GRAIN BELT EXPRESS CLEAN LINE

ILLINOIS

ROUTE SELECTION STUDY

Prepared For Clean Line Energy Partners LLC

CLEAN LINE
ENERGY PARTNERS

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Acronyms and Abbreviations

AC	alternating current
A.D.	Anno Domini
B.C.	Before Christ
BSS	Biologically Significant Streams
COA	Conservation Opportunity Areas
CPCN	Certificate of Public Convenience and Necessity
CREP	Conservation Reserve Program
DC	direct current
FAA	Federal Aviation Administration
FERC	Federal Energy Regulatory Commission
GIS	Geographic Information System
Grain Belt Express	Grain Belt Express Clean Line LLC
Grain Belt Express Project	Grain Belt Express Clean Line Project
HVDC	high voltage direct current
I	Interstate
ICC	Illinois Commerce Commission
IDNR	Illinois Department of Natural Resources
INAI	Illinois Natural Areas Inventory
KCC	Kansas Corporation Commission
KDWPT	Kansas Department of Wildlife, Parks, and Tourism
kV	kilovolt
MDC	Missouri Department of Conservation
MDNR	Missouri Department of Natural Resources
MISO	Midcontinent Independent System Operator, Inc.
MONHP	Missouri Natural Heritage Program
MW	megawatt
NASS	National Agricultural Statistics Service
National Register	National Register of Historic Places
NRCS	Natural Resources Conservation Service
PJM	PJM Interconnection LLC, Inc.
Project	Grain Belt Express Clean Line Project

ROW	right-of-way
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WRP	Wetland Reserve Program

Glossary

Alternate Route—the route selected by the Routing Team and filed with the Commission as a formal alternate to the Proposed Route. Section 8-406.1(a)(1)(viii) of the Public Utilities Act requires the identification of "one or more alternate rights-of-way for the Project as part of the filing" (220 ILCS 5/8-406.1(a)(1)(viii)).

Alternative Routes—routes assembled from Potential Route links that were refined after the Public Meetings. The Proposed Route and an Alternate Route are identified as a result of the analysis and comparison of these routes.

Conceptual Routes—initial routes developed to consider a range of reasonable alignments in the Study Area. The development of Conceptual Routes is the first step in identifying routes based on large-scale opportunities and constraints.

constraint—areas that should be avoided to the extent feasible and reasonable during the Route Selection Study process. The constraints were divided into two groups based on the size of the geographic area encompassed by the constraint. The first group includes constraints covering large areas of land in the Study Area. The second group of constraints encompasses other features covering smaller geographic areas or point-specific locations.

General Routing Guidelines—a set of principles that guide the development of alignments with respect to area land uses, sensitive features, and considerations of economic reasonableness.

link—the section of a Potential Route located between two nodes.

node—a common point of intersection between two or more Potential Routes.

opportunities—areas where the transmission line would have less disruption to area land uses and the natural and cultural environment. Opportunities typically include other linear infrastructure and utility corridors, such as the existing electric and gas transmission network, rail lines, and roads but may also include reclaimed lands or unused portions of industrial or commercial areas.

Potential Routes—Conceptual Routes are refined into Potential Routes as additional information from agency coordination, public outreach, and ongoing review of the area is obtained and considered. Potential Routes ultimately become Alternative Routes after further refinement following Public Meetings.

Potential Route Network—all Potential Routes and their interconnection points (nodes).

Proposed Route—the route identified by the Route Selection Study that is ultimately filed with the Illinois Commerce Commission for approval. The Proposed Route represents the "primary right-of-way" of the application as referenced in Section 8-406.1(a)(1)(viii) (220 ILCS 5/8-406.1(a)(1)(viii)).

Public Meeting—a public open house meeting in the Illinois Study Area.

Refined Potential Route Network—as the Potential Route Network is refined, links are modified, removed, or added creating the refined Potential Route Network. The Refined Potential Route Network is then presented to regulators and the public for comment and input.

Roundtables—community leader meetings.

Routing Team—the multi-disciplinary team that developed the Conceptual Routes, refined the Potential Routes, analyzed and compared Alternative Routes, and determined the Proposed Route and Alternate Route. The Routing Team's experience includes transmission line route planning and selection, impact assessment for natural resources, land use assessment and planning, cultural resource identification and assessment, impact mitigation, transmission engineering and design, and construction. A list of the Routing Team members, along with a description of their individual role, is in Appendix B.

Study Area—portions of Kansas, Missouri, Illinois, and Indiana evaluated for placement of the Grain Belt Clean Line Project.

Technical Guidelines—technical limitations for the Routing Team to follow related to the physical limitations, design, right-of-way requirements, or reliability concerns of the Project infrastructure.

Executive Summary

Introduction

Grain Belt Express Clean Line LLC (Grain Belt Express) proposes to construct a new high voltage direct current (HVDC) transmission line from Ford County, Kansas, to Sullivan County, Indiana. The HVDC line will be approximately 780 miles long and deliver approximately 500 megawatts (MW) of low-cost renewable power to an interconnection with the Midcontinent Independent System Operator, Inc. (MISO) and 3,500 MW of low-cost, renewable power to an interconnection with the PJM Interconnection, LLC (PJM) to serve markets in Missouri, Illinois, Indiana, and states farther east.

The HVDC transmission line will connect to the existing grid at three distinct locations. The converter stations for the Grain Belt Project would be constructed 1) near Sunflower Electric Cooperative's Spearville Substation in Ford County, Kansas; 2) near Ameren Missouri's Maywood-Montgomery 345 kilovolt (kV) line in Ralls County, Missouri; and 3) near American Electric Power's Sullivan/Breed Substation (herein after referred to as the Sullivan Substation) in Sullivan County, Indiana. The converter station in Ford County, Kansas, will convert the alternating current (AC) electricity from new wind generators in the local area to direct current (DC) electricity for delivery by the HVDC line. The converter stations in Ralls County, Missouri, and in Clark County, Illinois, will convert DC electricity to AC electricity for delivery to the local AC electric grid.

Grain Belt Express retained The Louis Berger Group, Inc., to support the siting, public outreach, and regulatory process for the Project. Together, staff from The Louis Berger Group, Inc., and Grain Belt Express conducted a Route Selection Study to identify a Proposed Route for the Grain Belt Express Project transmission line. The Proposed Route was determined by the Routing Team to be the route that best minimizes the overall effect of the transmission line on the natural and human environment while avoiding unreasonably circuitous routes, unreasonable costs, and special design requirements.

Routing Process

The Routing Team employed a route selection process that involved iterative phases of information gathering, outreach, route development, and route review and revision. The major phases of route development involved successively narrowing the choices under consideration from the earliest Conceptual Routes, to Potential Routes, to Alternative Routes, and ultimately to the selection of the Proposed Route or as additional information was gathered in each phase.

Initial route development efforts started with identifying large area constraints and opportunity features across the entire Project Study Area. Using this information, the Routing Team developed a range of Conceptual Routes, which were approximate alignments that focused the

early data gathering, field reconnaissance, and public outreach efforts of the Routing Team. During this phase, Roundtables were held in portions of the Study Area in each county crossed by Conceptual Routes. The Roundtable meetings were held to gather input from local officials, economic development representatives, and community leaders on area constraints, opportunities, and Conceptual Route alignments in those areas that provided the most suitable routing options for the Project. Fifty-seven Roundtable meetings were held across the Study Area. Upon completion of these Roundtables, the Routing Team had collected information from more than 740 community leaders in the Study Area. In Illinois, 14 Roundtables were held, with more than 175 participants attending from more than 20 counties.

As the Routing Team continued to collect information, coordinate with regulatory agencies, and gather additional information, the assemblage of Conceptual Routes was narrowed and refined. These refinements ultimately eliminated the Conceptual Routes in the southern and central portions of the Study Area from further consideration due to challenges associated with a range of routing constraints, including: large areas of federal land ownership, large complexes of reservoirs and recreational lakes, dense and interspersed development, and a lack of suitable crossings of the Mississippi River.

The remaining routes in the northern portion of the Study Area were considered Potential Routes and extended northeast from Ford County, Kansas; crossed the Missouri River between Kansas City and the Nebraska state line; crossed the Mississippi River north of St. Louis; and continued to the Sullivan Substation, remaining south of Springfield, Illinois. The Potential Routes were further refined and presented to state and local agency officials and the general public at a series of Public Meetings. At the Public Meetings, the Routing Team provided information about the Project and collected feedback to help further refine the Potential Routes. More than 3,160 people attended the 27 Public Meetings in Illinois.

During and after the first two rounds of Public Meetings in Illinois, 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 and removed 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. To accommodate a reasonable comparison between Alternative Routes, the Routing Team divided the routes into four distinct segments, 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). Alternative Routes in each segment were compared against one another, and the most suitable route from each segment was selected for compilation of the Proposed Route.

Alternatives Analysis and Selection of the Proposed and Alternate Routes

The Alternative Routes (Alternative Routes A through Q) were assessed and compared by segment with respect to their potential impacts on natural resources (water resources, wildlife and habitats, special status species, and geology and soils), the built environment (developed land, agriculture, aesthetic resources, and cultural resources), and any noted engineering or construction challenges (alignments/crossings of existing linear features, transportation crossings, and general constructability considerations).

Based on that analysis, the Routing Team selected a combination of Alternative Routes B, C, K, and P as the Proposed Route for the Project. This combination of Alternative Routes met the overall goal of minimizing impacts on the natural and human environment along the route, while best utilizing existing linear rights-of-way and avoiding non-standard design requirements. The Proposed Route has a total length of 206.3 miles across nine counties in Illinois.

Alternative Route B was selected in Segment 1. Alternative Route B follows along existing roads and field edges through the heavily cultivated floodplain of the Mississippi River, avoiding impacts to existing pivot irrigation and generally passing between fields that cannot be farmed contiguously (due to existing drainages, elevation changes, roads, etc.). Although Alternative Route A is shorter and more direct across the floodplain, it crosses through the middle of several fields with numerous large irrigation pivots with extension arms that would likely require longer spans and special design requirements to avoid. Alternative Route B, though slightly longer in the floodplain, follows a shorter route through the heavily forested bluffs to the east, which would result in the loss of the least amount of potential special-status bat habitat in an area within 10 miles of known bat hibernacula and timber rattlesnake habitat. In contrast, Alternative Route A crosses farther to the north, taking a longer route through the bluff forests to connect to the routes in Segment 2. Although a portion of this route parallels an existing transmission line, thereby reducing forest fragmentation effects, it clears more forest habitat due to its longer length. Alternative Route A crosses in close proximity to the two more populated places in Segment 1, and passes in close proximity to more houses. In contrast, Alternative Route B approaches the bluffs farther to the south, away from the more populated areas and roads, crosses fewer small parcels, and has fewer residences within both 250 feet (0 residences) and 500 feet (2 residences).

Overall, Alternative Route B was chosen as the Proposed Route in Segment 1 because it has less impact on agricultural lands and pivot irrigation systems, special-status species forested habitat, populated areas, and residences.

Alternative Route C was selected in Segment 2. Alternative Route C was identified as the Proposed Route in Segment 2 due primarily to its lower potential to impact environmentally sensitive features along its western half and more direct routing, with the least amount of

impact on agricultural land use and residential areas along its eastern half, as compared to the other Alternative Routes.

Alternative Route C is the shortest route in the segment and follows along distinct-owner parcel boundaries for approximately 49 percent of its total length. It requires the least amount of forest clearing in the area between the Mississippi and Illinois Rivers (the River Hills ecosystem) – an important area for habitat conservation due to its greater contiguous forest areas, and an important area for many sensitive species, including the Indiana and northern long-eared bat and timber rattlesnake. Alternative Route C crosses the Illinois River along an existing pipeline crossing, avoiding the creation of a new utility crossing location on the river. In the eastern portion of Alternative Route C, the route closely follows along parcel boundaries for a significant portion of its length, thereby minimizing its impact on agricultural operations. All of the Alternative Routes, except Alternative Route C, cross the estimated obstruction zone for a private airstrip and pass directly adjacent to a large Boy Scouts of America camp, Camp Bunn, near the Village of Hettick. Alternative Route C also has the fewest number of residences within 250 feet (1 residence) and 500 feet (8 residences).

