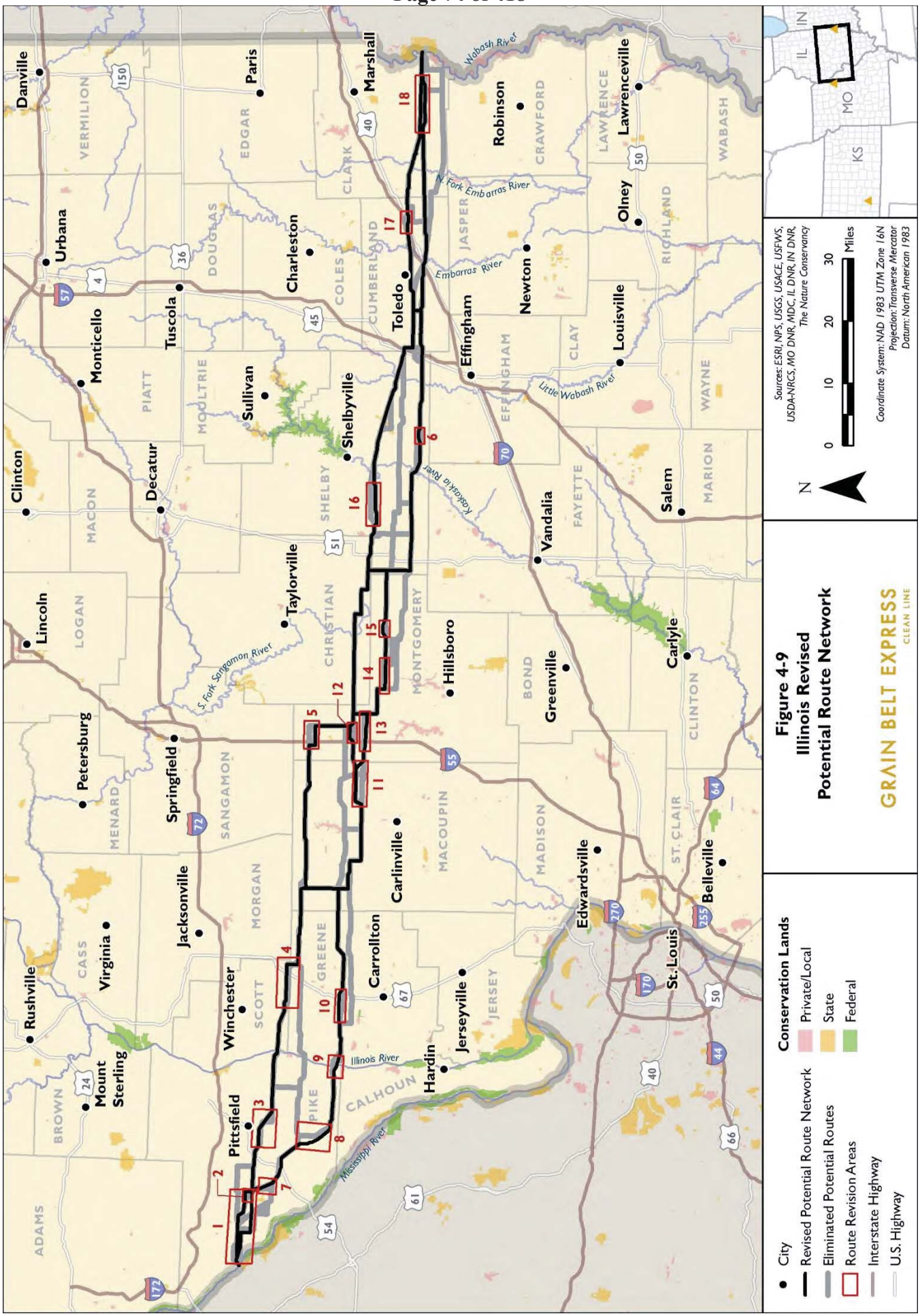


Figure 4-9
Illinois Revised
Potential Route Network
GRAIN BELT EXPRESS
CLEAN LINE
Conservation Lands
Private/Local
State
Federal
City
Revised Potential Route Network
Eliminated Potential Routes
Route Revision Areas
Interstate Highway
U.S. Highway
Sources: ESRI, NPS, USGS, USACE, USFWS, USDA-NRCS, MO DNR, MDC, IL DNR, IN DNR, The Nature Conservancy
Coordinate System: NAD 1983 UTM Zone 16N
Projection: Transverse Mercator
Datum: North American 1983
Miles
0 10 20 30
N
IN
IL
MO
KS
Danville
Urbana
Monticello
Clinton
Decatur
Lincoln
Petersburg
Springfield
Jacksonville
Rushville
Virginia
Mount Sterling
Pittsfield
Winchester
Paris
Tuscola
Sullivan
Taylorville
Charleston
Marshall
Shelbyville
Toledo
Effingham
Hillsboro
Carlinville
Carrollton
Jerseyville
Hardin
Robinson
Newton
Vandalia
Greenville
Edwardsville
St. Louis
Belleville
Olney
Louisville
Lawrenceville
Salem
Carlyle
VERMILION
EDGAR
CLARK
CRAWFORD
LAWRENCE
WABASH
DOUGLAS
COLES
CUMBERLAND
JASPER
RICHLAND
PIATT
MOULTRIE
SHELBY
EFFINGHAM
CLAY
WAYNE
MACON
CHRISTIAN
MONTGOMERY
FAYETTE
MARION
LOGAN
BOND
CLINTON
MENARD
SANGAMON
MACOUPIN
MADISON
ST. CLAIR
CASS
MORGAN
SCOTT
GREENE
JERSEY
BROWN
PIKE
CALHOUN
ADAMS
Wabash River
N. Fork Embarras River
Embarras River
Little Wabash River
Kaskaskia River
S. Fork Sangamon River
Illinois River
Mississippi River
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

Nearly half of the length of the revised Potential Route runs along existing parcel boundaries, versus none on the original route segment. The revised Potential Route moves farther from three residences, two along 240th Avenue and the other along 280th Lane, compared to the original alignment. One residence is closer to the modified revised Potential Route than to the original Potential Route, although there is significant tree screening between the residence and the route to mitigate potential visual impacts on the residence.

3. Pike County, south of Pittsfield:

The Potential Routes were revised south of Pittsfield following the first round of Public Meetings. A landowner at the meeting provided information regarding the abandoned status of the county work farm and suggested a revised route along 225th Avenue. Accounting for the abandoned county work farm (previously identified as a possible residence from aerial imagery), this section of the modified route has one residence within 500 feet versus two residences on the original Potential Route and it follows along parcel boundaries for more than a mile greater length than the original Potential Route.

