX1,XX2,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 23	AA,HH,KK1,ST,IJ2,KK3,QR,RS,UU2,XX1,XX2,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 24	AA,HH,KK1,ST,IJ2,KK3,QR,RS,UU2,XX1,JK,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 25	AA,HH,KK1,ST,IJ2,KK3,QR,RS,UU2,XX1,JK,YY2,KL,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 26	AA,HH,KK1,ST,IJ2,KK3,QR,RS,UU2,YY1,YY2,YY3,YY4,YY5,ZZ,CD1,CD2,GH
CSS 27	AA,HH,KK1,ST,TU,NN3,SS,TT1,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 28	AA,HH,KK1,ST,TU,NN3,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 29	AA,HH,KK1,ST,TU,NN3,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 30	AA,HH,KK1,ST,TU,NN3,SS,TT1,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 31	AA,HH,KK1,ST,TU,NN3,SS,TT1,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 32	AA,HH,KK1,ST,TU,NN3,SS,TT1,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 33	AA,HH,KK1,ST,TU,NN3,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 34	AA,HH,KK1,ST,TU,NN3,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 35	AA,HH,KK1,ST,TU,NN3,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 36	AA,HH,KK1,ST,TU,NN3,SS,UU1,RS,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 37	AA,HH,KK1,ST,TU,NN3,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 38	AA,HH,KK1,ST,TU,NN3,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 39	AA,HH,KK1,ST,TU,NN3,SS,TT1,TT2,TT3,HI
CSS 40	AA,HH,KK1,ST,TU,NN3,SS,TT1,TT2,PQ,CD2,GH
CSS 41	AA,HH,KK1,ST,TU,NN3,SS,UU1,UU2,XX1,XX2,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 42	AA,HH,KK1,ST,TU,NN3,SS,UU1,UU2,XX1,XX2,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 43	AA,HH,KK1,ST,TU,NN3,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 44	AA,HH,KK1,ST,TU,NN3,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 45	AA,HH,KK1,ST,TU,NN3,SS,UU1,UU2,YY1,YY2,YY3,YY4,YY5,ZZ,CD1,CD2,GH
CSS 46	AA,HH,JJ,LL,NN1,IJ1,IJ2,KK3,KK4,VV1,VV2,AB1,AB2,HI
CSS 47	AA,HH,JJ,LL,NN1,IJ1,IJ2,KK3,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 48	AA,HH,JJ,LL,NN1,IJ1,IJ2,KK3,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 49	AA,HH,JJ,LL,NN1,IJ1,IJ2,KK3,KK4,WW,VV2,AB1,AB2,HI
CSS 50	AA,HH,JJ,LL,NN1,IJ1,IJ2,KK3,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 51	AA,HH,JJ,LL,NN1,IJ1,IJ2,KK3,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 52	AA,HH,JJ,LL,NN1,IJ1,IJ2,KK3,QR,TT2,TT3,HI
CSS 53	AA,HH,JJ,LL,NN1,IJ1,IJ2,KK3,QR,TT2,PQ,CD2,GH
CSS 54	AA,HH,JJ,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,XX1,XX2,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 55	AA,HH,JJ,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,XX1,XX2,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 56	AA,HH,JJ,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,XX1,JK,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 57	AA,HH,JJ,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,XX1,JK,YY2,KL,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 58	AA,HH,JJ,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,YY1,YY2,YY3,YY4,YY5,ZZ,CD1,CD2,GH
CSS 59	AA,HH,JJ,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 60	AA,HH,JJ,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 61	AA,HH,JJ,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH

Route	Route Links
CSS 62	AA,HH,JJ,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 63	AA,HH,JJ,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 64	AA,HH,JJ,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 65	AA,HH,JJ,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 66	AA,HH,JJ,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 67	AA,HH,JJ,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 68	AA,HH,JJ,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 69	AA,HH,JJ,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 70	AA,HH,JJ,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 71	AA,HH,JJ,LL,NN1,NN2,NN3,SS,TT1,TT2,TT3,HI
CSS 72	AA,HH,JJ,LL,NN1,NN2,NN3,SS,TT1,TT2,PQ,CD2,GH
CSS 73	AA,HH,JJ,LL,NN1,NN2,NN3,SS,UU1,UU2,XX1,XX2,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 74	AA,HH,JJ,LL,NN1,NN2,NN3,SS,UU1,UU2,XX1,XX2,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 75	AA,HH,JJ,LL,NN1,NN2,NN3,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 76	AA,HH,JJ,LL,NN1,NN2,NN3,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 77	AA,HH,JJ,LL,NN1,NN2,NN3,SS,UU1,UU2,YY1,YY2,YY3,YY4,YY5,ZZ,CD1,CD2,GH
CSS 78	AA,HH,JJ,LL,OO,PP,QQ,SS,TT1,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 79	AA,HH,JJ,LL,OO,PP,QQ,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 80	AA,HH,JJ,LL,OO,PP,QQ,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 81	AA,HH,JJ,LL,OO,PP,QQ,SS,TT1,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 82	AA,HH,JJ,LL,OO,PP,QQ,SS,TT1,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 83	AA,HH,JJ,LL,OO,PP,QQ,SS,TT1,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 84	AA,HH,JJ,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 85	AA,HH,JJ,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 86	AA,HH,JJ,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 87	AA,HH,JJ,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 88	AA,HH,JJ,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 89	AA,HH,JJ,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 90	AA,HH,JJ,LL,OO,PP,QQ,SS,TT1,TT2,TT3,HI
CSS 91	AA,HH,JJ,LL,OO,PP,QQ,SS,TT1,TT2,PQ,CD2,GH
CSS 92	AA,HH,JJ,LL,OO,PP,QQ,SS,UU1,UU2,XX1,XX2,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 93	AA,HH,JJ,LL,OO,PP,QQ,SS,UU1,UU2,XX1,XX2,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 94	AA,HH,JJ,LL,OO,PP,QQ,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 95	AA,HH,JJ,LL,OO,PP,QQ,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 96	AA,HH,JJ,LL,OO,PP,QQ,SS,UU1,UU2,YY1,YY2,YY3,YY4,YY5,ZZ,CD1,CD2,GH
CSS 97	AA,HH,JJ,LL,OO,PP,RR,BC,CD1,CD2,GH
CSS 98	AA,HH,JJ,LL,OO,PP,RR,DE,EF,GH
CSS 99	AA,HH,JJ,LL,OO,PP,RR,DE,FG
CSS 100	AA,GG,II,LL,NN1,IJ1,IJ2,KK3,KK4,VV1,VV2,AB1,AB2,HI
CSS 101	AA,GG,II,LL,NN1,IJ1,IJ2,KK3,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 102	AA,GG,II,LL,NN1,IJ1,IJ2,KK3,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH

Route	Route Links
CSS 103	AA,GG,II,LL,NN1,IJ1,IJ2,KK3,KK4,WW,VV2,AB1,AB2,HI
CSS 104	AA,GG,II,LL,NN1,IJ1,IJ2,KK3,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 105	AA,GG,II,LL,NN1,IJ1,IJ2,KK3,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 106	AA,GG,II,LL,NN1,IJ1,IJ2,KK3,QR,TT2,TT3,HI
CSS 107	AA,GG,II,LL,NN1,IJ1,IJ2,KK3,QR,TT2,PQ,CD2,GH
CSS 108	AA,GG,II,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,XX1,XX2,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 109	AA,GG,II,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,XX1,XX2,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 110	AA,GG,II,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,XX1,JK,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 111	AA,GG,II,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,XX1,JK,YY2,KL,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 112	AA,GG,II,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,YY1,YY2,YY3,YY4,YY5,ZZ,CD1,CD2,GH
CSS 113	AA,GG,II,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 114	AA,GG,II,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 115	AA,GG,II,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 116	AA,GG,II,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 117	AA,GG,II,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 118	AA,GG,II,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 119	AA,GG,II,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 120	AA,GG,II,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 121	AA,GG,II,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 122	AA,GG,II,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 123	AA,GG,II,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 124	AA,GG,II,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 125	AA,GG,II,LL,NN1,NN2,NN3,SS,TT1,TT2,TT3,HI
CSS 126	AA,GG,II,LL,NN1,NN2,NN3,SS,TT1,TT2,PQ,CD2,GH
CSS 127	AA,GG,II,LL,NN1,NN2,NN3,SS,UU1,UU2,XX1,XX2,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 128	AA,GG,II,LL,NN1,NN2,NN3,SS,UU1,UU2,XX1,XX2,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 129	AA,GG,II,LL,NN1,NN2,NN3,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 130	AA,GG,II,LL,NN1,NN2,NN3,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 131	AA,GG,II,LL,NN1,NN2,NN3,SS,UU1,UU2,YY1,YY2,YY3,YY4,YY5,ZZ,CD1,CD2,GH
CSS 132	AA,GG,II,LL,OO,PP,QQ,SS,TT1,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 133	AA,GG,II,LL,OO,PP,QQ,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 134	AA,GG,II,LL,OO,PP,QQ,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 135	AA,GG,II,LL,OO,PP,QQ,SS,TT1,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 136	AA,GG,II,LL,OO,PP,QQ,SS,TT1,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 137	AA,GG,II,LL,OO,PP,QQ,SS,TT1,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 138	AA,GG,II,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 139	AA,GG,II,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 140	AA,GG,II,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 141	AA,GG,II,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 142	AA,GG,II,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 143	AA,GG,II,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH

Route	Route Links
CSS 144	AA,GG,II,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 145	AA,GG,II,LL,OO,PP,QQ,SS,TT1,TT2,PQ,CD2,GH
CSS 146	AA,GG,II,LL,OO,PP,QQ,SS,UU1,UU2,XX1,XX2,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 147	AA,GG,II,LL,OO,PP,QQ,SS,UU1,UU2,XX1,XX2,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 148	AA,GG,II,LL,OO,PP,QQ,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 149	AA,GG,II,LL,OO,PP,QQ,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 150	AA,GG,II,LL,OO,PP,QQ,SS,UU1,UU2,YY1,YY2,YY3,YY4,YY5,ZZ,CD1,CD2,GH
CSS 151	AA,GG,II,LL,OO,PP,RR,BC,CD1,CD2,GH
CSS 152	AA,GG,II,LL,OO,PP,RR,DE,EF,GH
CSS 153	AA,GG,II,LL,OO,PP,RR,DE,FG
CSS 154	BB,DD1,CC,II,LL,NN1,IJ1,IJ2,KK3,KK4,VV1,VV2,AB1,AB2,HI
CSS 155	BB,DD1,CC,II,LL,NN1,IJ1,IJ2,KK3,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 156	BB,DD1,CC,II,LL,NN1,IJ1,IJ2,KK3,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 157	BB,DD1,CC,II,LL,NN1,IJ1,IJ2,KK3,KK4,WW,VV2,AB1,AB2,HI
CSS 158	BB,DD1,CC,II,LL,NN1,IJ1,IJ2,KK3,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 159	BB,DD1,CC,II,LL,NN1,IJ1,IJ2,KK3,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 160	BB,DD1,CC,II,LL,NN1,IJ1,IJ2,KK3,QR,TT2,TT3,HI
CSS 161	BB,DD1,CC,II,LL,NN1,IJ1,IJ2,KK3,QR,TT2,PQ,CD2,GH
CSS 162	BB,DD1,CC,II,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,XX1,XX2,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 163	BB,DD1,CC,II,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,XX1,XX2,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 164	BB,DD1,CC,II,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,XX1,JK,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 165	BB,DD1,CC,II,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,XX1,JK,YY2,KL,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 166	BB,DD1,CC,II,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,YY1,YY2,YY3,YY4,YY5,ZZ,CD1,CD2,GH
CSS 167	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 168	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 169	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 170	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 171	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 172	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,TT1,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 173	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 174	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 175	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 176	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 177	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 178	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 179	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,TT1,TT2,TT3,HI
CSS 180	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,TT1,TT2,PQ,CD2,GH
CSS 181	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,UU1,UU2,XX1,XX2,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 182	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,UU1,UU2,XX1,XX2,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 183	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 184	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH

Route	Route Links
CSS 185	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,UU1,UU2,YY1,YY2,YY3,YY4,YY5,ZZ,CD1,CD2,GH
CSS 186	BB,DD1,CC,II,LL,OO,PP,QQ,SS,TT1,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 187	BB,DD1,CC,II,LL,OO,PP,QQ,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 188	BB,DD1,CC,II,LL,OO,PP,QQ,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 189	BB,DD1,CC,II,LL,OO,PP,QQ,SS,TT1,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 190	BB,DD1,CC,II,LL,OO,PP,QQ,SS,TT1,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 191	BB,DD1,CC,II,LL,OO,PP,QQ,SS,TT1,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 192	BB,DD1,CC,II,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 193	BB,DD1,CC,II,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 194	BB,DD1,CC,II,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 195	BB,DD1,CC,II,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 196	BB,DD1,CC,II,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 197	BB,DD1,CC,II,LL,OO,PP,QQ,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 198	BB,DD1,CC,II,LL,OO,PP,QQ,SS,TT1,TT2,TT3,HI
CSS 199	BB,DD1,CC,II,LL,OO,PP,QQ,SS,TT1,TT2,PQ,CD2,GH
CSS 200	BB,DD1,CC,II,LL,OO,PP,QQ,SS,UU1,UU2,XX1,XX2,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 201	BB,DD1,CC,II,LL,OO,PP,QQ,SS,UU1,UU2,XX1,XX2,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 202	BB,DD1,CC,II,LL,OO,PP,QQ,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 203	BB,DD1,CC,II,LL,OO,PP,QQ,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 204	BB,DD1,CC,II,LL,OO,PP,QQ,SS,UU1,UU2,YY1,YY2,YY3,YY4,YY5,ZZ,CD1,CD2,GH
CSS 205	BB,DD1,CC,II,LL,OO,PP,RR,BC,CD1,CD2,GH
CSS 206	BB,DD1,CC,II,LL,OO,PP,RR,DE,EF,GH
CSS 207	BB,DD1,CC,II,LL,OO,PP,RR,DE,FG
CSS 208	BB,DD1,DD2,EE,MM,PP,QQ,SS,TT1,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 209	BB,DD1,DD2,EE,MM,PP,QQ,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 210	BB,DD1,DD2,EE,MM,PP,QQ,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 211	BB,DD1,DD2,EE,MM,PP,QQ,SS,TT1,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 212	BB,DD1,DD2,EE,MM,PP,QQ,SS,TT1,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 213	BB,DD1,DD2,EE,MM,PP,QQ,SS,TT1,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 214	BB,DD1,DD2,EE,MM,PP,QQ,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 215	BB,DD1,DD2,EE,MM,PP,QQ,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 216	BB,DD1,DD2,EE,MM,PP,QQ,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 217	BB,DD1,DD2,EE,MM,PP,QQ,SS,UU1,RS,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 218	BB,DD1,DD2,EE,MM,PP,QQ,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 219	BB,DD1,DD2,EE,MM,PP,QQ,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 220	BB,DD1,DD2,EE,MM,PP,QQ,SS,TT1,TT2,TT3,HI
CSS 221	BB,DD1,DD2,EE,MM,PP,QQ,SS,TT1,TT2,PQ,CD2,GH
CSS 222	BB,DD1,DD2,EE,MM,PP,QQ,SS,UU1,UU2,XX1,XX2,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 223	BB,DD1,DD2,EE,MM,PP,QQ,SS,UU1,UU2,XX1,XX2,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 224	BB,DD1,DD2,EE,MM,PP,QQ,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 225	BB,DD1,DD2,EE,MM,PP,QQ,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH

Route	Route Links
CSS 226	BB,DD1,DD2,EE,MM,PP,QQ,SS,UU1,UU2,YY1,YY2,YY3,YY4,YY5,ZZ,CD1,CD2,GH
CSS 227	BB,DD1,DD2,EE,MM,PP,RR,BC,CD1,CD2,GH
CSS 228	BB,DD1,DD2,EE,MM,PP,RR,DE,EF,GH
CSS 229	BB,DD1,DD2,EE,MM,PP,RR,DE,FG
CSS 230	BB,DD1,DD2,FF,MM,PP,QQ,SS,TT1,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 231	BB,DD1,DD2,FF,MM,PP,QQ,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 232	BB,DD1,DD2,FF,MM,PP,QQ,SS,TT1,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 233	BB,DD1,DD2,FF,MM,PP,QQ,SS,TT1,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 234	BB,DD1,DD2,FF,MM,PP,QQ,SS,TT1,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 235	BB,DD1,DD2,FF,MM,PP,QQ,SS,TT1,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 236	BB,DD1,DD2,FF,MM,PP,QQ,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,AB2,HI
CSS 237	BB,DD1,DD2,FF,MM,PP,QQ,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,TT3,HI
CSS 238	BB,DD1,DD2,FF,MM,PP,QQ,SS,UU1,RS,QR,KK4,VV1,VV2,AB1,OP,PQ,CD2,GH
CSS 239	BB,DD1,DD2,FF,MM,PP,QQ,SS,UU1,RS,QR,KK4,WW,VV2,AB1,AB2,HI
CSS 240	BB,DD1,DD2,FF,MM,PP,QQ,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,TT3,HI
CSS 241	BB,DD1,DD2,FF,MM,PP,QQ,SS,UU1,RS,QR,KK4,WW,VV2,AB1,OP,PQ,CD2,GH
CSS 242	BB,DD1,DD2,FF,MM,PP,QQ,SS,TT1,TT2,TT3,HI
CSS 243	BB,DD1,DD2,FF,MM,PP,QQ,SS,TT1,TT2,PQ,CD2,GH
CSS 244	BB,DD1,DD2,FF,MM,PP,QQ,SS,UU1,UU2,XX1,XX2,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 245	BB,DD1,DD2,FF,MM,PP,QQ,SS,UU1,UU2,XX1,XX2,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 246	BB,DD1,DD2,FF,MM,PP,QQ,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 247	BB,DD1,DD2,FF,MM,PP,QQ,SS,UU1,UU2,XX1,JK,YY2,KL,XX3,LM,YY4,MN,XX5,ZZ,CD1,CD2,GH
CSS 248	BB,DD1,DD2,FF,MM,PP,QQ,SS,UU1,UU2,YY1,YY2,YY3,YY4,YY5,ZZ,CD1,CD2,GH
CSS 249	BB,DD1,DD2,FF,MM,PP,RR,BC,CD1,CD2,GH
CSS 250	BB,DD1,DD2,FF,MM,PP,RR,DE,EF,GH
CSS 251	BB,DD1,DD2,FF,MM,PP,RR,DE,FG
CSS 252	AA,HH,KK1,KK2,KK3,QR,RS,UU2,YY1,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 253	AA,HH,KK1,ST,IJ2,KK3,QR,RS,UU2,YY1,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 254	AA,HH,KK1,ST,TU,NN3,SS,UU1,UU2,YY1,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 255	AA,HH,JJ,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,YY1,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 256	AA,HH,JJ,LL,NN1,NN2,NN3,SS,UU1,UU2,YY1,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 257	AA,HH,JJ,LL,OO,PP,QQ,SS,UU1,UU2,YY1,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 258	AA,GG,II,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,YY1,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 259	AA,GG,II,LL,NN1,NN2,NN3,SS,UU1,UU2,YY1,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 260	AA,GG,II,LL,OO,PP,QQ,SS,UU1,UU2,YY1,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 261	BB,DD1,CC,II,LL,NN1,IJ1,IJ2,KK3,QR,RS,UU2,YY1,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 262	BB,DD1,CC,II,LL,NN1,NN2,NN3,SS,UU1,UU2,YY1,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 263	BB,DD1,CC,II,LL,OO,PP,QQ,SS,UU1,UU2,YY1,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 264	BB,DD1,DD2,EE,MM,PP,QQ,SS,UU1,UU2,YY1,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH
CSS 265	BB,DD1,DD2,FF,MM,PP,QQ,SS,UU1,UU2,YY1,YY2,KL,XX3,XX4,XX5,ZZ,CD1,CD2,GH

Table 6-3 Sam Switch to Navarro Route Components

Route	Route Links
SSN 1	AAA,BBB,III
SSN 2	AAA,CCC,EEE,GGG,III
SSN 3	AAA,CCC,EEE,HHH
SSN 4	AAA,CCC,FFF
SSN 5	DDD,EEE,GGG,III
SSN 6	DDD,EEE,HHH
SSN 7	DDD,FFF

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7.0 ENVIRONMENTAL IMPACTS OF THE ALTERNATIVE ROUTES

Following is a description of the evaluation of the potential impacts to the natural, environmental, and human resources in the study area from the construction and operation of the proposed project. Tables C-1, C-2, and C-3, located in Appendix C, summarize the environmental and land use data evaluated by Burns & McDonnell professionals with expertise in the different environmental and land use disciplines. The assessment of impacts has been broken down by each segment of the proposed project (i.e. Central A to Central C, Central C to Sam Switch, and Sam Switch to Navarro).