Alternative Route K was selected as the Proposed Route in Segment 3. Alternative Route K is aligned primarily along parcel boundaries, crosses the fewest small parcels, and has the fewest residences in close proximity. Alternative Route K avoids crossing through the incorporated area of Wenonah and an area immediately adjacent to an actively expanding rock quarry (and through an area planned for future quarry development). East of Pana, the northern Alternative Routes, in contrast to Alternative Route K, pass through an area of higher density residential development, requiring numerous turns and shifts to avoid individual residences, as well as several notable diversions from the existing 345 kV line once in a parallel alignment. In contrast to the northern Alternative Routes, Alternative Route K is aligned along ownership boundaries to much greater extent and would likely have a lesser impact on residential areas and agricultural lands in the central and eastern portions of Segment 3. The northern Alternative Routes also cross the Hidden Springs State Forest while parallel to the existing line along a steep banked section of Richland Creek, which would likely require significant clearing along both sides of the riparian corridor. Illinois DNR expressed concerns with this crossing, given its potential impacts on sensitive aquatic and riparian habitats, as well as the stability of the steep rocky valley sides of this stream. In contrast to the northern Alternative Routes, Alternative Route K would avoid the Hidden Springs State Forest and impacts to the Richland Creek riparian corridor.

Overall, Alternative Route K was identified as the Proposed Route in Segment 3 because it follows parcel boundaries to great extent, while avoiding crossing through a planned quarry expansion, the incorporated area of Wenonah, the Hidden Springs State Forest, and the Lincoln Trail Motosports facility. It also has fewer small parcels crossed (less than 10 acres), fewer residences within 250 feet (0 residences) and 500 feet (29 residences), no public airfield

obstruction zone crossings, and the greatest percent of total length along ownership boundaries compared to other Alternative Routes in Segment 3.

Alternative Route P was selected as the Proposed Route in Segment 4. In the western portion of Segment 4, Alternative Route P parallels along the south side of the existing 345 kV transmission line from its connection with Alternative Route K to the proposed converter station location. Residential development along the line is relatively limited, and no deviations from the parallel alignment are required to avoid individual residences. In contrast, Alternative Route Q, farther to the south, follows loosely along parcel boundaries with several turns to avoid residences and a pivot. Because Alternative Route P parallels an existing transmission line for its entire length, it would impact forest fragmentation less than Alternative Route Q. East of the proposed converter station location, the two Alternative Routes follow similar paths; however, Alternative Route P would have the least impact on existing pivot irrigation systems.

Alternative Route P is selected as the Proposed Route in Segment 4 because it is parallel to an existing high-voltage transmission line for its length with no deviations and would have less impact to pivot irrigation facilities, residences, and forest fragmentation.

The combination of Alternative Routes B, C, K, and P comprise a Proposed Route for the Project that best minimizes the overall effect of the Grain Belt Express transmission line on the natural and human environment while avoiding unreasonably circuitous routes, unreasonable costs, and special design requirements.

The Routing Team recommends a combination of Alternative Routes A, G, a slightly modified L, and Q as the Alternate Route for the Project. The Alternate Route has a total length of 207.5 miles across nine counties in Illinois, less than 1 percent longer than the Proposed Route.

The Routing Team considers this route to adequately meet the overall goal of minimizing impacts on the natural, human, and historic resources, while making use of existing divisions of land, avoiding non-standard design requirements, and being completely distinct from the Proposed Route per Illinois statute. The latter of these requirements required a slight modification to Alternative Route L. The proposed modification shifts a small 2-mile segment of the route 0.5 mile to the east to ensure the route alignment is not coincident with any portion of the alignment of the Proposed Route. This small modification follows along existing divisions of land and would result in no additional impacts beyond those of the original alignment, ensuring consistency with the analysis presented in this study.

Although the Routing Team considers the Proposed Route to be the best assemblage of the Alternative Routes, the Alternate Route was also developed through the same methodology, integrating input from government agencies, local officials, and the general public into the route development, analysis, and selection process. Like the Proposed Route, Alternative Routes A, G, L, and Q were continually revised and refined through multiple iterative rounds of selection

through the Conceptual and Potential Route development phases, engineering reviews, and comparative assessment from the Routing Team. As such, the Routing Team determined the Alternate Route to be a viable Alternate to the Proposed Route for the Grain Belt Express Project.

The combination of Alternative Routes A, G, L, and Q comprise an Alternate Route for the Project that is reasonable and sound because: 1) the selection of the Alternate Route followed the same methodology as the Proposed Route, integrating input from government agencies, local officials, and the general public into the route development, analysis, and selection process; 2) the Alternate Route abides by the routing guidelines and does a reasonable job of minimizing the overall effect of the Grain Belt Express transmission line on the natural and human environment, while avoiding unreasonably circuitous routes, unreasonable costs, and special design requirements; and 3) the Alternate Route is a completely separate route from the Proposed Route with no coincident portions.

1. Introduction

1.1 Project Overview

Grain Belt Express Clean Line LLC (Grain Belt Express) proposes to construct a new high voltage direct current (HVDC) transmission line from Ford County, Kansas, to Sullivan County, Indiana. The HVDC line will be approximately 780 miles long and deliver approximately 500 megawatts (MW) of power to an interconnection with the Midcontinent Independent System Operator, Inc. (MISO), and 3,500 MW of power to an interconnection with the PJM Interconnection, LLC (PJM), to serve markets in Missouri, Illinois, Indiana, and states farther east.

The HVDC transmission line will connect to the existing grid at three distinct locations. The converter stations for the Grain Belt Express Clean Line Project (Grain Belt Express Project or Project) will be constructed 1) near Sunflower Electric Cooperative's Spearville Substation in Ford County, Kansas; 2) near Ameren Missouri's Maywood-Montgomery 345 kilovolt (kV) line in Ralls County, Missouri; and 3) near American Electric Power's Sullivan/Breed 345 kV Substation (herein after referred to as the Sullivan Substation) in Sullivan County, Indiana. The converter station in Ford County, Kansas, will convert the alternating current (AC) electricity from new wind generators in the local area to direct current (DC) electricity for delivery by the HVDC line. The converter stations in Ralls County, Missouri, and in Clark County, Illinois, will convert DC electricity to AC electricity for delivery to the AC electric grid.

Together, the HVDC transmission line, converter stations, a series of AC transmission lines that will collect electricity from generators in Kansas (AC Collector System), along with an AC line from the converter station in Clark County, Illinois, to the interconnection point within the PJM grid comprise the Grain Belt Express Project

1.2 Overview of the Regulatory Process

Grain Belt Express is seeking approval to own, construct, and operate the HVDC transmission line in each state crossed by the Project: Kansas, Missouri, Illinois, and Indiana. Regulatory approval for the Project has been secured in Kansas and Indiana, and an application has been submitted in Missouri and is currently under review by the Missouri Public Service Commission (Case No. EA-2014-2027). An application will also be submitted to the Illinois Commerce Commission (ICC) for a Certificate of Public Convenience and Necessity (CPCN) for the portion of the Project in Illinois. This study presents the information used, methodology, and rationale for the selection of the Proposed Route and Alternate Route in Illinois.

Once approvals for the Project are received from each state, site-specific permitting and consultation efforts concerning wetlands, cultural resources, highway crossings, and others will be completed with the appropriate state and federal agencies.

1.3 Project Timeline and Routing Process Overview

Grain Belt Express began formal development of the Project in July 2010. Soon after, Grain Belt Express contracted with The Louis Berger Group, Inc., to support the siting, public outreach, and regulatory processes for the Project. Staff from The Louis Berger Group, Inc., and Grain Belt Express (the Routing Team) began compiling information about the Study Area by coordinating with various regulatory agencies and identifying Conceptual Routes (see Section 2.2, *Process Steps and Terminology,* for a description of route development) for the Project.

In spring 2011, the Routing Team began hosting a series of community leader meetings (Roundtables; see Section 3.3.1) in southern Missouri and Kansas to gather information regarding local area constraints, community concerns, development plans, and other information from county officials, mayors, economic development coordinators, regional planners, environmental organization leaders, and federal and state agency officials. Throughout the summer of 2011, the Routing Team continued to consider routing concepts, coordinate with agencies, and review possible routing options in the field.

During winter 2011, the Routing Team developed a range of Conceptual Routes in the Study Area for the Project. By spring 2012, the Routing Team began a series of Roundtable meetings in locations along the northern portion of the Study Area in Kansas, Missouri, and Illinois, as well as in southern Illinois. Fifty-seven Roundtable meetings were held across the Study Area. By the time these Roundtables were completed, the Routing Team had collected information from more than 740 community leaders in the Study Area. In Illinois, representatives from more than 20 counties, totaling more than 175 participants, attended 14 Roundtables.

During summer and fall 2012, the Routing Team continued to coordinate with state and federal regulatory agencies concerning constraint areas, routing opportunity features, and potential suitable crossing locations of the Missouri, Mississippi, and Illinois Rivers. The Routing Team continued to review and refine the network of Conceptual Route alignments, and by fall 2012, it had eliminated Conceptual Routes in the southern and central portions of the Study Area and focused its analysis and Potential Route development efforts on the northern portion of the Study Area. The reduced Study Area encompasses the area around Spearville, Kansas; north of the Flint Hills and Kansas City and south of the Nebraska state line; east toward the Mississippi River between St. Louis, Missouri, and Quincy, Illinois; and then east across Illinois (on a general trajectory south of Springfield) toward American Electric Power's Sullivan Substation in Indiana, south of Terre Haute. Numerous Conceptual Routes were formed across the Study Area and

multiple Missouri and Mississippi River crossing locations were evaluated to determine reasonable alignments across these rivers into Missouri and Illinois.

By late spring 2013, the Routing Team had refined the Potential Routes in Kansas and identified Alternative Routes from the western converter station to the Missouri River. In summer of 2013, the Proposed Route in Kansas was selected. The Proposed Route crosses the Missouri River and enters Missouri south of St. Joseph along the Rockies Express/Keystone Pipeline corridor. This location became the starting point of the Potential Routes under evaluation in Missouri.

By late fall 2013, the Routing Team had refined the Potential Routes and identified Alternative Routes from the Missouri River to the Mississippi River. By the spring of 2014, the Proposed Route in Missouri was selected and submitted to the Missouri Public Service Commission. The Proposed Route in Missouri continued east from the Missouri River, passing just south of Salisbury, Moberly, and the Mark Twain Lake, before turning to the northeast to cross the Mississippi River. A range of crossings of the Mississippi River were considered from Hannibal to Clarksville, Missouri. The most suitable crossing point was determined to be approximately 1.5 miles south of the U.S. Army Corps of Engineers' (USACE) Lock and Dam 22 near Saverton, Missouri. This crossing location became the starting point of the Potential Routes under evaluation in Illinois.

During the spring, summer, and fall of 2014, the Routing Team continually refined the Potential Route Network in Illinois. By winter 2014, the Potential Route Network was refined to a level suitable for an initial presentation to state and federal agencies, local landowners, and the general public (see Section 3.3.2, *Public Meetings*). In early December, the first of three rounds of Public Meetings was held in Illinois, with individual meetings held in each of the counties with Potential Route segments. More than 1,800 members of the public attended the first round of Public Meetings in Illinois. The attendees were asked to provide comments on the Project and the Potential Routes.

Following the first round of Public Meetings in Illinois, the Routing Team reviewed and responded where necessary to hundreds of public comments submitted at the Public Meetings, online, by mail, or by telephone. The Routing Team reviewed input from the public and considered newly identified constraints and sensitive features, areas of concern, and routing preferences, resulting in further refinement of the Potential Routes for the Project. During this period, Grain Belt Express continued coordinating with state and federal regulatory agencies and non-governmental groups associated with historic and natural resources.