After angling away from 225th Avenue, the modified Potential Route moves away from following along parcel boundaries on a southeastern trajectory. The original Potential Route turned due south following parcel boundaries (although not always ownership boundaries). It had one residence in proximity, along 205th Avenue. The modified Potential Route crosses diagonally across several parcels that are divided into smaller fields, areas of pasture, and forested riparian areas. The fragmented nature of those parcels increases the potential for some structures to be aligned along field boundaries, partially avoiding placing structures within actively farmed ground.

The overall modified Potential Route is nearly 1 mile shorter in length than the original and it has fewer homes within 500 feet.

4. Greene and Scott Counties, south of Alsey and Manchester:

The Potential Routes south of Alsey and Manchester were revised following the first round of Public Meetings, primarily to align the routes along parcel boundaries and to move farther from nine residences along County Line Road between Greene and Scott Counties. The revised Potential Route was moved north 0.25 mile, to the half section line north of County Line Road before turning due south to the east of Murray Road. In addition to moving farther from residences and despite being nearly a mile longer than the original Potential Route, the modified Potential Route follows parcel ownership boundaries for 5.0 miles versus just 1.2 miles of the original Potential Route (52 percent versus 14 percent of the length of the modified and original Potential Routes, respectively).

5. Montgomery County, northeast of Farmersville:

A 3.9-mile section of the Potential Route Network was modified northeast of Farmersville, where I-55 is crossed. The original Potential Route continued its east-west trajectory across I-55 for approximately 2.5 miles before angling due south 0.5 mile west of East 6th Road. The Potential Route came within fewer than 250 feet of one residence. The Potential Route came close to one residence (within fewer than 250 feet). The Potential Route was modified to angle south before reaching I-55, paralleling a rail line and parcel boundary for 1 mile, before turning back to the east and crossing the interstate highway. The modified Potential Route has zero residences within 250 feet (versus one within 250 feet on the original Potential Route) and parallels an additional 1 mile of parcel ownership boundary.