7.1 IMPACTS ON NATURAL RESOURCES

Impacts to natural resources that were evaluated include physiography and land cover, soils, hydrology, vegetation, threatened and endangered plant species, wetlands, wildlife, and threatened and endangered animal species.

7.1.1 Physiography and Land Cover

Land cover impacts along the alternative routes have been broken down into four categories: rangeland, cultivated land, mobile irrigation land, and wooded areas. Wetlands and open water have been taken into consideration for land cover, but are discussed in the wetlands section that follows. These land cover impacts were determined based primarily on a review of aerial photography.

Rangeland is the most desirable land cover for transmission line routing based on the low potential for impacts. Cultivated and mobile irrigation lands are the next desirable land cover. Wooded areas are the least desirable as transmission ROWs require a low vegetation profile and these areas would have to be cleared within the ROW.

Construction and operation of the transmission line would not result in any significant impacts to the existing physiography. Land clearing would consist primarily of tree and shrub removal. Any potential impact to topography would be from the use of heavy construction equipment and excavation required for the construction of the proposed project, which would be minimal and generally temporary in nature. Alternative routes were designed to parallel existing ROW and disturbed areas (where possible) in order to minimize potential impacts to land cover.

Central A to Central C

Based on the types of land cover crossed, alternative routes AC 7 and AC 9 cross the fewest wooded areas (6.4 and 6.6 miles respectively), when compared to the other alternative routes.

Central C to Sam Switch

Based on the types of land cover crossed, the south-central alternative routes cross the least amount of wooded areas (ranging from 35.5 and 44.9 miles) and rangeland areas crossed are generally higher (ranging from 94.5 to 106.2), when compared to the other alternative routes.

Sam Switch to Navarro

Based on the types of land cover crossed, alternative route SSN 7 crosses the least amount of wooded areas (3.8 miles) and rangeland areas crossed is generally higher (17.7 miles), when compared to the other alternative routes.

7.1.2 Soils

The project could result in temporary, minor adverse impacts to the soils within the ROW during construction activities; however, no significant impacts to soils are anticipated along any of the alternative routes. The primary impacts to soils would result from the use of heavy construction equipment and excavation required for construction of new foundations and support structures. These activities, only temporary in nature, could cause soil compaction, ruts or tracks from vehicle movement, and mixing of the soil profile. During construction of the proposed transmission line, some erosion could occur within the cleared ROW, resulting in localized increases in soil loss and sedimentation of area streams.

Erosion control measures employed during construction would include seeding, placement of staked straw bales or silt fences on sloped areas, and other appropriate measures to control runoff. In addition, construction crews would be instructed to avoid soil-disturbing activities during excessively wet weather.

Some of the alternative routes traverse soils that are considered by the USDA as prime farmland. Aside from potential construction-related erosion, impacts to prime farmland soils are anticipated to be minor and occur only at the base (a small footprint) of transmission line structures. Transmission lines are not considered to be a conversion of farmland because the land can still be used after construction, thus the proposed project is exempt from the Farmland Protection Policy Act (FPPA).

7.1.3 Hydrology

Potential hydrology impacts along the alternative routes were considered and evaluated by the number of streams and rivers crossed by each alternative route and the length of streams parallel to the alternative routes (within 100 feet). These potential impacts were determined using digital hydrology data from the USGS National Hydrology Dataset (NHD).

Construction and operation of the project would not significantly impact surface water features along the proposed transmission line. Short-term, minor water quality impacts may occur during the construction of the proposed project. Such potential impacts would be associated with soils from disturbed areas being transported into adjacent surface waters during storm events. Lone Star will obtain the appropriate permits from the USACE where the transmission line spans over streams and rivers. Potential impacts to groundwater and aquifers are not expected to occur from construction of the proposed project. Precautions will be taken during construction to ensure the proper control and handling of any petroleum or other chemicals that may be needed during construction.

It is unlikely that structures will be located within FEMA-designated 100-year floodplains along streams and rivers. However, should structures be located in a floodplain, careful planning and siting should eliminate construction activities impacting flood channels and therefore should not significantly affect flooding.

Central A to Central C

Alternative route AC 4 is favored from a hydrology perspective based on the number of streams and rivers crossed (105 crossings) and length of streams parallel to the alternative routes (2 miles) being generally lower, when compared to the other alternative routes. None of the Central A to Central C alternative routes cross any TPWD identified ecologically significant stream segments.

Central C to Sam Switch

The southern alternative routes are favored from a hydrology perspective based on the number of streams and rivers crossed (ranging from 270 to 281 crossings) and length of streams parallel to the alternative routes (ranging from 5.9 to 6.7 miles) being generally lower, when compared to the other alternative routes. The northern alternative routes cross one TPWD identified ecologically significant stream segment, the Brazos River. The north-central alternative routes cross one TPWD identified ecologically significant stream segment, the Steele River, and the south-central alternative routes cross two TPWD identified ecologically significant stream segments, Colony Creek and Steele Creek. The southern alternative routes do not cross any ecologically significant stream segments. Potential impacts to these ecologically significant stream segments are not anticipated as these streams would be spanned by the transmission line. If structures are required to be placed within the streams, placement would be designed to minimize any impacts. Lone Star will also prepare a Storm Water Pollution Prevention Plan (SWPPP) and any associated permits prior to any soil disturbance to reduce the chance of impacting the water quality of these streams during construction.

Sam Switch to Navarro

Alternative route SSN 3 is favored from a hydrology perspective based on the number of streams and rivers crossed (50 crossings) and length of streams parallel to the alternative routes (0.9 mile) being generally lower, when compared to the other alternative routes. None of the Sam Switch to Navarro alternative routes cross any TPWD identified ecologically significant stream segments.

7.1.4 Vegetation

Construction and subsequent ROW maintenance of the project would result in the loss of vegetation within the transmission line ROW due to clearing. Most of this clearing is associated with traversing undeveloped land. The majority of the vegetation that would be impacted by the proposed project consists of live oak – ashe juniper communities; live oak – mesquite – ashe juniper communities; silver bluestem – Texas wintergrass grassland; mesquite – lotebrush shrub; mesquite brush; havard shin oak – mesquite brush; oak – mesquite – juniper communities/woods; post oak parks/woods; post oak woods, forest, and grassland mosaic; ashe juniper communities/woods; elm – hackberry communities/woods; and water oak – elm – hackberry forest. Trees such as oaks, sumac, hackberry and juniper occurring in or immediately adjacent to the transmission line ROW would have to be cleared to protect the integrity of the line. Minimal impacts would occur in cultivated areas by the placement of the structures. Where possible, alternative routes were designed to parallel existing ROW and disturbed areas in order to minimize potential impacts to vegetation.

TPWD indicated in its January 21, 2009 letter to the PUCT concerning the CREZ projects that impacts to native vegetation should be minimized to the extent feasible during construction. If native vegetation must be impacted, TPWD recommends mitigating for the loss by re-vegetating areas disturbed by project activities with site-specific native species. Additionally, TPWD strongly recommends that areas of existing native grasses should be preserved to the extent feasible. To prevent the introduction of non-native species to native pastures/rangelands, ground disturbance in such areas should be completely avoided. In areas where ground disturbance is unavoidable, restoration should include original or higher-quality native vegetation. TPWD further requested that the use of bermuda grass (*Cynodon dactylon*) and other non-native species be completely avoided.

7.1.4.1 Threatened and Endangered Plant Species

Potential impacts to threatened and endangered plant species were determined by reviewing data from the Texas Natural Diversity Database (TxNDD), operated by TPWD, as well as written correspondence with both USFWS and TPWD personnel. Additionally, several reconnaissance surveys (including via helicopter) were conducted along the alternative routes.

TPWD recommended in its August 3, 2009 letter to Lone Star that surveys for rare plants in areas that have the potential to be disturbed during construction should occur when plants would be most detectable (typically during flowering periods). If during construction, rare plant species, natural communities, or special features are discovered, TPWD recommends that precautions be taken to avoid impacts to them. Additionally, USFWS should also be contacted for species concurrence, further guidance, permitting, survey protocol, and mitigation for federally listed species.

TPWD also indicated in its August 3, 2009 letter to Lone Star that plant species of concern (comanche peak prairie-clover and dwarf broomspurge) and the redberry juniper-midgrass series natural community were within ten miles of the project area. However, as the alternative routes have been identified since that time, they are further than ten miles away from these plant species and series.

Central A to Central C

No known threatened or endangered plant species or natural communities are within ten miles of the alternative routes. Therefore, no potential impacts are anticipated to threatened and endangered plant species or natural communities. Upon approval of a final route by the PUCT, detailed environmental surveys will be conducted along the proposed transmission line to identify potential habitat and/or threatened or endangered plant species. If encountered, Lone Star will coordinate with both the USFWS and TPWD accordingly.

