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BEFORE THE TENNESSEE REGULATORY AUTHORITY
NASHVILLE, TENNESSEE

IN RE:

IN THE MATTER OF THE PETITION	)	
OF PLAINS AND EASTERN CLEAN	)	
LINE LLC FOR A CERTIFICATE OF	)	
CONVENIENCE AND NECESSITY	)	Docket No. 14-00036
APPROVING A PLAN TO	)	
CONSTRUCT A TRANSMISSION LINE	)	
AND TO OPERATE AS AN ELECTRIC	)	
TRANSMISSION PUBLIC UTILITY	)	

TESTIMONY OF JASON THOMAS
ENVIRONMENTAL DIRECTOR
CLEAN LINE ENERGY PARTNERS LLC

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Exhibits

I. QUALIFICATIONS

Q. Please state your name, present position and business address.

A. My name is Jason Thomas. I am the Environmental Director for Clean Line Energy Partners LLC. My business address is 1001 McKinney Street, Suite 700, Houston, Texas 77002.

Q. What are your duties and responsibilities as Environmental Director at Clean Line Energy Partners?

A. I oversee the environmental planning and permitting of over 3,000 miles of proposed high voltage transmission projects in several states. In this capacity, I maintain working relationships with the federal and state regulatory agencies and several non-governmental organizations.

I am an environmental scientist and planner by training and experience. I served as a member of the Routing Team for the Plains and Eastern Clean Line transmission Project ("Plains & Eastern Project" or "Project"), where I was directly involved in the development and analysis of potential routes for the high voltage direct current ("HVDC") transmission line, public outreach efforts, coordination with state and federal agencies, comparison of alternatives, and preparation of the Tennessee Route Selection Study ("Route Selection Study"), which is attached to my testimony as **Exhibit JT-1**.

Q. What is the purpose of your testimony?

A. I am testifying on behalf of Plains and Eastern Clean Line LLC ("Plains and Eastern") for the purpose of describing the proposed Plains & Eastern Project route in Tennessee. My testimony describes the routing process and serves to sponsor the Route Selection Study.

Q. Please summarize your education and professional background.

A. I am an environmental management professional with over 18 years of experience in a range of areas. I have successfully permitted and provided construction oversight on several complex linear projects, including high voltage transmission lines. I have extensive experience in environmental planning, natural resources, agency consultation, due diligence, regulatory compliance, and construction. I was employed in a role similar to my current one for NextEra Energy Resources, the largest owner and operator of wind generation in North America, supporting the development of wind, solar, transmission, and natural gas projects in several states. In that capacity, I managed environmental studies and permitting for over 2,800 MW of renewable energy projects, over 250 miles of transmission lines, and pipelines. My experience prior to NextEra includes over ten years of providing environmental consulting services for a wide range of private and public clients for transmission lines, pipelines, highways, infrastructure, and transit projects.

Q. Have you previously provided information to other regulatory bodies for proceedings or permit decisions similar to this one?

A. Yes. I have been directly involved in preparing applications and supporting environmental studies for several federal and state regulatory bodies, including, but not limited to, the U.S. Army Corps of Engineers, U.S. Forest Service, Bureau of Land Management, various state lands offices, and the Public Utility Commission of Texas.

II. THE ROUTE SELECTION STUDY

Q. Are you sponsoring the Route Selection Study?

A. I am. The Route Selection Study is attached as **Exhibit JT-1**.

Q. Please provide an overview of the Route Selection Study.

A. The Route Selection Study documents Plains and Eastern's process for the evaluation and selection of a Proposed Route (defined below) within the state of Tennessee. This study describes Plains and Eastern's data collection, agency coordination, stakeholder outreach, route development, alternative route comparison, and selection processes.

The goal of the Route Selection Study was to identify a Proposed Route that minimizes the overall effect of the transmission line on the natural and human environment, avoids circuitous routes and unreasonable costs, and minimizes special design requirements. To achieve this goal, Plains and Eastern sought to gain an understanding of the routing opportunities and sensitivities in a defined Study Area, to develop a network of potential corridors and routes, to further narrow these to feasible Alternative Routes, identify potential impacts, and to ultimately select a Proposed Route.

Q. Who performed the Route Selection Study?

A. Plains and Eastern employed a multi-disciplinary team of professionals, the "Routing Team," to undertake the routing process. This Routing Team included professionals with experience in transmission line route planning and selection; impact avoidance, minimization and mitigation; natural resource assessment; land use assessment and planning; cultural resource identification and assessment; and transmission engineering, design, and construction.

III. DESCRIPTION OF THE ROUTING PROCESS

Q. Please describe the terminology that you use to describe the routing process.

A. In describing the routing process, I will refer to several routing-related terms, including the following:

Study Area – The broad geographical area within which data gathering began and within which potential corridors were considered.

Candidate Corridors – Corridors within the Study Area, approximately five miles wide.

Corridor Network – Several intersecting Candidate Corridors.

Study Corridor – A five to eight-mile-wide corridor selected from segments of Candidate Corridors to represent the best opportunity for minimizing land use and environmental impacts. The Study Corridor was wider in some areas to provide more chances to minimize potential impacts or to follow existing linear features.

Network of Potential Routes – The series of intersecting routes (one-mile-wide) that Plains and Eastern presented to the U.S. Department of Energy ("DOE") for its use in the scoping process and review of the Project under the National Environmental Policy Act ("NEPA").

Alternative Routes – Four routes in Tennessee, each of which are generally 1,000 feet wide.

Proposed Route – A single route, selected from among the Alternative Routes, which is generally 1,000 feet wide. The eventual Proposed Right-of-Way (generally 150-to-200 feet in width) would be located within the Proposed Route.

Proposed Right-of-Way – An area approximately 200-feet wide within the Proposed Route, in which Plains and Eastern proposes to construct and operate the Plains & Eastern Project.

Routing Opportunities – Also referred to simply as "opportunities," these features include pre-existing linear infrastructure along which transmission line

development is considered generally compatible. Examples include roads, existing transmission lines, and existing pipelines.

Routing Sensitivities – Also referred to simply as "sensitivities," these include various resources that potentially limit or conflict with transmission line development. Examples include areas restricted by regulations or easements limiting transmission line development, pre-existing incompatible land uses, or other locations containing natural or man-made resources that are subject to protection and/or for which impacts are difficult to mitigate (e.g., threatened and endangered species habitat, residential and commercial development, cultural and historic resources, etc.).

General Guidelines and Technical Guidelines – Also referred to collectively as "guidelines" below, these informed the Routing Team during all phases of the route development process. The General Guidelines take into account routing opportunities and sensitivities. They are intended to minimize conflicts with existing resources, developed areas, and existing incompatible infrastructure; maximize opportunities for paralleling existing compatible infrastructure; and take into consideration land use and other factors affecting route identification. The Technical Guidelines are specific to the Project and are based on technical limitations related to Project design, right-of-way requirements, and reliability concerns. The Technical Guidelines are informed by: (1) technical expertise of industry professionals (e.g., civil, structural, and electrical engineers; transmission planners; and other project managers) responsible for the reliable and economical construction, operation, and maintenance of the Project and other electric system facilities with which the Project interconnects; (2) North American Electric Reliability

Corporation reliability standards; and (3) industry best practices. The guidelines are presented in detail in **Exhibit JT-1**, Section 2.5.

Q. Prior to commencing the route development process, how did Plains and Eastern determine endpoints for the HVDC transmission line?

A. Prior to the route development process, Plains and Eastern studied potential endpoints for the HVDC transmission line. Plains and Eastern determined the Oklahoma endpoint based on the presence of excellent wind resources, proximity to an existing high-voltage transmission system, and compatible land use and environmental sensitivities for siting the transmission line and the new wind generation enabled by the Project. Plains and Eastern identified the Tennessee endpoint based on the following factors: engineering and interconnection considerations, including its proximity to existing transmission facilities capable of reliable interconnection and delivery of up to 3,500 MW of energy to points in Tennessee and elsewhere in the Mid-South and Southeast; the level of potential upgrades required to accommodate the Project; historical congestion and market access; and land use and environmental siting considerations. After completing detailed interconnection analyses, including interconnection studies with Tennessee Valley Authority ("TVA"), Clean Line selected TVA's Shelby Substation as the endpoint in Tennessee. Mario Hurtado provides further detail regarding the selection of the Shelby Substation in his testimony.

Q. Please summarize Plains and Eastern's process for route development.

A. The Routing Team employed an iterative route development process to identify a Proposed Route in Tennessee that included identifying a study area, developing routes, reviewing routes with respect to information gathered from state and federal regulatory

agencies, community leaders, and the general public, and refining routes based on available information. The first phase involved the Routing Team identifying a Network of Potential Routes across three states (Oklahoma, Arkansas, and Tennessee). The second phase focused on identifying Alternative Routes in Tennessee. The Routing Team then selected a Proposed Route in Tennessee by comparing Alternative Routes using the criteria and guidelines presented in **Exhibit JT-1**.

Q. Please describe the first phase of route development.

A. Starting with the proposed endpoints, the Routing Team began the route development process by including all of Oklahoma and Arkansas, and portions of Kansas, Missouri, Texas, Mississippi, and Tennessee in a Study Area for the HVDC transmission line. The Routing Team developed five Study Area Siting Criteria based on known routing opportunities and routing sensitivities within the Study Area. Please refer to **Exhibit JT-1**, Appendix E, Table E-1 for the Study Area Siting Criteria.

The next step in the route development process was the development of five-mile-wide Candidate Corridors between endpoints in the Study Area in Oklahoma, Arkansas, and Tennessee. The Candidate Corridors generally followed large-scale opportunities, such as existing transmission lines, pipelines, and highway rights-of-way, and avoided known large-scale or concentrations of sensitivities, such as population centers. Plains and Eastern presented the Candidate Corridors during stakeholder outreach to solicit feedback.

Following additional stakeholder outreach, the Routing Team analyzed a network of Candidate Corridors, called the Corridor Network, with the goal of selecting a five to eight-mile-wide Study Corridor. The Routing Team developed a more detailed and

refined list of 27 Study Corridor Siting Criteria for evaluating the Corridor Network. Please refer to **Exhibit JT-1**, Appendix E, Table E-2 for the Study Corridor Siting Criteria. The Routing team used a combination of the General and Technical Guidelines, refined criteria, and stakeholder input with the goal of avoiding and minimizing potential impacts to sensitivities. While complete avoidance of all sensitivities was not possible, the Routing Team selected the Study Corridor because it represented the best opportunity to minimize land use and environmental impacts.

Next, the Routing Team developed a more detailed and refined list of 58 criteria for developing and evaluating the Route Network. Please refer to **Exhibit JT-1**, Appendix E, Table E-3 for a list of the criteria used to develop and evaluate the Route Network. The Routing team developed the Route Network within and near the Study Corridor by following the guidelines and applying these criteria. During this step, Plains and Eastern also conducted Open House meetings throughout the Project area, including meetings in Atoka and Munford, Tennessee.

As the route selection process continued, the Routing Team sought to refine the routes down to a Network of Proposed Routes that were proposed to the DOE for inclusion in their scoping process. The Routing Team used a decision-making process that included consideration of the guidelines, Route Network criteria, and stakeholder feedback. The Network of Potential Routes consisted of a network of one-mile-wide corridors within and near the Study Corridor. The Network of Potential Routes was the subject of public review and comments in the NEPA scoping process, including at a scoping meeting held in Atoka, Tennessee.

Q. Please describe the second phase of route development.

A. The second phase in identifying potential routes for the HVDC transmission line was to identify Alternative Routes. Following the conclusion of the DOE's scoping process, the Routing Team began this phase with the Network of Potential Routes and ended with the identification of Alternative Routes for further evaluation.

Following the conclusion of the DOE's NEPA scoping process, the Routing Team revisited comments received during Plains and Eastern's stakeholder outreach and reviewed the DOE's Scoping Summary Report. Using these comments, with input from the DOE, the Routing Team developed a more detailed and refined list of over 70 siting criteria for the identification of the Alternative Routes and selection of the Proposed Route. These criteria are presented in **Exhibit JT-1**, Appendix F. The Routing Team then applied the guidelines and these criteria to identify 1,000-foot-wide preliminary Alternative Routes based on two potential Mississippi River crossings. The Routing Team examined ways to minimize potential impacts to: known residential areas and planned developments associated with the cities of Munford, Atoka, Tipton, and Millington; designated forested wetlands; and public and private airports. Members of Routing Team also conducted aerial reconnaissance by helicopter in August 2013 to verify field conditions and determine the need for any adjustments to the preliminary Alternative Routes.

An important step in this process was the selection of Plains and Eastern's preferred Mississippi River crossing to determine a western endpoint in the state of Tennessee. The selection of a preferred crossing location included consideration of opportunities and sensitivities in Mississippi County, Arkansas, and in Tipton and Shelby

Counties in Tennessee. The northern crossing is north of Drummonds and west of the existing Shelby to Sans Souci 500 kV transmission line. The southern crossing is near Frenchman's Bayou.

The Routing Team preferred the southern Mississippi River crossing for a number of environmental and engineering reasons. The southern crossing would result in fewer potential environmental impacts as compared to the northern crossing. For example, the southern crossing resulted in routes that intersected approximately two fewer miles of floodplains in Tennessee, intersected three fewer miles of agricultural lands in Tennessee, and reduced proximity to eight recorded cultural and historic sites in Tennessee and Arkansas. The southern Mississippi River crossing was also preferred from an engineering perspective. For example, the approximate span length across the river at the southern crossing would be 3,400 feet, which is 700 feet shorter than the 4,100-foot-wide northern crossing. Due to this shorter span, this southern crossing would also require comparatively shorter support structures.

After selection of the southern Mississippi River crossing, the Routing Team established it as the western endpoint for an evaluation of Alternative Routes in Tennessee. All Alternative Routes begin at the Tennessee state line on the west bank of the Mississippi River and use the southern crossing. The eastern endpoint for the Tennessee portions of the Project was the Shelby Substation in Shelby County. The Routing Team identified four possible combinations of Alternative Routes in Tennessee between these endpoints.

Q. How was agency input incorporated into the route selection process?

A. The Routing Team coordinated with numerous federal and state agencies and local officials to gather information for the route planning process. Initial agency coordination efforts focused on introductions to the Project, data gathering, and discussions concerning likely permitting and consultation requirements. Discussions aided Plains and Eastern in the identification of sensitivities and informed the development of the guidelines. **Exhibit JT-1**, Section 3.0 lists the agencies consulted during the route development process.

Q. How was public input incorporated into the route selection process?

A. Plains and Eastern led a community outreach program designed to communicate the purpose and benefits of the Project, inform community leaders and the public about the regulatory process and Project timeline, gather comments on the Project, and solicit information that would inform the route development and siting process.

As part of this outreach program, Plains and Eastern held county roundtable meetings and public open houses. Specifically, the goals of those meetings included the following: to introduce the Project to attendees; to present a Project overview and anticipated schedule; to discuss the Routing Team's siting criteria and methodology; and to outline the environmental review process, with an emphasis on opportunities for public input. The meetings also included a map review session, during which Plains and Eastern presented one-mile-wide corridors to stakeholders to gain feedback on opportunities and sensitivities to consider during route development. Please see the testimony of Mario Hurtado for a more detailed description of the public outreach program.

IV. IDENTIFICATION OF THE PROPOSED ROUTE

Q. Summarize the alternatives analysis process and the primary reasons for selecting the Proposed Route.

A. The Routing Team evaluated and compared four Alternative Routes by applying the siting criteria as presented in **Exhibit JT-1**, Appendix F. These criteria addressed three categories: (1) potential impacts to the natural environment, (2) potential impacts to human environment, and (3) engineering considerations. For each of these three categories, the Routing Team determined that Alternative Route A best met the goal of minimizing impacts on the natural and human environments while avoiding circuitous routes, unreasonable costs, and non-standard design requirements.

When considering potential impacts to the natural and human environment and without discounting other criteria, the Routing Team found it important to consider potential impacts in Tennessee to existing homes, agricultural production, wetlands, floodplains, and state natural heritage occurrence records. Alternative Route A best minimized potential impacts on the human environment because it had no residential structures within 100 feet of the centerline, had the fewest residential structures within 500 or 1,000 feet, and intersected the least amount of agricultural lands. Additionally, Alternative Route A had the least number of nearby recorded archaeological sites and had no cemeteries within 500 feet. Alternative Route A best minimized potential impacts on the natural environment because it intersected the least amount of wetlands, intersected the least amount of floodplains, and had the fewest number of nearby state natural heritage occurrence records. Alternative Route A intersected two water bodies, one more than Alternative Route C, but fewer than Alternative Route D. **Exhibit JT-1** describes

the alternatives comparison in detail and provides supporting data for all criteria, including those not mentioned here.

Based on this evaluation, the Routing Team recommended Alternative Route A as the Proposed Route for the Project in Tennessee. Plains and Eastern selected the Proposed Route based on the Routing Team's application of the guidelines, evaluation of stakeholder comments, and application of the siting criteria.

Q. Does the Proposed Route represent a reasonable route for the Project?

A. Yes. The Proposed Route is a reasonable route because it is a result of an interdisciplinary and rational process that integrated input from regulatory agencies, local officials, and the public into the progressive stages of route development, analysis, and selection. Plains and Eastern's routing process is consistent with the transmission line siting principles followed by the TVA, other federal electric utility entities, and common electric utility practice. This process resulted in the selection of a Proposed Route that best minimizes impacts on the natural and human environments while avoiding circuitous routes, unreasonable costs, and non-standard design requirements.

V. REQUEST FOR APPROVAL OF A PROPOSED RIGHT-OF-WAY

Q. Please describe the process following selection of the Proposed Route to identify the Proposed Right-of-Way.

A. Plains and Eastern used the criteria in **Exhibit JT-1**, Appendix F, to assist in determining the location of a Proposed Right-of-Way within the 1,000-foot-wide Proposed Route. Plains and Eastern also completed preliminary engineering studies to optimize the location of the Proposed Right-of-Way, the Mississippi River Crossing, and the interconnection location near the Shelby Substation. Additionally, Plains and Eastern

worked with landowners along the Proposed Route to determine a mutually agreeable location for the Proposed Right-of-Way that best balanced engineering considerations, siting criteria, and landowner preferences. This process resulted in the identification of the Proposed Right-of-Way, which is depicted in the map attached as **Exhibit C** to Plains and Eastern's Petition, and on which Plains and Eastern is seeking approval to construct the HVDC transmission line for the Plains & Eastern Project in Tennessee.

Q. Please describe the Proposed Right-of-Way over which Plains and Eastern is requesting approval from the Authority to construct and operate the HVDC transmission line for the Plains & Eastern Project.

A. Plains and Eastern requests from the Authority the approval to construct and operate the Project's HVDC transmission line within the Proposed Right-of-Way depicted in the map attached as **Exhibit C** to Plains and Eastern's Petition in this docket. The Proposed Right-of-Way is depicted as 200 feet wide. Plains and Eastern anticipates that the typical width of the transmission line easement will be between 150 and 200 feet, which allows for the construction, maintenance and safe operation of the Project. The Proposed Right-of-Way is consistent with the route that Plains and Eastern has identified to DOE as the applicant-proposed route for consideration in the NEPA process.

Q. Does this conclude your testimony?

A. Yes, it does.

I swear that the foregoing testimony is true and correct to the best of my knowledge, information and belief.

Jason Thomas
Environmental Director
Clean Line Energy Partners LLC

STATE OF TEXAS :

COUNTY OF HARRIS :

Sworn and subscribed before me this 3 day of April, 2014.

Notary Public
My Commission Expires: 7-22-2015

EXHIBIT JT-1: Tennessee Route Selection Study

Route Selection Study

In Support of Filing before the Tennessee Regulatory Authority

for the

PLAINS & EASTERN

CLEAN LINE

March 2014

Prepared for:

Plains and Eastern Clean Line LLC

Prepared by:

ecology and environment, inc.
Global Environmental Specialists

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List of Tables

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List of Figures

Appendix A, "Figures," contains all of the figures.

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Acronyms and Abbreviations

AC	alternating current
BPA	Bonneville Power Administration
CCN	certificate of public convenience and necessity
DC	direct current
DOE	United States Department of Energy
E & E	Ecology and Environment, Inc.
EIS	environmental impact statement
ESRI	Environmental Systems Resource Institute
GIS	geographic information system
HVDC	high-voltage direct current
kV	kilovolt(s)
MISO	Midcontinent Independent System Operator
MW	megawatt(s)
NEPA	National Environmental Policy Act
NWI	National Wetlands Inventory
OPGW	optical ground wire
Plains and Eastern	Collectively, Plains and Eastern Clean Line LLC and Plains and Eastern Clean Line Oklahoma LLC, which are subsidiaries of Clean Line Energy Partners LLC.
Project	Plains & Eastern Clean Line transmission project
RFP	Request for Proposals
ROW	right-of-way
SR	State Route
TDEC	Tennessee Department of Environment and Conservation
Tenn. Code Ann.	Tennessee Code Annotated
TRA	Tennessee Regulatory Authority
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
USFWS	United States Fish and Wildlife Service
WAPA	Western Area Power Administration

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1.0 Introduction

Plains and Eastern Clean Line LLC and its affiliate Plains and Eastern Clean Line Oklahoma LLC (collectively, "Plains and Eastern") are proposing to construct, own, and operate the Plains & Eastern Clean Line transmission project (the Project). This report summarizes the decision-making process Plains and Eastern used to identify potential routes for the high-voltage direct current (HVDC) transmission line that led to the selection of the Proposed Route in Tennessee.

This document provides an overview of the Project, an overview of the routing process, a summary of stakeholder outreach meetings, a summary of the route development process and the Alternative Routes, an evaluation and comparison of the Alternative Routes, and identification of the Proposed Route and the rationale for its selection. The report includes appendices containing all figures (Appendix A); a list of the Routing Team members (Appendix B); a summary of stakeholder comments pertaining to routing (Appendix C); copies of Plains and Eastern's public notices for Open Houses (Appendix D); detailed descriptions of the Project-wide Siting Criteria (Appendix E); and a detailed description of the siting criteria used for the identification of the Alternative Routes and selection of the Proposed Route (Appendix F).

1.1 Project Overview

The proposed Project is an overhead ± 600 kilovolt (kV) HVDC electric transmission system and associated facilities with the capacity to deliver approximately 3,500 megawatts (MW) from renewable energy generation facilities in the Oklahoma Panhandle region to load serving entities in the Mid-South and southeastern United States via an interconnection with the Tennessee Valley Authority (TVA) in Tennessee. Plains and Eastern is also considering an interconnection to the Midcontinent Independent System Operator (MISO) in Arkansas.