By early 2015, the newly revised Route Network was presented to state and federal agencies, local landowners, and the general public at a second round of Public Meetings in Illinois, held during the first week of February 2015. Following these meetings, the Routing Team again

reviewed hundreds of public comments submitted at the Public Meetings, online, by mail, or by telephone. Revisions to the Route Network were made based on new routing information gathered through public and agency input, additional route reconnaissance efforts, and consideration of the characteristics of each route segment.

In the weeks preceding the third round of Public Meetings, which were held in March 2015, the Routing Team compiled a series of Alternative Routes from the remaining segments of the Potential Route Network, analyzed them based on a range of quantitative and qualitative factors, and identified a Proposed Route for the Grain Belt Express Project. An Alternate Route to the Proposed Route was also identified as required by Section 8-406.1(a)(1)(viii) of the Public Utilities Act (220 ILCS 5/8-406.1(a)(1)(viii)).

1.4 Project Description

1.4.1 Line Characteristics

The Grain Belt Express Project will be a ±600 kV HVDC transmission line capable of delivering 500 MW of power to the intermediate converter station in Missouri and 3,500 MW of power to the converter station at the American Electric Power's Sullivan Substation. The HVDC transmission line facility will consist of the primary conductors that carry the electricity, metallic return conductors, shield wires that protect the line from lightning strikes, structures that support the conductors and wires, and foundations that support the structures.

Grain Belt Express will use single foundation lattice mast and/or steel monopole transmission structures for the straight-line sections of the Project. Steel lattice structures will be used for turning locations, endpoints, or where greater structural support is needed. In limited instances, guyed lattice structures may be used where absolutely necessary. Design specifications and structure types are presented in **Appendix A**.

1.4.2 Right-of-Way Characteristics

The HVDC portion of the Grain Belt Express Project will be constructed within a 150- to 200-foot-wide right-of-way (ROW). Tall-growing vegetation (taller than 10 feet) will be cleared from the ROW to its full 150- to 200-foot width or as necessary for the safe and reliable operation of the transmission line. Farming and grazing land uses are typically compatible with transmission line ROWs and can continue within the transmission line ROW. Only the area at the base of each structure will be removed from existing land use (roughly 0.0009 acre for a typical monopole or steel lattice mast structure or 0.018 acre for a typical lattice structure).

1.4.3 Converter Stations

The Grain Belt Express Project includes three converter stations. A converter station for an HVDC transmission line looks similar to a typical large electric substation with an additional

building that contains the converter power electronics in an enclosed environment. Each converter station will require roughly 40 to 60 fenced-in acres and will be located near its point of interconnection to the AC grid.

A converter station at the western end, where the wind energy is generated in Kansas, will convert power from AC to DC. The other two converter stations will invert power from DC into AC for delivery to customers through the existing AC electric grid. The Grain Belt Express Project will deliver power to the AC grid in two locations, one in Missouri and one near the Illinois/Indiana border, for injection into the MISO and PJM transmission grids, respectively.

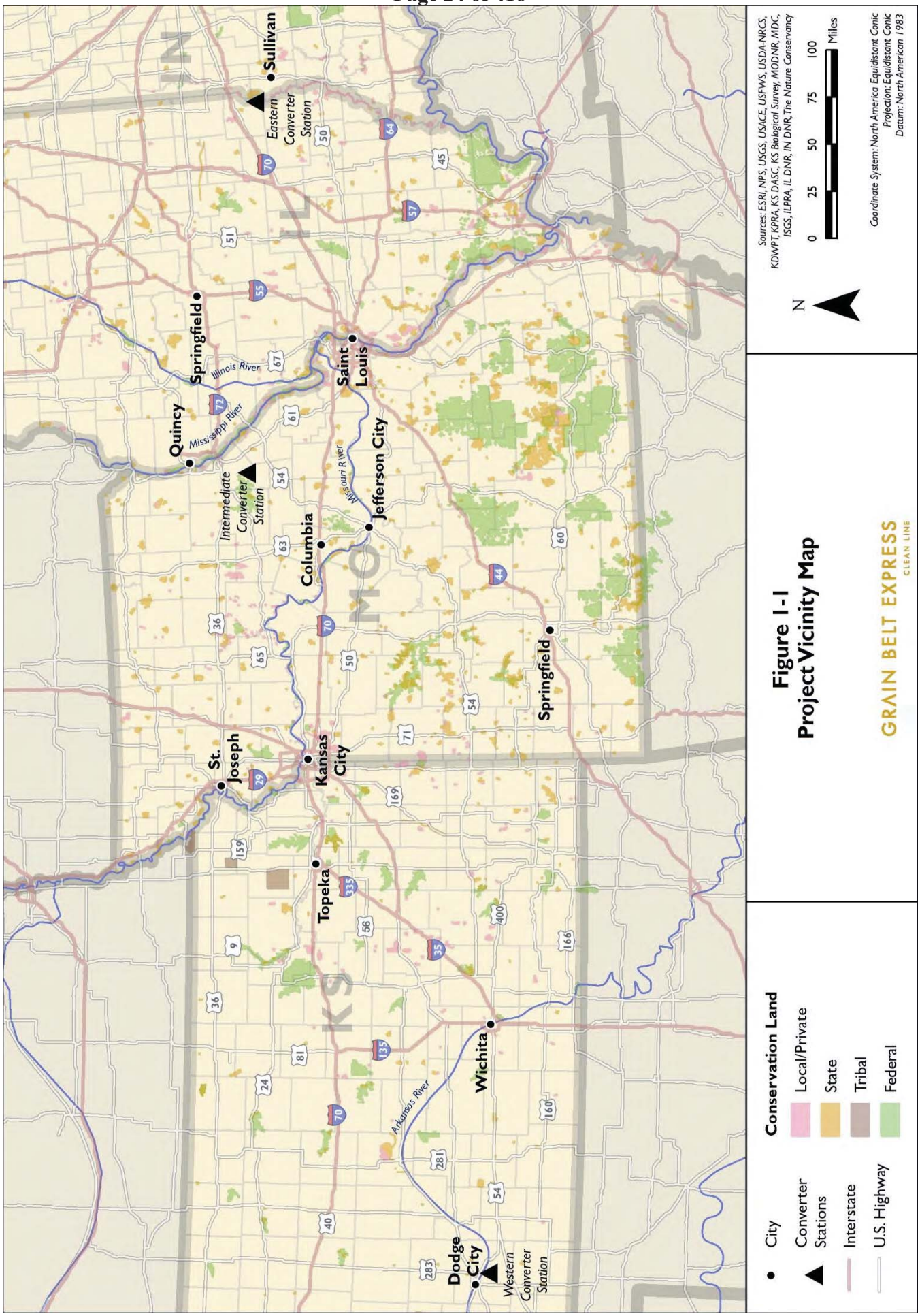
The intermediate converter station will be located near the intersection of the existing Ameren Missouri's Maywood-Montgomery 345 kV transmission line and the Proposed Route in Ralls County, Missouri. The eastern converter station will be located in Clark County, Illinois, near the Sullivan Substation, along Ameren's Casey–Breed 345 kV line.

1.4.4 Project Vicinity

The Project will be constructed between Ford County, Kansas, and Sullivan County, Indiana (**Figure 1-1**). Land use in the Project area is dominated by a combination of rural agricultural land uses (active farm and ranch lands) in the west and along the north of the Project area, with a progressive transition to more forested landscapes farther east and south in Missouri and Illinois. Four major rivers, the Arkansas, Missouri, Mississippi, and Illinois, cross the area and provide water for agricultural lands.

Major cities in the Project area from west to east include Dodge City, Wichita, and Topeka, Kansas; St. Joseph, Kansas City, Springfield, Columbia, Jefferson City, and St. Louis, Missouri; and Quincy and Springfield, Illinois.

Major large land area attractions and recreational resources within the Project area include the Flint Hills (Tall Grass Heartland in Kansas); the Mark Twain and Shawnee National Forests in Missouri and Illinois, respectively; Mark Twain Lake in Missouri; the general region of the Ozarks, which contains forests; and a widely distributed array of federally and state-managed reservoirs that provide outdoor recreation, flood protection, and water sources.


Sullivan
Eastern Converter Station
Springfield
Illinois River
Quincy
Mississippi River
Intermediate Converter Station
Saint Louis
Jefferson City
Missouri River
Columbia
Springfield
St. Joseph
Kansas City
Topeka
Wichita
Arkansas River
Dodge City
Western Converter Station
MO
KS
Conservation Land
Local/Private
State
Tribal
Federal
City
Converter Stations
Interstate
U.S. Highway
Figure 1-1
Project Vicinity Map
GRAIN BELT EXPRESS
CLEAN LINE
Sources: ESRI, NPS, USGS, USACE, USFWS, USDA-NRCS, KDWPT, KPRA, KS DASC, KS Biological Survey, MODNR, MDC, ISGS, ILPRA, IL DNR, IN DNR, The Nature Conservancy
0 25 50 75 100 Miles
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Datum: North American 1983

2. Routing Process

2.1 Goal of the Route Selection Study

The Route Selection Study was conducted to identify the route for the Grain Belt Express Project. The overall goal of this Route Selection Study is to gain an understanding of the opportunities and constraints in the Study Area, develop feasible Alternative Routes, evaluate potential impacts of the Alternative Routes, and identify a Proposed Route and Alternate Route for the Project. The Proposed Route is defined as the route that minimizes the overall effect of the transmission line on the natural and human environment, avoids unreasonably circuitous routes and unreasonable costs, and minimizes special design requirements.

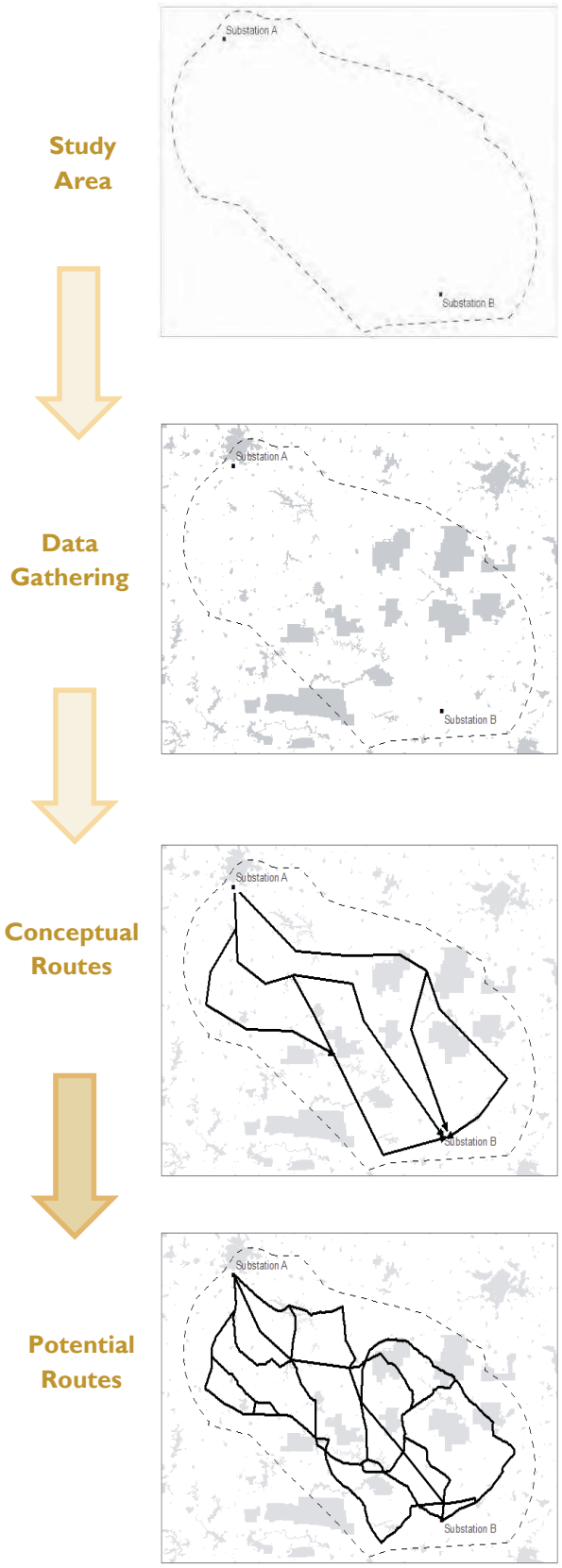
2.2 Process Steps and Terminology

The route development process is inherently iterative with frequent additions or deletions of line segments and revisions to existing alignments as new constraints and opportunities are identified and inputs are received. Because of the iterative nature of the route development process, the Routing Team uses specific vocabulary to describe the routes at different stages of development.