Central C to Sam Switch

None of the alternative routes cross any known threatened or endangered plant species. The northern alternative routes cross a minimum of two miles of post oak-blackjack oak series communities. The glen rose yucca and the ashe juniper-oak series, cedar elm-sugarberry series, little bluestem-indiangrass series, pecan-sugarberry series, and Texas oak series natural communities, are within ten miles of the alternative routes, but none are crossed. Upon approval of a final route by the PUCT, detailed environmental surveys will be conducted along the proposed transmission line to identify potential habitat and/or threatened or endangered plant species. If encountered, Lone Star will coordinate with both the USFWS and TPWD accordingly.

Sam Switch to Navarro

No threatened and endangered plant species or natural communities are known to be crossed by the alternative routes. The little bluestem-indiangrass series community identified by TPWD is within ten miles; but is not crossed. Upon approval of a final route by the PUCT, detailed environmental surveys will be conducted along the proposed transmission line to identify potential habitat and/or threatened or

endangered plant species. If encountered, Lone Star will coordinate with both the USFWS and TPWD accordingly.

7.1.5 Wetlands

Potential wetland impacts along the alternative routes have been broken down into three categories, forested/scrub-shrub, emergent, and open water (lakes and ponds). These potential impacts were determined based on a review of aerial photography, USFWS NWI maps, USDA NAIP infrared imagery, and topography maps.

To minimize potential impacts to wetlands areas, the alternative routes were designed to span wetland areas where possible. Additionally, the alternative routes were designed to parallel existing ROW and disturbed areas (where possible) in order to minimize potential impacts to wetlands. Very few of the wetlands along the alternative routes exceed the typical span of the transmission structures. Lone Star would obtain the appropriate permits from the USACE for any work within wetlands.

TPWD recommended in its January 21, 2009 letter to the PUCT concerning the CREZ projects and in its August 3, 2009 letter that transmission lines should be located as far from wetlands and open water as possible to avoid potential collisions by waterfowl and other bird species. TPWD further recommended that transmission lines adjacent to these areas should be buried when feasible, and bird flight diverter markings should be installed when overhead lines are used.

USFWS recommended in its June 26, 2009 letter that alternative routes should parallel existing ROW wherever possible in order to minimize potential impacts. Additionally, the most current and innovative methods for minimizing potential impacts from ROW clearing should be implemented where practical. Finally, in order to minimize avian collisions with transmission lines, alternative routes should be placed a reasonable distance away from wetlands and other large aquatic bodies and visual markers should be installed on overhead lines where collisions are likely to be significant.

Central A to Central C

Alternative route AC 4 is favored from a wetlands perspective based on the length of forested/scrub-shrub wetlands (0.6 miles), emergent wetlands (1 mile), and open water (0.2 miles) crossed is generally shorter when compared to the other alternative routes. Upon approval of a final route by the PUCT, detailed environmental surveys will be conducted along the proposed transmission line to identify jurisdictional waters of the U.S. If necessary, Lone Star will coordinate with the USACE.

Central C to Sam Switch

The north-central alternative routes are favored from a wetlands perspective based on the length of forested/scrub-shrub wetlands (1.4 to 1.5 miles), emergent wetlands (1.9 miles), and open water (0.8 to 1 mile) crossed is generally shorter when compared to the other alternative routes. Upon approval of a final route by the PUCT, detailed environmental surveys will be conducted along the proposed transmission line to identify jurisdictional waters of the U.S. If necessary, Lone Star will coordinate with the USACE.

Sam Switch to Navarro

Alternative route SSN 3 is favored from a wetlands perspective based on the length of forested/scrub-shrub wetlands (1.1 miles), emergent wetlands (0.3 mile), and open water (0.2 mile) crossed is generally shorter when compared to the other alternative routes. Upon approval of a final route by the PUCT, detailed environmental surveys will be conducted along the proposed transmission line to identify jurisdictional waters of the U.S. If necessary, Lone Star will coordinate with the USACE.

7.1.6 Wildlife

Construction and operation of the transmission line could result in some temporary adverse impacts to wildlife, primarily from the removal of vegetation within or near the proposed project that could provide feeding, shelter, or nesting habitat for some species. Potential impacts to most species would be temporary and short-term during construction and would consist primarily of displacement and disturbance. Some less mobile species occurring along the transmission line could be directly impacted and movements between segmented habitats could be temporarily impeded due to noise and human presence. Additional temporary disturbance could occur during future maintenance of the transmission line. No impacts are anticipated to fish species because waterways would be spanned or avoided. Potential impacts to migratory birds would be minimized by implementing bird flight diverters along potential stopover areas, when avoidance is not possible. Alternative routes were designed to parallel existing ROW and disturbed areas (where possible) in order to minimize potential impacts to wildlife.

7.1.6.1 Threatened and Endangered Animal Species

Potential impacts to threatened and endangered animal species were determined by reviewing data from the TxNDD, operated by TPWD, written correspondence and discussions with both USFWS and TPWD personnel, and detailed review of aerial photography combined with helicopter surveys in October 2009 and March 2010 of the alternative routes. Based on the results of the above described evaluations, the assessment below was conducted regarding potential impacts to threatened or endangered species or their habitat.

Because the proposed transmission line project is not likely to be built directly along high cliffs or adjacent to bluffs known to provide roosting, nesting or foraging habitat for either the American or arctic peregrine falcon, no impacts are expected. The proposed project is not likely to lead to a loss of viability or federal listing of this species.

The only study area county known to have the potential for the Bachman's sparrow is Freestone County. Since none of the alternative routes cross any portion of Freestone County, the proposed project is not anticipated to have a negative effect on the Bachman's sparrow.

Bald eagles may forage in the project area; however direct impacts would be limited to accidental collisions with the transmission lines. Nesting habitat is not expected to be impacted. The proposed project is not expected to lead to a loss of viability or federal protection of the species.

No suitable nesting habitat for the black-capped vireo was determined to be present along any of the alternative routes. Marginally suitable habitat was observed on some of the immediately adjacent properties, and portions of some of the alternative routes do provide potential habitat for transient or migrating black-capped vireo. This species typically nests in distinctive and dense scrubby mottes (to about 6 feet high) interspersed in open grassland. Common vegetation within these mottes includes shin oak, plateau live oak, evergreen sumac, Texas persimmon, agarita, and ashe juniper. Due to a lack of scrubby vegetation within an open canopy along the alternative routes, it was determined that no potentially suitable nesting habitat for the black-capped vireo is present along the alternative routes. Because specific portions of the alternative routes do provide potential habitat for transient or migrating black-capped vireo, it may be necessary to conduct a species specific survey following USFWS protocols in these locations. Upon approval of a final route by the PUCT, Lone Star will coordinate with the USFWS to determine if species specific surveys will be required.

Potential suitable habitat for the golden-cheeked warbler was identified along Route Links EF, WW, RR, II, and KK1 within the Central C to Sam Switch segment of the project. Potential suitable habitat in these areas consists of mature mixed ashe-juniper and mature oak. Variations in topography along these route links also contribute to suitable habitat for this species, providing necessary slopes and small canyons that the golden-cheeked warbler prefers for nesting and foraging. In general, golden-cheeked warblers occur in areas with a moderate to high density of mature trees, and dense foliage in the upper canopy. Higher golden-cheeked warbler densities are typically associated with larger contiguous patches of mixed ashe-juniper and mature oak, with greater average tree height, a mixed variability in tree heights, and a greater density of deciduous trees. Observations made during the habitat assessment confirmed the presence of

potentially suitable habitat meeting these criteria along the aforementioned route links; therefore, further investigation will be necessary to determine if golden-cheeked warblers are utilizing these habitats. Upon approval of a final route by the PUCT, a detailed survey will be conducted along the proposed transmission line to determine if the project crosses habitat that is occupied by golden-cheeked warblers. The survey will be conducted during the breeding season for this species (March 1-August 15). If necessary, Lone Star will coordinate with the USFWS.

Suitable habitat for the interior least tern is not present within or adjacent to the alternative transmission line routes. Therefore, the proposed project is not anticipated to have a negative effect on this state and federally listed threatened species.

Suitable habitat for piping plovers is not present within or adjacent to the alternative transmission line routes. Therefore, the proposed project is not anticipated to have a negative effect on this state and federally listed threatened species.

Suitable habitat for the white-faced ibis is not present within or adjacent to the alternative transmission line routes. Therefore, the proposed project is not anticipated to have a negative effect on this state listed threatened species.

Whooping cranes nest in Canada and winter in coastal marshes in Texas. The migration route of this population passes through north central Texas (through the project area) and migrating whooping cranes often are sighted at and along reservoirs, large ponds, rivers, and wetlands at stop-over habitats.

The proposed project has the potential to adversely affect whooping cranes by means of inadvertent collisions, and possible human disturbance during construction and maintenance activities. Collisions with transmission lines are a substantial cause of whooping crane mortality in migration (Brown et al. 1987, Lewis 1992). The proposed transmission line will not cause direct impacts to any area designated as critical habitat.

In their June 26, 2009 letter, the USFWS has requested that active mitigation measures for whooping cranes (i.e., bird flight diverters) be incorporated into any new transmission line and re-constructed line projects. Upon approval of a final route, Lone Star will consult with USFWS personnel to identify potential mitigation alternatives that may reduce potential impacts to the migrating whooping cranes. In addition, Lone Star will devise and implement a program to educate construction contractors regarding methods to avoid and minimize impacts to the whooping crane. Lone Star plans to conduct surveys to

identify potential suitable stopover habitat for the whooping crane. Lone Star plans to install bird flight diverters along the transmission line in areas where suitable stopover habitat is identified.

Wood storks do not occur regularly in the proposed project area; however it is possible that transient or migrating individuals could occur. Mitigation measures taken such as bird flight diverters would reduce the chances of collisions for wood storks with the transmission lines. If these mitigation measures are implemented, the proposed project is not likely to lead towards a loss of viability or federal listing of this species.