A summary of the Project's major facilities and improvements follows:

- **Converter Stations:** Alternating current (AC)/direct current (DC) converter stations at each end of the transmission line. Plains and Eastern proposes to locate the endpoint converter stations in Texas County, Oklahoma, and Shelby County, Tennessee. Plains and Eastern is considering an intermediate converter station in Pope or Conway County, Arkansas. At each converter station, AC transmission lines will be required for interconnection to the existing grid.
- **HVDC Transmission Facilities:** A ± 600kV HVDC overhead electric transmission line with the capacity to deliver approximately 3,500 MW. Components of the HVDC transmission facilities include:
    - Tubular and lattice steel structures used to support the transmission line.
    - Communications/control and protection facilities (optical ground wire [OPGW] and fiber optic regeneration sites).
    - Right-of-way (ROW) easements for the transmission line, with a typical width of approximately 150 to 200 feet.
    - The Proposed Route for the HVDC transmission line in Tennessee is 16.44 miles.

- **AC Collection System Facilities:** To facilitate efficient interconnection of wind generation, four to six AC collection transmission lines of up to 345kV from the Texas County converter station to points in the Oklahoma Panhandle region. Components of the AC facilities include:
  - Tubular or lattice steel structures used to support the transmission line.
  - Communications/control and protection facilities.
  - ROW easements for the transmission line with a typical width of approximately 150 to 200 feet.
- **Access Roads:** To access the Project facilities and work areas during the construction and operation phases, Plains and Eastern will use existing public and private roads and construct new, private access roads as needed.
- **Temporary Construction Areas:**
  - Temporary construction areas such as multi-use construction yards, fly yards, tensioning and pulling sites, and wire-splicing sites.
  - To access the Project facilities and work areas during the construction phase, Plains and Eastern will use existing public and private roads and construct temporary roads.

2.0 Routing Process

Plains and Eastern began the routing process by framing a large Study Area, which it narrowed to a Network of Potential Routes, and subsequently identified Alternative Routes and selected the Proposed Route. This occurred through an iterative process of applying progressively more detailed and restrictive siting criteria, using general and technical guidelines, and taking into consideration stakeholder comments. Plains and Eastern's routing process is consistent with the transmission line siting principles followed by the TVA, other federal electric utility entities[1] and common electric utility practice.

2.1 Goal of the Route Selection Study

This Route Selection Study documents the iterative process Plains and Eastern used to identify the Alternative Routes and subsequently select the Proposed Route for the portion of the Project located in Tennessee. The goal of the Route Selection Study was to identify a Proposed Route that minimizes the overall effect of the transmission line on the natural and human environment, avoids circuitous routes and unreasonable costs, and minimizes special design requirements. To achieve this goal, Plains and Eastern sought to gain an understanding of the routing opportunities and sensitivities in a defined Study Area, develop a network of potential corridors and routes, further narrow these to feasible Alternative Routes, identify potential impacts, and ultimately select a Proposed Route.

2.2 Routing Team

Plains and Eastern employed a multi-disciplinary team of professionals, referred to hereinafter as the "Routing Team," to undertake the routing process. This team included professionals with experience in transmission line route planning and selection; impact avoidance, minimization and mitigation; natural resource assessment; land use assessment and planning; cultural resource identification and assessment; and transmission engineering, design, and construction. The Routing Team is comprised of a combination of Clean Line Energy Partners employees and representatives from a technical support team, including members from Ecology and Environment, Inc. (E & E) (general environmental consultant); SWCA Environmental Consultants (cultural and historical resources consultant); and Pike Energy Solutions (engineering and construction consultant). Appendix B provides a list of the individuals on the Routing Team.

2.3 Terminology

Through the routing process, the Routing Team developed the following terms to describe elements of the routing process:

- *Study Area* – The broad geographical area within which data gathering began and within which potential corridors were considered.
- *Candidate Corridor* – A corridor within the Study Area, approximately 5 miles wide.
- *Corridor Network* – Several intersecting Candidate Corridors.
- *Study Corridor* – A 5- to 8-mile-wide corridor selected from among the Candidate Corridors.

[1] For example, the Rural Utility Service (Basin Electric 2012), Western Area Power Administration (WAPA 2010) and Bonneville Power Administration (BPA 2010) use similar route development processes, siting criteria, and alternatives analysis.

- *Network of Potential Routes* – The series of intersecting routes (1-mile-wide corridors) that was presented by the DOE for review in the National Environmental Policy Act (NEPA) scoping process.
- *Alternative Routes* – Four routes in Tennessee that are generally 1,000 feet wide. This report identifies, evaluates, and compares these routes for the purposes of selecting a Proposed Route.
- *Proposed Route* – A single route in Tennessee, selected from among the Alternative Routes, that is generally 1,000 feet wide. This route represents the area within which Plains and Eastern's proposed ROW would be located. The eventual ROW (typically 150 feet to 200 feet wide) would be located within the Proposed Route.
- *Routing Opportunities* – Also referred to simply as opportunities, these features include pre-existing linear infrastructure along which transmission line development is considered generally compatible. Examples include roads, existing transmission lines, and existing pipelines.
- *Routing Sensitivities* – Also referred to simply as sensitivities, these include various resources that potentially limit or conflict with transmission line development. Examples include areas restricted by regulations or covenants/easements limiting transmission line development, pre-existing incompatible land uses, or other locations containing natural or man-made resources that are subject to protection and/or for which impacts are difficult to avoid or minimize (e.g., threatened and endangered species habitat, residential and commercial development, cultural and historic resources, etc.).

The following terms correspond to agency and public outreach events that occurred during and informed the route development process in Tennessee. Section 3, "Agency and Public Outreach," describes the agency and public outreach events in more detail.

- *Agency Pre-Design Meeting:* Meeting conducted by Plains and Eastern to provide federal and state of Tennessee regulatory agencies Project-related information and solicit input on opportunities and sensitivities to inform the Routing Team's development of the Study Corridor.
- *Agency Pre-Permitting Meeting:* Meeting conducted by Plains and Eastern to provide federal and state of Tennessee regulatory agencies Project-related information and solicit input on opportunities and sensitivities to inform the Routing Team's development of the Network of Potential Routes.
- *County Roundtable:* Meeting conducted by Plains and Eastern with community leaders to provide Project-related information and solicit input on opportunities and sensitivities to inform the Routing Team's development of the Network of Potential Routes.
- *Open House:* Meeting conducted by Plains and Eastern with the public to provide Project-related information and solicit input on opportunities and sensitivities to inform the Routing Team's development of the Network of Potential Routes.
- *DOE Scoping Meeting:* Meeting conducted by the DOE with the public to determine the scope of issues to be addressed in the EIS and solicit input on opportunities and sensitivities to inform the Routing Team's development of Alternative Routes.

2.4 Process Steps

The Routing Team undertook the process steps listed below to identify and select the Proposed Route in Tennessee. These steps are described in detail in Section 4, "Route Development."

- Study Area Development;
- Identification of Candidate Corridors;
- Identification of Corridor Network;
- Selection of Study Corridor;
- Identification of Network of Potential Routes;
- Identification of Alternative Routes; and
- Selection of the Proposed Route.

As described in Section 3, "Agency and Public Outreach," Plains and Eastern conducted outreach to regulatory agencies, the general public, and other stakeholders throughout the routing process in order to inform them about the Project, gain high-level routing information, and gather feedback on the criteria and routes being considered.

2.4.1 Routing Opportunities and Sensitivities

Throughout the siting process, the Routing Team evaluated potential routes using criteria that included a set of routing opportunities and sensitivities. The Routing Team developed and refined siting criteria during each iterative phase of routing and defined the specific opportunities and sensitivities to be examined during the Routing Process. As the precision increased with each iterative process step, the Routing Team applied more detailed criteria to identify sensitivities and opportunities. Appendices E and F contain the siting criteria for each iterative routing phase.

2.5 General and Technical Guidelines

The Routing Team developed General and Technical Guidelines for use throughout the routing process.

The General Guidelines take into account routing opportunities and sensitivities. They are intended to minimize conflicts with existing resources, developed areas, and existing incompatible infrastructure; maximize opportunities for paralleling existing compatible infrastructure; and take into consideration land use and other factors affecting route identification.

The General Guidelines consist of the following:

- Utilize existing linear corridors to the extent practicable;
- Utilize areas with land uses/land cover that are consistent or compatible with linear utility uses, such as existing utility corridors and open lands, to the extent practicable;
- Avoid existing residences;
- Avoid nonresidential structures, including barns, garages, and commercial buildings;
- Minimize interference with the use and operation of existing schools, known places of worship, and existing facilities used for cultural, historical, and recreational purposes;
- Avoid cemeteries or known burial places;

- Minimize adverse effects to economic activities (e.g., impacts to existing residences, businesses, and developed areas);
- Minimize crossing of designated public resource lands, including, but not limited to, national and state forests and parks, large camps and other recreation lands, designated battlefields or other designated historic resources and sites, and state-owned wildlife management areas;
- Minimize crossings of tribal trust lands and allotments;
- Minimize the number and length of crossings of large lakes, major rivers, large wetland complexes, and other sensitive water resources;
- Minimize adverse effects on protected species habitat and on other identified sensitive natural resources (e.g., forested areas, native prairies, and other areas identified by Natural Heritage Commissions);
- Minimize visibility of transmission lines from residential areas and visually sensitive public locations (e.g., public parks, scenic routes or trails, and designated Wild and Scenic Rivers);
- Avoid areas of past environmental contamination; and
- Minimize route length, circuity, special design requirements, and impractical construction requirements.

The Technical Guidelines are specific to the Project. They are based on technical limitations related to Project design, ROW requirements, and reliability concerns. The Technical Guidelines are informed by: (1) technical expertise of industry professionals (e.g., civil, structural, and electrical engineers; transmission planners; and other project managers) responsible for the reliable and economical construction, operation, and maintenance of the Project and other electric system facilities with which the Project interconnects; (2) North American Electric Reliability Corporation reliability standards; and (3) industry best practices.

The Technical Guidelines consist of the following:

- Minimize the crossing of existing transmission lines, particularly crossings of 345kV or above;
- Minimize paralleling corridors with more than one existing circuit of 345kV or above;
- Maintain 200 feet of centerline-to-centerline separation when paralleling existing transmission lines of 345kV or above;
- Maintain 150 feet of centerline-to-centerline separation when paralleling 138kV or lower voltage transmission lines;
- Minimize turning angles in the transmission line greater than 65 degrees;[2]
- Minimize the length of the transmission line located on slopes greater than 20 percent; and
- Minimize underbuild[3] or double circuit arrangements with existing AC infrastructure.

[2] The degrees expressed here represent the angle of a turn measured from a straight line. For example, a straight line is 0 degrees and a light angle would be 3 to 4 degrees.

[3] "Underbuild" refers to conductors from other circuits placed on the same structure, but below HVDC conductors.

2.6 Data Collection

This section describes the sources of information that the Routing Team used to support the Tennessee Route Selection Study. The Routing Team collected data from a variety of sources, including paper-based maps, aerial photography, information from stakeholders, and field reconnaissance.

2.6.1 Digital Aerial Photography

Aerial photography is an important tool for route evaluation. The primary sources of aerial imagery used in the route development effort for the Project included:

- 2010 color aerial photography produced by the National Agricultural Imagery Program (NAIP), and
- 2013 color aerial photography produced by Environmental Systems Research Institute (ESRI).

The Routing Team reviewed aerial photography from these sources using Geographic Information System (GIS) software (ArcMap v10). Updated information, such as the location of residences, other structures, and other constraints, was annotated to the photography by using either paper maps (e.g., from information gathered at public meetings) and transferred into the GIS, or by digitizing the data directly into the GIS during field inspections. Key features, such as residences, outbuildings, places of worship, cemeteries, and commercial and industrial areas, were identified and mapped in GIS using aerial photography.

2.6.2 GIS Data Sources

The Routing Team used information from existing GIS data sets from many sources, including federal, state, and local governments. This included state-owned lands from the Tennessee Wildlife Resources Agency (TWRA) and the Tennessee Department of Environment and Conservation (TDEC); and sensitive species known occurrences from the Tennessee Natural Heritage Program. Clean Line also gathered GIS data in the form of map-specific comments from Tennessee regulatory agencies during outreach. The Routing Team obtained most of this information from official agency GIS data websites and/or directly from government agencies.

A GIS is an effective tool for planning studies, identifying landscape-level opportunities and sensitivities, and comparing environmental issues across alternatives. Due to variations in the age and specificity of some GIS data, however, the Routing Team exercised professional judgment when evaluating and interpreting the data and comparing alternatives.

2.6.3 Route Reconnaissance

In August 2012, Routing Team members examined potential routes in the field by automobile from points of public access. During this reconnaissance, they correlated observed features to information identified on aerial photography, digital United States Geological Survey 7.5 minute topographic maps, road maps, and GIS sources. The members of the field reconnaissance team took special care to identify residential structures and confirm those previously identified from aerial photography. All residences were assumed to be occupied unless the structure was obviously uninhabitable. The field teams verified and added these features to the GIS database.

In August 2013, a field team conducted aerial reconnaissance by helicopter to examine the preliminary Alternative Routes and determine the presence or absence of features that were not visible from aerial photography and/or ground-based reconnaissance.

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3.0 Agency and Public Outreach

An integral part of the routing process was meeting with agencies and other stakeholders to provide Project-related information and to solicit their input to the route siting process. Sections 3.1 and 3.2 describe specific meetings and outreach events conducted by Plains and Eastern in Tennessee. In addition to Plains and Eastern's outreach for the Project, the DOE is conducting a NEPA review of the Project. Section 3.3, "DOE Scoping Meetings," summarizes the DOE scoping process in Tennessee.

3.1 Regulatory Agency Coordination

Plains and Eastern coordinated with regulatory agencies to solicit their input on the Project. This section describes the regulatory agencies consulted, meeting schedule and goals, meeting format, and post-meeting activities. In December 2010, Plains and Eastern initiated preliminary outreach to federal and state agencies requesting agency input on the Project. Plains and Eastern subsequently conducted agency outreach meetings in Tennessee in March 2011 and September 2012.

Plains and Eastern met with the following agencies in Memphis, Tennessee, on March 22, 2011:

- United States Army Corps of Engineers (Memphis District);
- United States Department of Agriculture Natural Resources Conservation Service;
- Tennessee Division of Environment and Conservation, Water Pollution Control;
- Tennessee Department of Transportation; and
- TWRA.

Plains and Eastern met with the following agencies in Memphis, Tennessee, on September 20, 2012:

- United States Department of Energy;
- United States Army Corps of Engineers (Memphis District);
- United States Fish and Wildlife Service (USFWS);
- Tennessee Department of Transportation;
- TWRA; and
- TDEC.

The goals of the March 2011 agency meeting were to initiate preliminary agency outreach, present a Project overview and anticipated schedule, discuss the Routing Team's siting criteria and methodology, and gather input to inform the route siting process. Additionally, Plains and Eastern solicited input on potential permits, environmental concerns, the Study Area and Candidate Corridors. The goals of the September 2012 agency meeting were to provide a Project overview, a status update, and a review of the routing process to date. Plains and Eastern presented 5-mile-wide (March 2011) and 1-mile-wide (September 2012) corridors at map review sessions during which agency representatives commented on routing opportunities and sensitivities to consider.

Plains and Eastern's agency meetings included several Plains and Eastern representatives and seven to nine agency staff attendees. Meetings were held at the TDEC's Memphis office. Plains and Eastern provided the invited agencies with a meeting agenda and preliminary permit table for their review prior to the meetings. An information packet containing the agenda, permit table, and other information was distributed during the meeting.

Plains and Eastern's presentation introduced the company and provided background and technical information. They also described the current siting criteria and routing process. During the meeting, agency personnel were encouraged to ask questions, provide input, comment on the corridor maps, review a draft permit table, and identify potential siting opportunities and sensitivities.

After each agency meeting, Plains and Eastern mapped and digitized geographic-specific comments to inform the routing process. After each agency meeting, Plains and Eastern distributed draft and final meeting summaries to ensure accuracy of the information and comments recorded. A summary of comments received during the agency outreach meetings appear in Appendix C.

3.2 Community and Stakeholder Outreach

Plains and Eastern conducted County Roundtable meetings and public Open Houses. This section details the meeting schedule and goals, meeting format, and post-meeting activities.

Plains and Eastern conducted three County Roundtable meetings in Tipton County, Tennessee, during October 2012 (see Table 3-1, "Schedules and Locations of County Roundtables"). Plains and Eastern invited representatives of Tipton and Shelby county commissions, county government agencies, and planning departments to attend these meetings.

Table 3-1
Schedules and Locations of County Roundtables

Date	Meeting Location
Monday October 29, 2012 5:00–6:30 pm	Munford Fire Station 1375 Munford Avenue Munford, Tennessee 38058
Tuesday, October 30, 2012 7:00–8:30 am	Poplar Grove United Methodist Church Fellowship Hall 228 Quito Drummonds Road Drummonds, Tennessee 38023
Tuesday October 30, 2012 12:00–1:30 pm	Gateway Baptist Church Room S103 1915 Rosemark Road Atoka, Tennessee 38004

Two months after the County Roundtables, Plains and Eastern invited the public to attend two Open Houses for Shelby and Tipton County, Tennessee in December 2012 (see Table 3-2, "Schedules and Locations of Open Houses"). Plains and Eastern provided public notice of the Open House meetings through a combination of press releases, notices in local newspapers, Project website updates, social media notices, radio spots, and e-mail (see Appendix D for Tennessee Public Notices). In many cases, Plains and Eastern requested that e-mail recipients forward the message to anyone else the recipient believed might be interested in the Project to achieve broader dissemination. Plains and Eastern also provided a toll-free RSVP hotline and e-mail address for stakeholders to confirm attendance or ask questions.

Table 3-2
Schedules and Locations of Open Houses

Date	Event Venue
Tuesday December 4, 2012 7:00–9:00 am	Munford First Methodist United Church 57 South Tipton Road Munford, Tennessee 38058
Tuesday December 4, 2012 5:00–7:00 pm	Elks Lodge 164 Commercial Drive Atoka, Tennessee 38004

The goals of both the County Roundtable meetings and the Open Houses included the following: to introduce the Project to attendees; to present a Project overview and anticipated schedule; to discuss the Routing Team's siting criteria and methodology; and to outline the environmental review process, with an emphasis on opportunities for public input. The meetings also included a map review session, during which Plains and Eastern presented detailed maps of the area showing 1-mile-wide Potential Routes.

County Roundtable meetings and Open Houses were held at easily accessible, local venues. Twenty-eight individuals attended the roundtable meetings. Forty-seven members of the public attended the Open Houses. An information packet was distributed during the meeting. Plains and Eastern representatives then introduced the company and provided to attendees information describing general Project-related background, technical specifications, the environmental review process, environmental and economic benefits, landowner relationships, business opportunities, and the routing process to date. Plains and Eastern representatives asked stakeholders to provide feedback on opportunities and sensitivities near the Project and recorded any geographic-specific comments directly on the maps. Plains and Eastern also posted all Open House materials on a public website (www.plainsandeasterncleanline.com) to ensure that stakeholders who were unable to attend the Open House meetings could review the meeting materials. Appendix C provides a summary of the comments received from stakeholders during the County Roundtables and Open House meetings.

3.3 DOE Scoping Meetings

In addition to the agency, community, and public outreach conducted by Plains and Eastern, the DOE is conducting a review of the Project pursuant to NEPA (DOE/EIS-0486). The DOE's formal scoping period began on December 21, 2012, and ended on March 21, 2013. While the purpose of public scoping is to determine the scope of issues to be addressed in the EIS, the Routing Team also considered the comments received by the DOE in its evaluation of routing opportunities and sensitivities in the Project area and in developing feasible Alternative Routes. The DOE scoping process is described in detail in the Draft Final Plains & Eastern Project Scoping Summary Report (DOE 2013). Appendix C summarizes comments received during the DOE scoping period and considered by the Routing Team relevant to the Tennessee route development process. For a summary of all comments received by the DOE, see the Scoping Summary Report available at www.plainsandeasterneis.com.

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4.0 Route Development

This section describes the iterative routing process to develop potential routes for the HVDC transmission line in Tennessee. For the purposes of this report, the routing process is described below in two primary phases: 1) Identification of the Network of Potential Routes; and, 2) Identification of Alternative Routes for evaluation in this report. The following sections describe these phases in more detail.

4.1 Identification of the Network of Potential Routes

The first phase in the development of identifying potential routes for the HVDC transmission line involved an iterative routing process across three states. This phase of the process began in 2009 with the identification of potential endpoints and concluded in late 2012 with the identification of the Network of Potential Routes presented at the DOE's scoping meetings. Figure 4-1, "Identification of the Network of Potential Routes," provides a graphic overview of this phase. The steps in this first phase include:

1. **Establish Endpoints.** Prior to the route development process, Plains and Eastern began studying potential endpoints for the HVDC transmission line. Plains and Eastern determined the Oklahoma endpoint based on the presence of excellent wind resources, proximity to an existing high-voltage transmission system, and compatible land use and environmental sensitivities. Plains and Eastern determined the Tennessee endpoint based on several factors, including:

    - Consideration of potential upgrades. The level of potential upgrades required to accommodate the Project were lower compared to other endpoint locations.
    - Proximity to existing transmission facilities. Plains and Eastern selected an endpoint that was capable of reliable interconnection and delivery of up to 3,500MW and provided sufficient energy transfer. Plains and Eastern reviewed the historical congestion and market access, and given the robustness of the TVA grid and the geographic location of the Shelby Substation, this delivery point will make the energy delivered by the Project available to customers throughout Tennessee, the Mid-South, and the Southeast.
    - Surrounding opportunities and sensitivities. Plains and Eastern selected the Shelby Substation because of fewer land use and environmental siting sensitivities compared to other endpoints.

    Additionally, this endpoint allowed access to the TVA service territory. Early in the development process for the Project, Plains and Eastern identified TVA as a key potential customer for the Project. Plains and Eastern did this based on several factors, including:

    - TVA's leadership position as the largest electric utility in the Mid-South and the Southeast;
    - TVA's stated goal of increasing its sources of cost-effective clean energy;
    - TVA's initiative starting in 2008 to begin purchases of wind energy on a long-term basis from generators located in windier areas generally west of TVA's service territory; and

- TVA's existing high-voltage transmission system, which allows it to efficiently transport energy throughout its seven-state service area and which has connections to all of the other major utilities in the Mid-South and the Southeast.
- After engaging in numerous interconnection studies with TVA, Plains and Eastern selected TVA's Shelby Substation as the endpoint in Tennessee.