Initial route development efforts start with identifying large area constraints and opportunity features within the **Study Area**, which encompasses the endpoints of the Project and areas in between. These areas are typically identified using a combination of readily available public data sources.

The Routing Team uses this information to develop **Conceptual Routes** adhering to a series of general routing and technical guidelines (see Section 2.4, *Routing Guidelines*). Efforts are made to develop Conceptual Routes throughout the Study Area to ensure that all reasonable alignments are considered. Alignments are approximate at this stage, but are revised after ongoing review and analysis and with input from the public, governmental entities, and other stakeholders. During this step, Roundtables are held in each county crossed by a Conceptual Route to gain more information about the Study Area.

As the Routing Team continues to collect information, coordinate with regulatory agencies, and gather additional site-specific information, Conceptual Routes are refined. The revised Conceptual Routes are **Potential Routes**.



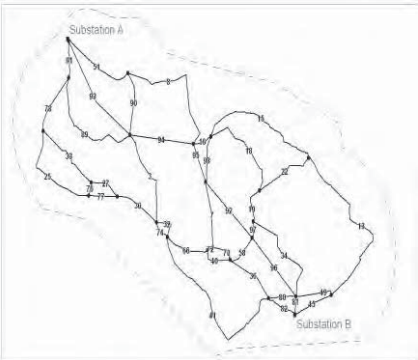
Where two or more Potential Routes intersect, a **node** is created, and between two nodes, a **link** is identified. Together, the Potential Routes and their interconnected links are referred to as the **Potential Route Network**. The links are numbered for identification, and evaluated both independently and collectively.

As the Routing Team continues to gather information and review the links of the Potential Route Network, links are modified, removed, or added. Based on this iterative process, a **Refined Potential Route Network** is developed and presented to government officials and the public at Public Meetings. Attendees provide input on Potential Route links and additional site-specific information for the Routing Team to consider.

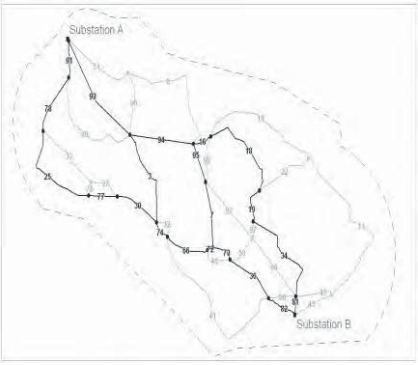
As public input is incorporated, the links of the Potential Route Network are further refined and compared, and a selection of the most suitable links is assembled into **Alternative Routes**. Alternative Routes are routes that begin and end at similar locations for direct comparison. Potential impacts are assessed and compared with land uses, natural and cultural resources, and engineering and construction concerns.

Ultimately, through analysis and comparison of the Alternative Routes, a **Proposed Route** is identified. The Proposed Route is the route that minimizes the overall effect of the Project on the natural and human environment, while avoiding circuitous routes, extreme costs, and non-standard design requirements. [Note: In Illinois, a viable **Alternate Route** is also identified by the Routing Team and filed with the Commission as a formal alternate to the Proposed Route.]

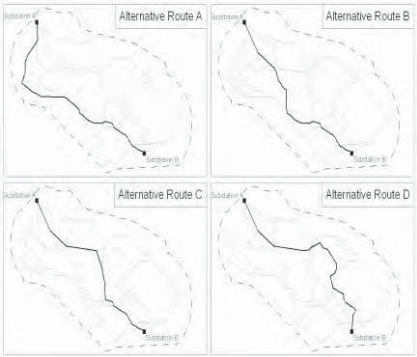
Potential Route Network



Refined Potential Route Network



Alternative Routes



Proposed Route

*Please note the above graphics are for illustration purposes only and do not reflect actual routes.

2.3 Routing Team Members

A multidisciplinary Routing Team performed the Route Selection Study. Members of the Routing Team have experience in transmission line route planning and selection, natural resource impact assessment, land use assessment and planning, cultural resource identification and assessment, impact mitigation, transmission engineering and design, and construction. **Appendix B** lists the Routing Team members and their respective areas of responsibility.

The team worked together during the Route Selection Study to:

- Define the Study Area
- Develop Routing Guidelines
- Collect and analyze environmental and design data
- Identify routing constraints and opportunities
- Consult with resource and permitting agencies
- Develop and revise the route alternatives
- Analyze and report on the selection of a Proposed Route

2.4 Routing Guidelines

As noted previously, the overall goal of the Route Selection Study is to identify a Proposed Route that minimizes the overall effect of the transmission line on the natural and human environment, avoids unreasonably circuitous routes and unreasonable costs, and minimizes special design requirements. A set of routing guidelines help the Routing Team reach that goal by setting forth principles that guide the development of alignments considered in the study.

The Routing Team considered two types of guidelines: General Routing Guidelines and Technical Guidelines. General Routing Guidelines establish a set of principles that guide the development of alignments with respect to area land uses, sensitive features, and considerations of economic reasonableness. Technical Guidelines provide the Routing Team with technical limitations related to the physical limitations, design, ROW requirements, or reliability concerns of the Project infrastructure.

2.4.1 General Routing Guidelines

The following are General Routing Guidelines used for the Grain Belt Express Project:

a. Maximize the separation distance from and/or minimize impacts on residences

b. Maximize the separation distance from and/or minimize impacts on schools, hospitals, and other community facilities

c. Avoid the need for removal of existing barns, garages, commercial buildings, and other nonresidential structures

d. Minimize impacts on agricultural use, including the operation of irrigation infrastructure

e. Avoid crossing cemeteries or known burial places

f. Minimize crossing designated public resource lands, such as national and state forests and parks, large camps and other recreational lands, historic resources and sites, and state designated wildlife management areas

g. Minimize crossing large lakes, major rivers, and large wetland complexes

h. Minimize impacts on critical habitat, protected species, and other identified sensitive natural resources

i. Minimize substantial visual impacts on residential areas and public resources

j. Minimize route length, circuity, cost, and special design requirements

2.4.2 Technical Guidelines

The following are Technical Guidelines used for the Grain Belt Express Project:

a. Minimize the crossing of 345 kV and 500 kV transmission lines

b. Minimize paralleling corridors with more than one existing 345 kV or above circuit

c. Maintain 200 feet of centerline-to-centerline separation when paralleling existing transmission lines of 345 kV or above

d. Maintain 150 feet of centerline-to-centerline separation when paralleling 138 kV or lower voltage transmission lines

e. Minimize turning angles in the transmission line greater than 45 degrees

f. Minimize placing structures on sloping soils of more than 30 degrees (20 degrees at angle points)

g. Avoid underbuild arrangements with existing AC infrastructure

h. Maintain a safe operational distance from existing wind turbines

2.5 Data Collection

The following sources of information were used to support the analysis in the Route Selection Study.

2.5.1 GIS Data Sources

The study made extensive use of Geographic Information System (GIS) software (ArcMap v10.2) and data sources. Information from existing GIS data sets was gathered from many sources, including federal, state, and local governments (see sources in **Appendix C**). Much of this information was obtained from official agency GIS data access websites and government agencies. The Routing Team also created and corrected GIS data by digitizing information from paper-based maps, completing aerial photograph interpretation, conducting interviews with stakeholders, and completing field reconnaissance.

2.5.2 Digital Aerial Photography

Aerial photography is an important tool for route selection. The primary sources of aerial imagery used in the route identification, analysis, and selection effort for the Project include:

- National Agricultural Imagery Program's color aerial photography (2012, 2014)
- Google's Google Earth color aerial photography
- Microsoft's Bing Aerial Imagery service

Aerial photography from these sources was viewed using GIS software (ArcMap v10.2). A variety of information was collected through photo interpretation of these imagery sources in GIS, such as the location of residences, mining operations, airfields, and existing transmission lines. Features identified through aerial photograph interpretation were verified through route reconnaissance to the extent practical.

2.5.3 Route Reconnaissance

Routing Team members examined Potential Routes by automobile from points of public access and correlated observed features to information identified on aerial photography, U.S. Geological Survey 7.5-minute topographic maps in digital format, road maps, and the range of GIS sources. Prior to field reconnaissance, some features, such as residences, outbuildings, recognized places of worship, cemeteries, and commercial and industrial areas, were identified and mapped in GIS using aerial photography. Residences were categorized as either occupied or unoccupied. In instances where it was unclear whether or not a residence was occupied, it was assumed to be occupied. These features were then verified during field reconnaissance and added to the GIS database using laptops running GIS software supported by real-time global positioning system information.

In addition to automobile reconnaissance, the Routing Team also conducted a helicopter review of the Alternative Routes from the air to determine the presence or absence of features not visible from the ground-based reconnaissance efforts.

2.6 Routing Constraints

The Routing Team identified and mapped routing constraints in the Study Area. These constraints were defined as areas that should be avoided to the extent feasible during the Route Selection Study process. The constraint list was revised as the Routing Team developed greater familiarity with the Study Area and gathered additional data through Agency Meetings and Public Meetings. The constraints were divided into two groups based on the size of the geographic area encompassed by the constraint.

The first group included constraints covering large areas of land in the Study Area. The Routing Team considered large-area constraints as unfavorable or incompatible for developing routes and avoided those areas to the extent possible.

The list of large-area constraints consists of:

a. Urban areas, including cities, towns, villages, and other built-up areas
b. Federal lands, including national forests, national parks, national wildlife areas, lands administered by USACE for flood control, and military facilities
c. State forest park lands and wildlife management areas
d. Conservation lands and lands designated for their natural importance or scenic value
e. Native American reservation lands
f. Areas near airports and airstrips
g. National Register of Historic Places (National Register), Historic Districts and adjacent areas
h. Large recreational sites
i. Large lakes and reservoirs that could not be spanned with the structures set well back from the shores
j. Large wetlands or wetland complexes

The second group of constraints encompasses other features covering smaller geographic areas or point-specific locations. Conceptual Routes were developed to avoid large-area constraints. The alignments were then refined to create Potential Routes that avoided, to the extent possible and practical, point-specific constraints, including but not limited to:

a. Individual occupied[1] residences (including houses, permanently established mobile homes, and multi-family buildings)

[1] See Section 2.5.3, *Route Reconnaissance*.

b. Commercial and industrial buildings, or areas within commercial properties with current plans for construction and development
c. Quarries and areas within their control planned for future mining operations
d. Irrigation facilities
e. Recorded and designated historic buildings and sites, including any specified buffer zone around each site
f. Recorded sites of designated threatened, endangered, and other rare species or unique natural areas and the specified buffer zone around each site
g. Small wetlands or waterbodies
h. Developed recreational sites or facilities
i. Communication towers
j. Designated scenic vista points

2.7 Routing Opportunities

Routing opportunities were identified by the Routing Team as locations where the proposed transmission line might be located with less disruption to surrounding land uses and the natural and cultural environment. Opportunity features typically included other linear infrastructure and utility corridors, such as existing electric and gas transmission networks, rail lines, and roads, but may also include reclaimed lands or unused portions of industrial or commercial areas, if compatible.

Existing transmission lines were considered an opportunity if they were aligned in a suitable direction. Paralleling existing transmission lines is a common practice used when routing new transmission lines and is supported by many state utility commissions, state and federal regulatory agencies, and the Federal Energy Regulatory Commission (FERC 1970). Paralleling existing linear utilities consolidates utility corridors by placing a new land use feature in close alignment with an existing similar land use feature, thereby avoiding the fragmentation of existing land uses and habitats through an area. In addition, paralleling existing transmission lines can reduce the overall impact of the new transmission line on visually sensitive areas (e.g., historic sites and outdoor recreational areas), avian resources, and airfield flight zones because any impacts of the new line are considered with respect to the impacts of the existing line. In these areas, the impacts of the new line are considered incremental to the existing impacts, rather than as completely new impacts in otherwise unimpacted areas.