The alternative routes would span the Brazos River and any other drainage and would avoid impacts to waterways and respective inhabitants, including the sharpnose shiner and smalleye shiner. Therefore, the proposed project is not anticipated to have a negative effect on these federally listed candidate species.

The only study area county known to have the potential for the black bear is Hood County. Since none of the alternative routes cross any portion of Hood County, the proposed project is not anticipated to have a negative effect on the black bear.

The last recorded occurrence of the black-footed ferret is from Dallam County (outside the study area) in 1953. Since the black-footed ferret is considered extirpated from Texas, the proposed project is not anticipated to have a negative effect on this federally-listed species.

Both red and gray wolves are now considered extirpated from Texas and are not anticipated to occur in the project area. Therefore, the proposed project is not anticipated to have a negative effect on wolves.

The proposed transmission line would span over all drainages to avoid impacts to waterways and respective inhabitants, including the alligator snapping turtle, the Brazos water snake, and the Concho water snake. Therefore, the proposed project is not anticipated to have a negative effect on these state listed threatened species.

The only study area county known to have the potential for the Houston toad is Freestone County. Since none of the alternative routes cross any portion of Freestone County, the proposed project is not anticipated to have a negative effect on the Houston toad.

Education of all construction personnel should be conducted prior to construction activities concerning suitable habitat, and a description of the Texas horned lizard, the timber rattlesnake, and the Texas garter snake should be distributed in an effort to maximize avoidance strategies if one is encountered. It is unlikely that the proposed project would have a negative effect on these state listed threatened species.

Education of all construction personnel should be conducted prior to construction activities concerning suitable habitat, and a description of the western burrowing owl and the plains spotted skunk should be distributed in an effort to maximize avoidance strategies if one is encountered. It is unlikely that the proposed project would have a negative effect on these state listed threatened species.

The proposed transmission line would span drainages to avoid impacts to waterways. Therefore, the proposed project is not anticipated to have a negative effect on the Guadalupe bass.

As the project is not proposed along any coastal beaches, bays, or estuaries, direct impacts to colonial waterbirds are not expected.

Temporary disturbances to prairie dog towns may occur during the initial construction process, and possibly during future maintenance activities; however, it is not anticipated that long-term effects will result.

TPWD made several recommendations in its August 3, 2009 letter pertaining to threatened and endangered animal species. As a generality, TPWD recommends the avoidance of potential impacts to all threatened and endangered wildlife, habitat, and food supply.

For the whooping crane, TPWD recommends precautions are taken to avoid potential impacts. Construction of lines near wetlands or other potential stopover sites should be avoided. If placement of lines near potential stopover sites is unavoidable, lines placed in areas that are or could be frequently used by cranes should be marked with bird flight diverters.

For the black-capped vireo and golden-cheeked warbler, TPWD indicated that even if these species are not directly impacted by habitat removal, nesting pairs in surrounding vegetation to the ROW can be disrupted by construction noise and activity. Such disturbance (harming or harassing) would violate the definition of "take" in the Endangered Species Act. Surveys for these species should occur before construction activities within 300 feet of alternative routes. If these species or suitable habitat for these species is found, TPWD recommends avoiding potential impacts by scheduling construction activities outside of the breeding and nesting season (March – August) within 300 feet of habitat.

For the interior least tern, TPWD recommends that potential alternative routes avoid wide braided rivers with sand and gravel bars such as the Brazos River and Double Mountain Fork of the Brazos River. In areas where alternative routes will potentially span such habitat, TPWD recommends implementing bird flight diverters or burial of the line.

For the bald eagle, TPWD indicated that although this species has been removed from the federal threatened and endangered species list, it remains protected by state law and the U.S. Bald Eagle and Golden Eagle Protection Act. Surveys for nests should occur if trees near perennial waterways would have to be removed. Potential impacts to trees with nests should be avoided and perch guards, bird flight diverters, and adequate conductor spacing should be implemented.

For the Texas horned lizard, TPWD recommends potential impacts to both this species and its primary food source, the harvester ant (*Pogonomyrmex* sp.), should be avoided during construction. Potential impacts to vegetation communities known to inhabit or considered to be suitable for this species should be minimized to the extent possible. Where impacts to vegetation are unavoidable, TPWD recommends the area be surveyed for evidence of rare species prior to clearing or construction. If areas are found to contain this species, precautions should be taken to avoid potential impacts.

For the keystone species, the black-tailed prairie dog, TPWD recommends avoiding potential impacts to prairie dog towns, as they provide food and shelter for various other wildlife species. Where impacts are unavoidable, TPWD recommends non-harmful exclusion methods are used to encourage the animals to vacate the area prior to disturbance.

For alternative routes within or near colonial waterbird rookeries, TPWD recommends construction activities should be scheduled when the birds are not present, particularly after nesting activities (February – August) have ceased, where impacts are unavoidable.

USFWS outlined several recommendations in its June 26, 2009 letter pertaining to threatened and endangered animal species:

- All wetland, stream, and river crossings should be avoided when practical or be made at the smallest width possible or at previously disturbed areas in a perpendicular manner. Vegetation removal should be minimized and towers should be placed such that transmission lines span these areas where feasible.
- Transmission lines spanning or adjacent to wetlands, rivers, and streams should be constructed with bird flight diverters. USFWS strongly recommends that alternative routes be designed and selected to avoid spanning wetlands.
- Habitat surveys for the black-capped vireo and the golden-cheeked warbler should be conducted by a federally permitted biologist familiar with both the vireo and the warbler within and adjacent to the project area. Construction activities which would not directly impact vireo and warbler

habitat but are within 100 yards of suitable habitat should be scheduled outside the birds' breeding season (March – August). In the event that this is not possible, further coordination with USFWS should be taken.

- Surveys for Navasota ladies'-tresses should be conducted in and adjacent to the project area. If tresses are identified within the project area, further coordination with USFWS should be taken.
- If the interior least tern is identified within the project area, construction activities should occur outside its known nesting season (April – August).
- Potential impacts to sharpnose and smalleye shiners should be considered during project planning. General best management practices designed to minimize impacts to rivers, riparian corridors, and wetlands should also minimize impacts to these species.

7.2 SUMMARY OF NATURAL RESOURCES IMPACTS

Several natural resources have been evaluated to determine both the possibility of ecological and natural resource impacts from the proposed transmission project. As a generality, potential impacts to all natural resources should be avoided and minimized for the design, construction, and maintenance of the proposed project.

Central A to Central C

Based on the natural resources in this area, alternative route AC 4 is favored. Alternative route AC 4 generally has the lowest potential impact to the natural resources crossed. Although alternative route AC 4 has the least potential to impact natural resources, none of the alternative routes are anticipated to significantly impact or alter the natural resources within the project area.

Central C to Sam Switch

Based on the natural resources in this area, the south-central alternative routes are favored. The south-central alternative routes generally have the lowest potential impact to natural resources crossed. Although the south-central alternative routes have the least potential to impact natural resources, with appropriate mitigation measures (where necessary) none of the alternative routes are anticipated to significantly impact or alter the natural resources within the project area.

Sam Switch to Navarro

Based on the natural resources in this area, alternative route SSN 3 is favored. Alternative route SSN 3 generally has the lowest potential impact to natural resources crossed. Although alternative route SSN 3 has the least potential to impact natural resources, none of the alternative routes are anticipated to significantly impact or alter the natural resources within the project area.

7.3 IMPACTS ON HUMAN RESOURCES

This section contains a discussion of the potential impacts of the project on the human resources found along the alternative routes including land use, infrastructure, and socioeconomics. The primary criteria considered to measure potential land use impacts from this project included overall route length, potential impacts to agriculture, proximity to habitable structures, length parallel to existing corridors (including apparent property boundaries), and potential impacts to park/recreational areas.

7.3.1 Community Values and Community Resources

Community resources can be impacted directly, where construction of a transmission line, support structure, or ROW would result in restricted access to, or removal of said resource, or indirectly, where the intrinsic value of the resource, usually aesthetic, would be diminished. Impacts to community values and community resources are discussed in detail in the below sections.

7.3.1.1 Land Use and Development Patterns

Land use impacts from transmission line construction are determined by the amount of land (of whatever use) displaced by the actual ROW and by the compatibility of electric 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 and materials through the area. Construction noise and dust, as well as disruption of traffic flow, may also temporarily affect the area immediately adjacent to the ROW. Coordination between Lone Star, its contractors, and landowners regarding access to the ROW and construction scheduling should minimize these disruptions. Most existing land uses may continue during construction.

PUCT Substantive Rule § 25.101 requires that the PUCT consider whether new transmission line routes parallel existing compatible ROWs, property lines, or other natural or cultural features. In general, all of the alternative routes parallel existing corridors as well as apparent property boundaries for a significant amount of their length.

By paralleling existing corridors, potential impacts to property, community values and community resources, and view sheds are typically minimized due to the already disturbed nature of the area crossed by the existing facility/corridor and are therefore normally considered to be preferable versus creating a completely new corridor.

Central A – Central C

Alternative Routes AC 3, AC 5, and AC 7 have the greatest length parallel to existing corridors. These routes all contain Link L which parallels several existing transmission lines between Abilene, Texas and Lake Fort Phantom Hill. However, these alternative routes are located in closer proximity to the more developed areas of the project area.

Alternative routes AC 2, AC 4, AC 6, and AC 9 have the next greatest length parallel to existing corridors, followed by alternative routes AC 1 and AC 8.

Central C – Sam Switch

The south-central alternative routes have the greatest length parallel to existing corridors (134.5 miles to 142.6 miles), followed closely by the southern alternative routes (136.1 miles to 138.6 miles). The northern and north-central routes have the least amount parallel to existing corridors (109.7 miles to 116.5 miles and 122.9 to 126.1 miles respectively).

Sam Switch - Navarro

Alternative route SSN 4 has the greatest length parallel to existing corridors with 27.2 miles, followed by alternative route SSN 7 (25.6 miles). Alternative route SSN 2 parallels existing corridors for 24.3 miles and alternative route SSN 5 for 22.7 miles. Alternative routes SSN 1, SSN 3, and SSN 6 all parallel existing corridors for less than 20 miles.