6. Shelby County, west of Stewardson:

West of the Village of Stewardson, the Potential Routes follow a half section line for 9.5 miles. Several residences are close to that half section line between the Union Pacific railroad between Holland and Mode, and 2300 East Road. The original Potential Route diverted south for 0.125 mile, following no parcel boundaries but avoiding the three residences. The modified Potential Route instead angles northeast to the one-quarter section line, following parcel ownership boundaries for a little more than a mile before angling back down to the original half section line. The revised Potential Route crosses less agricultural land, as the area north of the half section line has a greater mix of agriculture and forested land than the area crossed by the original Potential Route.

7. Pike County, northeast of Rockport:

East of the Ray Norbut State Fish and Wildlife Area in Pike County, the Potential Route was modified from a due north-south direction to a northwest to southeast trajectory. The revised Potential Route is 21 percent shorter than the original and crosses significantly less forested land, therefore requiring less ROW clearing. The original Potential Route crosses through several large contiguous forested areas, whereas the modified Potential Route passes through a mix of forest and small agricultural fields. In addition to the modified Potential Route creating less new forest fragmentation and being one quarter shorter in length compared to the original Potential Route, the original Potential Route has one residence close to Dutch Creek Road compared to zero residences in proximity to the modified Potential Route.

8. Pike County, west of Nebo:

The Potential Route network between Nebo and Pleasant Hill in Pike County was modified following the second round of Public Meetings. The modified Potential Route is more than 10 percent shorter than the original Potential Route. Neither route is located within 500 feet of any residences, and both routes cross through a similar mix of small forest and agricultural fields on variable terrain. The modified Potential Route removes circuity from the Potential

Route network, while incorporating landowner feedback for better placement on their property.

9. Pike County, southern Illinois River crossing:

At the southernmost Illinois River crossing, the Potential Route Network was revised to the south by between 0.25 and 0.75 mile. The Potential Route was modified to the south for 0.25 mile, parallel but within the southern boundary of the same landowner. The modified Potential Route angles to the southeast to cross the Illinois River south of Wing Island, continuing to the southeast before resuming the original alignment along 1950 Road North. Landowners at the first round of Public Meetings identified a residence as abandoned on 470th Street close to (<500 feet) the modified Potential Route. The original Potential Route has two 90 degree angles in agricultural land east of the Illinois River. Overall, the modified Potential Route is 20 percent shorter in length, incorporates landowner feedback for better placement on landowner property, and has fewer and less drastic angles, which could result in less impact to agricultural land.

10. Greene County, south of White Hall:

South of White Hall, the Potential Route Network was modified 0.25 to 0.5 mile north to follow a greater proportion of parcel ownership boundaries through this heavily agricultural area. The revised Potential Route is along parcel boundaries for 67 percent of its length, compared to just 32 percent for the original Potential Route. The modified Potential Route also moves farther away from a potential historic residence along U.S. Highway 67.

11. Macoupin County, north of Standard City:

The Potential Route Network was modified approximately 1.5 miles north, between Nilwood and Standard City. The revised Potential Route is 1.1 miles longer; however, it has a greater percentage of the route along parcel ownership boundaries (65 percent compared to 52 percent of the original Potential Route). As a result of greater residential density north of Standard City along Klaus Road, Enslow Road, and Bloome Road, the original Potential Route had several residences in proximity. The revised Potential Route is farther from Standard City and this residential development. It largely follows parcel boundaries and a portion of Union Pacific railroad between Nilwood and Carlinville.

12. Montgomery County, east of Waggoner:

East of I-55, to the east of Waggoner, the Potential Route Network was revised following the first round of Public Meetings. The revised Potential Route is 0.5 mile longer, but it is along parcel boundaries for 57 percent of its length versus only 20 percent of the original Potential Route. Landowner feedback in this heavily farmed region encouraged modifying the original Potential Routes to better align with parcel boundaries where possible. In addition to the

increased alignment along ownership boundaries, the revised Potential Route is farther from several homes along Brown Trail.

13. Montgomery County, southeast of Waggoner:

Following the second round of Public Meetings, the Potential Route Network was modified southeast of Waggoner to between 0.25 mile and 0.5 mile south of the original Potential Route. The revised Potential Route maintains a perpendicular crossing of I-55, while gaining nearly 2 miles of additional alignment along ownership boundaries as compared to the original Potential Route. The original Potential Route crossed through the center of several 0.5-acre agricultural parcels. In addition, the revised Potential Route has zero residences within 500 feet compared to one residence within 500 feet on the original Potential Route.