Major pipelines were also considered an opportunity feature, especially in areas where there were no existing transmission lines and in forested areas where the pipeline has an established and cleared ROW. Like transmission lines, pipeline ROWs are cleared linear corridors of

existing disturbance where construction of buildings and other non-pipeline facilities are prohibited. Paralleling these features consolidates linear ROWs with similar construction and use limitations, thereby avoiding the fragmentation of land uses through an area.

Roads are typically considered as a logical linear opportunity for planning transmission lines and are commonly paralleled by lower voltage transmission and distribution lines. However, for higher voltage lines with larger structures and longer spans, alignments along roads often conflict with the residential and commercial development common along roadways, with future transportation corridor expansion, and with highway ROW and clearance requirements.

Rail lines present a similar type of opportunity feature, but also one that can be limited by adjacent development. Communities and industrial facilities (including grain elevators) are often located along rail lines, making it difficult to closely parallel them with a transmission line for any significant distance. However, where feasible, both roads and rail lines were considered.

In addition to existing linear infrastructure, the grid-based section lines of the public land survey system and the parcel boundaries that further dissect each section (referred to as section/parcel boundaries) also served to guide the development of alignments along logical divisions of land ownership and use. The Routing Team aligned routes along section/parcel boundaries in the absence of, or as an alternative to, parallel alignments along existing linear infrastructure if existing land use would be more affected by the Project. This was most relevant in farmed areas, where farming operations extend to the edge of the property boundary.

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3. Agency and Public Outreach

3.1 Regulatory Agency Coordination

The Routing Team contacted numerous federal, state, and local agencies to gather information for the route planning process. Coordination efforts focused on introductions to the Project, data gathering, and discussions concerning likely permitting and consultation requirements. Discussions were held with the Illinois Department of Agriculture, Illinois Department of Natural Resources (IDNR), Illinois State Historic Preservation Agency, Illinois Environmental Protection Agency, Bureau of Water, Illinois Department of Transportation, U.S. Fish and Wildlife Service (USFWS), USACE, and other non-governmental organizations. These agencies and non-governmental organizations were asked to review the Potential Route Network and the Mississippi and Illinois River crossing locations and to provide any information that would be helpful in selecting a preferred crossing and route. The outcome of these discussions helped to select the final crossing location and Proposed Route and is discussed in Section 4.3.

The agencies consulted are provided in the list below. Copies of correspondence with federal offices and state agencies in Illinois are provided in **Appendix D**.

Federal Agency and Regulatory Authorities:

- U.S. Environmental Protection Agency, Region 7
- U.S. Fish and Wildlife Service
  - Midwest Region, Columbia Ecological Services Office
  - Mountain-Prairie Region, Kansas Ecological Services Field Office
  - Midwest Region, Rock Island Ecological Services Field Office
  - Midwest Region, Marion Ecological Services Sub-Office
- U.S. Army Corps of Engineers
  - Kansas City District (Kanopolis Office)
  - Rock Island District
  - Louisville District
  - St. Louis District
  - Tulsa District

- National Park Service
  - Fort Larned National Historic Site
  - National Historic Trails
    - California National Historic Trail
    - Santa Fe National Historic Trail
    - Oregon National Historic Trail
- Natural Resources Conservation Service

State Agency and Regulatory Authorities:

- Missouri
  - Missouri Public Service Commission
  - Missouri Department of Conservation
  - Missouri Department of Transportation
  - Missouri Department of Natural Resources
    - State Historic Preservation Office
    - Division of Environmental Quality
- Kansas
  - Kansas Corporation Commission
  - Kansas Department of Transportation
  - Kansas Department of Wildlife, Parks and Tourism
  - Kansas Historical Society
  - Kansas Forest Service
  - Kansas Department of Agriculture
  - Kansas Department of Health and Environment
- Illinois
  - Illinois Department of Agriculture
  - Illinois Environmental Protection Agency, Bureau of Water
  - Illinois Department of Natural Resources, Historic Preservation Office
  - Illinois Department of Natural Resources
  - Illinois Department of Transportation
  - Illinois Nature Preserve Commission
  - Illinois State Farm Service Agency

- Indiana
  - Indiana Utility Regulatory Commission
  - Indiana Department of Environmental Management
  - Indiana Department of Natural Resources
    - Division of Fish and Wildlife
    - Division of Historic Preservation and Archeology

3.2 Non-governmental Organizations

In addition to state and federal agencies, the Routing Team coordinated with several natural resource and historic conservation groups during the process. These contacts provided valuable additional information sources for identifying sensitive natural resource habitats and historic resources in the Study Area. These groups included:

- The Nature Conservancy, Missouri, Kansas, and Illinois Chapters
- Illinois Farm Bureau
- Ducks Unlimited of Illinois
- Ducks Unlimited of Missouri
- Prairie Rivers Network (National Wildlife Federation)
- National Pony Express Association
- Oregon-California Trails Association
- Sierra Club, Kansas, Illinois and Missouri Chapters
- Environmental Law and Policy Center
- Audubon Missouri
- Missouri Coalition for the Environment
- Missouri Prairie Foundation
- Environment Missouri
- Illinois Environmental Council
- Illinois Natural Resources Defense Council

3.3 Community Outreach Activities

The Routing Team led a community outreach program designed to educate the public about the purpose and benefits of the Project, inform community leaders and the public about the regulatory process and Project timeline, and gather information to assist the siting effort.

An important part of the outreach program was to identify key community leaders in each county in which the line may be constructed. To this end, Grain Belt Express staff met with local county officials throughout the Study Area early in the development process to introduce the Project and identify key planning, economic development, and community leaders in each county. These contacts provided insight into local planning issues and development efforts.

Two types of public outreach meetings were conducted for the Grain Belt Express Project: Roundtables and Public Meetings. The Routing Team planned meeting locations within the Study Area so that potential attendees would be within a 30-mile radius of at least one meeting location.

3.3.1 Roundtables

The main goal of the Roundtables was to coordinate with and gain valuable information from community leaders in each county in the Study Area. These community leaders included local, county, and municipal elected officials; local government planners; community and business leaders; economic development experts; local utilities and cooperatives; and federal and state agency officials. At each Roundtable, members of the Routing Team presented an overview of the Project and described the routing process. After the presentation, attendees and members of the Routing Team broke into small working groups to review aerial maps of the Study Area counties. Attendees were encouraged to write on the maps and to provide and verify specific information about sensitive features, planned development, and existing infrastructure in their communities. Attendees were also encouraged to draw route suggestions on the aerial maps for the Routing Team to consider during the routing study, based on current and future opportunities and constraints. After the meetings, the identified constraints and suggested routes were digitized, reviewed, and/or incorporated into the routing process. In Illinois, 14 Roundtables were held with over 175 participants from more than 20 counties.

The Roundtables provided the Routing Team with an avenue to gain community perspectives on new or planned infrastructure in relation to the community member's county or jurisdiction through face-to-face communication. The community leaders at the Roundtables helped to identify large area constraints or opportunities in their counties or jurisdictions. Community leader input also helped identify potential future land use plans, such as the construction of new water storage facilities; communication towers; or new industrial, commercial, or residential development; and they helped identify and verify the approximate location of existing features, such as historic sites, mining activities, communication towers, airstrips, schools, and churches.

The Routing Team considered data provided by community leaders at the Roundtables in its route development and selection efforts.

3.3.2 Public Meetings

Grain Belt Express hosted three Public Meetings in each county crossed by the Project to present information about the Project, present Potential Routes, and seek input from the general public. The meetings were held in week long "rounds," during which one meeting was held in each county where the Project may be located. The first round of Public Meetings was held in the first week of December 2014 (1st through the 5th), the second in the first week of February 2015 (2nd through the 6th), and the third in the first week of March 2015 (2nd through the 6th). Approximately 3,160 recorded attendees came to the 27 Public Meetings in Illinois.

Notification for the Public Meetings included individual mailings sent to landowners, newspaper advertisements, coordination with local community leaders, and posts on the Project website. Mailings were sent to property owners (as identified in the local county tax and parcel information received from each county) within a "planning corridor" surrounding each link of the Potential Route Network. The planning corridor served to identify those landowners with the greatest potential to be directly affected by the Project. The planning corridor width was greatest during the first round of meetings (approximately 2.5 miles centered on the links of the Potential Route Network) to account for the greater likelihood of identifying unknown constraints, resulting in revisions to the Potential Routes within the Study Area. The planning corridor was narrowed for the second and third rounds (to approximately 1 mile in width) to account for the decreased likelihood of identifying new constraints requiring significant route revisions. Also, portions of the planning corridors that included major developed and/or incorporated areas were typically not included in mailing lists because these areas were not suitable for route development, and the intent of the notification effort was to invite landowners with property that may be directly affected by the Project. Almost 17,000 invitations were sent to notify landowners about the meetings. Copies of the invitations can be found in **Appendix E**.

At each Public Meeting, members of the Routing Team greeted and signed in meeting attendees. At sign-in, attendees were provided with a comment card and asked to fill out the top of the card. The comment card was perforated, with the top portion requesting information such as attendees' name(s), address, telephone number, and email address. After the attendee completed the top portion, the top of the card was removed to document each individual's attendance. The lower portion of the comment card included several questions for attendees to answer, including questions about potential constraints and potential opportunity areas, and a space to write in general comments about the Project. Attendees were encouraged to turn in the bottom portion prior to leaving the meeting, but were also provided the opportunity to mail comments back to the Routing Team. The upper and lower portions of the comment card

were labeled with the same unique number to identify the attendee. In this way, landowner attendance was tracked, and once filled out and submitted, the lower body of the comment card could be linked back to the individual landowner's contact information.

After attendees signed in, they were given a guided tour of the Project presented on a series of poster boards arranged on easels. The tour provided information regarding the purpose of the Project, Project benefits, the routing process and criteria, physical characteristics of the line, and easement and compensation information. Information about agricultural impact mitigation was also provided for interested parties. Guided tours typically lasted about 15 minutes and were conducted in small groups to allow attendees to ask questions and receive immediate answers from representatives of the Routing Team.

At the end of the tour, Routing Team representatives provided assistance to attendees in locating their property or other features of concern on aerial photography maps that displayed the array of Potential Route links under consideration. Each map presented a specific portion of the line with information on identified constraints, land areas, and existing infrastructure presented at a scale of 1 inch = 1,000 feet. Participants were encouraged to document the location of their houses, places of business, areas of concern on their properties, or other sensitive resources on the printed maps. Routing Team members worked with landowners to ensure that each comment or group of comments provided by an attendee was also referenced to the number on the attendee's individual comment card by recording it on or next to the attendee's comments on the map.

One or two digital mapping stations were also provided at each Public Meeting to allow attendees the opportunity to find their properties and document their input directly in the GIS database. Each digital mapping station was run by a GIS technician and contained all of the data presented on the printed maps and a full parcel database to help search for parcels that owners could not find on the printed maps.

Analysis of Public Comments

After the Public Meetings, all the maps used to collect comments were scanned, geo-referenced, and integrated into the GIS database. The locations of specific comments provided by attendees, denoted by the commenter's unique comment card identification number, were digitized within the mapping program and linked to the information provided on the individual's complete comment card. All comments received via the comment cards were recorded and categorized in a database for review and correlation with mapped comment locations during the routing revision process.

Generally, the members of the public who attended the Public Meetings helped to identify small area constraints or opportunities on their properties or in their communities. Meeting attendees provided specific information regarding the location, or planned location of features

such as residences, barns or outbuildings, irrigation facilities, cemeteries, schools, airfields, historic markers, and other culturally significant locations. They also provided information regarding current land use such as agricultural uses, rangeland, and recreational areas.