7.3.1.2 Agriculture

The evaluation of potential impacts to agricultural resources was determined by examining aerial photography and field results of reconnaissance surveys, and then separating those findings into the categories of rangeland, cultivated land, and mobile irrigation systems.

The potential impact on the agricultural use of rangeland will be negligible because the constructed transmission line will not interfere with grazing and Lone Star will not fence the ROW or otherwise separate the ROW from adjacent lands. Further, the impact on cropland and land with mobile irrigation systems will also be minimized with the placing of structures in close proximity to fence and property lines where applicable. All land with mobile irrigation systems will be spanned such that no transmission structures impede the operation of the mobile irrigation system. The only land that will be permanently impacted for the production of crops or animals would be that land physically occupied by the transmission line structures or in a few areas by guy wires.

Land designated as rangeland was valued as having the least potential impacts, and cropland and land with mobile irrigation systems was valued as having the potential for the highest impacts from an agricultural perspective.

All of the alternative routes traverse soils that are considered by the USDA as prime farmland. Aside from potential construction-related erosion, impacts to prime farmland soils are anticipated to be minor and occur only at the base of transmission line structures. The NRCS indicated in its October 21, 2009 letter that prime farmland soils do occur within the study area, but transmission lines are not considered to be a conversion of farmland because the land can still be used after construction. Therefore, the proposed project is exempt from the FPPA.

Central A – Central C

The alternative routes range between 35.9 miles and 48.9 miles of length through rangeland with alternative routes AC 2, AC 3, AC 5, and AC 9 having the greatest length through rangeland followed by alternative routes AC 1, AC 4, AC 6, AC 7, and AC 8.

The alternative routes range between 35.3 miles and 48.9 miles of length through cropland with alternative routes AC 2, AC 4, and AC 8 having the least amount through cropland followed by alternative routes AC 1, AC 3, AC 5, AC 6, AC 7, and AC 9.

Alternative routes AC 4, AC 6, and AC 8 do not cross any cropland irrigated by mobile irrigation systems. Alternative routes AC 1 and AC 2 both cross 0.1 miles of cropland irrigated by mobile irrigation systems and alternative routes AC 5, AC 7, and AC 9 cross 0.2 miles. Alternative route AC 3 crosses 0.3 miles of cropland irrigated by mobile irrigation systems.

Given the lengths of each route across the different types of agricultural land use, alternative routes AC 2 and AC 4 appear to have the least amount of potential impacts to agricultural production.

Central C – Sam Switch

The south-central alternative routes range between 94.5 miles and 106.2 miles of length through rangeland followed by the northern alternative routes (94.2 miles to 101 miles). The north-central alternative routes range between 96.7 miles and 97.5 miles and the southern alternative routes cross between 90.7 miles to 93.8 miles of rangeland.

The northern alternative routes generally cross the least amount of cropland ranging between 29.4 miles and 30.6 miles, followed by the north-central alternative routes (34.6 miles to 36.2 miles). The south-

central alternative routes cross approximately 32.3 miles to 42.5 miles of cropland and the southern alternative routes cross the most cropland with 46.9 miles to 48.0 miles.

The northern alternative routes do not cross any cropland irrigated by mobile irrigation systems. The north-central alternative routes cross between 0.1 and 0.3 miles of cropland irrigated by mobile irrigation systems and the southern alternative routes cross 0.5 miles. The south-central routes cross the most cropland irrigated by mobile irrigation systems with 0.5 miles to 0.8 miles.

Given the lengths of each route across the different types of agricultural land use, the northern alternative routes appear to have the least amount of potential impacts to agricultural production.

Sam Switch - Navarro

The alternative routes range between 12.6 miles and 17.7 miles of length through rangeland with alternative routes SSN 7 and SSN 4 having the greatest length through rangeland (17.7 miles and 16.6 miles respectively) followed by alternative routes SSN 5 and SSN 1 with 15.4 miles and 14.7 miles.

The alternative routes range between 10.2 miles and 15.7 miles of length through cropland with alternative routes SSN 4 and SSN 7 having the least amount through cropland (10.2 miles and 10.5 miles respectively).

None of the alternative routes in the Sam Switch to Navarro segment of the project cross any cropland irrigated by mobile irrigation systems.

Given the lengths of each route across the different types of agricultural land use, alternative routes SSN 4 and SSN 7 appear to have the least amount of potential impacts to agricultural production.

7.3.1.3 Urban and Residential Areas

Generally, when developing routes for a new transmission line, cities and towns are avoided due to the concentration of development located within their boundaries. There were a number of municipal areas throughout the project area that were largely avoided during route development. However, some routes tended to be closer to municipal boundaries than others, and a few cross the actual city limits in locations where the concentration of development appeared to be less dense.

Generally, one of the more important measures of potential land use impacts is the number of habitable structures located in the vicinity of each route. Burns & McDonnell determined the number and distance and direction of habitable structures located within 500 feet of the centerline of each route through

interpretation of aerial photography and verification during reconnaissance surveys, where possible. The aerial photography used to determine the distance of habitable structures within 500 feet of the centerline of each alternative route has a horizontal accuracy of ±30 feet. To account for this and to ensure that all habitable structures within 500 feet were properly identified, Burns & McDonnell identified all habitable structures within 530 feet. Burns & McDonnell, to the greatest extent reasonable, in the routing of the alternative routes, attempted to avoid habitable structures.

Central A – Central C

Alternative Routes AC 3, AC 5, AC 7, and AC 9 cross the city of Abilene south of Fort Phantom Hill Lake, so they would be the least preferable from an urban and residential perspective. The other route alternatives (AC 1, AC 2, AC 4, AC 6, and AC 8) would not cross any municipalities.

The alternative routes range between 20 and 38 habitable structures within 500 feet of the route centerlines. Alternative routes AC 1 and AC 8 have the fewest habitable structures within 500 feet with 20 and 27, respectively. Alternative routes AC 6 and AC 9 have the next fewest habitable structures within 500 feet with 30 and 31 respectively, followed by alternative routes AC 2 (33), AC 4 (34), AC 7 (34), AC 3 (37) and AC 5 (38).

Alternative route AC 1 is favored from an urban and residential perspective. Not only does AC 1 have the fewest habitable structures within 500 feet, it is the northernmost alternative route and generally is located the furthest from the municipalities in the project area.

Table D-1, located in Appendix D, summarizes the type of habitable structure, direction and distance from the closest route link, as well as the unique identification number to each habitable structure depicted on Figure 3-2 and Figures 3-2A through 3-2F.

Central C – Sam Switch

The north-central routes pass close to, but do not cross the city of Stephenville. The north-central routes cross a small portion of the northernmost edge of the City of Hillsboro, (parallel to an existing pipeline corridor). The south-central alternative routes cross a portion of the City of Abbott where the boundary extends north about two miles from the city center to include the area immediately adjacent to Interstate 35. The southern and south-central routes do not cross any city boundaries, but pass closer to cities than the northern route alternatives.

The northern alternative routes have the fewest habitable structures (85 to 87) within 500 feet followed by the south-central alternative routes with 100 to 103 habitable structures. The southern alternative

routes (108 to 126) and the north-central alternative routes (126) have the most habitable structures within 500 feet.

The northern alternative routes are favored from an urban and residential perspective as they have the fewest habitable structures within 500 feet and are generally located furthest from the municipalities in the project area. The south-central alternative routes would be the next best alternative.

Table D-2, found in Appendix D, summarizes the type of habitable structure, direction and distance from the closest route link, as well as the unique identification number to each habitable structure depicted on Figure 3-2 and Figures 3-2A through 3-2F.

Sam Switch - Navarro

None of the alternative routes for Sam Switch to Navarro cross any municipalities. The alternative routes range between 8 and 23 habitable structures within 500 feet of the route centerlines. Alternative routes SSN 7 and SSN 4 have the fewest habitable structures within 500 feet with 8 and 11, respectively. Alternative routes SSN 1 and SSN 5 have the next fewest habitable structures within 500 feet with 17 each, followed by alternative routes SSN 2 (20), SSN 6 (20), and SSN 3 (23).

Alternative routes SSN 7 and SSN 4 are favored from an urban and residential perspective.

Table D-3, found in Appendix D, summarizes the type of habitable structure, direction and distance from the closest route link, as well as the unique identification number to each habitable structure depicted on Figure 3-2 and Figures 3-2A through 3-2F.

7.3.1.4 Park and Recreational Areas

The evaluation of potential impacts to park and recreational areas considered the potential disruption or preemption of recreational activities from construction of the proposed project.

Central A – Central C

None of the alternative routes for the Central A to Central C segment of the project cross any park/recreational areas. In addition, none of the alternative routes for the Central A to Central C segment of the project have any park/recreational areas within 1,000 feet.

No impacts to the use or enjoyment of any park/recreational area located within the project area of the Central A to Central C segment of the project are anticipated from any of the alternative routes.

Central C – Sam Switch

The majority of the alternative routes for the Central C to Sam Switch segment of the project either cross or are located within 1,000 feet of a park/recreational area. The northern alternative routes will cross a portion of recreational land associated with Whitney Lake (Link VV1 will cross USACE easements only and Link WW will cross USACE-owned land).

The north central alternative routes will cross recreational land associated with Whitney Lake as well as Plowman Creek Park (also associated with Whitney Lake). Route Link TT2 will cross a significant portion of USACE-owned land. There are no additional park/recreational facilities located within 1,000 feet of the north central alternative routes.

The south-central alternative routes will also cross a portion of recreational land associated with Whitney Lake. Route Links XX1, XX4, XX5, YY4, and ZZ will cross small portions of USACE easement land, whereas Route Links XX2 and XX4 will cross USACE-owned land. In addition, the south-central alternative routes are located approximately 1,000 feet southeast of the Latham Springs Baptist Camp.

The southern alternative routes will not cross any park/recreational areas, but will be located approximately 1,000 feet southeast of the Latham Springs Baptist Camp.