14. Montgomery County, southeast of Harvel:

The Potential Routes southeast of Harvel were modified south 0.25 mile from the quarter section line to the half section line between the Nokomis Blacktop and North 22nd Avenue. The revised Potential Route is nearly 70 percent aligned with parcel ownership boundaries in this heavily agricultural area, as compared to 26 percent for the original Potential Route. The original Potential Route is closer to two private airstrips to the north, one of which was identified during the first round of Public Meetings.

15. Montgomery County, Wenonah:

The Potential Route Network was revised to avoid negatively affecting mining operations west of Wenonah. For several miles east and west of Wenonah, the Potential Route Network follows the half section line between Nokomis Blacktop and North 22nd Avenue. The original Potential Route deviates slightly to the north to avoid a residence and farm outbuildings along Taylorville Road, north of Nokomis. There is a large surface mining operation west of Wenonah. Through conversations with local landowners and representatives from the mine at the first and second rounds of Public Meetings, the Potential Routes were modified to deviate farther north to be aligned adjacent to North 22nd Avenue. Locating the Potential Route adjacent to the roadway would minimize impacts on farmlands and the mining operations that are negotiating a plan to extend the mine to the south of North 22nd Avenue.

16. Shelby County, south of Tower Hill:

South of Tower Hill the Potential Routes were revised to move approximately 0.75 mile south near 900 North Road. The original Potential Route was 0.25 mile north of 900 North Road, relatively close to the many residences. In contrast, the revised Potential Route is on the half section line south of the road for most of its length, along parcel ownership boundaries. The revised Potential Route is slightly shorter in length and follows parcel boundaries for 63 percent of its total length, versus only 32 percent of the original alignment. The original Potential Route passed within 500 feet of the approximate location of the small Liston Cemetery. The exact

location of the cemetery could not be verified due to its remote and wooded surroundings.

17. Cumberland County, northeast of Greenup:

Following the first and second round of Public Meetings, the Potential Route Network was modified northeast of Greenup, along the crossing of U.S. Highway 40. The Potential Routes approach the area from the west paralleling the Ameren 345 kV Neoga–Casey–Breed transmission line. The original Potential Route deviated from the parallel alignment west of U.S. Highway 40 to the northeast, before angling east and then back to the southeast to cross the highway. The highway follows the path of the National Historic Road and has several historic sites and markers along its route. Paralleling existing infrastructure is a recognized method to mitigate impacts to historic features, such as scenic or historic roadways. Unlike the original Potential Route, the revised Potential Route remains parallel to the existing transmission line to cross the National Historic Road.

The revised Potential Route continues to the east before resuming a parallel alignment along the existing transmission line. Following the second round of Public Meetings, the Potential Route was further revised to avoid affecting administrative buildings for the Lincoln Trail Motorsports complex. Both the original and revised Potential Routes cross the Motosports Park, as does the existing Casey–Breed 345 kV transmission line.

18. Clark County, northwest of West Union:

Following the first round of Public Meetings, the Potential Routes south of West Union were revised to follow an alignment roughly 0.25 mile south of the existing Ameren Casey–Breed 345 kV transmission line before angling northeast toward the proposed converter station location. The original Potential Route in this area was unduly circuitous, going 1.5 miles south of West Union before circling back to the north toward the proposed converter station site. In addition, the area south and east of West Union has many pivot irrigation systems (15) that would need to be considered in design efforts.

The above-described revisions result in Potential Routes that are much shorter in length than the original routing options to go south of West Union and provide a more direct Potential Route to the proposed converter station location. The revised Potential Route passes over the edge of one pivot system, largely avoiding the area south and east of West Union where many more center pivot irrigation systems are in place.