More than 900 comment cards were received following the Public Meetings, and members of the Routing Team responded to individuals posing a question or specific concern if a response was requested. Comments were also collected from the public through the Project website, mailed letters, email, and a toll-free phone number. The maps with the Potential Routes presented at the Public Meetings were also posted online, so stakeholders could review the Potential Routes and provide comments even if they were unable to attend the Meetings.

Comment cards also included a question related to opportunity features. In developing Potential Routes, the Routing Team considered paralleling linear features, including existing transmission lines, pipelines, parcel boundaries, roads, and rail lines. To gain greater perspective on these opportunity features, comment cards at the first round of meetings included a question inquiring which types of features the individual preferred for parallel alignments. Each comment card was scanned and entered into a database that enabled the Routing Team to track parallel preferences, as well as concerns, for each individual who provided a card.

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4. Route Development

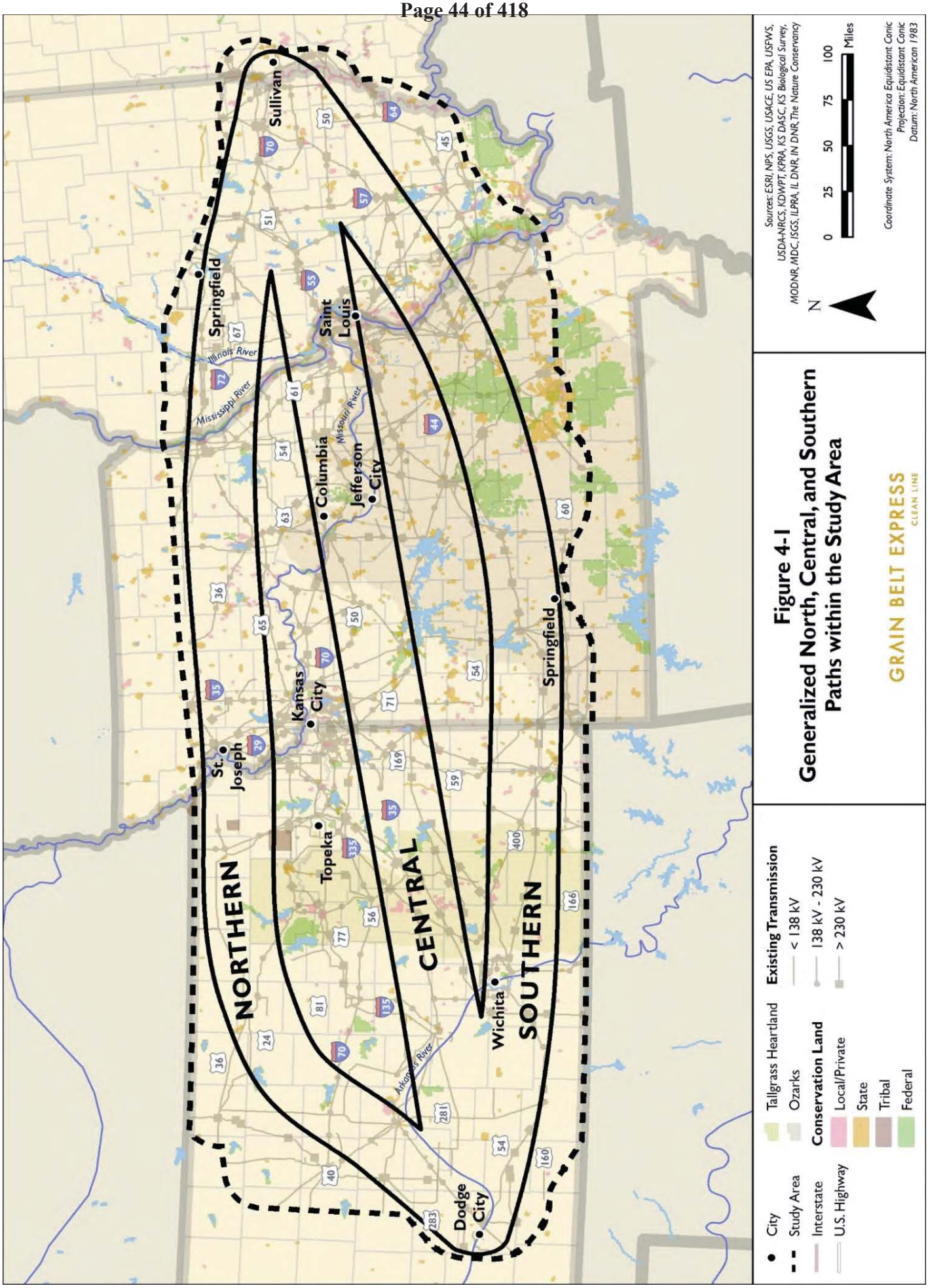
As described in Section 2.2, the route development effort is an iterative process beginning with identification of Conceptual Routes within a Study Area that are further refined to become a network of Potential Routes. Conceptual Routes were initially developed and compared across all four states to identify the most suitable location for the Project from a high level. The Conceptual Routes were then further refined state by state to become Potential Routes. The network of Potential Routes was then analyzed, compared, refined, and ultimately assembled into Alternative Routes. Finally, comparative potential impacts were evaluated for each Alternative Route to identify a Proposed Route (as well as a statutorily required Alternate Route in Illinois). To date, the Proposed Route in Kansas has been approved (KCC 2013, Docket # 13-GBEE-803-MIS), and the Proposed Route in Missouri is currently under review by the Missouri Public Service Commission (Case No. EA-2014-0207). (Approval of the Indiana portion of the route by the Indiana Utility Regulatory Commission is not required.)

This study documents the methods, information, and rationale for the selection of the Proposed Route and Alternate Route in Illinois. The following sections provide discussions of each phase of route development and present a summary of routing decisions and analysis that led to the subsequent refinement stage.

4.1 Study Area

The Study Area for the Grain Belt Express Project is generally defined as the geographic area encompassing the two end-point converter stations in Ford County, Kansas, and Clark County, Illinois (and the nearby PJM interconnection point in Sullivan County, Indiana), and logical interconnection locations for the third, intermediate converter station near the Missouri/Illinois border in Ralls County, Missouri (**Figure 4-1**). The presence and extent of certain relevant resources within the Study Area were also considered while delineating the Study Area boundary. One of the major factors that guided the definition of the Study Area boundary is the presence of opportunity features, particularly existing linear ROWs, including electric transmission line and pipeline ROWs. Incorporating the location and trajectory of existing linear utility corridors in the delineation of the Study Area ensures that Potential Routes parallel to existing linear infrastructure are considered.

Although the term Study Area boundary suggests that the Study Area is maintained throughout the study process as a fixed boundary, in practice this was not the case. As the routing study progressed, the Routing Team identified additional opportunities and constraints, and the Study Area boundary was modified, as appropriate.


NORTHERN
CENTRAL
SOUTHERN
Sullivan
Springfield
Saint Louis
Columbia
Jefferson City
Kansas City
St. Joseph
Topeka
Wichita
Dodge City
Springfield
Illinois River
Mississippi River
Missouri River
Arkansas River
City
Study Area
Interstate
U.S. Highway
Tallgrass Heartland
Ozarks
Conservation Land
Local/Private
State
Tribal
Federal
Existing Transmission
< 138 kV
138 kV - 230 kV
> 230 kV
Figure 4-1
Generalized North, Central, and Southern Paths within the Study Area
GRAIN BELT EXPRESS
CLEAN LINE
Sources: ESRI, NPS, USGS, USACE, US EPA, USFWS, USDA-NRCS, KDWPT, KPRA, KS DASC, KS Biological Survey, MODNR, MDC, ISGS, ILPRA, IL DNR, IN DNR, The Nature Conservancy
N
0 25 50 75 100 Miles
Coordinate System: North America Equidistant Conic
Projection: Equidistant Conic
Datum: North American 1983

4.2 Conceptual Route Development in the Study Area

Conceptual Routes are the first step in the route development effort. As the name suggests, Conceptual Routes are developed as broad routing "concepts" that typically avoid large area constraints or incorporate notable opportunity features in the Study Area. In practice, the transition from Conceptual Routes to Potential Routes falls along a continuum. However, for the purpose of this study and to provide for clarity in referencing different decision phases of the effort, routing decisions that impacted route planning across all four states are presented under the Conceptual Route development process.

The Routing Team developed an array of initial Conceptual Routes for the Grain Belt Express Project in Kansas, Missouri, Illinois, and Indiana. The following sections provide a summary of the Conceptual Routes that the team considered, including the basis for the routing concept, key constraints and opportunities encountered, and the decision whether to eliminate or continue refinement of each Conceptual Route. For simplicity and clarity, the Conceptual Routes are grouped based on their relative geography in the Study Area (see **Figure 4-1**). Conceptual Routes in the northern portions of the Study Area followed paths that led north of Kansas City and St. Louis to reach the eastern converter station location. Conceptual Routes in the central portion of the Study Area generally followed paths north of Wichita, south of Kansas City, and north of St. Louis, and Conceptual Routes in the southern portion of the Study Area generally followed a trajectory either north or south of Wichita and the reservoir system in Missouri but crossed into Illinois south of St. Louis.

4.2.1 Conceptual Routes—Northern Portion of the Study Area

Conceptual Routes along the northern portion of the Study Area were developed to consider alignments that crossed the Missouri River between Kansas City and the Nebraska state line, crossed the Mississippi River north of St. Louis, and remained south of Springfield, Illinois, to continue to the Sullivan Substation (**Figure 4-2**). Residential density along the northern Conceptual Routes is relatively minimal, and most large area constraints were readily avoidable. However, three major river crossings, sensitive grassland habitats, and historic sites and trails represented notable challenges to the route development effort through this portion of the Study Area.

Large area constraints in the northern portion of the Study Area in Kansas include: multiple federally owned reservoirs and state conservation lands; two national wildlife refuges; several army bases; and the cities of Topeka, Lawrence, Salina, Hays, and Great Bend. In addition, the Flint Hills Ecoregion, one of the largest intact areas of tallgrass prairie in North America, occupies a significant portion of the Study Area in Kansas. In Missouri, large area constraints include: developed areas along U.S. Highway 36 and numerous conservation easements associated with the Grand River and Swan Lake National Wildlife Refuge, Mark Twain National

Wildlife Refuge, Thomas Hill Reservoir, Mark Twain Reservoir, the Missouri National Guard Macon Training Site, two state parks, and several state conservation areas. In Illinois, dense development around Quincy, Springfield, and Effingham presented challenges for routing the Project, as well as conservation easements along the Illinois River, the Meridosia National Wildlife Refuge, and Lake Shelbyville.

Opportunity features in the northern portion of the Study Area include the existing network of transmission lines and an array of interstate pipelines passing from southwest to the northeast in Kansas and from west to southeast in Missouri. Section lines and parcel boundaries also served to guide the development of route alignments to follow along ownership boundaries when possible. Several rail lines and state or federal highways were also considered in the initial development of Conceptual Routes; however, restrictions on overhanging state highway ROW combined with the close relationship between roads, rail, and commercial or residential development limited the development of reasonable alignments along many of these features.

The Routing Team considered a variety of different route options to exit the western converter station in Kansas toward the northern portion of the Study Area. Route development in this area of Kansas is encumbered by extensive farmlands and irrigation facilities; the physical congestion of existing wind generation facilities, transmission lines, substations, and residences; and sensitive lesser prairie-chicken habitat that surrounds the Spearville area along its eastern and northern periphery. However, several suitable route options were developed along section/parcel boundaries to the north and east and along existing transmission lines to the northeast toward Great Bend.