2. **Identify Study Area.** Based on the locations of the proposed endpoints, the Routing Team began the route development process by including all of Oklahoma and Arkansas, and portions of Kansas, Missouri, Texas, Mississippi, and Tennessee in a Study Area for the HVDC transmission line. The Routing Team developed siting criteria based on known opportunities and sensitivities (see Appendix E, Table E-1).
3. **Develop Candidate Corridors.** The Routing Team applied the General and Technical Guidelines and the Study Area siting criteria (Appendix E, Table E-1) to establish five 5-mile-wide Candidate Corridors within the Study Area between the endpoints. To the extent possible, the Candidate Corridors followed large-scale opportunities, such as existing transmission lines, pipelines, and highway rights-of-way, and avoided known large-scale or concentrations of sensitivities. Plains and Eastern presented the Candidate Corridors during stakeholder outreach to solicit feedback.
4. **Identify Corridor Network.** The Routing Team used input from stakeholders to refine the siting criteria, to retain Candidate Corridors for further analysis, and to eliminate Candidate Corridors with relatively greater sensitivities. The Routing Team developed 20 potential corridor configurations using Candidate Corridors and corridor alternatives in response to stakeholder input and by applying the siting criteria to identify the Corridor Network.
5. **Identify Study Corridor.** Following additional stakeholder outreach, the Routing Team analyzed the Corridor Network with the goal of selecting a 5-mile-wide to 8-mile-wide Study Corridor. The Routing Team used a combination of the General and Technical Guidelines, the siting criteria (see Appendix E, Table E-2), and stakeholder input (see Appendix C) with the goal of avoiding and minimizing impacts to sensitivities. While complete avoidance of all sensitivities was not possible, the Routing Team selected the Study Corridor because it represented the best opportunity to minimize land use and environmental impacts based on information available at that time.
6. **Identify Route Network.** To refine the Study Corridor, the Routing Team developed the siting criteria listed in Appendix E, Table E-3. Following the identification of these criteria, the Routing Team conducted an iterative route selection process to identify the Route Network. During this step, Plains and Eastern conducted Open Houses throughout the Project area, including those held in Atoka and Munford, Tennessee. Figure 4-2 depicts the Route Network presented at the Open Houses.
7. **Identify Network of Potential Routes.** As the route selection process continued, the Routing Team used a decision-making process that included consideration of General and Technical Guidelines, siting criteria, and stakeholder feedback. Using this process, the Routing Team refined the Route Network to the Network of Potential Routes proposed to DOE. The Network of Potential Routes consisted of a network of 1-mile-wide corridors within and near the Study Corridor. The DOE presented the Network of Potential Routes during the EIS scoping process, including a scoping meeting held in Atoka, Tennessee, on January 24, 2013.

4.2 Identification of Alternative Routes

The second phase in identifying potential routes for the HVDC transmission line was to identify Alternative Routes. Following the conclusion of the DOE's scoping process, the Routing Team began this phase with the Network of Potential Routes and ended with the identification of Alternative Routes for further evaluation. An important step in this process was the selection of a preferred Mississippi River crossing to determine a western endpoint in the state of Tennessee. During this phase, the Routing Team evaluated several Preliminary Alternative Routes, each of which was approximately 1,000 feet wide. During the execution of this phase, the Routing Team employed the following steps to identify Preliminary Alternative Routes:

- Refinement of the siting criteria;
- Identification of Preliminary Alternative Routes, including aerial reconnaissance;
- Selection of a preferred Mississippi River Crossing location; and
- Identification of Alternative Routes considered for further evaluation.

4.2.1 Refinement of Siting Criteria

Following the conclusion of the DOE's NEPA scoping period, the Routing Team revisited comments received during Plains and Eastern's stakeholder outreach and reviewed the DOE's Scoping Summary Report (DOE 2013). The Routing Team used these comments and input from the DOE to refine the siting criteria. Appendix F presents the refined criteria used during this step. The Routing Team applied these criteria to refine the Network of Potential Routes and identify 1,000-foot-wide Preliminary Alternative Routes.

4.2.2 Identification of Preliminary Alternative Routes

The Routing Team applied the General and Technical Guidelines, siting criteria, stakeholder feedback, and scoping comments to identify Preliminary Alternative Routes based on two potential Mississippi River crossings. Figure 4-2, "Preliminary Tennessee Alternative Routes Considered," depicts the Preliminary Alternative Routes. In Tennessee, land uses found in this Segment are comprised of a combination of agricultural lands and residential areas. The Routing Team identified alternative routes to minimize potential impacts to known residential areas and planned developments associated with the cities of Munford, Atoka, Tipton, and Millington; NWI designated forested wetlands; and a public and military airport (Millington Regional Jetport / Naval Support Activity Mid-South).

Members of the Routing Team conducted aerial reconnaissance of the Tennessee portion by helicopter on August 18, 2013, to verify field conditions and determine the need for any adjustments to the Preliminary Alternative Routes. The Routing Team used these observations to refine the Preliminary Alternative Routes and to identify the final Alternative Routes.

4.2.3 Selection of a Preferred Mississippi River Crossing

The selection of a Preferred Mississippi River Crossing included consideration of opportunities and sensitivities in Mississippi County, Arkansas, and Tipton County, Tennessee. The Routing Team viewed the Mississippi River to be an important sensitivity and engineering consideration. The Routing Team concluded that many locations along the river were not technically feasible, due to the width of the river itself or due to the presence of sensitivities on either side of the river. Ultimately, the Routing Team identified two potential crossing locations of the river that were consistent with the siting criteria (e.g., minimize floodplains, avoid known interior least tern nesting areas, avoid Lower Hatchie NWR, avoid

Meeman-Shelby Forest State Natural Areas, avoid Meeman-Shelby Forest State Park, avoid Eagle Lake Refuge WMA, and avoid known cultural resources). Figure 4-2, "Preliminary Tennessee Alternative Routes Considered," depicts the two Mississippi River crossing locations considered by the Routing Team. The northern crossing is oriented in a north-south direction, located north of Drummonds and west of the existing Shelby to Sans Souci 500kV transmission line. The northern crossing has an approximate 0.6-mile span across the Mississippi River. The approximate span length across the river at the northern crossing would be 4,100 feet. The southern crossing is oriented in an east-west direction, located near Frenchman's Bayou. The southern crossing has an approximate 0.5-mile span across the Mississippi River. The approximate span length across the river at the southern crossing would be 3,400 feet.

The Routing Team evaluated the two crossings using available desktop data, field and aerial reconnaissance, preliminary engineering feasibility studies, General and Technical Guidelines, siting criteria, and comments received throughout the siting process. The Routing Team selected the southern Mississippi River crossing because the southern crossing resulted in routes that:

- Were approximately 2 miles shorter in Tennessee;
- Intersected approximately 2 fewer miles of 100-year floodplain in Tennessee;
- Affected 3 fewer miles of agricultural lands in western Tennessee;
- Reduced proximity to eight recorded cultural and historic sites in Tennessee and Arkansas;
- Were within 1,000 feet of 15 fewer residences in Arkansas;
- Affected approximately 13 fewer miles of agricultural land in Arkansas; and,
- Minimized circuitous routes.

4.2.4 Identification of Alternative Routes for Further Evaluation

After selection of the southern Mississippi River crossing, the Routing Team established the crossing as an endpoint for an evaluation of Alternative Routes in Tennessee. All Alternative Routes begin at the Tennessee state line on the west bank of the Mississippi River and use the southern crossing. The Routing Team identified four possible combinations of Alternative Routes in Tennessee, as shown in Figure 4-3, "Tennessee Alternative Routes Considered for Further Evaluation," for further evaluation. A description of each Alternative Route follows:

- **Alternative Route A:** After crossing the Mississippi River at Frenchmen's Bayou, the route turns south along Coon Valley Road for 1 mile before turning east along section lines for 1 mile and then traversing generally southeast for approximately 5 miles through Tipton County, crossing Herring Hills Road and Quito Drummond Road. Approximately 0.5 mile west of Wilkinsville Road, the route turns east for 1 mile before turning south for 1.5 miles until it meets Walker Road. Alternative Route A then turns east, generally parallel to Walker Road in Millington, until crossing State Route (SR) 3/United States Highway (US) 51, where it continues east and then northeastward for approximately 3 miles before terminating at the proposed converter station siting area.

- **Alternative Route B:** Alternative Route B follows Alternative Route A east from the state line to a point approximately 0.5 mile west of Wilkinsville Road in Tipton County. From this location, Alternative Route B traverses generally northeast and then east for approximately 3 miles through Tipton County to pass north of housing developments along Simmons Road and SR 3/US 51. Alternative Route B then meets TVA's Shelby-to-Sans Souci 500kV electrical transmission line, which it generally follows southeast for approximately 4 miles before terminating at the proposed converter station siting area.
- **Alternative Route C:** Alternative Route C follows Alternative Route A east from the state line to the point where Alternative Route A turns east away from Coon Valley Road. From this location, the Alternative Route C continues south along Coon Valley Road and private farm roads for approximately 1.6 miles. The route then turns generally southeast, paralleling property lines where possible, for approximately 4 miles. Alternative Route C then turns south as it crosses Simmons Road for 1 mile along section lines before turning east along section lines for 1 mile. The route then parallels Walker Road where it meets with Alternative Route A along Walker Road in Millington, Shelby County. Alternative Route C then follows Alternative Route A to the proposed converter station siting area.
- **Alternative Route D:** Alternative Route D follows Alternative Route C from the state line to the point where Alternative Route C turns east to meet Walker Road just south of the Tipton/Shelby county line. At this location, Alternative Route D continues generally south for approximately 5 miles along parcel boundaries to the extent practicable while crossing Veterans Parkway, Quito Road, and Shelby Road. The route then turns east to cross SR 3/U.S. Highway 51 in Millington and begins to parallel Paul Barrett Parkway (SR 385) and the TVA's Covington-to-Northeast Gate 161kV transmission line easterly, southeasterly, and then northerly direction for approximately 10 miles. Alternative Route D then diverges from the transmission line in an area south of Shelby Substation to terminate at the proposed converter station siting area. This route was identified through stakeholder comments received during DOE's scoping period.

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5.0 Alternative Route Evaluation and Comparison

This section compares the Alternative Routes based on the siting criteria defined in Appendix F, Table F-1. These criteria are divided into three categories: (1) potential impacts to the natural environment, (2) potential impacts to human environment, and (3) and engineering considerations. Table 5-1, "Comparison of the Alternative Routes by Siting Criteria," presents the Routing Team's results of this comparison. The following section provides a summary of the comparisons between Alternative Routes for each siting criterion.

5.1 Potential Impacts to the Natural Environment

5.1.1 Water Resources

The Routing Team examined several siting criteria for water resources, including wetlands, waterbodies and floodplains. Figure 5-1, "Wetlands, Waterbodies, Visual and Cultural Sensitivities," shows the locations of wetlands and waterbodies. None of the Alternative Routes intersected National Wetlands Inventory (NWI)-designated non-forested wetlands, NWI wetland crossings greater than 1,000 feet, springs, or Wild and Scenic Rivers.

For NWI forested wetlands, Alternative Route A traverses the least amount with Alternative Route D traversing the most. Alternative Route D traverses the greatest amount of floodplains with the remaining Alternative Routes traversing a comparable amount. All Alternative Routes cross one major waterbody, the Mississippi River. Alternative Route B crosses one other waterbody, Alternative Routes A and C cross two other waterbodies, and Alternative Route D crosses four other waterbodies.

5.1.2 Biological Resources

The Routing Team examined several siting criteria for biological resources including USFWS-Designated Critical Habitat, Natural Heritage Program Species Occurrence records, and protected bat occurrence areas. Figure 5-2, "Biological Sensitivities and Contaminated Sites," shows the locations of potential Indiana bat occurrence areas. Natural Heritage Program Species Occurrence records are confidential and, therefore, not displayed on Figure 5-2.

None of the Alternative Routes intersect USFWS-Designated Critical Habitat, or lands documented by the USFWS as having a potential for occurrence of the Ozark big-eared or gray bat. The USFWS has documented that the Indiana bat may potentially occur throughout Tipton and Shelby Counties; therefore, the difference in this criterion between the routes correlates to the total route length. Alternative Route D, because of its greater length compared to other Alternative Routes, has greater potential to encounter areas that may provide habitat for the endangered Indiana bat. Additionally, there are fewer Natural Heritage Program Species Occurrence records near Alternative Route A than the other Alternative Routes.

5.1.3 Land Cover

The Routing Team examined the United States Geological Survey National Land Cover Dataset to determine land cover. The Routing Team used County property appraiser records for landowner parcel boundaries. Figure 5-3, "Land Cover," shows the distribution of land cover.

Alternative Route D traverses the fewest landowner parcels and Alternative Route B traverses the most. Although Alternative Route D traverses the fewest parcels, this is due to it traversing large parcels and is not a correlation to length. Alternative Routes A, B, and C traverse a similar amount of agricultural and open lands. Alternative Route D traverses the most agricultural/open lands and urban/developed lands and the least amount of forested lands. Alternative Route A traverses the greatest amount of forested lands.

5.1.4 Soil, Geologic, or Topographic Resources

The Routing Team examined several siting criteria for soil, geologic, or topographic resources including prime farmland, farmlands of statewide importance, slopes greater than 20 percent, and karst areas.

The Alternative Routes do not traverse any farmlands of statewide importance or known karst areas. Alternative Routes A, B, and C traverse a comparable amount of prime farmland while Alternative Route D traverses approximately twice the amount of the others. Alternative Routes A and B traverse about twice as much distance where slopes are greater than 20 percent than do Alternative Routes C and D. However, these areas with these slopes comprise less than 5 percent of the total length of each Alternative Route.

5.2 Potential Impacts to the Human Environment

5.2.1 Structures

The Routing Team considered the presence of structures near the Alternative Routes. Figure 5-3 shows the locations of schools, churches, and hospitals. During the analysis of the Alternative Routes, the Routing Team examined the number of structures within several distances from the representative centerline of the Alternative Routes. These distance intervals (see Table 5-1) were 0 to 100 feet, 100 to 250 feet, 250 to 500 feet, and 500 to 1,000 feet.

None of the Alternative Routes are within 1,000 feet of any schools or hospitals. Alternative Route A is within 1,000 feet of 82 residences, Alternative Route B is within 1,000 feet of 228 residences, Alternative Route C is within 1,000 feet of 178 residences, and alternative Route D is within 1,000 feet of 406 residences. Alternative Route A is within 1,000 feet of fewer residences as compared to other Alternative Routes. Alternative Route A is also within 1,000 feet of fewer agricultural, commercial, and industrial structures than other Alternative Routes. Alternative Route B is not within 1,000 feet of any churches, while Alternative Routes A and C are within 1,000 feet of two churches, and Alternative Route D is within 1,000 feet of three churches.

5.2.2 Government Jurisdictions

The Routing Team examined federal-, state-, county-, city-, and town-owned lands that are managed for conservation or recreation and jurisdictions as defined in the siting criteria found in Appendix F, Table F-1. Figure 4-3, "Tennessee Alternative Routes Considered for Further Evaluation," shows these lands and jurisdictions. No Alternative Route crosses federal-, state-, county-, city-, or town-owned lands managed for conservation or recreation; however, Aycock Park is within 500 feet of Alternative Route D. Alternative Routes A and B traverse the least amount of land within the City of Millington municipality boundaries while Alternative D traverses the greatest amount.

5.2.3 Conservation Easements or Areas

The Routing Team examined federal and state conservation easements as defined in the siting criteria in Appendix F, Table F-1 (see Figure 4-3). All of the Alternative Routes are within 500 feet of a Natural Resources Conservation Service Wetlands Reserve Program easement on the west side of the Mississippi River. Based on review of easement documentation, surveying and preliminary engineering design, effects to this easement are avoidable. No other conservation easements are intersected.

5.2.4 Airports/Airfields

The Routing Team examined airports and airfields, which are shown in Figure 5-4, "Existing Infrastructure." Alternative Route D is within 1 mile of a private airfield (Ray Airfield) in Shelby County east of the City of Millington. Additionally, Alternative Route A is not within 1 mile of any airport (per Federal Aviation Administration and Bureau of Transportation Statistics datasets). Detailed evaluation shows that structure heights proposed would be below the glide slope of the Millington Regional Jetport, including consideration of future runway expansion plans. Plains and Eastern has examined the topography of this area and existing and future glide slopes extending northward from the Millington Regional Jetport and has concluded that siting a transmission line in this area is feasible. Plains and Eastern worked with the Millington Regional Jetport Authority and their design firm to ensure that Plains and Eastern transmission structures would not interfere with the present or future glide slope or runway expansion plans.

5.2.5 Visual/Cultural Resources

The Routing Team examined several siting criteria for visual/cultural resources including scenic routes and trails, Natural Register of Historic Places locations, recorded cultural and historic sites, and cemeteries. Figure 5-4, "Existing Infrastructure," shows the locations of these resources.

None of the Alternative Routes are within 0.25 mile of sites that are listed on the National Register of Historic Places. All of the Alternative Routes traverse the Mississippi River, sections of which were utilized as a Trail of Tears water route and as water crossings for the Trail's overland routes. Alternative Routes B and D are located near fewer recorded cultural and historic sites within 0.25 mile than Alternative Routes A and C. This is due to a number of documented structures that are older than 50 years that occur in Shelby County near Alternative Routes A and C. The number of documented structures of this age in Shelby County is partly due to historic structure surveys performed by Shelby County. Additionally, both Alternative Routes C and D are within 500 feet of Saint Marks Cemetery, whereas Alternative Routes A and B are not within 500 feet of any cemeteries.

5.2.6 Environmentally Regulated Sites

The Routing Team examined environmentally regulated sites as defined per the siting criteria found in Appendix F. The Alternative Routes do not intersect and are not within 0.25 mile of any environmentally regulated sites.

5.3 Engineering Considerations

5.3.1 Existing Infrastructure

The Routing Team examined existing linear infrastructure for paralleling opportunities. Figure 5-4, "Existing Infrastructure," shows these opportunities. No transmission pipelines were identified that provided opportunities for the Alternative Routes. Alternative Route B and Alternative Route D parallel existing linear infrastructure with Alternative Route D paralleling the most. Alternative Route B parallels approximately 1 mile of the Shelby to Sans Souci 500kV electrical transmission line north and west of the Shelby substation in Tipton County. Alternative Route D is parallel to 500kV transmission lines south and west of the Shelby substation, for a distance of approximately 11 miles.

5.3.2 Other Engineering Considerations

The Routing Team examined the total length and crossings of existing linear infrastructure as described in the engineering considerations in (Appendix F). All of the Alternative Routes cross the Shelby to Sans Souci 500kV transmission line and Alternative Route D crosses an additional 161kV electrical transmission line. The Alternative Routes do not cross any pipelines. The number of major road and railroad crossings was the same among all Alternative Routes. Alternative Routes A, B, and C are within 0.3 mile of each other with Alternative Route A being the shortest, but Alternative Route D is more than 50 percent longer than the other Alternative Routes.