Compilation of the Alternative Routes

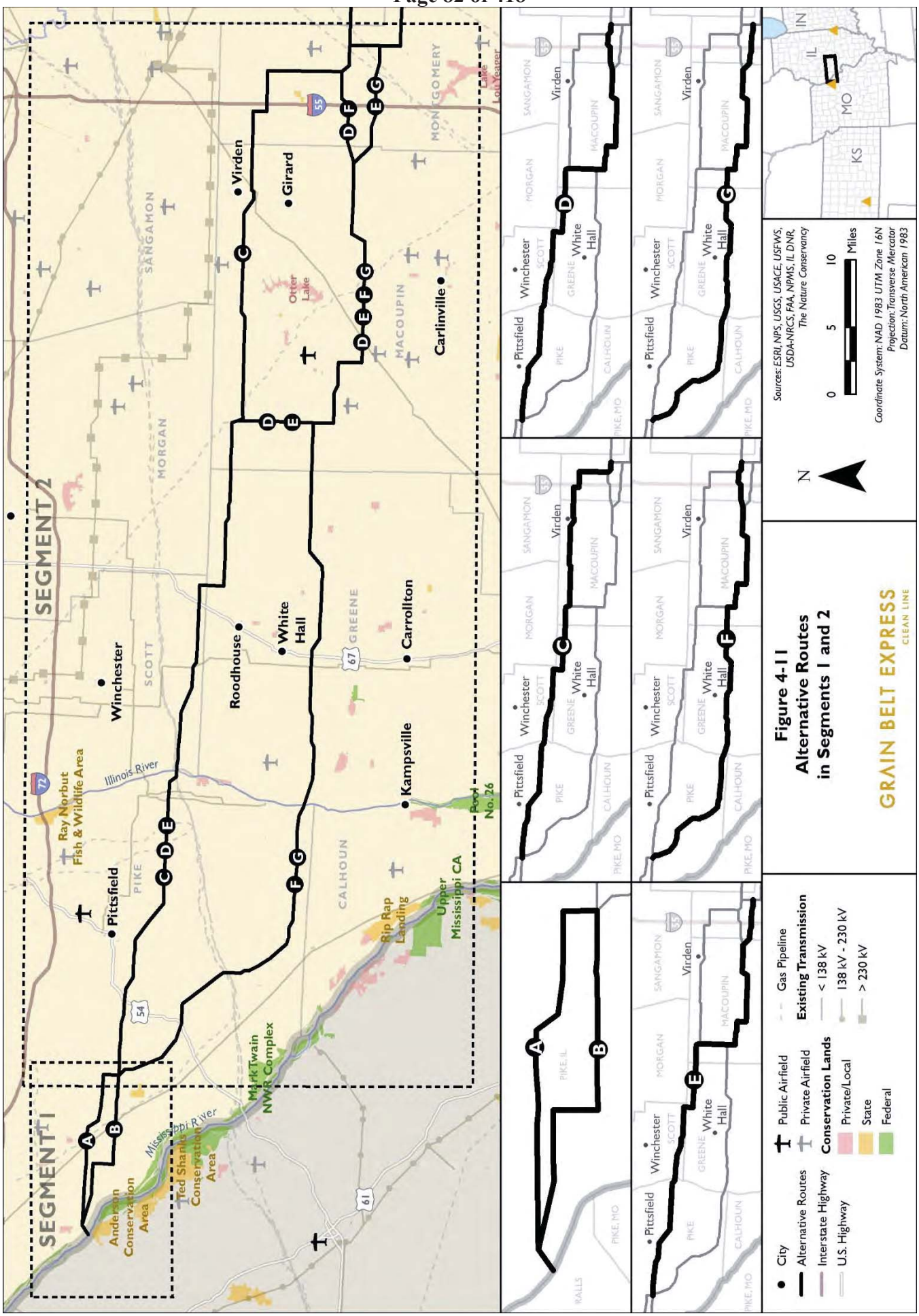
During and after the first two rounds of Public Meetings, the Routing Team reviewed the Potential Route Network in detail with respect to a variety of environmental, cultural, and land use factors, public input on area constraints near the Potential Routes, and engineering input.