Conceptual Routes north of Great Bend continued either along section/parcel boundaries west of U.S. Highway 183, north along an existing 115 kV transmission line near U.S. Highway 281, or northeast along the Natural Gas Pipeline of America pipeline corridor to Concordia. Conceptual Routes were initially developed between Cheyenne Bottoms Wildlife Area and Quivira National Wildlife Refuge but were eliminated from further consideration following agency coordination with the Kansas Department of Wildlife, Parks, and Tourism (KDWPT) and USFWS because of concerns relating to migratory birds and the federally listed endangered whooping crane. In addition, Conceptual Routes initially formed along Interstate (I-) 70 were also eliminated from further consideration due to the frequent diversions required to avoid developed areas along I-70 and in proximity to Fort Riley Army Installation. These routes also cross the Tallgrass Heartland of the Flint Hills, a highly scenic area viewed by 12,000 to 20,000 travelers a day.

From Concordia to the Missouri River, three main west-to-east Conceptual Routes were developed with periodic north-to-south interconnections between each route. The Routing Team considered three primary Missouri River crossing locations near St. Joseph, Missouri:

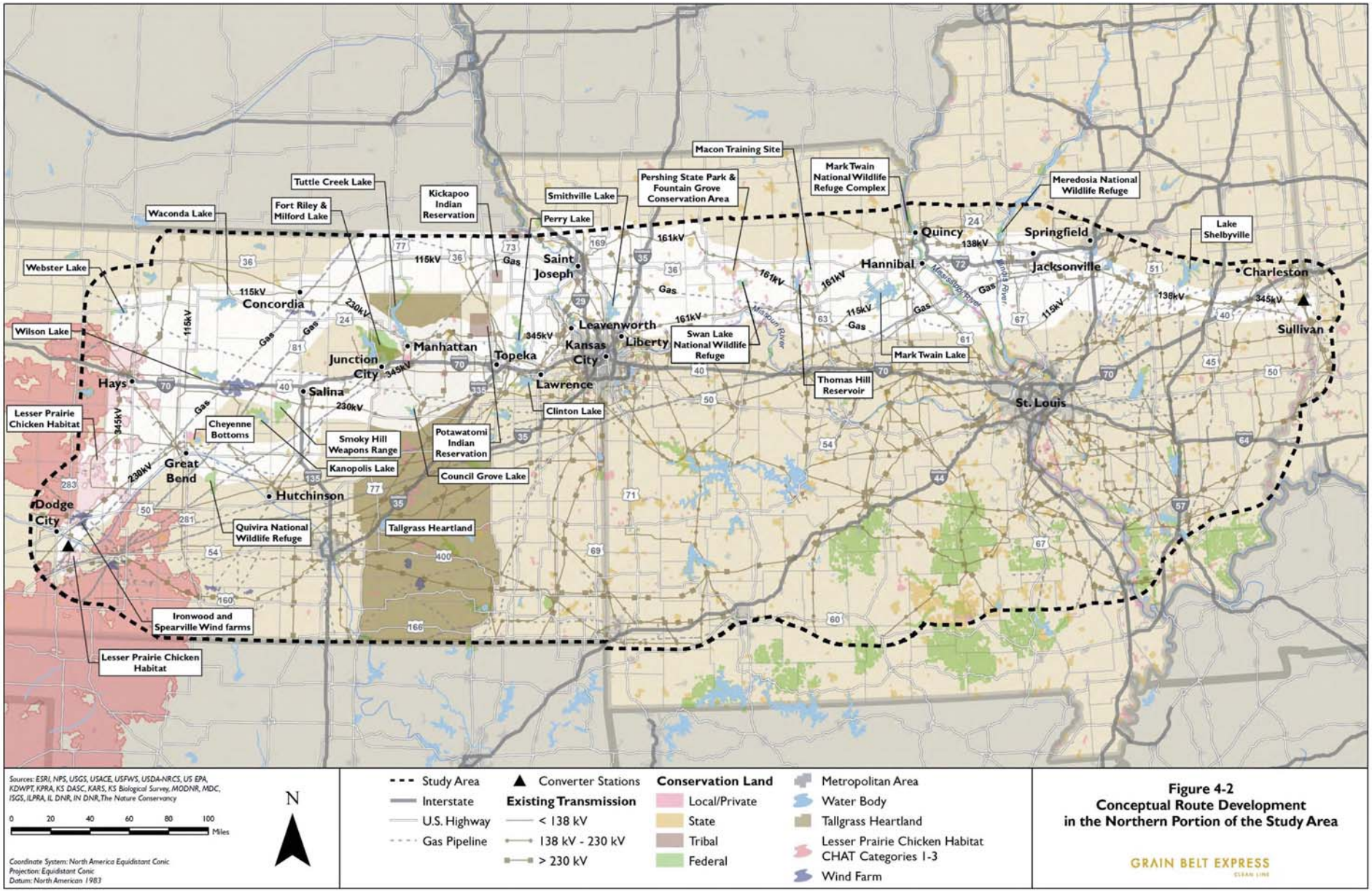


Figure 4-2
Conceptual Route Development in the Northern Portion of the Study Area

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two on a trajectory north of the city and one to the south. The two northern river crossings were developed at locations that avoided a series of Missouri Department of Conservation (MDC) lands in the floodplain on the eastern bluffs of the river and provided access to parallel a 345 kV line toward St. Joseph. The southernmost crossing was developed to parallel the Rockies Express/Keystone Pipeline corridor from near Fairview, Kansas, up to and across the Missouri River.

St. Joseph's residential and commercial development served as the primary constraint on the eastern bluffs[2] of the Missouri River. The steep topography beyond the floodplain quickly shifts land use from floodplain farmland to a combination of forest-covered hillsides and moderate to high-density residential development. The Routing Team initially developed alignments from the two northern river crossings along the Cooper – St. Joseph 345 kV line north of the city. However, pockets of residential and commercial development extending northward from the city along I-229 and I-29 prevented suitable parallel alignments along the line through this area. Ultimately, the Routing Team developed routing alignments that diverged from a parallel alignment near Amazonia and continued farther east before angling south to continue along the east side of St. Joseph, paralleling the existing Hawthorne–St. Joseph 345 kV transmission line toward the southeastern corner of Buchanan County.

The Routing Team developed a network of Conceptual Routes starting at the Rockies Express/Keystone Pipeline crossing of the Missouri River. Similar to the northern crossing, steep topography beyond the floodplain quickly shifts land use from floodplain farmland to a combination of forested hills and moderate density residential development. A network of routes was developed from this southern crossing location eastward, through the farmlands in the Missouri floodplain and into the sporadic residential development along the bluffs and in the subsequent valleys eastward. Conceptual Routes were developed through this area along pipeline or existing transmission lines to the southeast to pass through the residential development along the bluffs and around the community of Agency, Missouri, which is located just east of St. Joseph.

Conceptual Routes beyond St. Joseph and east across Missouri were developed around three primary concepts: an alignment based on the section/parcel boundary just south of U.S. Highway 36; a route that continued parallel along the Rockies Express/Keystone Pipeline corridor; and an alignment that paralleled existing transmission lines to the north that looped between St. Joseph, Fairport, Jamesport, Brookfield, and Marceline, Missouri. The Routing Team ultimately removed this latter route alignment from further consideration because the benefits of paralleling the existing transmission lines through this area did not outweigh the likelihood of impacts associated with frequent diversions to avoid residences near Gallatin and

[2] A bluff is a steep cliff, or wall or rock or soil that borders a river or its flood plain.

Jamesport, multiple transmission line crossings, and crossings of several private and federal conservation easements and Pershing State Park.

Extensive federal, state, and private conservation areas line the banks of the Grand River just east of Highway 65. Two breaks in these conservation lands along the river were considered for crossing the Grand River and its floodplain forests. The first crossing was identified just north of the Swan Lake National Wildlife Refuge and south of the Town of Sumner. The second crossing was identified approximately ten miles south along the Rockies Express/Keystone Pipeline corridor.

East of the Grand River, Conceptual Routes were developed to avoid the Thomas Hill Reservoir and the conservation lands surrounding it by passing north or south around the reservoir. Conceptual Routes south of Thomas Hill Reservoir paralleled an existing 161 kV transmission line that angles southeast of the reservoir before turning east, just south of Cairo. Conceptual Routes north of Thomas Hill Reservoir avoided conservation lands and the Army National Guard's Macon Training Site, located just east of the reservoir.

In Monroe and Ralls Counties, Mark Twain Lake encompasses a large area of land that includes a state park, federal land managed by USACE, and a patchwork of private conservation easements. Conceptual Routes were developed north and south of the lake. Routes developed along the north side connected to potential Mississippi River crossings near Quincy, Illinois and Hannibal, Missouri. Routes that continued south of the lake—both through Monroe County and along the Rockies Express/Keystone Pipeline farther south in Audrain County—connected to potential river crossings near Hannibal, Louisiana, and Clarksville, Missouri.

The Routing Team considered numerous Mississippi River crossing locations during the Conceptual Route development phase, both north and south of St. Louis, from roughly Quincy, Illinois to Grand Tower, Illinois. Conceptual Routes in the northern portion of the Study Area fell within a 75-mile stretch of the Mississippi River from Quincy, Illinois, to Winfield, Missouri. Initial siting efforts focused on locations along the river with existing infrastructure crossings but soon expanded to consider all areas where residential development, sensitive habitats, public lands, and cultural resources were limited. Of the many Mississippi River crossings the Routing Team considered, five potential crossings were identified from which the preferred crossing location was ultimately selected (see Section 4.3.2, *Development of the Potential Route Network*, for a discussion of Mississippi River crossings).

In Illinois, the Routing Team developed a network of Conceptual Routes that continued east along existing transmission and pipeline corridors, and along section/parcel boundaries toward the Sullivan Substation. In general, land use in the area is agricultural with an increasing prevalence of forested lands between the Mississippi and Illinois Rivers and farther south near

St. Louis. Major communities in the northern portion of the Study Area in Illinois include Quincy, Jacksonville, Springfield, Chatham, Pana, and Effingham.

Minimal or easily avoidable large public land areas exist through this portion of the Study Area, and a range of opportunity features are available to develop Conceptual Routes across the state. However, in general, residential development tends to be higher in the northern portion of the Study Area in Illinois when compared to Missouri or Kansas.

At the northern extent of the northern Study Area, Conceptual Routes were developed to consider alignments from a crossing point near Quincy, Illinois, east along the existing Ameren 138 kV transmission lines that head east and south of Meridosia, north of Jackson, and southeast toward Pana. Conceptual Routes in the central portion of the northern Study Area extended from potential river crossings near Hannibal, Missouri (both north and south), and allowed for the consideration of alignments along I-72, portions of the Rockies Express corridor, and along parcel and section boundaries that gradually headed southeast toward Pana. Residential and commercial development along the interstate and the pipeline corridor between Pittsfield, Winchester, and south of Jacksonville, Illinois, made these features challenging for developing reasonable route alignments. Conceptual Routes in the southern portion of the northern Study Area extended eastward from the potential river crossings near Louisiana and Clarksville, Missouri, toward Pana and Oconee, Illinois. These Conceptual Routes were primarily developed along section and parcel boundaries due to a lack of suitable existing east/west linear corridors through this area.

The geographic distribution of the Conceptual Routes narrows as the routes continue east of the U.S. Highway 51 (between Pana and Oconee, Illinois) toward the eastern converter station, Indiana state line, and the Sullivan Substation. Through this area, routes were primarily developed to consider alignments along the 345 kV lines running southeast of Pana, and section and parcel boundary alignments immediately south.

4.2.2 Conceptual Routes—Central Portion of the Study Area

The central portion of the Study Area consists of those routes that generally followed the most direct path from the western converter station to Sullivan Substation, while still considering various opportunity features and avoiding constraints. As **Figures 4-1** and **4-3** show, Conceptual Route development efforts through this portion of the Study Area were greatly affected by almost every major metropolitan area, and its associated suburban development, in the Study Area.