Table 5-1
Comparison of the Alternative Routes by Siting Criteria

Criterion[a]	Unit	Alternative Route A (16.44 miles)	Alternative Route B (16.58 miles)	Alternative Route C (16.67 miles)	Alternative Route D (26.99 miles)
Water Resources					
NWI Forested Wetlands	Miles	0.53	0.82	0.59	1.00
NWI Non-Forested Wetlands	Miles	0.00	0.00	0.00	0.00
NWI Forested Wetland Crossings >1,000 ft	Number	0	0	0	0
NWI Non-Forested Wetland Crossings >1,000 ft	Number	0	0	0	0
Floodplains - Length Crossed	Miles	6.06	6.68	6.17	9.82
Floodplains - Crossings Greater than 1,000 ft	Number	8	8	5	11
Major Waterbodies and Reservoirs - Number Intersected (Mississippi River)	Number	1	1	1	1
Major Waterbodies and Reservoirs - Distance Crossed (Mississippi River)	Miles	0.83	0.83	0.83	0.83
State-Designated Waterbodies with Special Significance	Number	1	1	1	1
Other Waterbodies	Number	2	1	2	4
Springs within 0–250 ft	Number	0	0	0	0
Springs within 250–500 ft	Number	0	0	0	0
Wild and Scenic Rivers	Number	0	0	0	0
Biological Resources					
USFWS-Designated Critical Habitat	Miles	0.00	0.00	0.00	0.00
State Natural Heritage Program Species Location Data – Occurrence Records	Number	6	7	8	8
Miles within Counties Documented as Having Ozark Big-Eared Bat Potential Occurrence	Miles	0.00	0.00	0.00	0.00
Miles within Counties Documented as Having Indiana Bat Potential Occurrence	Miles	16.44	16.58	16.67	26.99
Gray Bat Potential Occurrence Areas	Miles	0.00	0.00	0.00	0.00
Land Cover					
Parcels and Parcel Boundaries	Number	57	77	56	44
Agriculture and Open Lands					
NLCD Pasture/Hay	Miles	1.71	1.83	1.69	3.05
NLCD Barren Land	Miles	0.00	0.00	0.00	0.00
NLCD Grassland/Herbaceous	Miles	0.00	0.00	0.00	0.00
NLCD Shrub/Scrub	Miles	2.14	2.38	1.96	1.83
NLCD Cultivated Crops	Miles	6.50	6.76	7.06	14.26
Total Agriculture and Open Lands	Miles	10.36	10.96	10.72	19.15

Table 5-1
Comparison of the Alternative Routes by Siting Criteria

Criterion[a]	Unit	Alternative Route A (16.44 miles)	Alternative Route B (16.58 miles)	Alternative Route C (16.67 miles)	Alternative Route D (26.99 miles)
Forested Areas	Miles	3.40	2.89	3.07	2.61
Urban/Developed Areas	Miles	0.78	0.72	0.99	2.96
Soil, Geologic, and Topographic Resources					
Prime Farmland	Miles	8.28	8.17	8.14	17.56
Farmlands of Statewide Importance	Miles	0.00	0.00	0.00	0.00
Slopes Greater than 20%	Miles	0.68	0.68	0.32	0.32
Karst Areas	Miles	0.00	0.00	0.00	0.00
Structures					
K–12 Schools, Colleges and Universities					
within 0–100 ft	Number	0	0	0	0
within 100–250 ft	Number	0	0	0	0
within 250–500 ft	Number	0	0	0	0
within 500–1,000 ft	Number	0	0	0	0
Churches					
within 0–100 ft	Number	0	0	0	0
within 100–250 ft	Number	0	0	0	0
within 250–500 ft	Number	1	0	1	2
within 500–1,000 ft	Number	1	0	1	1
Hospitals					
within 0–100 ft	Number	0	0	0	0
within 100–250 ft	Number	0	0	0	0
within 250–500 ft	Number	0	0	0	0
within 500–1,000 ft	Number	0	0	0	0
Residences					
within 0–100 ft	Number	0	0	0	0
within 100–250 ft	Number	4	0	12	9
within 250–500 ft	Number	20	42	46	67
within 500–1,000 ft	Number	58	186	120	330
Agricultural, Commercial, and Industrial Structures					
within 0–100 ft	Number	2	0	2	0
within 100–250 ft	Number	3	0	11	11
within 250–500 ft	Number	9	5	9	16
within 500–1,000 ft	Number	35	58	42	56

Table 5-1
Comparison of the Alternative Routes by Siting Criteria

Criterion[a]	Unit	Alternative Route A (16.44 miles)	Alternative Route B (16.58 miles)	Alternative Route C (16.67 miles)	Alternative Route D (26.99 miles)
Government Jurisdictions					
Cities and Towns	Miles	1.39	1.20	2.94	8.28
National Forests (U.S. Department of Agriculture Forest Service) - Administrative Boundary	Miles	0.00	0.00	0.00	0.00
National Forests (U.S. Department of Agriculture Forest Service)-Owned	Miles	0.00	0.00	0.00	0.00
National Wildlife Refuges (USFWS)	Miles	0.00	0.00	0.00	0.00
National Parks (National Park Service)	Miles	0.00	0.00	0.00	0.00
USACE Lands	Miles	0.00	0.00	0.00	0.00
DOD Lands	Miles	0.00	0.00	0.00	0.00
State Parks					
Tennessee State Parks (Tennessee Department of Environment and Conservation, Division of Parks and Conservation, State Parks)	Miles	0.00	0.00	0.00	0.00
State-Owned WMAs					
Tennessee WMAs (Tennessee Wildlife Resources Agency)	Miles	0.00	0.00	0.00	0.00
Tennessee Natural Areas (Tennessee Department of Environment and Conservation, Division of Natural Areas, Natural Areas Program)	Miles	0.00	0.00	0.00	0.00
County-, City-, and Town-owned Lands that are managed for conservation or recreation	Miles	0.00	0.00	0.00	0.00
Tribal Trust Lands and Allotments	Miles	0.00	0.00	0.00	0.00
Conservation Easements or Areas					
Federal Conservation Easements	Miles	0.07	0.07	0.07	0.07
State Conservation Easements	Miles	0.00	0.00	0.00	0.00
Airport/Airfields					
Military Airports	Miles	0.00	0.00	0.00	0.00
FAA-Registered Public Airports within 1 mile	Number	0	0	0	0
FAA-Registered Private Airports within 1 mile	Number	0	0	0	1
Other Private Airstrips and Helipads within 1 mile	Number	0	0	0	0

Table 5-1
Comparison of the Alternative Routes by Siting Criteria

Criterion[a]	Unit	Alternative Route A (16.44 miles)	Alternative Route B (16.58 miles)	Alternative Route C (16.67 miles)	Alternative Route D (26.99 miles)
Visual/Cultural Resources					
Federally and State-Designated Scenic Routes, Trails, and Byways	Number	1	1	1	1
Sites on the NRHP within 0.25 mile	Number	0	0	0	0
Recorded Cultural or Historical Sites					
Archaeological Sites within 0.25 mile	Number	4	9	5	8
Historical Sites within 0.25 mile	Number	16	0	16	1
Total Recorded Cultural or Historical Sites within 0.25 mile	Number	20	9	21	9
Cemeteries within 500 feet	Number	0	0	1	1
Environmentally Regulated Sites					
Known Contaminated Sites within 0.25 mile	Number	0	0	0	0
Engineering Considerations					
Total Length of the Transmission Line	Miles	16.44	16.58	16.67	26.99
Electrical Transmission Line Crossings					
69kV–345kV intersected by the representative centerline	Number	0	0	0	1
Greater than 345kV intersected by the representative centerline	Number	1	1	1	1
Transmission Pipeline Crossings	Number	0	0	0	0
Major Road Crossings	Number	2	2	2	2
Railroad ROW Crossings	Number	1	1	1	1
Existing Infrastructure[b]					
Electrical Transmission Lines (69kV and higher)	Miles	0.21	1.34	0.21	10.99
Transmission Pipelines	Miles	0.00	0.00	0.00	0.00
Railroads	Miles	0.23	0.27	0.23	0.21
Publically Maintained Federal, State, and County Roads	Miles	0.34	0.28	0.34	4.60
Total Paralleling Existing Linear Infrastructure	Miles	0.78	1.75	0.78	11.69

Notes:

(a) Sources for all criteria are shown in Appendix F.

(b) Miles of existing infrastructure are determined by measuring the length of the representative centerline intersection with a 500-foot buffer to each side of existing infrastructure. Crossings of existing infrastructure are included in this total and can add approximately 1,000 to 1,500 feet of length per crossing, depending on the angle of intersection. The Engineering Considerations section presents the number of crossings for each type of existing infrastructure. The Routing Team considered this additional length during the route identification process

Table 5-1
Comparison of the Alternative Routes by Siting Criteria

Criterion[a]	Unit	Alternative Route A (16.44 miles)	Alternative Route B (16.58 miles)	Alternative Route C (16.67 miles)	Alternative Route D (26.99 miles)

Key:
DOD = (United States) Department of Defense
FAA = Federal Aviation Administration
ft = feet
kV = kilovolt(s)
NLCD = National Land Cover Dataset
NRHP = National Register of Historic Places
NWI = National Wetlands Inventory
ROW = right-of-way
USACE = United States Army Corps of Engineers
USFWS = United States Fish and Wildlife Service
WMA = Wildlife Management Area

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6.0 Selection of the Proposed Route

Following the comparison of Alternative Routes A through D, the Routing Team selected the Proposed Route for submittal to the Tennessee Regulatory Authority. The Alternative Routes were assessed and compared with respect to their potential impacts on the following three categories described in Section 5, "Alternative Route Evaluation and Comparison": (1) potential impacts to the natural environment, (2) potential impacts to human environment, and (3) and engineering considerations. From this analysis, the Routing Team recommended selection of Alternative Route A for consideration by the Tennessee Regulatory Authority because this route best met the goal of minimizing impacts on the natural and human environments while avoiding circuitous routes, unreasonable costs, and non-standard design requirements.

The Routing Team selected Alternative Route A because, in comparison to the other Alternative Routes, it:

- Had fewer residences within 1,000 feet;
- Intersected the least amount of agricultural lands;
- Intersected the least amount of forested wetlands;
- Intersected less area that could be potential habitat for the Indiana bat (due to its shorter length);
- Intersected the least amount of floodplains;
- Minimized length within municipality or city boundaries; and
- Avoided known cemeteries.

Plains and Eastern selected Alternative Route A as the Proposed Route, as shown on Figure 6-1, "Proposed Route," based on the Routing Team's application of General and Technical Guidelines, evaluation of stakeholder comments (see Appendix C), and application of the siting criteria (Appendix F).

The Proposed Route for the Project is a reasonable route because it was a result of an interdisciplinary and rational process that integrated input from regulatory agencies, local officials, and the general public into the progressive stages of route development, analysis, and selection. Plains and Eastern's routing process is consistent with the transmission line siting principles followed by the TVA, other federal electric utility entities, and common electric utility practice. This process resulted in the identification of a Proposed Route that best met the goal of this Route Selection Study.

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Appendix A
Figures

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List of Figures

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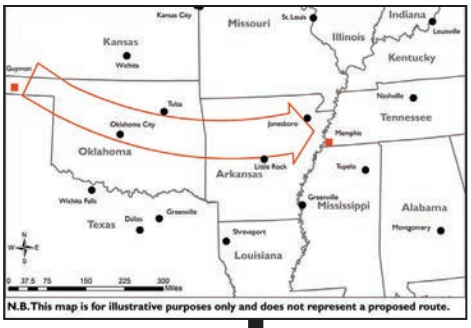
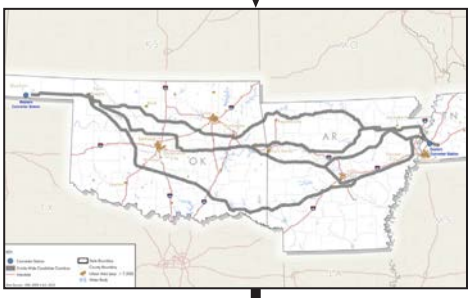


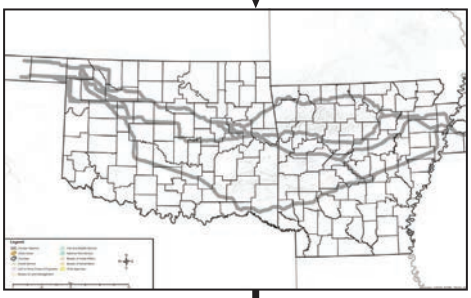
Study Area

- 2009-2010
- Broad geographic area
- Endpoint determination



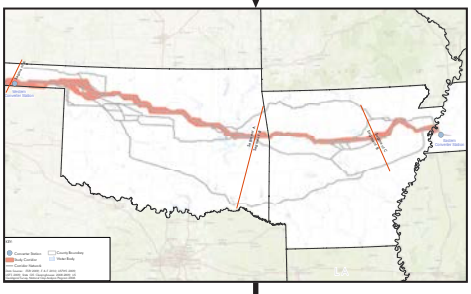
Candidate Corridors

- 2010
- Each 5 miles wide



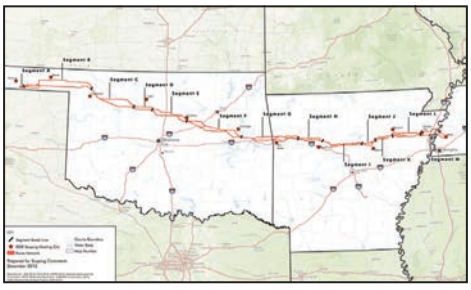
Corridor Network

- 2010-2011
- Each 5 miles wide



Study Corridor

- 2012
- One 5- to 8-mile-wide corridor



Network of Potential Routes

- Published with Notice of Intent December 21, 2012
- One-mile-wide corridors

Figure 4-1
Identification of the Network of Potential Routes
Plains and Eastern Clean Line
Oklahoma, Arkansas and Tennessee

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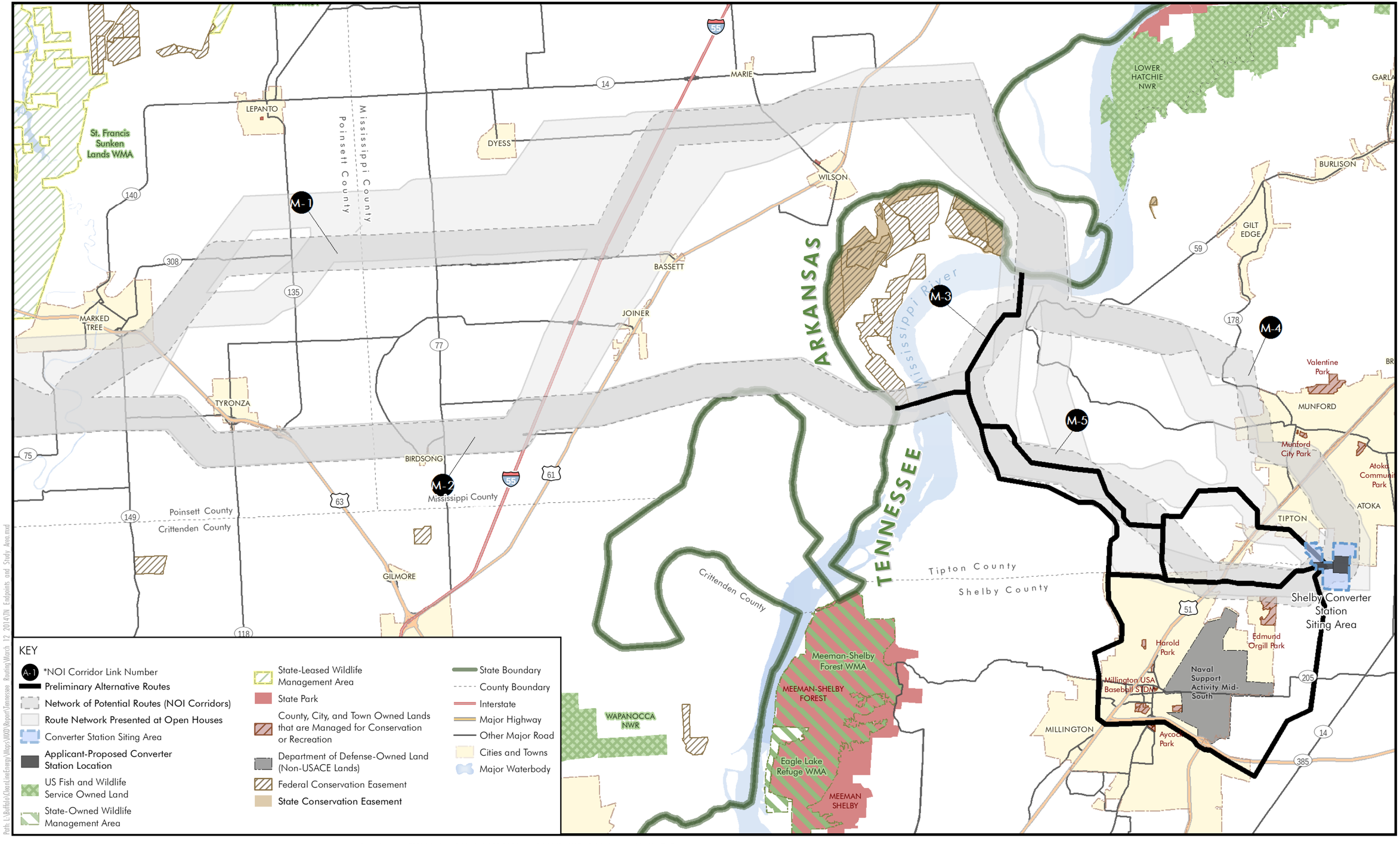
PLAINS & EASTERN
CLEAN LINE



KEY

- A-1 *NOI Corridor Link Number
- Preliminary Alternative Routes
- Network of Potential Routes (NOI Corridors)
- Route Network Presented at Open Houses
- Converter Station Siting Area
- Applicant-Proposed Converter Station Location
- US Fish and Wildlife Service Owned Land
- State-Owned Wildlife Management Area
- State-Leased Wildlife Management Area
- State Park
- County, City, and Town Owned Lands that are Managed for Conservation or Recreation
- Department of Defense-Owned Land (Non-USACE Lands)
- Federal Conservation Easement
- State Conservation Easement
- State Boundary
- County Boundary
- Interstate
- Major Highway
- Other Major Road
- Cities and Towns
- Major Waterbody

Path: L:\Griffith\Clean Line Energy\Maps\MXD\Report\Tennessee_Routing\March_12_2014\TN_Endpoints_and_Study_Area.mxd

0 2 4 Miles
0 2 4 Kilometers
N
1:165,000
Date: 3/18/2014

Data Sources: ESRI 2010 and 2012; USFS 2009a and 2009b; USFWS 2012a and 2012b; TWRA 2007; DOE 2013; TDEC 2011; USDA Natural Resources Conservation Service (NRCS) n.d.; The Conservation Registry 2012; NPS 2012; FAA 2010; BTS 2013; Clean Line 2013e and 2013 f.

*Network of Potential Route Link Number refers to a naming system used by the DOE during the EIS scoping process.

Figure 4-2
Preliminary Tennessee Alternative Routes Considered
Plains & Eastern Clean Line
Arkansas and Tennessee

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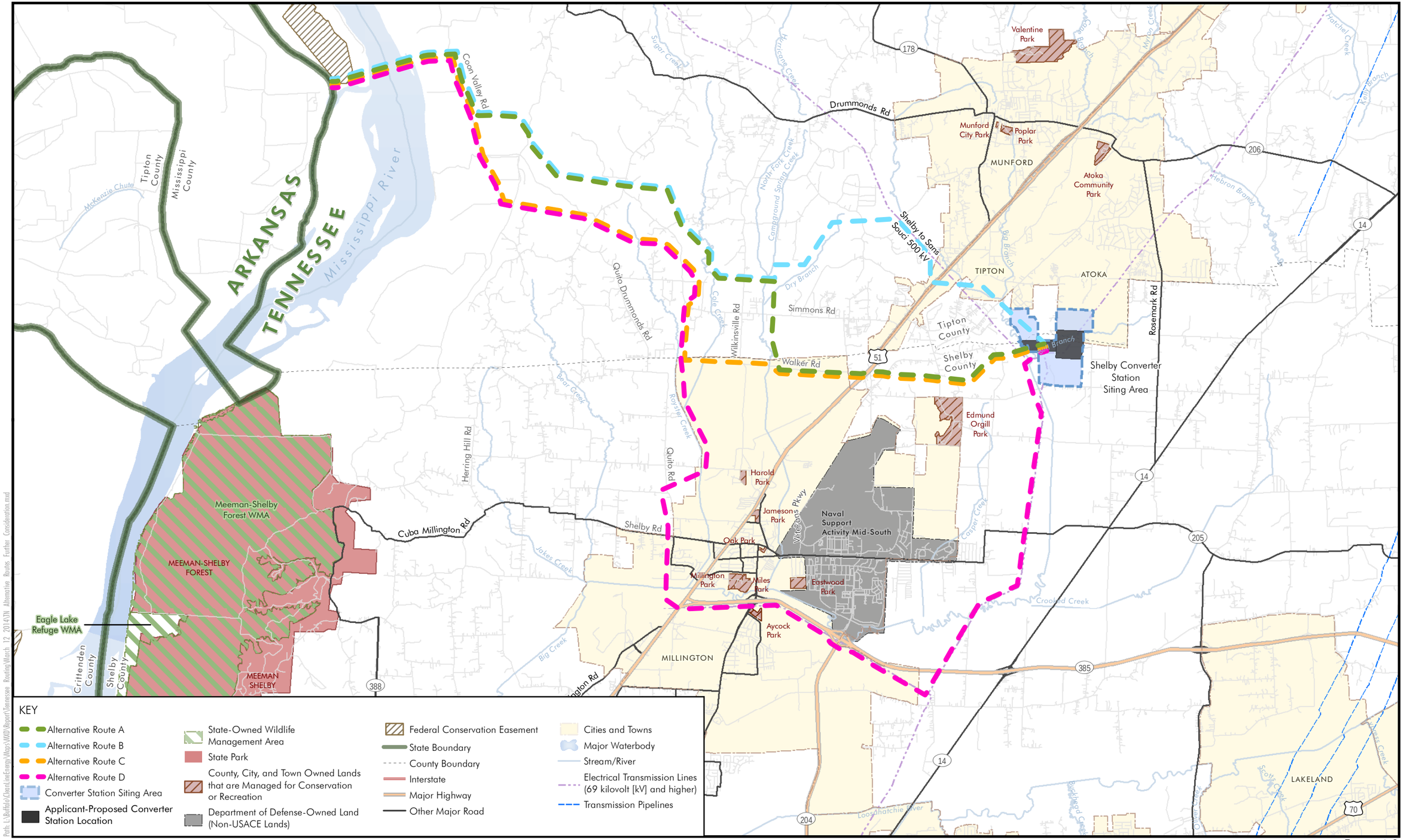
PLAINS & EASTERN
CLEAN LINE



KEY

- Alternative Route A
- Alternative Route B
- Alternative Route C
- Alternative Route D
- Converter Station Siting Area
- Applicant-Proposed Converter Station Location
- State-Owned Wildlife Management Area
- State Park
- County, City, and Town Owned Lands that are Managed for Conservation or Recreation
- Department of Defense-Owned Land (Non-USACE Lands)
- Federal Conservation Easement
- State Boundary
- County Boundary
- Interstate
- Major Highway
- Other Major Road
- Cities and Towns
- Major Waterbody
- Stream/River
- Electrical Transmission Lines (69 kilovolt [kV] and higher)
- Transmission Pipelines

0 2 4 Miles
0 2 4 Kilometers
N
1:100,000
Date: 3/18/2014

Data Sources: ESRI 2010 and 2012; USFS 2009a and 2009b; USFWS 2012a and 2012b; TWRA 2007; DOE 2013; TDEC 2011; USDA Natural Resources Conservation Service (NRCS) n.d.; The Conservation Registry 2012; NPS 2012; FAA 2010; BTS 2013; Clean Line 2013e and 2013 f.