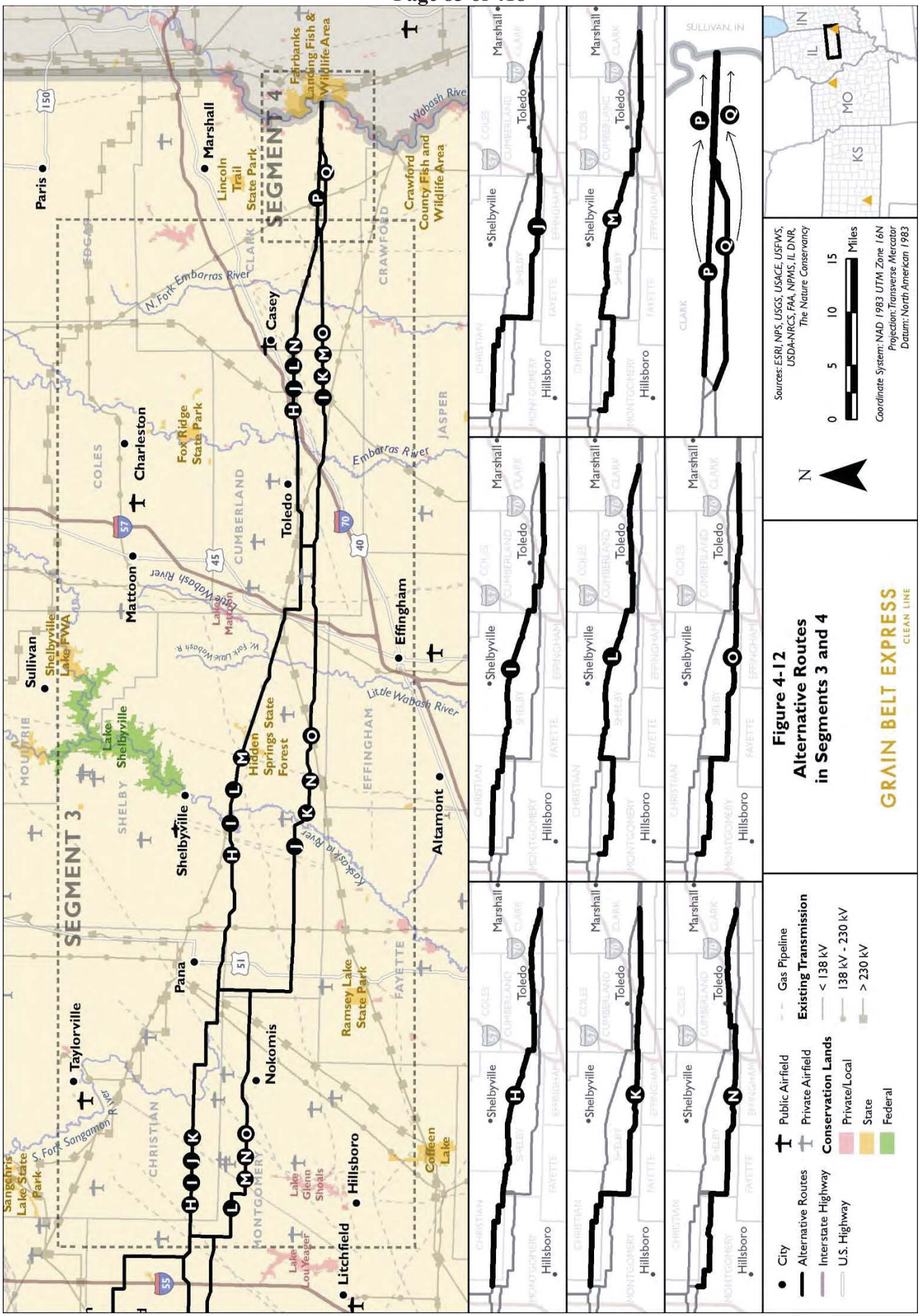
These reviews resulted in the removal of several links of the Potential Route Network to focus analysis and comparison on those links that had lesser overall impact.

The Routing Team compiled the remaining links in the refined Potential Route Network into Alternative Routes (**Figure 4-10**). To accommodate a reasonable comparison between Alternative Routes, the Routing Team divided the routes into Segment 1 (Alternative Routes A and B), Segment 2 (Alternative Routes C–G), Segment 3 (Alternative Routes H–O), and Segment 4 (Alternative Routes P and Q) (**Figure 4-11** and **Figure 4-12**).

Each segment begins and ends at a similar point for all of the Alternative Routes within that segment, which provides for a reasonable comparison between each of the Alternative Routes. From each of the segments, one Alternative Route was ultimately selected, and when the four selected Alternative Routes were connected, the Proposed Route resulted. Segment 1 begins at the Mississippi River crossing and extends roughly 5 miles east into the river bluffs; Segment 2 continues from the Mississippi River bluffs to a point where the network converges just beyond I-55; Segment 3 continues from I-55 to just east of the crossing of I-70/40 near Greenup; and Segment 4 continues from that point to the Indiana state border. A detailed description of the Alternative Routes is provided in **Appendix F**.