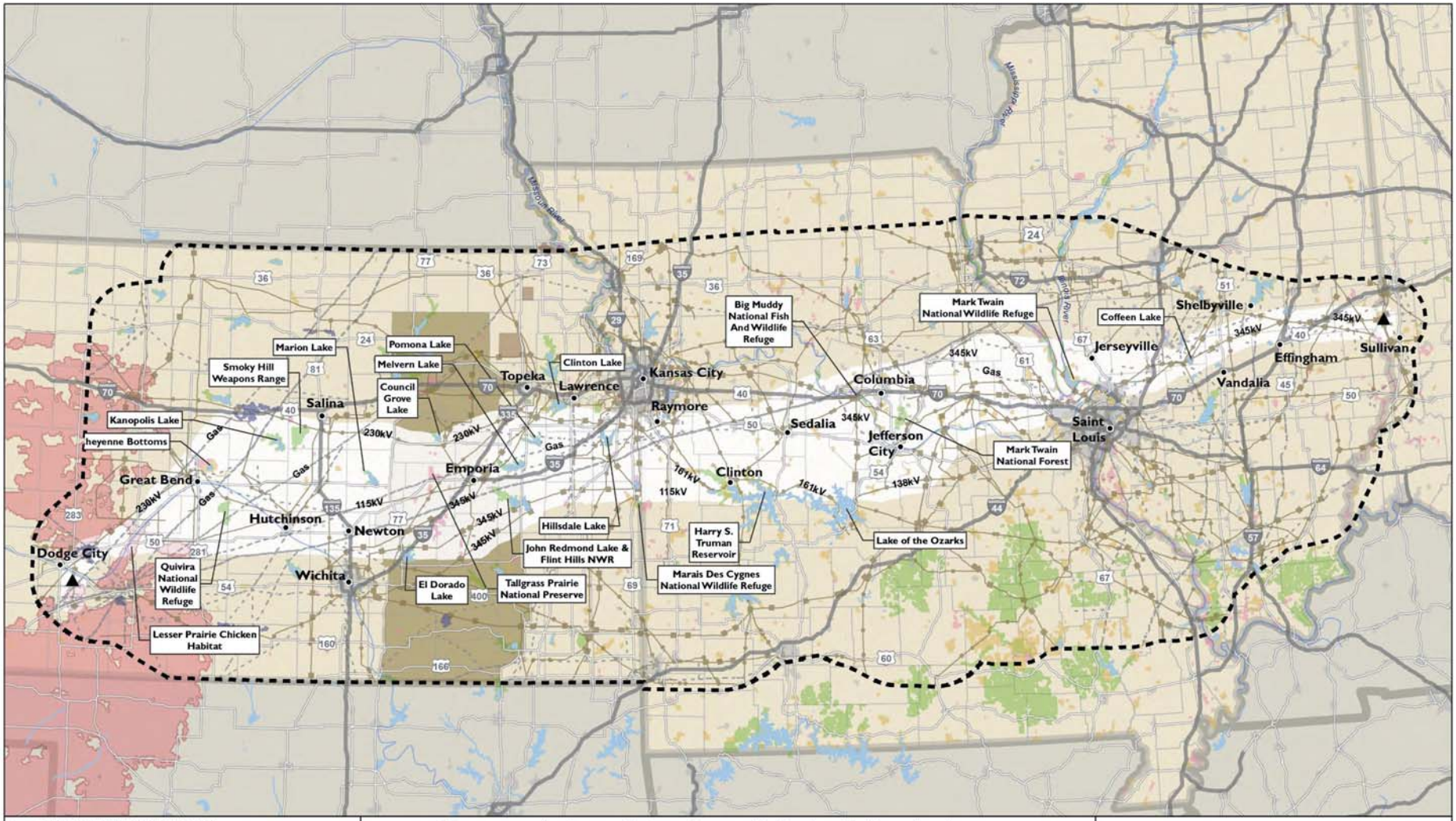
The primary path for exiting the western converter station in the central portion of the Study Area was along a 115 kV transmission line to Stafford. One other Conceptual Route was initially considered immediately south of Cheyenne Bottoms but was later eliminated due to concerns from KDWPT and USFWS (see Northern Conceptual Route Discussion).

From Stafford, Conceptual Routes either continued northeast to Hutchinson along existing transmission lines or due east along section/parcel boundaries for more than 75 miles to approximately 7 miles south of Newton, Kansas. The routes to Hutchinson continued north along an existing 345 kV line between Hutchinson and the Summit Substation and then east through the Tallgrass Heartland along existing transmission lines. Maintaining parallel alignments along this route became increasingly difficult as residential development adjacent to the existing line increased in the satellite communities south of Topeka and Kansas City.

Conceptual Routes from Newton continued either northeast across the Tallgrass Heartland parallel to an existing 345 kV line eventually connecting with the routes described above through Carbondale, Kansas, or east to parallel a 115 kV line across the Tallgrass Heartland. Continuing east of the Tallgrass Heartland, Conceptual Route development became encumbered by development protruding south of Kansas City and the Harry S. Truman Reservoir to the east and south. Attempts were made to develop Conceptual Routes through this area along existing transmission lines that connect the outer Kansas City suburbs of Gardner, Spring Hill, Raymore, and Pleasant Hill and along a pipeline that passes between Waverly, Kansas, and Holden, Missouri; however, these routes were later eliminated due to the spread and density of residential development and the numerous diversions from parallel alignments along transmission lines, pipelines, and section/parcel boundaries necessary to avoid individual residences.

East of the Kansas-Missouri state boundary and dense residential development south of Kansas City, the Conceptual Routes split with the northernmost routes following an existing gas pipeline corridor northeast toward Warrensburg, diverting to find a suitable crossing of the Missouri River and picking up the gas line corridor again north of the Missouri River and south of Franklin. The southernmost Conceptual Routes in this area attempted to follow 161 kV transmission lines around the north shores of the Truman Reservoir and Lake of the Ozarks, although frequent diversions from a parallel alignment were necessary due to residential development and recreational areas adjacent to the reservoirs. Additional Conceptual Routes were developed north of the lakes and south of Warrensburg and Sedalia, Missouri.

Conceptual Routes following the gas line corridor past Franklin continued north of Columbia and into the northern Conceptual Route area. Increased residential development linking Columbia, Jefferson City, and communities on the north shore of the Lake of the Ozarks and increased conservation land along the section of the Missouri River from Arrow Rock to Jefferson City decreased routing opportunities and suitable crossings of the Missouri River in this area. The Conceptual Routes that were developed followed primarily parcel boundaries or connected sections of existing transmission lines heading east or northeast for relatively short distances. The terrain between the reservoir complex in the south and the Missouri River in the north became increasingly more variable, and land use became more heavily forested as the Conceptual Routes proceeded east into the Ozark Mountains.



Sources: ESRI, NPS, USGS, USACE, USFWS, USDA-NRCS, US EPA, KDWPT, KPRA, KS DASC, KARS, KS Biological Survey, MODNR, MDC, ISGS, ILPRA, IL DNR, IN DNR, The Nature Conservancy

0 20 40 60 80 100 Miles

Coordinate System: North America Equidistant Conic
Projection: Equidistant Conic
Datum: North American 1983

N

- City
- Study Area
- Interstate
- U.S. Highway
- Gas Pipeline
- Converter Stations

Existing Transmission
- < 138 kV
- 138 kV - 230 kV
- > 230 kV

Conservation Land
- Local/Private
- State
- Tribal
- Federal
- Metropolitan Area
- Water Body
- Tallgrass Heartland
- Lesser Prairie Chicken Habitat CHAT Categories 1-3
- Wind Farm

Figure 4-3
Conceptual Route Development in the Central Portion of the Study Area

GRAIN BELT EXPRESS
CLEAN LINE

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The Conceptual Routes just north of the Lake of the Ozarks turned northeast along 69 kV and 138 kV transmission lines toward Jefferson City and Chamois or toward Owensville. Due east from there, the larger metropolitan area of St. Louis dominates the landscape with development extending far to the west and south of the city, preventing the development of Conceptual Routes in these areas. The Conceptual Routes crossed the Missouri River by Chamois and angled northeast across an increasingly agricultural landscape when compared to the Ozark region to the south.

As the Conceptual Routes approached the Mississippi River, the Routing Team identified existing transmission line crossings near Bolter Island and Iowa Island, due north of St. Charles. Conceptual Routes using existing transmission line crossings closer to St. Louis were not feasible due to the density of residential and commercial development outside of St. Louis and significant federal, state, and private conservation lands around the confluence of the Missouri, Mississippi, and Illinois Rivers.

Conceptual Routes in the central portion of the Study Area in eastern Missouri continued north to blend into the northern portion of the Study Area or crossed the Mississippi River at locations not occupied by public lands or historic communities. East of the Mississippi and Illinois Rivers, the Conceptual Routes converged south of Litchfield, Illinois, to parallel existing 345 kV transmission lines northeast toward Pana, Illinois, in the northern portion of the Study Area or east toward the eastern converter station, staying north of Effingham and south of Charleston, Illinois.

4.2.3 Conceptual Routes—Southern Portion of the Study Area

The southern portion of the Study Area includes routes north and south of Wichita, Kansas, north of Springfield, Missouri, and south of St. Louis. Constraints in the southern portion of the Study Area include: Wichita and its associated suburban areas, the extensive airfields in and around Wichita, the Tallgrass Heartland, the expansive Harry S. Truman reservoir, Lake of the Ozarks, Pomme De Terre, Stockton Lake, Mark Twain National Forest, and land administered by the Department of Defense and the National Park Service.

Conceptual Routes exiting the western converter station primarily followed either section lines through farm lands east of Wichita, and/or paralleled existing transmission lines north and south of the Wichita metropolitan area. Routing opportunities near Wichita were highly encumbered by the expansive suburbs both north and south of the city, as well as an abundance of airfields associated with Wichita's extensive aviation industry. These two factors led to routes that were developed either north along existing 345 kV lines that crossed midway between Wichita and Newton or south of the city along section/parcel boundaries 10 and 20 miles south of the city. As a result, Conceptual Routes were developed along each of the four 345 kV transmission lines east of Wichita that transect the Tallgrass Heartlands in this area (see **Figure 4-4**). Beyond the Tallgrass Heartlands, Conceptual Route alignments continued along

existing transmission lines or section/parcel boundaries. Although route development through this area was comparatively simple given the low number of residences and public lands, significant oil and gas development sites and numerous wind farms hindered route development in some areas.

The Conceptual Routes in southeastern Missouri were primarily developed along roads, section/parcel lines, and paralleling existing transmission lines. Land use in southwestern Missouri is similar to that in eastern Kansas with farms and grasslands primarily used for grazing. The prevalence of grassland areas was specifically noted by MDC as a focus for preservation of grassland/prairie habitat and reintroduction of greater prairie chickens in the area. The Routing Team attempted to avoid these areas and/or parallel existing transmission lines where possible through this area.

Continuing east, terrain becomes more variable with less land suitable for agricultural use and a greater proportion of land under forest cover. An increase in large parcels of publicly owned lands, recreational areas, and reservoirs coincides with this physiographic change and greatly affected Conceptual Route development. Most notably, the irregular sprawl of the extensive Harry S. Truman Lake of the Ozarks, Pomme De Terre, and Stockton Lake reservoirs significantly limited the potential for reasonable alignments south of Jefferson City and north of Springfield. Through this area, the most suitable alignments were either along the northern edge of the Harry S. Truman and Lake of the Ozarks reservoirs; weaving south of the Harry S. Truman and Lake of the Ozarks reservoirs and north of Stockton Lake and Pomme De Terre; or following a southern path along an existing 345 kV transmission line between Springfield, Missouri, and Stockton Lake.

Farther east, the large land holdings of the Mark Twain National Forest and interspersed holdings of the Department of Defense, National Park Service, and State of Missouri affected Conceptual Route development. Routes developed through this area primarily followed alignments that diverted either north of the main body of the Mark Twain National Forest (Houston/Rolla and Salem/Potosi Ranger Districts) or south along a trajectory between the National Forest System lands and the Ozark National Scenic Riverway. An alignment was also considered that loosely paralleled the north side of I-40 (along a lower voltage transmission line) for more than 150 miles. Direct parallel along I-40 was avoided because of the significant residential and commercial development along the path of the interstate and its role as part of the Historic Route 66 corridor. Remnants of this historic travel way through the Ozarks are found just off I-40 and have been designated as scenic roads by the State of Missouri.