Figure 4-3
Tennessee Alternative Routes Considered for Further Evaluation
Plains & Eastern Clean Line
Tennessee

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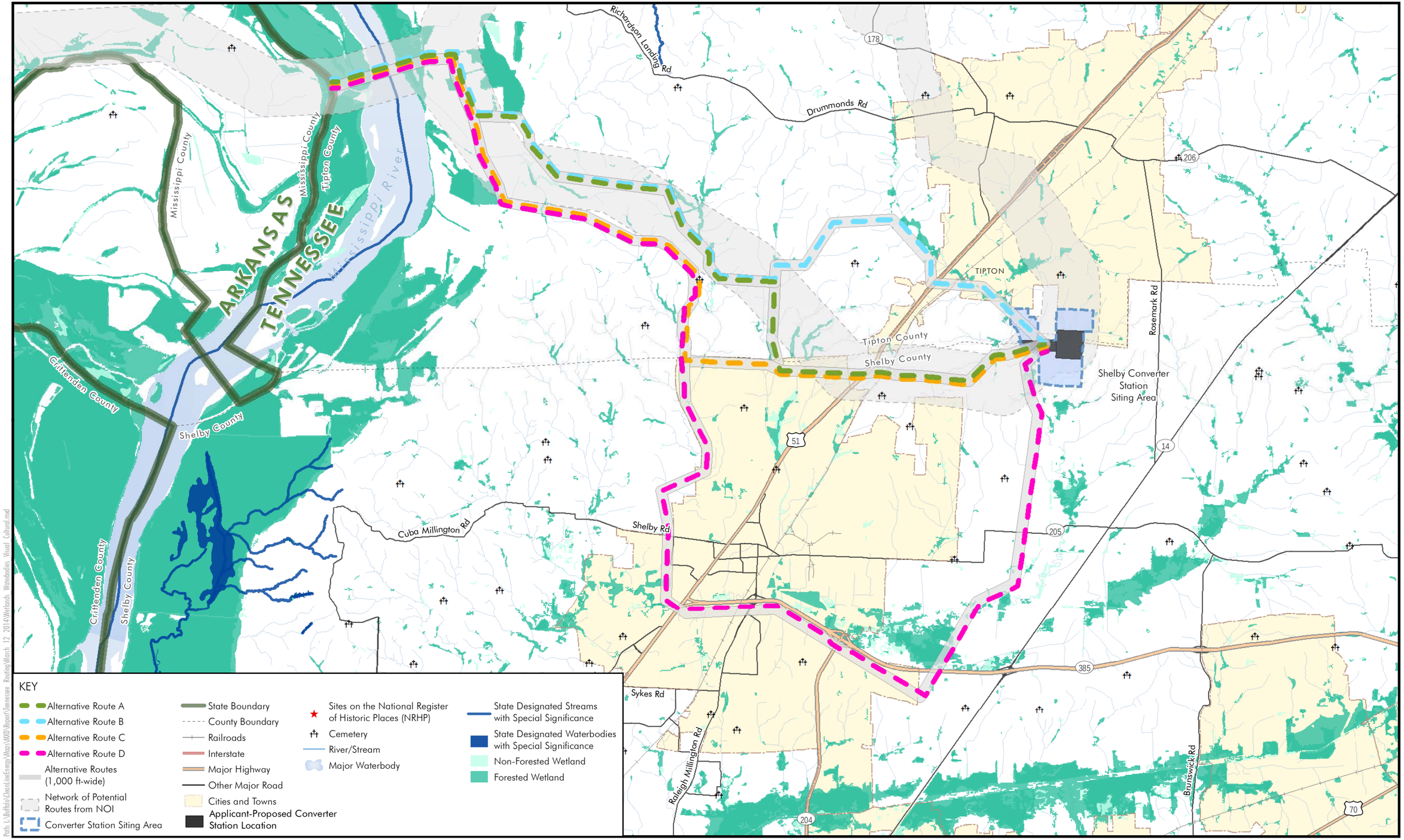
CLEAN LINE



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0 2 4 Miles
0 2 4 Kilometers
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1:100,000
Date: 3/18/2014

Data Sources: ESRI 2010 and 2012; USFWS 2012a; USGS 2006 and 2012b; Clean Line 2013f; USFS 2009b; NPS 2012.

Figure 5-1
Wetlands, Waterbodies, Visual and Cultural Sensitivities
Plains & Eastern Clean Line
Tennessee

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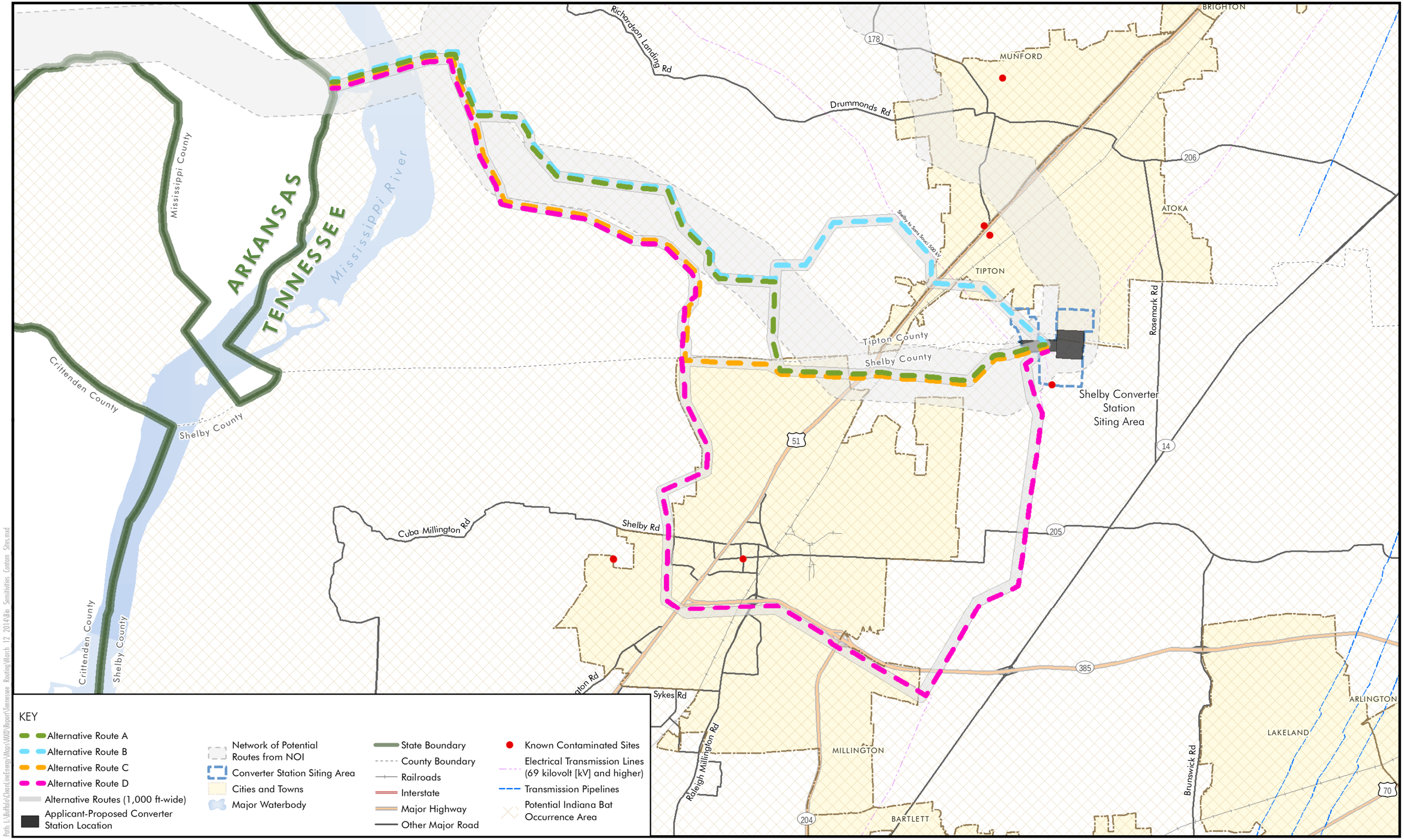
PLAINS & EASTERN
CLEAN LINE



KEY

- Alternative Route A
- Alternative Route B
- Alternative Route C
- Alternative Route D
- Alternative Routes (1,000 ft-wide)
- Applicant-Proposed Converter Station Location
- Network of Potential Routes from NOI
- Converter Station Siting Area
- Cities and Towns
- Major Waterbody
- State Boundary
- County Boundary
- Railroads
- Interstate
- Major Highway
- Other Major Road
- Known Contaminated Sites
- Electrical Transmission Lines (69 kilovolt [kV] and higher)
- Transmission Pipelines
- Potential Indiana Bat Occurrence Area

0 2 4 Miles
0 2 4 Kilometers
N
1:100,000
Date: 3/18/2014

ESRI 2010 and 2012; Ventyx 2013; Clean Line 2013f.

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Figure 5-2
Biological Sensitivities and Contaminated Sites
Plains & Eastern Clean Line
Tennessee

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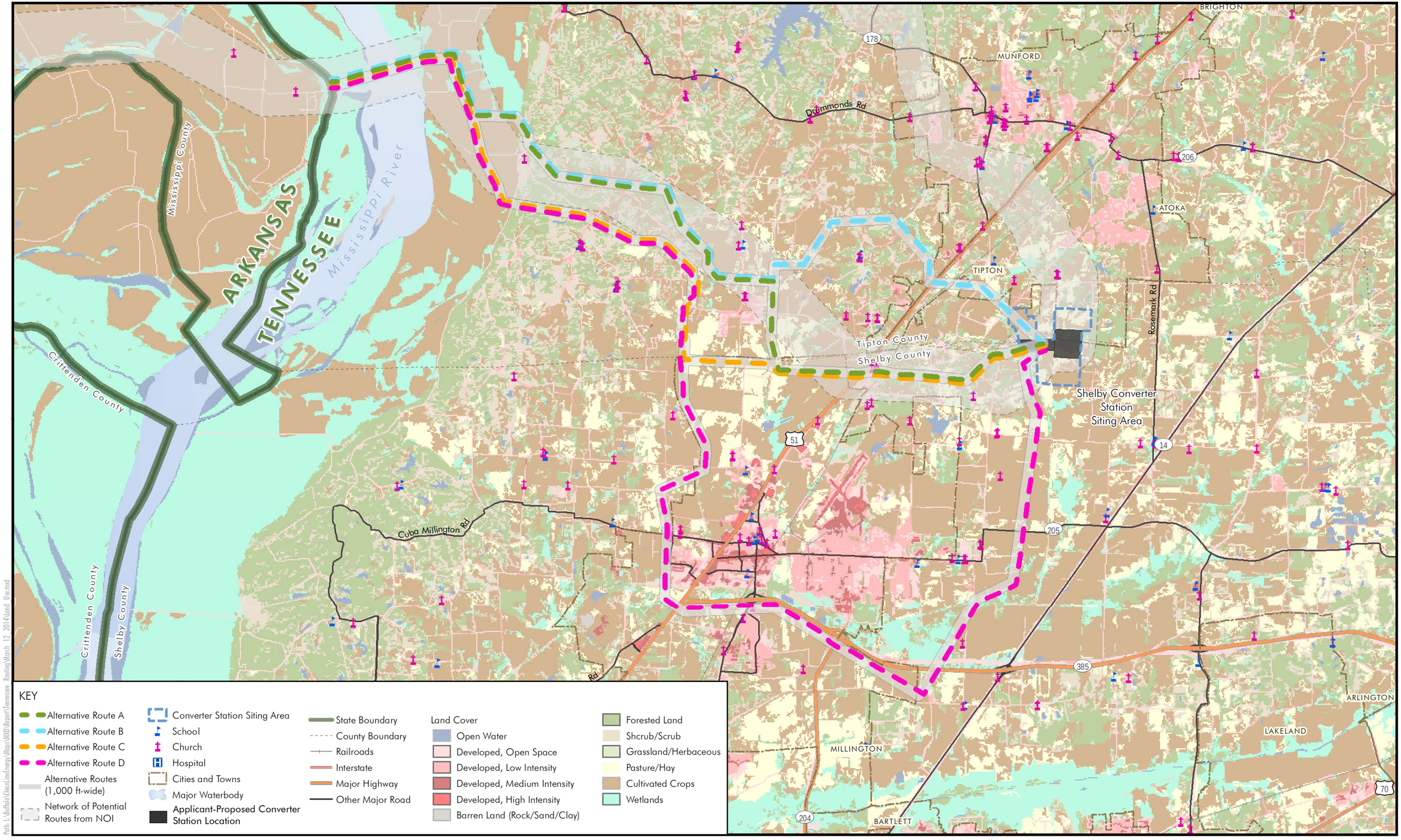

KEY

- Alternative Route A
- Alternative Route B
- Alternative Route C
- Alternative Route D
- Alternative Routes (1,000 ft-wide)
- Network of Potential Routes from NOI
- Converter Station Siting Area
- School
- Church
- Hospital
- Cities and Towns
- Major Waterbody
- Applicant-Proposed Converter Station Location
- State Boundary
- County Boundary
- Railroads
- Interstate
- Major Highway
- Other Major Road

Land Cover

- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land (Rock/Sand/Clay)
- Forested Land
- Shcrub/Scrub
- Grassland/Herbaceous
- Pasture/Hay
- Cultivated Crops
- Wetlands

0 2 4 Miles
0 2 4 Kilometers
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1:100,000
Date: 3/18/2014

Data Sources: ESRI 2010 and 2012; USGS 2006.

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Figure 5-3
Land Cover
Plains & Eastern Clean Line
Tennessee

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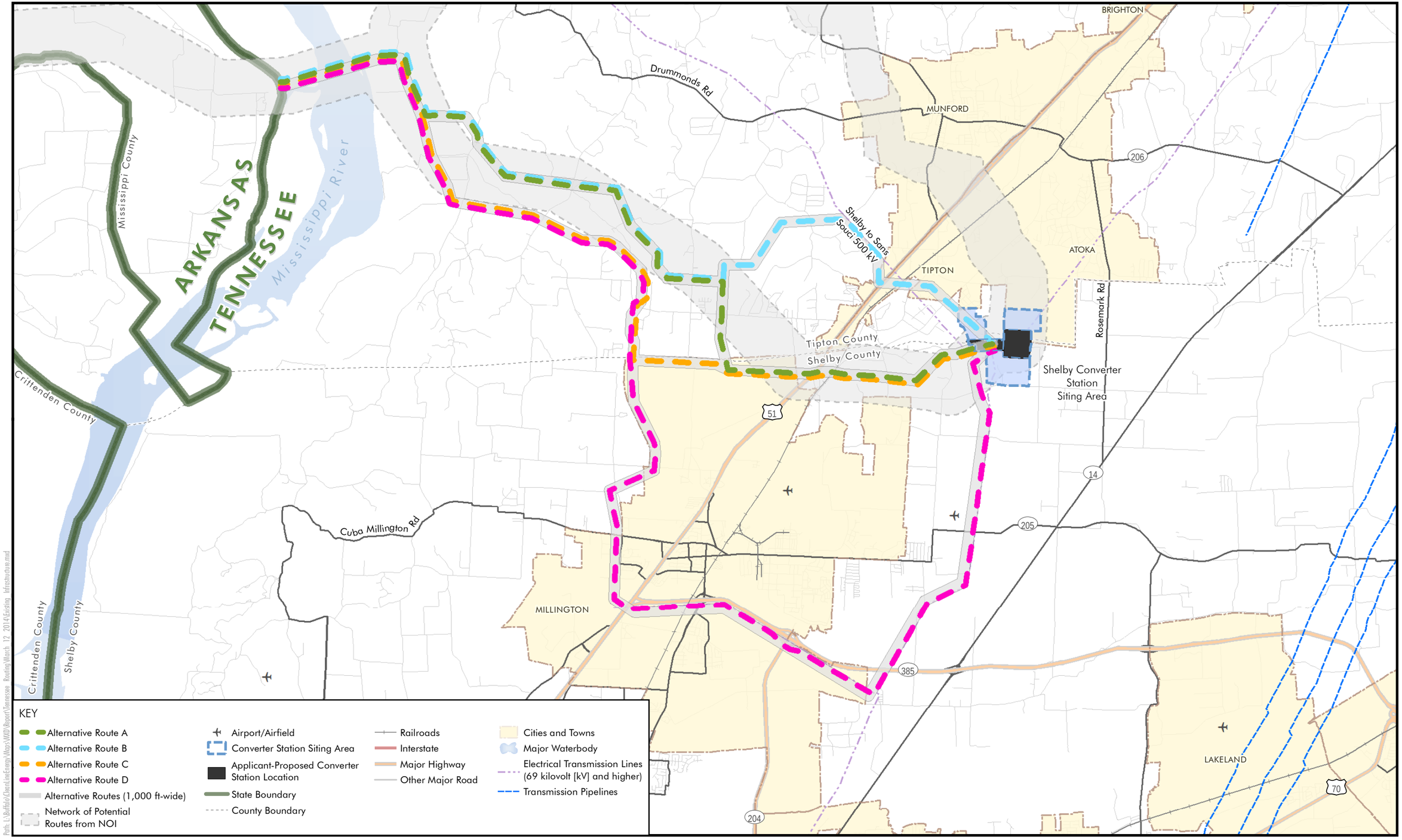
CLEAN LINE



KEY

- Alternative Route A
- Alternative Route B
- Alternative Route C
- Alternative Route D
- Alternative Routes (1,000 ft-wide)
- Network of Potential Routes from NOI
- Airport/Airfield
- Converter Station Siting Area
- Applicant-Proposed Converter Station Location
- State Boundary
- County Boundary
- Railroads
- Interstate
- Major Highway
- Other Major Road
- Cities and Towns
- Major Waterbody
- Electrical Transmission Lines (69 kilovolt [kV] and higher)
- Transmission Pipelines

0 2 4 Miles
0 2 4 Kilometers
N
1:100,000
Date: 3/18/2014

Data Sources: ESRI 2010 and 2012; USFS 2009a and 2009b; USFWS 2012a and 2012b; TWRA 2007; DOE 2013; TDEC 2011; USDA Natural Resources Conservation Service (NRCS) n.d.; The Conservation Registry 2012; NPS 2012; FAA 2010; BTS 2013; Clean Line 2013e and 2013 f.

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Figure 5-4
Existing Infrastructure
Plains & Eastern Clean Line
Tennessee

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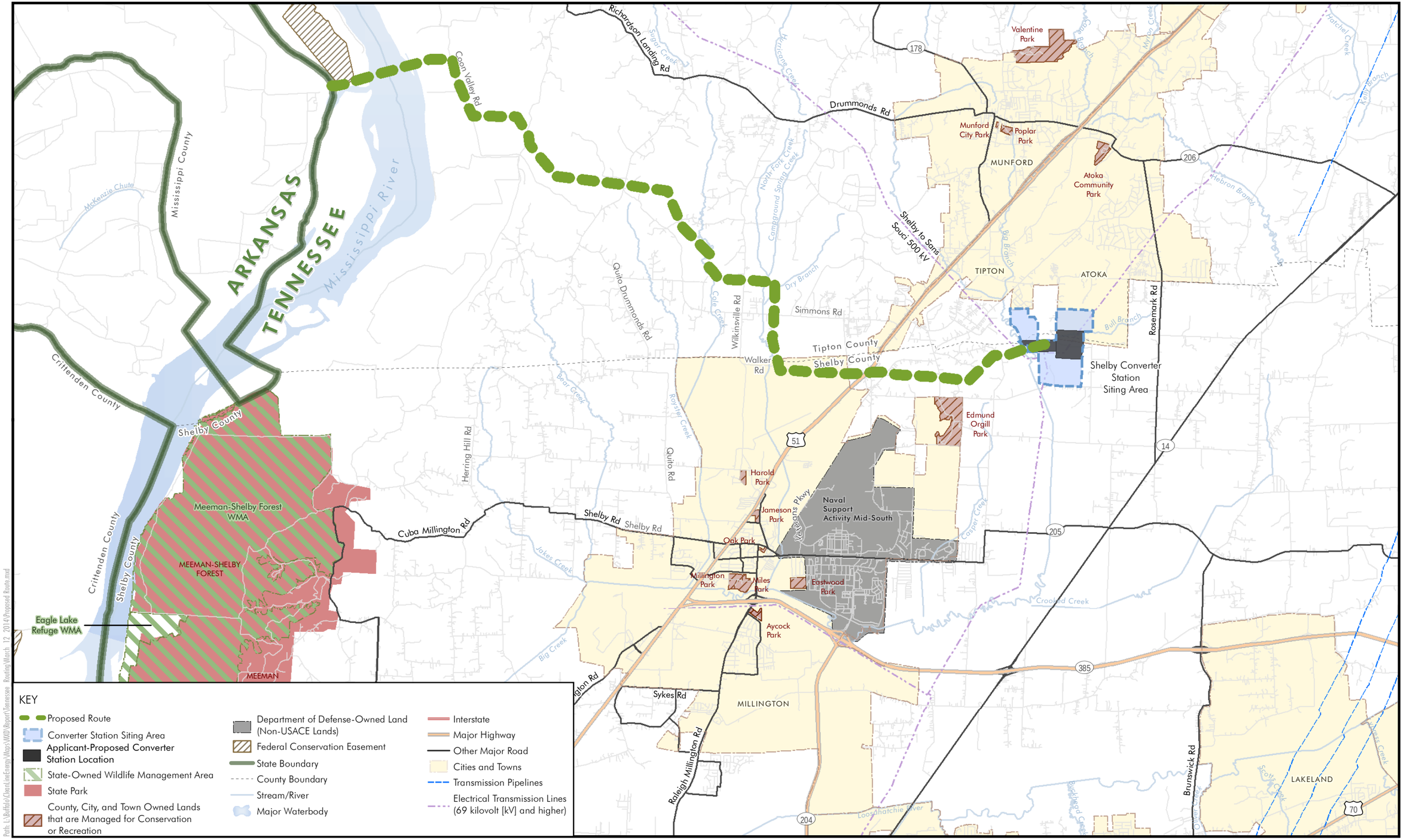
PLAINS & EASTERN
CLEAN LINE



KEY

- Proposed Route
- Converter Station Siting Area
- Applicant-Proposed Converter Station Location
- State-Owned Wildlife Management Area
- State Park
- County, City, and Town Owned Lands that are Managed for Conservation or Recreation
- Department of Defense-Owned Land (Non-USACE Lands)
- Federal Conservation Easement
- State Boundary
- County Boundary
- Stream/River
- Major Waterbody
- Interstate
- Major Highway
- Other Major Road
- Cities and Towns
- Transmission Pipelines
- Electrical Transmission Lines (69 kilovolt [kV] and higher)

0 2 4 Miles
0 2 4 Kilometers
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1:100,000
Date: 3/18/2014

Data Sources: ESRI 2010 and 2012; USFS 2009a and 2009b; USFWS 2012a and 2012b; TWRA 2007; DOE 2013; TDEC 2011; USDA Natural Resources Conservation Service (NRCS) n.d.; The Conservation Registry 2012; NPS 2012; FAA 2010; BTS 2013; Clean Line 2013e and 2013 f.

Figure 6-1
Proposed Route
Plains & Eastern Clean Line
Tennessee

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Appendix B
Routing Team

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Table B-1 provides the members of the Routing Team, business affiliation, and responsibility.

Table B-1
Routing Team Members

Name	Business Affiliation	Responsibility
Jason Thomas	Clean Line Energy Partners	Director, Environment
John Kuba	Clean Line Energy Partners	Environmental Manager
Ty White	Clean Line Energy Partners	GIS Analyst
David A. Crawley Jr.	Ecology & Environment, Inc.	Ecology & Environment, Inc. Routing Task Manager
Laurie Weaver	Ecology & Environment, Inc.	Ecology & Environment, Inc. Project Manager
Valerie Meyer	Ecology & Environment, Inc.	Biologist
Jerry Reading	Pike Energy Solutions	Engineering Review
Mike Tomadakis	Pike Energy Solutions	Engineering Review
Kevin Miller	SWCA Environmental Consultants	Cultural Resources Task Manager

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Appendix C
Comments Summary

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Table C-1 identifies agency and public comments received during Plains and Eastern meetings with agencies, Plains and Eastern stakeholder outreach activities, and DOE scoping that were considered for project siting within Tennessee. All comments received were evaluated regarding their relevance to the project area, the project siting process, and the need for coordination with government agencies or other stakeholders. For a summary of all comments received by the DOE, see the Scoping Summary Report available at www.plainsandeasterneis.com.