Danville
Urbana
Monticello
Clinton
Decatur
Lincoln
Petersburg
Springfield
Rushville
Virginia
Jacksonville
Mount Sterling
Winchester
Pittsfield
Paris
Tuscola
Sullivan
Charleston
Taylorville
Shelbyville
Marshall
Toledo
Effingham
Hillsboro
Carlinville
Carrollton
Jerseyville
Hardin
Robinson
Newton
Greenville
Vandalia
Edwardsville
St. Louis
Olney
Louisville
Lawrenceville
Salem
Carlyle
Belleville
Wabash River
N. Fork Embarras River
Embarras River
Little Wabash River
Kaskaskia River
S. Fork Sangamon River
Illinois River
Mississippi River
VERMILION
EDGAR
CLARK
CRAWFORD
LAWRENCE
WABASH
DOUGLAS
COLES
CUMBERLAND
JASPER
RICHLAND
WAYNE
PIATT
MOULTRIE
SHELBY
EFFINGHAM
CLAY
MACON
LOGAN
CHRISTIAN
MONTGOMERY
FAYETTE
MARION
MENARD
SANGAMON
BOND
CLINTON
CASS
MORGAN
MACOUPIN
MADISON
ST. CLAIR
BROWN
SCOTT
GREENE
JERSEY
PIKE
CALHOUN
ADAMS
Figure 4-10
Illinois Alternative Routes
GRAIN BELT EXPRESS
CLEAN LINE
Sources: ESRI, NPS, USGS, USACE, USFWS, USDA-NRCS, MO DNR, MDC, IL DNR, IN DNR, The Nature Conservancy
Miles
Coordinate System: NAD 1983 UTM Zone 16N
Projection: Transverse Mercator
Datum: North American 1983
City
Alternative Routes
Segment Boundaries
Interstate Highway
U.S. Highway
Conservation Lands
Private/Local
State
Federal


SEGMENT 1
SEGMENT 2
Pittsfield
Winchester
Roodhouse
White Hall
Virden
Girard
Carrollton
Kampsville
Carlinville
Ray Norbut Fish & Wildlife Area
Illinois River
Anderson Conservation Area
Ted Shanks Conservation Area
Mississippi River
Mark Twain NWR Complex
Rip Rap Landing
Upper Mississippi CA
Pool No. 26
Otter Lake
Lake Lou Yaeger
PIKE
SCOTT
MORGAN
SANGAMON
GREENE
CALHOUN
MACOUPIN
MONTGOMERY
PIKE, IL
PIKE, MO
RALLS
Figure 4-11
Alternative Routes
in Segments 1 and 2
GRAIN BELT EXPRESS
CLEAN LINE
City
Alternative Routes
Interstate Highway
U.S. Highway
Public Airfield
Private Airfield
Conservation Lands
Private/Local
State
Federal
Gas Pipeline
Existing Transmission
< 138 kV
138 kV - 230 kV
> 230 kV
N
0 5 10 Miles
Sources: ESRI, NPS, USGS, USACE, USFWS, USDA-NRCS, FAA, NPMS, IL DNR, The Nature Conservancy
Coordinate System: NAD 1983 UTM Zone 16N
Projection: Transverse Mercator
Datum: North American 1983
IN
IL
MO
KS


SEGMENT 3
SEGMENT 4
Paris
Marshall
Lincoln Trail State Park
Fairbanks Landing Fish & Wildlife Area
Crawford County Fish and Wildlife Area
Wabash River
N. Fork Embarras River
Casey
Charleston
Fox Ridge State Park
Mattoon
Toledo
Embarras River
Sullivan
Shelbyville Lake FWA
Lake Shelbyville
Effingham
Little Wabash River
Hidden Springs State Forest
Shelbyville
Altamont
Pana
Nokomis
Ramsey Lake State Park
Taylorville
Sangchris Lake State Park
S. Fork Sangamon River
Hillsboro
Litchfield
Lake Glenn Shoals
Lake Lou Yeager
Coffeen Lake
COLES
CUMBERLAND
CLARK
CRAWFORD
JASPER
EDGAR
MOULTRIE
SHELBY
EFFINGHAM
CHRISTIAN
MONTGOMERY
FAYETTE
SULLIVAN, IN
IN
IL
MO
KS
Figure 4-12
Alternative Routes
in Segments 3 and 4
GRAIN BELT EXPRESS
CLEAN LINE
City
Alternative Routes
Interstate Highway
U.S. Highway
Public Airfield
Private Airfield
Conservation Lands
Private/Local
State
Federal
Gas Pipeline
Existing Transmission
< 138 kV
138 kV - 230 kV
> 230 kV
N
0 5 10 15 Miles
Sources: ESRI, NPS, USGS, USACE, USFWS, USDA-NRCS, FAA, NPMS, IL DNR, The Nature Conservancy
Coordinate System: NAD 1983 UTM Zone 16N
Projection: Transverse Mercator
Datum: North American 1983