Although several of the route links will cross recreational land associated with Whitney Lake, the majority of this land is reserved as flood storage, and therefore, no significant impacts to the use or enjoyment of these areas is anticipated. The north central alternative routes that cross Plowman Creek Park will parallel an existing pipeline which would minimize potential impacts to the park.

Based on correspondence with USACE Whitney Lake personnel, an EA would be required for the shorter crossings of USACE-owned land (Links XX2 and XX4) and an Environmental Impact Statement (EIS) would be required for the two longer crossings of the USACE-owned land (Route Links WW and TT2). Alternative routes that cross USACE easement land (Links VV1, XX1, XX5, YY4, and ZZ) would not require either an EA or an EIS. At a meeting with USACE Whitney Lake personnel, it was stated that the USACE would not approve a route along Link TT2.

Sam Switch - Navarro

None of the alternative routes for the Sam Switch to Navarro segment of the project cross any park/recreational areas. In addition, alternative routes SSN 4 and SSN 7 do not have any park/recreational areas within 1,000 feet, and alternative routes SSN 1, SSN 2, SSN 3, SSN 5, and SSN 6

only have one park/recreation area (either the Thousand Oaks Ranch or the Navarro Mills Lake) within 1,000 feet.

No impacts to the use or enjoyment of any park/recreational area located within the project area of the Sam Switch to Navarro segment of the project are anticipated from any of the alternative routes.

7.3.1.5 Transportation and Aviation

All of the alternative routes will cross U.S. and State Highways, FM Roads, County Roads and other public roadways. No long term impacts are anticipated to the transportation system of the project area due to the construction of the proposed project. Short term impacts may occur during construction which could result in a temporary disruption of traffic service.

Typical structure heights will be 110 feet above ground. The PUCT requires that all known private airstrips and all public and private use airports registered with the FAA having no runway more than 3,200 feet in length within 10,000 feet of the route centerline be identified. For private airstrips, no FAA notification is required. For all public-use airports registered with the FAA having no runway more than 3,200 feet in length, the FAA would be notified if the proposed transmission line structures exceed a 50:1 horizontal slope from the closest point of the closest runway. The PUCT also requires that all airports registered with the FAA having at least one runway more than 3,200 feet in length within 20,000 feet of the route centerline be identified. For all public-use airports registered with the FAA with at least one runway more than 3,200 feet in length, the FAA would be notified if the proposed transmission line structures exceed a 100:1 horizontal slope from the closest point of the closest runway. The PUCT also requires that all heliports within 5,000 feet of the route centerline be identified. For all public-use heliports, the PUCT requests whether or not any transmission line structures will exceed a 25:1 horizontal slope from the closest point of the closest landing and takeoff area of the heliport to determine FAA notification requirements.

Burns & McDonnell identified airports and heliports along the alternative routes from field reconnaissance surveys, aerial interpretation, aeronautical charts, and GIS data obtained from the Bureau of Transportation Statistics (BTS, 2008).

Central A – Central C

There are no public- or private-use airports registered with the FAA having no runway more than 3,200 feet in length and no private airstrips within 10,000 feet of the centerline of the alternative routes for the Central A to Central C segment of the project. There are no public- or private-use airports registered with

the FAA having at least one runway greater than 3,200 feet in length within 20,000 feet of any of the alternative routes, and no heliports located within 5,000 feet of any of the alternative routes for the Central A to Central C segment of the project.

No impacts are anticipated to the operation of any airstrips or airport located in the project area from the construction of the proposed transmission line project on any of the alternative routes.

Central C – Sam Switch

The southern alternative routes have the fewest FAA-registered airports (two) that have at least one runway that is greater than 3,200 feet in length within 20,000 feet. The northern alternative routes have the most with six FAA-registered airports.

The alternative routes all have between two and three FAA-registered airports having no runway greater than 3,200 feet in length within 10,000 feet, and the southern and south-central alternative routes have one private airstrip within 10,000 feet. The northern and north-central alternative routes have up to four private airstrips within 10,000 feet.

Similarly, the south-central and southern alternative routes do not have any heliports within 5,000 feet of their route centerline and the northern and north-central alternative routes have up to four heliports within 5,000 feet.

Although FAA notification may be required for one of the airports along the alternative routes, no significant impacts to the operations of the area airports is anticipated from the construction of the proposed project.

Table 7-1 illustrates the name of each airport/airstrip (if known), the type of each airport/airstrip, and the direction and distance of the airport/airstrip from the closest route link. Burns & McDonnell also conducted preliminary calculations to determine if FAA notification will be required for any of the identified airport/airstrips.

Table 7-1 Airports/Airstrips/Heliports along the Central C to Sam Switch Route Links

Link	Airport Name	Type	Direction	Distance (feet)	FAA Notification
AA	Albany Municipal	Public, 3200+	North	11,610	No
AA	Caselman Ranch Airstrip	Private, <3200	South	1,260	No
AA	Stephens County Airstrip	Public, 3200+	North	9,600	Yes
AA	Unknown	Private	North	2,880	No

Link	Airport Name	Type	Direction	Distance (feet)	FAA Notification
CC	South Green Ranch Airstrip	Private	North	5,920	No
CC	Unknown	Private	North	6,690	No
EE	Eastland Municipal	Public, 3200+	South	19,570	No
EE	Quahadi Ranch Airstrip	Private, 3200+	West	9,720	No
FF	Cisco Municipal	Public, 3200+	Northeast	17,270	No
FF	Quahadi Ranch Airstrip	Private, 3200+	North	5,070	No
HH	Dearing Ranch Airstrip	Private, <3200	West	9,700	No
HH	Link Ranch Heliport	Private	South	1,660	No
HH	Thurber Lake Airstrip	Private, 3200+	West	12,190	No
HH	Unknown	Private	North	3,790	No
II	Dearing Ranch Airstrip	Private, <3200	East	9,020	No
II	Moore Ranch Airstrip	Private, <3200	West	4,730	No
II	Thurber Lake Airstrip	Private, 3200+	North	18,740	No
KK1	Kimzey Airstrip	Private, 3200+	Northeast	19,540	No
KK2	Unknown	Private	Southwest	4,450	No
KK3	Flat Top Ranch Airstrip	Private, 3200+	South	17,890	No
LL	Clark Field Municipal Airstrip	Public, 3200+	Southwest	11,470	No
LL	Ed Shadle Airstrip	Private, <3200	Southwest	5,730	No
MM	Unknown	Private	Northwest	2,580	No
NN1	Rough Creek Lodge Heliport	Private	North	550	No
NN1	Rough Creek Lodge Heliport	Private	North	2,920	No
NN1	Unknown	Private	Northeast	3,370	No
SS	Flat Top Ranch Airstrip	Private, 3200+	South	3,010	No
ST	Rough Creek Lodge Heliport	Private	Southwest	4,450	No
ST	Rough Creek Lodge Heliport	Private	Southwest	1,500	No
ST	Unknown	Private	Southwest	3,000	No
TT2	George Staples Airstrip	Private	Northeast	3,910	No
TT3	Barnstormer Airstrip	Private, 3200+	South	9,530	No
TT3	Hillsboro Municipal	Public, 3200+	North	13,040	No
WW	Circle A Ranch Airstrip	Private, <3200	Southeast	4,920	No
WW	Unknown	Private	South	4,950	No
ZZ	Laguna Park Air Strip	Private, <3200	Northeast	6,100	No
AB2	Hillsboro Municipal	Public, 3200+	Northeast	7,310	Yes
BC	Laguna Park Air Strip	Private, <3200	Northeast	6,650	No

Link	Airport Name	Type	Direction	Distance (feet)	FAA Notification
DE	Pocock Airstrip	Private, <3200	South	3,920	No
FG	Stapleton Field	Private, <3200	Northwest	6,110	No
FG	Womack Farm Airstrip	Private, <3200	South	8,350	No
GH	Stapleton Field	Private, <3200	South	7,600	No
OP	George Staples Airstrip	Private	West	7,980	No
PQ	Barnstormer Airstrip	Private, 3200+	East	9,760	No

Sam Switch - Navarro

None of the alternative routes have any FAA-registered airports having at least one runway that is greater than 3,200 feet in length within 20,000 feet. All of the alternative routes have between one and two FAA-registered airports having no runway greater than 3,200 feet in length within 10,000 feet.

Alternative routes SSN 4 and SSN 7 both have one private airstrip within 10,000 feet and none of the alternative routes have any heliports within 5,000 feet.

No significant impact to the operations of the area airports is anticipated from the construction of the proposed project along any of the alternative routes.

Table 7-2 illustrates the name of each airport/airstrip (if known), the type of the airport/airstrip, and the direction and distance of the airport/airstrip from the nearest route links. Burns & McDonnell also conducted preliminary calculations to determine if FAA notification will be required for any of the identified airport/airstrips.

Table 7-2 Airport/Airstrips along the Sam Switch to Navarro Route Links

Link	Airport Name	Type	Direction	Distance (feet)	FAA Notification
BBB	Gizmo Field	Private,<3200	Southeast	9,990	No
CCC	Gizmo Field	Private,<3200	North	4,270	No
DDD	Gizmo Field	Private,<3200	North	4,780	No
FFF	Bar 16 Airstrip	Private,<3200	South	9,150	No
FFF	Unknown	Private	Southwest	2,220	No
HHH	Hewett-Knapp Airstrip	Private,<3200	South	4,210	No

7.3.1.6 Utility Facilities

As previously discussed, a considerable amount of each of the alternative routes will parallel existing utility facilities, primarily existing transmission lines and existing pipelines. The proposed transmission line ROW will be located immediately adjacent to the existing ROWs. The proposed transmission line will not share any ROW with the existing utility facilities. This separation will minimize potential impacts to existing utilities and utility facilities in the area. In addition, the proposed project will cross numerous existing utility facilities. In both cases, where the proposed project either crosses or parallels an existing utility facility, some mitigation measures may be required to protect the existing utility facilities. Once a final route is approved, detailed studies regarding the potential impact of the proposed project on existing utility facilities will be conducted and appropriate mitigative measures will be taken where necessary.