Table C-1
Comments Received Specific to Project Siting within Tennessee

Topic	Comment
Plains and Eastern Meetings with Federal and State Agencies	
Land Use and Recreation	Identified federal and state easement and public land boundaries, existing infrastructure, planned development details, and government facilities.
Surface Water	Identified infrastructure near potential Mississippi River crossings, sensitive waterbodies, mitigation program sites, and potential impacts on levees and mitigation measures.
Fish, Wildlife, and Vegetation	Recommended consideration of impacts on threatened and endangered species, wetlands, waterbodies, and forested areas.
Plains and Eastern Meetings with Public Stakeholders	
Land Use and Recreation	Identified public land boundaries; City of Munford municipal boundaries; areas of population growth; private property and hunting club boundaries; existing infrastructure locations including agricultural infrastructure such as pivot irrigation facilities; and planned development details.
Visual Resources	Commented on visual effects from vegetative clearing and the presence of new structures.
Surface Water	Identified waterbody and Mississippi River crossing locations.
Comments Received During DOE Scoping	
Scoping Corridors/Recommended Reroutes	Identified highly populated areas and Highway 51 as a routing opportunity. Commented on routing near existing linear infrastructure and following a southern route.
Land Use and Recreation	Identified planned and existing energy infrastructure; missing structures; residential subdivisions; potential future developments; agricultural land; restricted airspace associated with the Millington Regional Jetport runway expansion; private airfields; and City of Atoka, Tennessee municipal boundaries. Provided feedback on Alternative Routes through the City of Mumford, Tennessee, and information on structure classification.
Surface Water	Commented on wetlands, floodplains, waterbodies, and Mississippi River crossings.
Fish, Wildlife, and Vegetation	Identified potential effects on bats, raptors, migratory birds, and other wildlife.
Cultural Resources	Identified the Restland Memorial Gardens Cemetery.

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Appendix D
Open House Public Notices

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This appendix provides the media advisory and the newspaper advertisement published to notify the public of the Open Houses that Plains & Eastern held in Tennessee. Table D-1 provides the names of the newspapers and the dates of the advertisements that were published.

Table D-1
Open House Notification Publication Dates

Newspaper	Dates Notification was Published
The Commercial Appeal Millington/Tipton	Sunday November 25, 2012 Wednesday November 28, 2012 Sunday December 2, 2012
Millington Star	Wednesday November 21, 2012 Thursday November 29, 2012
The Leader	Wednesday November 21, 2012 Thursday November 29, 2012

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CLEAN LINE
ENERGY PARTNERS

MEDIA ADVISORY

MEDIA CONTACT

Sarah Bray	Becky Jones West
832.319.6340	901.682.3839
832.226.2116 cell	901.359.3323 cell
sbray@cleanlineenergy.com	beckywest@westrogers.com

CLEAN LINE ENERGY TO HOLD INFORMATIONAL OPEN HOUSES REGARDING TRANSMISSION LINE PROJECT FOR WIND ENERGY

CLEAN LINE TEAM WILL BE ON HAND FOR IN-DEPTH DISCUSSIONS

HOUSTON (November 15, 2012) - Clean Line Energy is hosting a series of public open house meetings with community members and landowners in southern Tipton and northern Shelby County to introduce the Plains & Eastern Clean Line. During these meetings, the Clean Line team will discuss potential routing options for the high voltage direct current electric transmission line project and provide the public an opportunity to provide feedback. Clean Line believes that public involvement is a crucial component of the transmission line development process and has identified a network of potential routes based on an extensive feedback from community leaders, landowners, government agencies, conservation and non-governmental organizations, as well as environmental and engineering data collected during more than two years. The public open house meetings will be held in communities near the network of potential routes in order to provide an opportunity for landowners and community leaders to learn about the project firsthand, ask questions and provide input. Per the schedule below, Clean Line representatives will also be available for interviews with the local media.

Building on Memphis' heritage as "America's distribution center," the Plains & Eastern Clean Line transmission line project will help position Greater Memphis as the 21st century hub for clean energy distribution in the Mid-South and Southeast by delivering 3,500 megawatts of clean energy from western Oklahoma, southwest Kansas, and the Texas Panhandle to TVA, Arkansas, and other southeastern markets. The clean energy will be transported via an approximately 750-mile overhead high voltage direct current transmission line. The Plains & Eastern Clean Line will cost approximately $2 billion with more than $300 million of investment in Tennessee.

The Plains & Eastern Clean Line will provide broad economic growth throughout the project area and supply affordable clean energy to millions of customers in the mid-south and southeast United States. In western Tennessee, the project will create the opportunity for hundreds of jobs to construct and operate the transmission line and will allow for millions in annual property taxes for the region. The construction of the Plains & Eastern Clean Line will lead to increased employment for those companies and others who provide goods and services in the wind energy and transmission sectors.

CLEAN LINE
ENERGY PARTNERS

Support for HVDC lines to deliver cost effective clean energy is growing throughout Tennessee and the Southeast. In 2010, TVA adopted a corporate vision to be one of the nation's leading providers of low-cost, cleaner energy by 2020. The Plains & Eastern Clean Line can help TVA meet its vision to source power from a balanced portfolio and maintain lower rates. In 2011, the Memphis, Light, Gas and Water (MLGW) Division Board of Commissioners unanimously passed a resolution in support of the development and implementation of clean energy transported by HVDC transmission to western Tennessee. The board also noted in the resolution that it will work cooperatively with TVA to bring additional low-cost, clean energy to benefit MLGW's customers. Clean Line Energy signed an agreement with Tennessee Valley Authority (TVA) in October of 2011 to identify the full range of benefits that high voltage direct current (HVDC) transmission projects may provide to TVA's stakeholders and to explore non-discriminatory methods for TVA to utilize independent transmission as a means to improve system reliability, increase resource flexibility, and enhance the potential for the integration of renewables.

What: Plains & Eastern Clean Line Public Open Houses
Opportunity for Media Interviews

Who: Clean Line Energy Partners – Plains & Eastern Clean Line

Times and Locations for Plains & Eastern Clean Line Public Open House Meetings:

Dec. 3 **Osceola, AR:**
The Civic Center
116 North Maple
Osceola, AR 72370
4:00 p.m. – Availability for media interviews
5:00 p.m. – 7:00 p.m. – Plains & Eastern Clean Line Public Open House

Dec. 4 **Munford:**
Munford First Methodist United Church
57 South Tipton Road
Munford, TN 38058
7:00 a.m. – 9:00 a.m. – Plains & Eastern Clean Line Public Open House
9:00 a.m. – Availability for media interviews

Dec. 4 **Atoka:**
Elks Lodge
164 Commercial Drive
Atoka, TN 38004
4:00 p.m. – Availability for media interviews
5:00 p.m. – 7:00 p.m. – Plains & Eastern Clean Line Public Open House

- - - - - - - - - - - -

About Clean Line Energy Partners: Clean Line's mission is to connect abundant, renewable energy resources to areas that have a high demand for clean, reliable energy. Clean Line is developing a series of high voltage direct current transmission projects to move renewable energy to market. For more information please visit www.CleanLineEnergy.com. For more information on the Plains & Eastern Clean Line project, please visit www.plainsandeasterncleanline.com.

1001 MCKINNEY, SUITE 700 HOUSTON, TX 77002 TEL 832.319.6310 FAX 832.319.6311

CLEANLINEENERGY.COM

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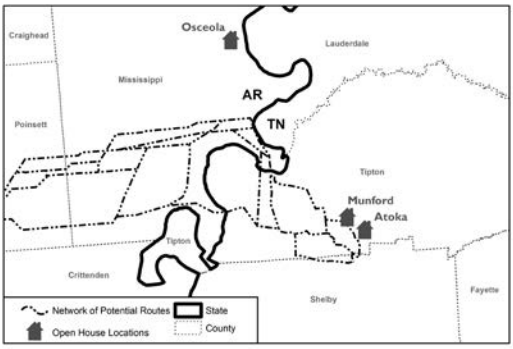
CLEAN LINE
ENERGY PARTNERS

PLEASE JOIN US!

Clean Line Energy invites you to a public open house meeting in your area to learn about the Plains & Eastern Clean Line electric transmission project.

The Plains & Eastern Clean Line will connect thousands of megawatts of clean energy generation from western Oklahoma, southwest Kansas, and the Texas Panhandle with utilities and customers in Tennessee, Arkansas, and other markets in the Mid-South and Southeast. The 750-mile transmission project will cost approximately $2 billion and will make possible billions of dollars of investments in new, clean energy projects, bringing jobs to Arkansas and Tennessee.

Network of Potential Routes in Your Area



This map represents the network of 1 to 3 mile-wide potential routes in your area. These potential routes will be used to identify the location of a 150–200 ft. transmission line easement subject to environmental, engineering studies, and regulatory approvals. More information about the project, including detailed maps will be available at the open houses. We are interested in gathering stakeholder feedback.

Project representatives will be on hand to provide information and answer your questions. A meal will also be served. The meetings will be held in open house format, please stop by when you can!

Open House Meeting Schedule

Monday Dec.3	Tuesday Dec.4
	7–9 am Munford First United Methodist Church 57 South Tipton Road Munford, TN 38058
5–7 pm The Civic Center 116 North Maple Osceola, AR 72370	5–7 pm Elks Lodge 164 Commercial Drive Atoka, TN 38004

RSVP TODAY!

Call 1(855) 844–0553 (toll-free) or email rsvp@plainsandeasterncleanline.com

For more information, visit www.plainsandeasterncleanline.com

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Appendix E
Project-wide Siting Criteria

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The Routing Team developed three iterations of siting criteria for the first phase of the route development process as follows:

- Study Area Siting Criteria (Table E-1);
- Study Corridor Siting Criteria (Table E-2); and
- Siting Criteria for the Network of Potential Routes (Table E-3).

The following tables identify the criteria specific to each iteration and provide a brief description of how the Routing Team applied each criterion.

Table E-1
Summary of Study Area Siting Criteria for Corridor Design and Selection

Criterion	Opportunity/ Sensitivity	Source	Application of Siting Criterion
Major Infrastructure	Opportunity: Existing Linear Features	Platts, McGraw Hill Financial (Platts) 2012; Environmental Systems Research Institute (ESRI) 2010	Existing linear infrastructure includes pipelines, transmission lines > 69kV, major roads, and railroads. Preference was given to corridors that followed other compatible linear infrastructure to the extent practicable.
Large Cities or Population Centers	Sensitivity: Land Use and Socioeconomics	ESRI 2010	Large cities include areas of dense population (e.g., Memphis), areas with high numbers of homes, and concentrations of commercial development. Preference was given to corridors that avoided or minimized potential effects to these areas to the extent practicable.
Federal and State Lands	Sensitivity: Land Use/ Land Cover	National Atlas of the United States 2006; ESRI 2010; supplemented with specific agency shapefiles as available	Lands owned by federal and state governments have high resource utilization values for a diverse group of public stakeholders (e.g., Department of Defense, National Wildlife Refuges, timber resources, outdoor recreation, significant cultural resources, etc.). Preference was given to corridors that minimized crossing of federal or state lands to avoid these resources to the extent practicable.
Recognized Native American Reservations	Sensitivity: Land Use/ Land Cover	National Atlas of the United States 2006	Native American Reservations can hold religious and/or cultural significance for the Native Americans who live on and have jurisdiction over such lands. Siting across Native American Reservations was avoided or minimized to the extent practicable.
Extent of Threatened and Endangered Species Ranges	Sensitivity: Biological Resources	U.S. Fish and Wildlife Service (USFWS) 1995; Oklahoma Department of Wildlife Conservation (ODWC) 2010	Several species and their habitats are protected by federal regulation (e.g. whooping crane, Ozark big-eared bat, and lesser prairie-chicken [candidate]). Preference was given to corridors that avoided or minimized potential effects to these species and their habitats to the extent practicable.

Table E-2
Summary of Study Corridor Siting Criteria for Corridor Design and Selection

Criterion	Opportunity/ Sensitivity	Unit Measure	Source	Application of Siting Criterion
Major Infrastructure	Opportunity: Existing Linear Features	Miles	Platts 2012; ESRI 2010	Existing linear infrastructure includes pipelines, electrical transmission lines >69kV, major roads, and railroads. Preference was given to corridors that followed other compatible linear infrastructure to the extent practicable.
Agriculture and Open Lands	Sensitivity: Land Use/ Land Cover	Square miles in corridor	U.S. Geological Survey (USGS) National Land Cover Dataset (NLCD) 2001 [1]	Siting a transmission line in agricultural areas does not typically require land cover conversion, except at the tower footprint. Transmission lines were generally considered compatible with most pastoral and agricultural lands. Preference was given to corridors with open lands on the assumption that potential effects could be minimized with proper siting.
Urban/ Developed Areas, Population Centers	Sensitivity: Land Use/ Land Cover	Square miles in corridor	USGS NLCD 2001, ESRI 2010 [2]	Locating transmission lines within areas of existing urban development often results in land use conflicts that are difficult to minimize or mitigate. Preference was given to corridors that avoided urban and developed areas.
Certain Federal Lands	Sensitivity: Land Use/ Land Cover	Square miles in corridor	ESRI 2010 [3]	National Forests, National Wildlife Refuges, and National Parks all contain important and/or sensitive natural and/or recreational resources. Many of these lands are subject to land management, resource or conservation plans that restrict certain uses and development to preserve these resources. Preference was given to corridors that minimized crossing of these federal lands to avoid these resources to the extent practicable.
Department of Defense Lands	Sensitivity: Land Use/ Land Cover	Square miles in corridor	ESRI 2010	Department of Defense lands represent specific resources utilized by our nation's military. Siting across or near DOD lands often triggers irreconcilable land use conflicts. DOD lands are also typically subject to access restrictions affecting Project construction, operation and maintenance. Siting over/near DOD lands was avoided to the extent practicable.
Certain State-Owned Lands [4, 5, 6]	Sensitivity: Land Use/ Land Cover	Square miles in corridor	ESRI 2010	Lands owned or managed by the state governments for conservation or recreation, such as state parks, wildlife management areas, and natural areas, contain important and/or sensitive resources. Preference was given to corridors that minimized crossing these state lands to avoid these resources.
Forested Areas	Sensitivity: Land Use/ Land Cover	Square miles in corridor	USGS NLCD 2001 [7]	Siting of transmission lines requires clearing of trees during Project construction and continued maintenance of a permanent ROW, which causes land cover conversion. Consequently, forested lands are considered less compatible with siting of a transmission line. Siting across forested lands was avoided and minimized to the extent practicable.

Table E-2
Summary of Study Corridor Siting Criteria for Corridor Design and Selection

Criterion	Opportunity/ Sensitivity	Unit Measure	Source	Application of Siting Criterion
Native Prairies	Sensitivity: Land Use/ Land Cover	Square miles in corridor	USGS Major Land Resources Areas (MLRAs) 1970 [8]	Siting transmission within large blocks of unfragmented native prairies can contribute to habitat fragmentation. Siting across remaining native prairies was avoided and minimized to the extent practicable.
Private and Public Airports	Sensitivity: Land Use/ Land Cover	Number in corridor	BTS 2013	Vertical obstructions, such as transmission structures, in proximity to airports or airfields may intrude on regulated or commonly used airplane flight/glide paths. Preference was given to corridors that minimized interference with restricted airspace, known flight paths, and glide slopes.
Federally Designated Scenic Routes or Trails [9]	Sensitivity: Land Use/ Land Cover	Number in corridor	ESRI 2010	Scenic routes and/or trails are often designated because of exceptional cultural, historical, visual, and/or aesthetic resources. Preference was given to routes that avoided scenic routes or trails, or to perpendicular crossings in proximity to existing utility crossings.
U.S. Fish and Wildlife Service (USFWS)-Designated Critical Habitat	Sensitivity: Biological Resources	Square miles in corridor	USFWS 2011	Critical habitat has been designated by the USFWS to help support endangered or threatened species. Preference was given to corridors that avoided crossing USFWS-designated critical habitat for federally threatened or endangered species to the extent practicable.
Lesser Prairie-Chicken (LEPC) Potential Habitat	Sensitivity: Biological Resources	Square miles in corridor	Oklahoma Department of Wildlife Conservation (ODWC) 2010	The ODWC developed the Oklahoma Lesser Prairie-Chicken Spatial Planning Tool (OLEPCSPT) 2010 Model as a tool for planning site development with consideration to LEPC conservation. The Routing Team used the inventory of ranked areas within each corridor to assess the relative value of LEPC habitat. Preference was given to corridors that avoided and/or minimized impacts to high value habitat to the extent practicable. Additionally, preference was given to corridors that followed existing linear infrastructure in high value habitat to reduce potential impacts.
Whooping Crane Migratory Pathway	Sensitivity: Biological Resources	Square miles in corridor	Whooping Crane Conservation Association 2009	The whooping crane is a federally endangered species that migrates through Oklahoma. During migration, whooping cranes stopover in large palustrine wetlands to rest and forage. While the known migration pathway cannot be avoided by the Project, preference was given to corridors that avoided large wetland complexes and documented sightings indicating potential stopover and foraging habitat.
Ozark Big-Eared and Indiana Bat Potential Occurrence Area	Sensitivity: Biological Resources	Square miles in corridor	USFWS 1995	The Ozark big-eared and Indiana bat are federally endangered bat species. Preference was given to corridors that avoided and/or minimized impact on areas of known habitat.

Table E-2
Summary of Study Corridor Siting Criteria for Corridor Design and Selection

Criterion	Opportunity/ Sensitivity	Unit Measure	Source	Application of Siting Criterion
American Burying Beetle Habitat	Sensitivity: Biological Resources	Square miles in corridor	USFWS 2008	The American burying beetle is a federally endangered species that occurs in eastern Oklahoma and western Arkansas. While the American burying beetle range cannot be avoided by the Project, preference was given to corridors that minimized intersecting this range to the extent practicable.
Wetlands	Sensitivity: Water Resources	Square miles in corridor	USFWS National Wetlands Inventory (NWI) 2012a USGS NLCD 2001	The Clean Water Act and other federal laws and programs promote wetland protection. Wetlands often serve important ecosystem functions, including as habitat for plants and wildlife, and filtering systems within watersheds. Preference was given to corridors that avoided and/or minimized the number/length of crossings of wetlands systems, particularly forested wetlands.
Major Waterbodies	Sensitivity: Water Resources	Number in corridor	USGS National Hydrography Dataset (NHD)	Crossing a major waterbody (generally defined as greater than 100 feet wide) may present additional environmental impacts or may require special engineering or construction methods. While major waterbodies cannot be entirely avoided by the Project, preference was given to corridors that minimized the number and width of crossing of major waterbodies and reservoirs.
National Register of Historic Places (NRHP) Sites	Sensitivity: Cultural Resources	Number in corridor	NPS 2012	Sites are listed on the NRHP because of their cultural and historical value. The Routing Team used the NRHP to identify officially designated historic places. Preference was given to corridors that avoided and/or minimized impacts to NRHP sites.
Slopes Greater than 15%	Sensitivity: Geologic Resources	Square miles in corridor	USGS National Map Viewer Digital Elevation Model (DEM)	Areas with steep slopes have a higher risk of erosion. Potential mass movement can cause instability affecting structure locations, can pose construction constraints, and can increase maintenance hazards. Preference was given to corridors that avoided and/or minimized crossing such areas to the extent practicable.
Karst Areas	Sensitivity: Geologic Resources	Square miles in corridor	USGS National Karst Map 2005 [10]	Karst topography may include areas of subsurface hazards, surface subsidence, and sinkhole development, which impact the engineering integrity of structures. Additionally, subsurface caverns/caves provide potential wildlife habitat, particularly for bat species. Preference was given to routes that avoided and/or minimized crossing karst areas to the extent practicable.
Landslide Incidence and Susceptibility	Sensitivity: Geologic Resources	Square miles in corridor	National Atlas of the United States 2006, USGS Landslide Incidence and Susceptibility dataset	Areas with higher risk of susceptibility to landslides can potentially cause instability affecting structure locations, can pose construction constraints, and can increase operational and maintenance hazards. Preference was given to corridors that avoided and/or minimized crossing such areas to the extent practicable.

Table E-2
Summary of Study Corridor Siting Criteria for Corridor Design and Selection

Criterion	Opportunity/ Sensitivity	Unit Measure	Source	Application of Siting Criterion
Highly Erodible Soils	Sensitivity: Geologic Resources	Square miles in corridor	U.S. Department of Agriculture (USDA)	The presence of highly erodible soils may cause instability in the ROW, increasing potential erosion and soil impacts. Preference was given to corridors that avoided and/or minimized crossing such areas to the extent practicable.
Total Length of Transmission Line	Sensitivity: Land Use, Construction Impacts, Cost	Miles	Calculated by ESRI ArcMap	Total length of the transmission line was used as a criterion to correlate to land requirements and construction impacts. Preference was given to corridors of a shorter overall length.
Electrical Transmission Line Crossings	Sensitivity: Engineering Consideration	Number in corridor	Platts 2012	Crossing over other high voltage transmission lines (100kV or greater) can result in greater ROW requirements, specialty structures, and increased maintenance hazards for both lines. Preference was given to corridors that required fewer crossings of other transmission lines greater than 100 kV, and especially lines greater than 345 kV to the extent practicable.
Pipeline Crossings	Sensitivity: Engineering Consideration	Number in corridor	Pipeline and Hazardous Material Safety Administration (PHMSA) 2012	Crossing transmission pipelines with a transmission line can result in greater ROW requirements, specialty structures, special construction methods, and increased maintenance hazards for both facilities. Preference was given to corridors that required fewer pipeline crossings to the extent practicable.
Major Road Crossings	Sensitivity: Engineering Consideration	Number in corridor	ESRI 2010	Crossing major roads with a transmission line can result in greater ROW requirements, specialty structures, special construction methods, and increased maintenance hazards for both facilities. Preference was given to corridors requiring fewer major roadway crossings to the extent practicable.
Railroad Crossings	Sensitivity: Engineering Consideration	Number in corridor	ESRI 2010	Crossing railroads with a transmission line can result in greater ROW requirements, specialty structures, special construction methods, and increased maintenance hazards for both facilities. Preference was given to corridors requiring fewer railroad crossings to the extent practicable.