4.4 Converter Station

As discussed in Section 1.4.3, *Converter Stations*, three converter stations will ultimately be constructed for the Project. The western converter station will take the power generated from the wind farms in southwest Kansas and convert it to DC electricity. The intermediate converter station will be located in Ralls County, Missouri, and convert DC electricity back to AC for delivery into the MISO electric grid. The eastern converter station will be located in Clark County, Illinois, and convert DC electricity back to AC to be transmitted to the Sullivan Substation in Indiana and injected into the PJM electric grid.

The general area for the eastern converter site was selected based on a number of factors, including its proximity to the Sullivan Substation, proximity to a major 345 kV line within a reasonable distance of the route alignments under consideration, and the presence of a transportation network that will be suitable for the safe and efficient transport of large converter station equipment. Once the local area was determined, site-specific factors drove the selection effort, such as proximity to the existing 345 kV line, residences, and suitable access roads; a minimum size requirement able to contain 40 and 60 acres of site development; gentle terrain (to limit grading requirements); and the avoidance of construction in the immediate floodplain of the Wabash River.

The location identified for the proposed converter station is in Clark County, Illinois, on a 110-acre site roughly 1 mile north of West Union. The site is primarily agricultural and slopes gently from south to north. It is bounded on the north and east by a narrow wooded corridor along Mill Creek. The site has a terrace running northeast across the center of the property. The Casey-Breed 345 kV transmission line crosses the northern portion of the property.

The Alternative Routes either approach the converter station location from the west, are sited along the southern side of the Casey-Breed 345 kV transmission line, or approach along a route that enters the converter station from the southwest. The Alternative Routes exit the substation site on the northeast side of the parcel, paralleling either the northern or the southern side of the existing line. Both Alternative Routes provide a reasonable means of access to the converter station.

5. Alternative Route Evaluation

This chapter describes the key resources in the Study Area in Illinois and provides a comparative analysis of the potential impacts of each Alternative Route on these resources. The analysis relies on a combination of information collected in the field, GIS data sources, supporting documents, stakeholder input, and the knowledge and experience of the Routing Team. Information presented throughout the chapter is based on a centerline for each Alternative Route.

5.1 Natural Environment Impacts

5.1.1 Water Resources

Water resources in the Study Area fall within the Mississippi River basin. Streams in the western two-thirds of the Study Area drain to the Mississippi River, whereas streams in the east drain to the Ohio River. Moving from west to east, the Study Area crosses the Sny, Lower Illinois, Macoupin, South Fork Sangamon, Shoal, Middle Kaskaskia, Upper Kaskaskia, Little Wabash, Embarras, and Middle Wabash-Busseron Hydrologic Unit Code -8 watersheds. Major river crossings include the Mississippi, Illinois, South Fork Sangamon, Kaskaskia, Little Wabash, Embarras, and Wabash Rivers. The Study Area ends at the Wabash River, which forms the eastern border of the state. Streams are relatively low gradient throughout the Study Area (Woods et al. 2006). Water resources in the Study Area are presented in **Figure 5-1**.

The majority of freshwater lakes in Illinois are human-made, including dammed stream and side-channel impoundments, strip-mine lakes, borrow pits, and other excavated lakes. Natural lakes in the Study Area typically include oxbow and backwater lakes along major rivers. The majority of wetlands that once occurred in Illinois have been drained and converted to agricultural use (Illinois Environmental Protection Agency 2014a).

The Mississippi and Illinois Rivers have formal levee drainage districts. The Sny Island Levee Drainage District along the eastern flood plain of the Mississippi River is the oldest in Illinois, having been officially established in 1880 shortly after the passage of the current Illinois Drainage Law in 1879. The Sny Island Levee Drainage District stretches for more than 60 miles and includes approximately 114,000 acres of floodplain bottomlands. The Study Area crosses both the Hillview and the Hartwell Drainage and Levee Districts along the eastern flood plain of the Illinois River. The Hillview and Hartwell leveed areas total more than 13,400 and 9,700 acres, respectively (USACE 2015b).