7.3.1.7 Visual Character

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

The assessment of aesthetic impacts to the visual character along the alternative routes was determined through field reconnaissance surveys and review of GIS mapping data. The evaluation focused on the general setting of the project area and the potential view of the proposed project from park and recreational areas and from state and U.S. highways.

Central A – Central C

In general, the Central A to Central C project area is rural in nature and dominated by a mix of agricultural activities (mainly rangeland and cropland) with occasional rural residences along the various county roads. The Central A to Central C project area has a mix of flat to rolling terrain with some areas containing greater topographic relief in the eastern portion of the project area.

Alternative Routes AC 4, AC 5, AC 6, AC 7, AC 8, and AC 9 have the least amount visible from U.S. and State Highways (ranging from 3.3 miles to 3.6 miles), whereas, alternative routes AC 1, AC 2, and AC 3 have between 20.9 miles and 29.6 miles.

None of the alternative routes for the Central A to Central C segment of the project would be visible from any park/recreational areas.

Central C – Sam Switch

In general, the eastern and western portions of the Central C to Sam Switch project area is rural in nature and dominated by a mix of agricultural activities (mainly rangeland and cropland) with scattered rural residences along the various county roads. The central portion of the Central C to Sam Switch project area contains the northern reaches of the Texas Hill Country and therefore, has more topographic relief than the eastern or western portions of the area.

All of the alternative routes cross both U.S. and State Highways and will be visible from these crossings for approximately 17.4 miles to 22.5 miles.

The southern alternative routes have the least amount of their length visible from park/recreation areas (zero to one mile), followed by the north-central alternative routes with 3.5 miles. The south-central and northern alternative routes have the greatest length within the visual foreground zones of park/recreational areas.

Based on this evaluation, the southern alternative routes would have the least amount of their length visible from publicly accessible areas, followed by the north-central alternative routes.

Sam Switch - Navarro

In general, the Sam Switch to Navarro project area is rural in nature and dominated by a mix of agricultural activities (mainly rangeland and cropland) with scattered rural residences along the various county roads. The Sam Switch to Navarro project area is primarily flat.

Alternative routes SSN 1, SSN 2, SSN 3, SSN 5, and SSN 6 have the least amount visible from U.S. and State Highways (ranging from 2.2 miles to 2.3 miles), whereas, alternative routes SSN 4 and SSN 7 both have 3.6 miles.

Alternative routes SSN 1, SSN 4, and SSN 7 have the least amount visible from park/recreational areas, followed by alternative routes SSN 2, SSN 3, SSN 5, and SSN 6.

Based on this evaluation, all of the alternative routes would be comparable in the amount of their length visible from publicly accessible areas.

7.3.1.8 Communication Towers

The identification of communication towers was determined through GIS data obtained from the Federal Communications Commission (FCC), aerial interpretation, and field reconnaissance surveys. The PUCT requires the identification of the following communication towers:

- Commercial AM radio transmitters within 10,000 feet of the route centerline.
- All FM radio transmitters, microwave relay stations, or other similar electronic installations within 2,000 feet of the centerline (for this report, those towers fitting this second definition will be referred to collectively as "communication" towers).

Central A – Central C

There are no commercial AM communication towers within 10,000 feet of any of the alternative routes of the Central A to Central C segment of the project.

Alternative routes AC 3, AC 7, and AC 9 do not have any FM radio transmitters, microwave relay stations, or other similar electronic installations within 2,000 feet of their centerline. Alternative routes AC 1, AC 2, AC 6, and AC 8 have one communication tower within 2,000 feet, Alternative route AC 5 has two communication towers, and Alternative route AC 4 has three communication towers within 2,000 feet.

There are four FM radio transmitters, microwave relay stations, or other similar electronic installations within 2,000 feet of the centerline for three different links between Central A and Central C. Link B is 1,710 feet south of a cellular tower owned or licensed to WWC Texas RSA Limited Partnership and 1,370 feet northeast of an emitter tower owned by the U.S. Air Force used for military purposes. Link G is 800 feet north of a cellular tower owned or licensed to Abilene SMSA Tower Holdings and Lubbock SMSA Limited Partnership, while Link J is 1,820 feet north of a cellular and microwave tower owned or licensed to WWC Texas RSA Limited Partnership.

No significant impacts to the operation of communication installations are anticipated from any of the alternative routes.

Central C – Sam Switch

The north-central alternative routes have one AM communication tower within 10,000 feet. There are no commercial AM communication towers within 10,000 feet of the northern, south-central, or southern alternative routes.

The north-central alternative routes also have other types of communication towers within 2,000 feet (nine to ten) followed by the south-central alternative routes with six to seven. The northern and southern alternative routes have the fewest communication towers within 2,000 feet (three to six).

No significant impacts to the operation of communication installations are anticipated from any of the alternative routes. Table 7-3 summarizes the type, distance, and direction of communication tower to the closest route link.

Table 7-3 Communication Towers along the Central C to Sam Switch Route Links

Link	Tower Owner/Licensee	Type	Direction	Distance (feet)
AA	Pinnacle Towers LLC	Communication	S	720
EE	SBA Towers II LLC	Communication	W	1,890
EE	Oncor License Holdings Company LLC / Atmos MID - TEX Division	Microwave	S	1,740
EE	Mobile Phone of Texas	Microwave / Paging	N	1,110
EE	Enbridge Energy Company, Inc. / Atmos MID - TEX Division	Radio Communication	S	1,570
FF	Louis Dreyfus Pipeline L.P.	Microwave	S	1,780
FF	Foster Charitable Foundation, Inc	Television	S	380
FF	Crown Castle Tower 05 LLC	Communication	N	1,760
GG	Multiple Licensees	Cellular / Microwave	W	230
II	Oncor License Holdings Company LLC	Microwave	SW	190
II	Unknown	Communication	SW	1,370
KK2	County of Somervell / Somervell Co. Sheriff's Department	Radio Communication	SW	1,980
LL	City of Stephenville	Radio Communication	SW	1,660
LL	Jay Mills Contracting Incorporated	Radio Communication	SW	520
MM	Crown Communication Inc	Communication	S	1,190
NN1	Dallas MTA, LP	Cellular	S	1,960
TT2	Oncor License Holdings Company LLC / Atmos MID - TEX Division	Radio Communication / Microwave	NW	1,000
TT2	Louis Dreyfus Pipeline LP	Microwave	S	570
TT3	T-Mobile West Corporation	Cellular	S	1,040
TT3	Union Pacific Railroad	Microwave	N	320
TT3	KHBR Radio, Inc	AM	S	9,720
CD1	Brazos Electric Power Cooperative, Inc.	Microwave	NW	840

Link	Tower Owner/Licensee	Type	Direction	Distance (feet)
CD1	Latham Springs Baptist Camp	Radio Communication	NW	930
HI	American Towers, Inc./ NEXTEL of Texas Inc.	Microwave	NE	1,850
PQ	SBA Properties, Inc./Nextel WIP License Corp.	Radio Communication	W	1,890
QR	Texas RSA 9B4 Limited Partnership	Cellular	E	550
ST	Dallas MTA, LP	Cellular	SW	1,120

Sam Switch - Navarro

There are no commercial AM communication towers within 10,000 feet of the alternative routes of the Sam Switch to Navarro segment of the project. Likewise, there are no FM radio transmitters, microwave relay stations, or other similar electronic installations within 2,000 feet.

7.4 SOCIOECONOMIC PATTERNS

This section addresses the potential impacts (both positive and negative) of the proposed project on the socioeconomic patterns along the alternative routes, including population, employment, and income.

7.4.1 Population

Construction and operation of the proposed transmission line along any of the proposed alternate routes would not directly result in a change to the population in the study area. The project would, however, help to provide the electrical needs for a growing population in the Texas metropolitan areas. Reliable electric service is important to residents and a significant factor in the location of many industries.

7.4.2 Employment and Income

Construction and operation of the proposed transmission line along any of the alternative routes would not significantly affect employment in the study area. The construction force needed to construct the proposed project would be small and temporary. Workers from outside the study area would likely commute on a daily or weekly basis. The presence of additional workers and increased employment would result in a slight increase in retail sales in the project area due to the purchases of food, fuel, and other merchandise. The project would increase the tax base in counties crossed by the proposed project, regardless of which route is selected.

7.5 SUMMARY OF HUMAN RESOURCES

Central A – Central C

In summary, alternative route AC 4 is favored from a land use and human resource perspective, followed by alternative route AC 8. Alternative route AC 4 is the shortest alternative route, has over 72 percent of its length parallel to existing corridors (including apparent property boundaries), and alternative route AC 4 will be the least visible alternative route from publicly accessible areas.

Central C – Sam Switch

In summary, the northern alternative routes are favored from a land use and human resource perspective, followed by the southern alternative routes. The northern alternative routes have the fewest habitable structures in close proximity, have the shortest length through cropland, and do not cross any cropland irrigated with mobile irrigations systems.

Sam Switch - Navarro

In summary, alternative route SSN 4 is favored from a land use and human resource perspective, followed by alternative route SSN 7. Alternative route SSN 4 parallels existing transmission lines for over 67% of its length, has the greatest length and total percentage parallel to existing corridors, only has 11 habitable structures in close proximity, crosses the least amount of cropland, and does not have any park/recreational areas within 1,000 feet.

7.6 CULTURAL RESOURCES

Construction activities associated with any proposed project have the potential to adversely impact cultural resources. The effects that could adversely affect a cultural resource eligible for the NRHP are discussed in 36 CFR 800 and include:

- destruction or alteration of all or part of a property (NRHP Eligible Property);
- isolation from or alteration of the property's surrounding environment (setting); or
- introduction of visual, audible, or atmospheric elements that are out of character with the property or that alter its setting.

Impacts may be direct or indirect. Direct impacts typically occur during construction. Indirect impacts include those caused by construction that occur later in time or are further removed, but are foreseeable. These impacts may include alterations in the pattern of land use, changes in population density, or