Notes:

1. The USGS NLCD 2001 land cover data were queried for the following types for this feature: Barren Land, Shrub/Scrub, Grassland/ Herbaceous, Pasture/Hay, and Cultivated Crops.

2. The USGS NLCD 2001 land cover data were queried for the following types for this feature: Developed, Open Space; Developed, Low Intensity; Developed, Medium Intensity; and Developed, High Intensity.

3. Federal Lands included: National Forests, National Wildlife Refuges, National Parks, USACE owned lands, Non-USACE Department of Defense owned lands, Bureau of Reclamation owned lands. National Forests include: Ozark and Ouachita National Forests, East Fork Wilderness, Dry Creek Wilderness, Flatside Wilderness, Leatherwood Wilderness, and Poteau Mountain Wilderness). National Wildlife Refuges include: Cache River NWR, Bald Knob NWR, Big Lake NWR, Big Lake Wilderness, Deep Fork NWR, Holla Bend NWR, Little River NWR, Lower Hatchie NWR, Optima NWR, Pond Creek NWR, Sequoyah NWR, and Wapanocca NWR. National Parks include: Buffalo National River, Buffalo National River (Lower Buffalo Unit) Wilderness, Buffalo National River (Ponca Unit) Wilderness, Hot Springs National Park, and Pea Ridge National Military Park). US Army Corps of Engineers Lands included: Arcadia Lake, Beaver Lake, Blue Mountain Lake, Broken Bow Lake, Bull Shoals Lake, Cache River Mitigation Project, Canton Lake, Dardanelle Lake, DeGray Lake, DeQueen Reservoir, Dierks Reservoir, Eufaula Lake, Fort Gibson Lake, Fort Supply Lake, Gillham Lake, Greers Ferry Lake, Heyburn Lake, Hugo Lake, Lake Greeson, Nimrod Lake, Norfork Lake, Optima Lake, Ozark Lake, Pat Mayse Lake, Pine Creek Lake, Robert S. Kerr Lake, Tenkiller Ferry Lake, and Webbers Falls Reservoir. Non-USACE Department of Defense owned lands included: Fort Chaffee (U.S. Army), Naval Support Activity Mid-South (U.S. Navy), Pine Bluff Arsenal (U.S. Army), and Vance Air Force Base (U.S. Air Force). Bureau of Reclamation owned land included McGee Creek Reservoir.

4. Arkansas State Lands included: Arkansas State Parks, Arkansas Wildlife Management Areas, and Arkansas Natural Areas. Arkansas State Parks included: Bull Shoals White River State Park, Crater of Diamonds State Park, Daisy State Park, De Gray State Park, Hampson- Archeological Museum State Park, Hobbs State Park/Conservation Management Area, Jacksonport State Park, Lake Catherine State Park, Lake Dardanelle State Park, Lake Fort Smith State Park, Lake Poinsett State Park, Mount Magazine State Park, Mount Nebo State Park, Petit Jean State Park, Pinnacle Mountain State Park, Prairie Grove Battlefield State Park, Toltec Mounds Archeological State Park, Village Creek State Park, Withrow Springs State Park, and Wooly Hollow State Park. Arkansas Wildlife Management Areas included: AGFC – Forrest L. Wood/Crowley's Ridge Nature Center, Beaver Lake WMA, Big Creek WMA, Big Lake WMA, Big Timber WMA, Blue Mountain WMA, Brewer Lake/Cypress Creek WMA, Buffalo National River WMA, Camp Robinson WMA, Cherokee Prairie Natural Area WMA, Cherokee WMA, Cove Creek Natural Area WMA, Cypress Bayou WMA, Dardanelle WMA, Dagmar WMA, DeGray Lake WMA, Departee Creek WMA, Departee Creek WMA - Estep Unit, Devil's Knob Natural Area WMA, Earl Buss Bayou DeView WMA, Ed Gordon/Point Remove WMA, Electric Island WMA, Fort Chaffee WMA, Frog Bayou WMA, Galla Creek WMA, Gene Rush/Buffalo River WMA, Greers Ferry Lake WMA, Harris Brake WMA, Henry Gray/Hurricane Lake WMA, Hobbs State Park Conservation Area WMA, Howard County WMA, J. Perry Mikles Blue Mountain SUA, Jamestown WMA, Jim Kress WMA, John Tully WMA, Jones Point WMA, Kelly's Slab WMA, Lake Greeson WMA, Lee County WMA, Loafer's Glory WMA, Madison County WMA, Maumelle River WMA, McIlroy Madison County WMA, Mt. Magazine WMA, Nimrod/Lloyd Millwood WMA, Norfork Lake WMA, Ouachita Wildlife Management Area - McCurtain Unit, Ozark Lake WMA, Ozark National Forest WMA, Petit Jean River WMA, Pine Tree Wildlife Demonstration Area, Piney Creek WMA, Prairie Bayou WMA, Provo WMA, Railroad Prairie Natural Area WMA, Rainey WMA, Rex Hancock/Black Swamp WMA, Ring Slough WMA, River Bend WMA, Slippery Hollow Natural Area WMA, Shirey Bay-Rainey Brake WMA, St. Francis Sunken Lands WMA, Sweden Creek Natural Area WMA, Sylamore WMA, Wattensaw WMA, Wedington WMA, White Hall WMA, and Winona WMA. Arkansas Natural Areas included: Baker Prairie Natural Area, Bear Hollow Natural Area, Benson Creek Natural Area, Big Creek Natural Area, Cave Springs Cave Natural Area, Chensey Prairie Natural Area, Cherokee Prairie Natural Area, Cove Creek Natural Area, Cow Shoals Riverfront Forest Natural Area, Dardanelle Rock Natural Area, Devil's Knob – Devil's Backbone Natural Area, Downs Prairie Natural Area, Goose Pond Natural Area, H.E. Flanagan Prairie Natural Area, Konecny Prairie Natural Area, Lorance Creek Natural Area, Mills Park Natural Area (easement), Railroad Prairie Natural Area, Searles Prairie Natural Area, Singer Forest Natural Area (easement), Slippery Hollow Natural Area, Smoke Hole Natural Area, Stone Road Glade Natural Area, and Sweden Creek Falls Natural Area.

5. Oklahoma State Lands included: Oklahoma State Parks and Oklahoma Wildlife Management Areas. Oklahoma State Parks included: Alabaster Caverns State Park, Beaver Dunes State Park, Beavers Bend State Park, Boggy Depot State Park, Brushy Lake State Park, Burnt Cabin Ridge State Park, Cherokee Landing State Park, Greenleaf State Park, Heyburn State Park, Hochatown State Park, Lake Schultz State Park, Little Sahara State Park, Gloss Mountain State Park, Boiling Springs State Park, Lake Eufaula State Park, Raymond Gary State Park, Fountainhead State Park, Fort Cobb State Park, McGee Creek State Park, Okmulgee State Park, Pine Creek Cove State Park, Red Rock Canyon State Park, Roman Nose State Park, Sequoyah State Park, and Hugo Lake State Park. Oklahoma Wildlife Management Areas included: Atoka WMA, Beaver River WMA, Canton WMA, Cherokee-Gruber WMA, Cimarron Bluff WMA, Cimarron Hills WMA, Cookson WMA, Cooper WMA, Deep Fork WMA, Dewey County WMA, Drummond Flats WMA, Ellis County WMA, Eufaula WMA, Fort Gibson WMA, Fort Supply WMA, Grassy Slough WMA, Hugo WMA, Heyburn WMA, Honobia Creek WMA, Hugo WMA, Keystone WMA, Lower Illinois River Public Fishing and Hunting Area, Lunceford Playa, Major County WMA, McClellan-Kerr WMA, McGee Creek WMA, Okmulgee Public Hunting Area, Optima WMA, Ouachita WMA, Pine Creek WMA, Schultz WMA, Sparrowhawk WMA, Stringtown WMA, Tenkiller WMA, and Whitegrass WMA.

6. Tennessee State Lands include: Fort Pillow State Historic Park, Meeman-Shelby Forest State Park, Eagle Lake Refuge Wildlife Management Area, John Tully Wildlife Management Area, Meeman-Shelby Forest State Natural Area.

7. The USGS NLCD 2001 land cover data were queried for the following types of forested land cover: Deciduous Forest, Evergreen Forest, Mixed Forest, and Woody Wetlands.

8. Due to the age of the most recent prairie data found (USGS MLRA 1970) and increases in urban development over time, it is expected that the actual area of prairie has declined and is anticipated be less than in the 1970 MLRA.

9. Federally Designated Scenic Routes or Trails include: Big Piney Creek Wild and Scenic River, Mulberry Wild and Scenic River, and North Sylamore Creek Wild and Scenic River.

10. A national dataset of karst and pseudokarst topography (areas of karst-like terrain produced by processes other than the dissolution of rock) produced by the USGS was reviewed.

Table E-3
Summary of Siting Criteria for Identification of the Route Network and Network of Potential Routes

Criterion	Opportunity/ Sensitivity	Unit Measure	Source	Application of Siting Criterion
Major Infrastructure	Opportunity: Existing Linear Features	Miles along reference centerline	Platts 2012; ESRI 2010; Ventyx 2013	Existing linear infrastructure includes: pipelines, electrical transmission lines >69kV, major roads, and railroads. Additionally, siting a transmission line in proximity to existing roads that could be used for access may reduce land use impacts. Preference was given to routes that followed compatible linear infrastructure to the extent practicable.
Agriculture and Open Lands	Sensitivity: Land Use/ Land Cover	Miles along reference centerline	Aerial Imagery and USGS NLCD 2006 [1, 2]	Siting a transmission line in agricultural areas does not typically require land cover conversion, except at the tower footprint. Transmission lines were generally considered more compatible with most pastoral and agricultural lands. Preference was given to corridors with agricultural or open lands as compared to forested and/or urban/developed areas.
Urban / Developed Areas	Sensitivity: Land Use/ Land Cover	Miles along reference centerline	Aerial Imagery and USGS NLCD 2006 [2, 3]	Locating transmission lines within areas of existing urban development often results in land use conflicts that are difficult to minimize or mitigate. Preference was given to routes that avoided urban and developed areas.
Cities and Towns	Sensitivity: Land Use/ Land Cover	Miles along reference centerline	ESRI 2010	Locating transmission lines within areas of existing or known planned development within a city or town often results in land use conflicts that are difficult to minimize or mitigate. Preference was given to routes that avoided and/or minimized crossings within city or town limits, especially highly populated areas.
Schools, Churches, and Hospitals	Sensitivity: Land Use	Number Within 0 to 500 feet, and 500 to 1,000 feet	ESRI 2010 and Clean Line 2012 [4]	Schools, churches (or other places of religious congregation), and hospitals are sensitive land use features. Preference was given to routes that minimized impacts to schools, churches and hospitals.
Residences	Sensitivity: Land Use	Number Within 0 to 500 feet and 500 to 1,000 feet	Clean Line 2012 [4] and aerial imagery	Residences are sensitive land use features. Preference was given to routes that maximized the distance from the greatest number of residences.

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Criterion	Opportunity/ Sensitivity	Unit Measure	Source	Application of Siting Criterion
Federal Lands: National Forests [5]	Sensitivity: Land Use/ Land Cover	Miles along reference centerline	ESRI 2010	National Forests typically have high resource, recreation, or conservation value to be enjoyed by the greater public. In addition, National Forests typically consist of distinct management areas, within which siting of a transmission line may not be considered compatible with the prescribed use of the management area (e.g., Wilderness Areas and Research Natural Areas). Siting over/ across National Forests was avoided and/or minimized to the extent practicable.
Federal Lands: National Wildlife Refuges [5]	Sensitivity: Land Use/ Land Cover	Miles along reference centerline	ESRI 2010	National Wildlife Refuges are established to conserve, manage, and, where appropriate, restore fish, wildlife, and plant resources and their habitats. Siting over/across National Wildlife Refuges was avoided and/or minimized to the extent practicable.
Federal Lands: National Parks [5]	Sensitivity: Land Use/ Land Cover	Miles along reference centerline	ESRI 2010	National Park lands contain important recreational, natural, and cultural or historic resources. Preference was given to routes that avoided and/or minimized crossing National Parks to the extent practicable.
Federal Lands: U.S. Army Corps of Engineers (USACE) Lands [5]	Sensitivity: Land Use/ Land Cover	Miles along reference centerline	ESRI 2010	USACE-owned lands include certain water supply reservoirs, hydroelectric facilities, flood control structures, and lands near navigable waterways. USACE lands often include natural and man-made sensitive or important resources (e.g., recreational uses, wildlife habitat, flood control and other civil infrastructure). Preference was given to routes that minimized crossing USACE-owned lands to the extent practicable.
Federal Lands: Department of Defense Lands [5]	Sensitivity: Land Use/ Land Cover	Miles along reference centerline	ESRI 2010	Department of Defense lands represent specific resources utilized by our nation's military. Siting across or near DOD lands often triggers irreconcilable land use conflicts. DOD lands are also typically subject to access restrictions affecting Project construction, operation and maintenance. Siting over/near DOD lands was avoided to the extent practicable.

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Criterion	Opportunity/ Sensitivity	Unit Measure	Source	Application of Siting Criterion
State Lands: State-Owned Lands that are managed for conservation or recreation [6, 7, 8]	Sensitivity: Land Use/ Land Cover	Miles along reference centerline	ESRI 2010	Lands owned by the state governments for conservation or recreation, such as state parks, Wildlife Management Areas, and Natural Areas, contain important and/or sensitive natural and recreational resources. Siting over/across these state-owned lands was avoided and/or minimized to the extent practicable.
State Lands: Oklahoma State School Lands	Neither: Land Use/Land Cover	Miles along reference centerline	Individual County Property Appraiser Office Data	The CLO, also known as the School Land Trust, is an Oklahoma state agency. The CLO oversees the sale, rental, disposal, and management of school lands and other public lands, as well as funds and proceeds derived thereof. Use of these lands for energy infrastructure is not prohibited by the CLO rules and regulations and could provide additional income for Oklahoma schools. The Oklahoma School Lands were not identified as an opportunity or a sensitivity.
State Lands: Lands Leased by Arkansas [6]	Sensitivity: Land Use/ Land Cover	Miles along reference centerline	ESRI 2010	Lands leased by Arkansas include WMAs leased by AGFC for hunting or outdoor recreational purposes. Siting over/across these AGFC-leased WMAs was minimized to the extent practicable.
County or Municipality Owned Lands that are managed for conservation or recreation	Sensitivity: Land Use/ Land Cover	Miles along reference centerline	ESRI 2010	Lands owned or managed by municipal governments for conservation or recreation, such as city parks, contain important and/or sensitive natural and/or recreational resources. In addition, many of these areas are utilized by the public for diverse purposes (e.g., outdoor recreation, community and cultural events, etc.). Siting over/across these county or municipality owned lands was avoided and/or minimized to the extent practicable.
Tribal Trust Land	Sensitivity: Land Use/ Land Cover	Miles along reference centerline	Confidential data	Tribal trust lands are held by the federal government for the beneficial interest of a Native American tribe. These lands are protected for their religious and/or cultural significance for the Native Americans who live on and have jurisdiction over such lands. Siting over/across such lands was avoided and/or minimized to the extent practicable.

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Criterion	Opportunity/ Sensitivity	Unit Measure	Source	Application of Siting Criterion
Conservation Easements	Sensitivity: Land Use/ Land Cover	Miles along reference centerline	Natural Resources Conservation Service, USFWS 2012b, ODWC 2012, ANHC n.d.(e)	Conservation Easements are in place to enhance and protect ecosystem resources, species and habitat. Preference was given to routes that avoided and/or minimized crossing lands known to be subject to conservation easements to the extent practicable.
Prime Farmland	Sensitivity: Land Use/ Land Cover	Miles along reference centerline	United States Department of Agriculture (USDA) Natural Resources Conservation Service (NCRS) 2012	Prime farmlands are state- or federally-designated soil types that have the best combination of physical and chemical characteristics for producing crops. Preference was given to routes that avoided and/or minimized crossing prime farmlands to the extent practicable.
Center Pivot Agricultural Fields	Sensitivity: Land Use/ Land Cover	N/A [9]	Aerial Imagery	Structures such as transmission towers commonly interfere with the operation of center pivot irrigation systems. Preference was given to routes that avoided and/or minimized interference with center pivot agricultural fields.
Forested Areas	Sensitivity: Land Use/ Land Cover	Miles along reference centerline	Aerial Imagery and USGS NLCD 2006 [2, 10]	Siting of transmission lines requires clearing of trees during Project construction and continued maintenance of a permanent ROW, which causes land cover conversion. Consequently, forested lands are considered less compatible with siting of a transmission line. Siting over/across forested areas was avoided and/or minimized to the extent practicable.
Native Prairies	Sensitivity: Land Use/ Land Cover	Miles along reference centerline	USGS Major Land Resources Areas (MLRAs) 1970; ANHC n.d.; TNC Oklahoma 2008 [11]	Siting transmission within large blocks of native prairies can contribute to habitat fragmentation. Siting over/across remaining native prairies was avoided and/or minimized to the extent practicable.
Stakeholder Comments	Sensitivity: Land Use/ Land Cover	N/A[9]	Stakeholder Outreach Comments	The Routing Team relied on stakeholder comments gathered from 2010 through 2012 to assist in avoiding and minimizing impacts to identified sensitivities, and maximizing siting opportunities, per the individual comment.

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Criterion	Opportunity/ Sensitivity	Unit Measure	Source	Application of Siting Criterion
Private, Public, and Military Airports' Restricted Airspace	Sensitivity: Land Use/ Land Cover	Number intersected by reference centerline	BTS 2013	Vertical obstructions, such as transmission structures, in proximity to airports or airfields may intrude on regulated or commonly used airplane flight/glide paths. Preference was given to routes that minimized interference with restricted airspace, known flight paths, and glide slopes to the extent practicable.
Federally Designated Scenic Routes or Trails [12]	Sensitivity: Land Use/ Land Cover	Number intersected by reference centerline	ESRI 2010	Scenic routes and/or trails have been designated because of exceptional cultural, historical, visual, and/or aesthetic resources. Preference was given to routes that avoided scenic routes or trails, or to perpendicular crossings in proximity to existing utility crossings.
Wild and Scenic Rivers	Sensitivity: Land Use/ Land Cover	Number intersected by reference centerline	NPS 2009	The Wild and Scenic Rivers System was created to preserve certain rivers with outstanding natural, cultural, and recreational values. Preference was given to routes that avoided and/or minimized crossings of Wild and Scenic Rivers to the extent practicable.
Parcels and Parcel Boundaries	Sensitivity: Land Use/ Land Cover	Number intersected by reference centerline	Individual county property appraiser office data	The Routing Team attempted to minimize parcel segmentation by crossing parcels near existing property boundaries to the extent practicable. In addition, preference was given to routes that intersected fewer parcels to the extent practicable.
USFWS-Designated Critical Habitat	Sensitivity: Biological Resources	Miles along reference centerline	USFWS 2012a	Critical habitat has been designated by the USFWS to help support endangered or threatened species. Preference was given to routes that avoided crossing USFWS-designated critical habitat for federally threatened or endangered species to the extent practicable.
State Natural Heritage Program Species Location Data – Occurrence Records	Sensitivity: Biological Resources	Number within 1 mile	OK Biological Survey; ANHC; Tennessee Department of Environment and Conservation [13]	The Natural Heritage occurrence data identifies the location of known occurrences of sensitive species. Preference was given to routes that included fewer occurrences of such species to the extent practicable.
Arkansas Natural Heritage Program Species Location Data – Focal Areas	Sensitivity: Biological Resources	Miles along reference centerline	ANHC n.d.	The ANHC designates focal areas of conservation interest as a planning tool. Preference was given to routes that avoided crossing such focal areas to the extent practicable.

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Summary of Siting Criteria for Identification of the Route Network and Network of Potential Routes

Criterion	Opportunity/ Sensitivity	Unit Measure	Source	Application of Siting Criterion
Arkansas Natural Heritage Program Species Location Data – Natural Areas [6]	Sensitivity: Biological Resources	Miles along reference centerline	ANHC n.d.	The ANHC holds fee title or conservation easements on lands in Arkansas referred to as Natural Areas. Natural Areas are subject to restrictions on development, including utility use/crossing. Siting over/across Natural Area was avoided and/or minimized to the extent practicable.
Arkansas Natural Heritage Program Species Location Data – Wetland Conservation Easements	Sensitivity: Biological Resources	Miles along reference centerline	ANHC n.d.	The ANHC holds wetland easements on lands in Arkansas consisting of areas of conservation interest. Preference was given to routes that avoided and/or minimize crossing wetland conservation easements to the extent practicable.
Arkansas Natural Heritage Program Species Location Data – Sensitive Streams	Sensitivity: Water Resources	Number Intersected by reference centerline	ANHC n.d.	ANHC-designated Sensitive Streams include those streams in Arkansas that are known to support globally rare species (i.e., those species with a Arkansas Heritage Program Rank of G1-G3 [14]). Preference was given to routes that avoided and/or minimized crossing Sensitive Streams to the extent practicable.
Arkansas Natural Heritage Program Species Location Data – Designated Streams	Sensitivity: Water Resources	Number Intersected by reference centerline	ANHC n.d.	ANHC Designated Streams include those listed on the Arkansas registry or system of natural and scenic rivers or included in the ADEQ's Regulation No. 2 that establishes water quality standards for the state. Preference was given to routes that avoided and/or minimized crossing Designated Streams to the extent practicable.
LEPC Potential Habitat: ODWC Oklahoma Lesser Prairie-Chicken Spatial Planning Tool (OLEPCSPT)[15]	Sensitivity: Biological Resources	Miles along reference centerline	ODWC OLEPCSPT 2010	The ODWC developed the OLEPCSPT 2010 Model as a tool for planning site development with consideration to LEPC conservation. The Routing Team used the inventory of ranked areas within each corridor to assess the relative value of LEPC habitat. Preference was given to routes that avoided and/or minimized crossing over/across high value habitat (Ranks 4 to 8) to the extent practicable. Additionally, preference was given to routes that followed existing linear infrastructure in high value habitat to reduce potential impacts. (Considered together with "Existing Infrastructure Parallels in LEPC Habitat" below.)

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Summary of Siting Criteria for Identification of the Route Network and Network of Potential Routes

Criterion	Opportunity/ Sensitivity	Unit Measure	Source	Application of Siting Criterion
LEPC Potential Habitat – Western Governors Association (WGA) Southern Great Plains (SGP) Crucial Habitat Assessment Tool (CHAT)	Sensitivity: Biological Resources	Miles along reference centerline	University of Kansas 2011 [16]	The WGA developed the SGP CHAT model as a tool to identify the relative value of LEPC habitat. Quantifying the ranked areas within each route helped the Routing Team compare the relative potential value of LEPC habitat. Preference was given to routes that avoided and/or minimized crossing over/across higher importance habitat (Ranks 1 to 3) to the extent practicable. Additionally, preference was given to routes that followed existing linear infrastructure in high value habitat to reduce potential impacts. (Considered together with "Existing Infrastructure Parallels in LEPC Habitat" below.)
Existing Infrastructure Parallels in LEPC Habitat	Sensitivity: Biological Resources And Opportunity: Linear Infrastructure	Miles along reference centerline within an existing avoidance area for the LEPC. [17]	Ventyx 2013; ESRI 2012; University of Kansas 2011; ODWC OLEPCSPT 2010	Where high-quality LEPC habitat was unavoidable, following existing infrastructure, specifically electrical transmission lines and major roadways, provided an opportunity to minimize habitat fragmentation. Preference was given to routes that followed existing linear infrastructure in high value habitat for OLEPCSPT and CHAT.
LEPC Core Areas	Sensitivity: Biological Resources	Miles along reference centerline	ODWC LEPC Conservation Action Plan [18]	Core Areas are identified as areas of high quality habitat that are targeted for conservation measures to help prevent the listing of the LEPC as a threatened or endangered species. Preference was given to routes that avoided Core Areas.
Whooping Crane Migratory Stopover Locations	Sensitivity: Biological Resources	Acres within 1 mile of stopover locations	Cooperative Whooping Crane Tracking Project 2010	The whooping crane is a federally endangered species that migrates through Oklahoma. During migration, whooping cranes stopover in palustrine wetlands to rest and forage. Preference was given to routes that avoided documented stopover habitat.
Ozark Big-Eared and Indiana Bat Potential Occurrence Areas	Sensitivity: Biological Resources	Miles along reference centerline	USFWS 1995	The Ozark big-eared and Indiana bat are federally endangered bat species. Preference was given to routes that avoided and/or minimized areas of known habitat to the extent practicable.
Known Bat Caves	Sensitivity: Biological Resources	Number Intersected within 0.5 mile of the reference centerline	TNC Oklahoma 2002	Known bat caves or hibernacula may represent bat habitat for sensitive bat species. Documented locations were avoided to the extent practicable.

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Criterion	Opportunity/ Sensitivity	Unit Measure	Source	Application of Siting Criterion
American Burying Beetle Potential Occurrence Areas	Sensitivity: Biological Resources	Miles along reference centerline	Clean Line 2012 derived from USFWS 2008 and USGS NLCD 2006 [2, 19]	The American burying beetle is a federally listed endangered species. While the species range cannot be avoided by the Project, preference was given to routes that avoided and/or minimized potential occurrence areas to the extent practicable
Wetlands	Sensitivity: Water Resources	Miles along reference centerline	USFWS National Wetlands Inventory (NWI) 2012a; USGS NLCD 2006 [2]	The Clean Water Act and other federal laws and programs promote wetland protection. Wetlands often serve important ecosystem functions, including as habitat for plants and wildlife, and filtering systems within watersheds. Preference was given to routes that avoided and/or minimized the number/length of crossings of wetlands systems, particularly forested wetlands.
Floodplains	Sensitivity: Water Resources	Miles along reference centerline	Federal Emergency Management Agency 2012 [20]	Construction within a floodplain may impair the ability of land to store and dissipate floodwaters and may require special engineering or construction methods. While floodplains cannot be entirely avoided, preference was given to routes that minimize the width of the crossing of mapped floodplains to the extent practicable.
Major Waterbodies	Sensitivity: Water Resources	Number intersected by reference centerline	USGS NHD 2012b	Crossing a major waterbody (generally defined as greater than 100 feet wide) may result in additional environmental impacts or may require special engineering or construction methods. While major waterbodies cannot be entirely avoided, preference was given to routes that minimized the number and width of crossing of major waterbodies and reservoirs.
State Designated Waterbodies with Special Significance	Sensitivity: Water Resources	Number intersected by reference centerline	ODEQ Water Protection Listings, Oklahoma Water Resources Board (2011) Appendix B (High Quality Waters); Tennessee Division of Water Pollution Control Outstanding National Resource Waters and Exceptional Tennessee Waters; Arkansas Department of Environmental Quality (ADEQ) (2012) [21]	Crossing a state-designated waterbody with special significance may generate adverse environmental impacts or require special engineering or construction methods. While designated waterbodies cannot be entirely avoided, preference was given to routes that minimized the number and width of crossing of designated waterbodies.

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Criterion	Opportunity/ Sensitivity	Unit Measure	Source	Application of Siting Criterion
Other Waterbodies	Sensitivity: Water Resources	Number intersected by reference centerline	USGS NHD 2012b [22]	Crossing a waterbody may result in additional environmental impacts and/or may require special engineering or construction methods. Additional consideration was given to the angle of intersection between the transmission line and the waterbody to minimize potential impacts on the streambed and riparian areas. While these waterbodies cannot be entirely avoided, preference will be given to routes that minimize the number of crossings.
Springs	Water Resources	Number intersected by reference centerline	USGS NHD 2012b	Natural springs are often environmentally sensitive areas that provide the headwaters of streams or contribute to stream flow. Preference was given to routes that avoided and/or minimized crossing natural springs to the extent practicable.
Sites on the National Register of Historic Places (NRHP)	Sensitivity: Cultural Resources	Number within 0.25 mile	National Park Service (NPS) 2012	Sites are listed on the NRHP because of their cultural and historical value. The NRHP was used to identify officially designated historic places. Preference was given to routes that avoided and/or minimized impacts to registered NHRP sites.
Recorded Cultural or Historical Sites	Sensitivity: Cultural Resources	Number intersected by reference centerline	Oklahoma Archeological Survey; Oklahoma SHPO 2012; Arkansas SHPO 2012; Tennessee SHPO 2012	Recorded cultural or historical sites may be sensitive to disturbance because of their cultural and historical value. Preference was given to routes that avoided and/or minimized impacts to cultural and historical sites.
Cemeteries	Sensitivity: Cultural Resources	Number within 500 feet	ESRI 2010 and field verified data	Cemeteries have cultural, historical, and social value. Preference was given to routes that avoided known cemeteries.
Slopes Greater than 20%	Sensitivity: Geologic Resources/ Engineering Consideration	Miles along reference centerline	USGS National Map Viewer Digital Elevation Model	Areas with steep slopes have a higher risk of erosion. Potential mass movement can cause instability affecting structure locations, can pose construction constraints, and can increase maintenance hazards. Preference was given to routes that avoided and/or minimized crossing such areas to the extent practicable.

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Karst Areas	Sensitivity: Geologic Resources	Miles along reference centerline	USGS National Karst Map 2005 [23]	Karst topography may include areas of subsurface hazards, surface subsidence, and sinkhole development, which impact the engineering integrity of structures. Additionally, subsurface caverns/caves provide potential wildlife habitat, particularly for bat species. Preference was given to routes that avoided and/or minimized crossing karst areas to the extent practicable.
Known Contaminated Sites	Sensitivity: Existing Contamination	Number within 0.25 mile	U.S. Environmental Protection Agency	Known contaminated sites, waste clean-up areas, and sites in need of remediation pose risks because construction may expose the contamination to the environment and construction workers. Also, these sites may require temporary or permanent removal/relocation of transmission lines during future site remediation. Preference was given to routes that avoided known contaminated sites to the extent practicable.
Total Length of the Transmission Line	Sensitivity: Land Use, Construction Impacts, Cost	Miles	Calculated by ESRI ArcMap	Total length of the transmission line was used as a criterion to correlate to land requirements and construction impacts. Preference was given to routes of shorter overall length.
Electrical Transmission Line Crossings	Sensitivity: Engineering Consideration	Number intersected by reference centerline	Ventyx 2013	Crossing over other high voltage transmission lines can result in greater ROW requirements, specialty structures, and increased maintenance hazards for both lines. Preference was given to routes with fewer crossings of other transmission lines greater than 100 kV, and especially lines greater than 345 kV.
Transmission Pipeline Crossings	Sensitivity: Engineering Consideration	Number intersected by reference centerline	Pipeline and Hazardous Material Safety Administration (PHMSA) 2012	Crossing transmission pipelines with a transmission line can result in greater ROW restrictions and limitations, including atypical construction methods and potential maintenance hazards. Preference was given to routes with fewer pipelines crossings to the extent practicable.

Table E-3
Summary of Siting Criteria for Identification of the Route Network and Network of Potential Routes

Criterion	Opportunity/ Sensitivity	Unit Measure	Source	Application of Siting Criterion
Major Road Crossings	Sensitivity: Engineering Consideration	Number intersected by reference centerline	ESRI 2010	Crossing major roads with a transmission line can result in greater ROW requirements, specialty structures, special construction methods, and increased maintenance hazards for both facilities. Preference was given to routes with fewer major road crossings to the extent practicable.
Railroad Crossings	Sensitivity: Engineering Consideration	Number intersected by reference centerline	ESRI 2010	Crossing railroads with a transmission line can result in greater ROW requirements, specialty structures, special construction methods, and increased maintenance hazards for both facilities. Preference was given to routes with fewer railroad crossings to the extent practicable.

Notes:

1. The USGS NLCD 2006 land cover data was queried for the following categories to identify agriculture and open lands: Barren Land, Shrub/Scrub, Grassland/ Herbaceous, Pasture/Hay, and Cultivated Crops.

2. According to the USGS Fact Sheet posted on February 23, 2012 – the NLCD 2006 Land Use Land Cover (LULC) data is the most recent data available. "*The next version of NLCD, entitled NLCD 2011, is currently (2012) in production. NLCD 2011 will update NLCD products to a nominal year of 2011 in all 50 States and Puerto Rico, and will continue to provide a national assessment of land cover change back to either 2001 or 2006. NLCD 2011 is scheduled for public release in December 2013.*"

3. The USGS NLCD 2006 land cover data were queried for the following types for this feature: Developed, Open Space; Developed, Low Intensity; Developed, Medium Intensity; and Developed, High Intensity.

4. Structure data was compiled through digitization of structure rooftops based on aerial photo interpretation and subsequent field verification surveys conducted via public roads in 2012.

5. Federal Lands included: National Forests, National Wildlife Refuges, National Parks, USACE owned lands, Non-USACE Department of Defense owned lands, Bureau of Reclamation owned lands. National Forests included: Ozark and Ouachita National Forests and East Fork Wilderness. National Wildlife Refuges included: Cache River NWR, Bald Knob NWR, Big Lake NWR, Deep Fork NWR, Holla Bend NWR, Little River NWR, Lower Hatchie NWR, Optima NWR, Sequoyah NWR, and Wapanocca NWR). National Parks included: Buffalo National River, Buffalo National River (Lower Buffalo Unit) Wilderness, Buffalo National River (Ponca Unit) Wilderness, Hot Springs National Park, and Pea Ridge National Military Park,. US Army Corps of Engineers Lands included: Arcadia Lake, Beaver Lake, Blue Mountain Lake, Broken Bow Lake, Bull Shoals Lake, Cache River Mitigation Project, Canton Lake, Dardanelle Lake, DeGray Lake, DeQueen Reservoir, Dierks Reservoir, Eufaula Lake, Fort Gibson Lake, Fort Supply Lake, Gillham Lake, Greers Ferry Lake, Heyburn Lake, Hugo Lake, Lake Greeson, Nimrod Lake, Norfork Lake, Optima Lake, Ozark Lake, Pat Mayse Lake, Pine Creek Lake, Robert S. Kerr Lake, Tenkiller Ferry Lake, and Webbers Falls Reservoir. Non-USACE Department of Defense owned lands included: Fort Chaffee (U.S. Army), Naval Support Activity Mid-South (U.S. Navy), Pine Bluff Arsenal (U.S. Army), and Vance Air Force Base (U.S. Air Force). Bureau of Reclamation owned land included McGee Creek Reservoir.

6. Arkansas State Lands included: Arkansas State Parks, Arkansas Wildlife Management Areas, and Arkansas Natural Areas. Arkansas State Parks included: Bull Shoals White River State Park, Crater of Diamonds State Park, Daisy state Park, De Gray State Park, Hampson- Archeological Museum State Park, Hobbs State Park/Conservation Management Area, Jacksonport State Park, Lake Catherine State Park, Lake Dardanelle State Park, Lake Fort Smith State Park, Lake Poinsett State Park, Mount Magazine State Park, Mount Nebo State Park, Petit Jean State Park, Pinnacle Mountain State Park, Prairie Grove Battlefield State Park, Toltec Mounds Archeological State Park, Village Creek State Park, Withrow Springs State Park, and Wooly Hollow State Park. Arkansas Wildlife Management Areas included: AGFC – Forrest L. Wood/Crowley's Ridge Nature Center, Beaver Lake WMA, Big Creek WMA, Big Lake WMA, Big Timber WMA, Blue Mountain WMA, Brewer Lake/Cypress Creek WMA, Brushy Creek WMA, Buffalo National River WMA, Camp Robinson WMA, Cherokee Prairie Natural Area WMA, Cherokee WMA, Cove Creek Natural Area WMA, Cypress Bayou WMA, Dardanelle WMA, Dagmar WMA, DeGray Lake WMA, Departee Creek WMA, Departee Creek WMA - Estep Unit, Devil's Knob Natural Area WMA, Earl Buss Bayou DeView WMA, Ed Gordon/Point Remove WMA, Electric Island WMA, Fort Chaffee WMA, Frog Bayou WMA, Galla Creek WMA, Gene Rush/Buffalo River WMA, Greers Ferry Lake WMA, Gulf Mountain WMA, Harris Brake WMA, Henry Gray/Hurricane Lake WMA, Hobbs State Park Conservation Area WMA, Howard County WMA, J. Perry Mikles Blue Mountain SUA, Jamestown WMA, Jim Kress WMA, John Tully WMA, Jones Point WMA, Kelly's Slab WMA, Lake Greeson WMA, Lee County WMA, Loafer's Glory WMA, Madison County WMA, Maumelle River WMA, McIlroy Madison County WMA, Mt. Magazine WMA, Nimrod/Lloyd Millwood WMA, Norfork Lake WMA, Ouachita Wildlife Management Area - McCurtain Unit, Ozark Lake WMA, Ozark National Forest WMA, Petit Jean River WMA, Pine Tree Wildlife Demonstration Area, Piney Creek WMA, Prairie Bayou WMA, Provo WMA, Railroad Prairie Natural Area WMA, Rainey WMA, Rex Hancock/Black Swamp WMA, Ring Slough WMA, River Bend WMA, Scott Henderson Gulf Mountain WMA, Slippery Hollow Natural Area WMA, Shirey Bay-Rainey Brake WMA, St. Francis Sunken Lands WMA, Sweden Creek Natural Area WMA, Sylamore WMA, Wattensaw WMA, Wedington WMA, White Hall WMA, and Winona WMA. Arkansas Natural Areas included: Baker Prairie Natural Area, Bear Hollow Natural Area, Benson Creek Natural Area, Big Creek Natural Area, Cave Springs Cave Natural Area, Chensey Prairie Natural Area, Cherokee Prairie Natural Area, Cove Creek Natural Area, Cow Shoals Riverfront Forest Natural Area, Dardanelle Rock Natural Area, Devil's Knob – Devil's Backbone Natural Area, Downs Prairie Natural Area, Goose Pond Natural Area, H.E. Flanagan Prairie Natural Area, Konecny Prairie Natural Area, Lorance Creek Natural Area, Mills Park Natural Area (easement), Railroad Prairie Natural Area, Searles Prairie Natural Area, Singer Forest Natural Area (easement), Slippery Hollow Natural Area, Smoke Hole Natural Area, Stone Road Glade Natural Area, and Sweden Creek Falls Natural Area.

7. Oklahoma State Lands included: Oklahoma State Parks and Oklahoma Wildlife Management Areas. Oklahoma State Parks included: Alabaster Caverns State Park, Beaver Dunes State Park, Beavers Bend State Park, Boggy Depot State Park, Brushy Lake State Park, Burnt Cabin Ridge State Park, Cherokee Landing State Park, Greenleaf State Park, Heyburn State Park, Hochatown State Park, Lake Schultz State Park, Little Sahara State Park, Gloss Mountain State Park, Boiling Springs State Park, Lake Eufaula State Park, Raymond Gary State Park, Fountainhead State Park, Fort Cobb State Park, McGee Creek State Park (also associated with Bureau of Reclamation's McGee Creek Reservoir), Okmulgee State Park, Pine Creek Cove State Park, Red Rock Canyon State Park, Roman Nose State Park, Sequoyah State Park, and Hugo Lake State Park. Oklahoma Wildlife Management Areas included: Atoka WMA, Beaver River WMA, Canton WMA, Cherokee-Gruber WMA, Cimarron Bluff WMA, Cimarron Hills WMA, Cookson WMA, Cooper WMA, Deep Fork WMA, Dewey County WMA, Drummond Flats WMA, Ellis County WMA, Eufaula WMA, Fort Gibson WMA, Fort Supply WMA, Grassy Slough WMA, Hugo WMA, Heyburn WMA, Honobia Creek WMA, Hugo WMA, Keystone WMA, Lower Illinois River Public Fishing and Hunting Area, Lunceford Playa, Major County WMA, McClellan-Kerr WMA, McGee Creek WMA, Okmulgee Public Hunting Area, Optima WMA, Ouachita WMA, Ozark Plateau Wildlife Management Area, Pine Creek WMA, Schultz WMA, Sparrowhawk WMA, Stringtown WMA, Tenkiller WMA, and Whitegrass WMA.

8. Tennessee State Lands include State Parks, Wildlife Management Areas and a State Natural Area. State Parks include: Fort Pillow State Historic Park and Meeman-Shelby Forest State Park. Wildlife Management Areas include: Eagle Lake Refuge Wildlife Management Area and John Tully Wildlife Management Area. Meeman-Shelby Forest State Natural Area is also included.

9. The Routing Team used GIS analysis to compare the criteria in the table, except those criteria denoted by "N/A" in the Unit Measure column above. GIS data was not available for criteria listed as "N/A" in the Unit Measure column or for criteria with a Source listed as aerial photos, topographic maps or stakeholder comments in the Source column. For example, center pivots were identified through interpretation of aerial photos and review of stakeholder comments. In these cases, the Routing Team followed the General Guidelines and Technical Guidelines.

10. The USGS NLCD 2006 land cover data were queried for the following types of forested land cover: Deciduous Forest, Evergreen Forest, Mixed Forest, and Woody Wetlands.

11. The ANHC has GIS data on prairie remnants in western Arkansas, and the TNC Oklahoma has information on the Tall Grass Prairie Reserve located in Osage County, Oklahoma.

12. Federally Designated Scenic Routes or Trails include: Big Piney Creek Wild and Scenic River, Mulberry Wild and Scenic River, and North Sylamore Creek Wild and Scenic River.

13. Each state's Natural Heritage Program provided occurrence locations of species that are considered endangered, threatened, rare, or imperiled, as well as outstanding natural communities, geologic features, and colonial bird nesting sites.

14. The Arkansas State Natural Heritage Program Species Location Data – Sensitive Streams data includes streams in the state of Arkansas that are known to support globally rare species (i.e., those species within the Arkansas Natural Heritage Program Rank of G1-G3). Global ranks are conservation ranks used by State Heritage Programs and NatureServe. The rank indicates the relative rarity of an element throughout its range.

15. The ODWC OLEPCSPT model classifies LEPC habitat value from 1 to 8. The higher the rank, the more valuable the habitat is to the LEPC. Ranks are determined by comparing the habitat against a set of eight criteria: historical range, current range, leks, habitat suitability, core habitat patch, core buffer habitat, managed/protected land, and avoided structures. Analysis characterized miles along centerline within higher-value habitat (i.e., Ranks 4 to 8).

16. The CHAT classifies habitat potential into the following five categories: 1-Irreplaceable, 2-Limiting, 3-Significant, 4-Unknown, and 5-Common. Analysis characterized miles along centerline for each ranked value of higher importance (Ranks 1 to 3).

17. The avoidance area is comprised of a 500-meter (1,640-foot) buffer from existing electrical transmission lines and a 2,377-meter (7,799-foot [1.477-mile]) buffer from existing roads that have been documented to be avoided by the LEPC (see siting application for references).

18. At the time of the analysis in late 2012, the ODWC Conservation Action Plan represented the state of the science with respect to the emphasis on "core areas". In early 2013, a broader five-state draft plan was released with a revised concept of "Focal Area," which represents the current the state of the science.

19. Clean Line created an ABB Potential Occurrence Area data layer by selecting certain categories from the NLCD 2006 data within the counties of occurrence based on USFWS 2008. Areas considered as potential occurrence areas included the following NLCD 2006 categories: Deciduous Forest, Evergreen Forest, Mixed Forest, Barren Land, Shrub/Scrub, Grassland/Herbaceous, Pasture/Hay.

20. The following Federal Emergency Management Agency (FEMA) flood zones will be used to identify floodplains: 0.2% Annual Chance Flood Hazard, Zone A and Zone AE.

21. Contaminated, high-quality waters, water protection areas, and sensitive fisheries habitat are avoided to the extent possible.

22. Other waterbodies are defined as all hydrographic categories in the StreamRiver feature of the NHD dataset.

23. A national dataset of karst and pseudokarst topography (areas of karst-like terrain produced by processes other than the dissolution of rock) produced by the USGS was reviewed.

Appendix F
Siting Criteria for Identification of the Alternative Routes and Selection of the Proposed Route

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Table F-1
Summary of Siting Criteria for the Identification of the Alternative Routes and Selection of the Proposed Route

Criterion	Unit	Measure	Source[1]	Application of Siting Criterion
Existing Infrastructure				
Electrical Transmission Lines (69 kilovolt [kV] and higher)	Miles	Within 500 feet of the representative centerline	Clean Line 2013a[2]	Preference will be given to Alternative Routes that follow existing electrical transmission lines 69kV or greater to the extent practicable. In general, higher voltage electrical transmission lines will be given preference over lower voltage electrical transmission lines. Low-voltage (i.e., less than 69kV) electrical transmission or distribution lines will not be considered an opportunity.
Transmission Pipelines	Miles	Within 500 feet of the representative centerline	Ventyx 2013[3]	Preference will be given to Alternative Routes that follow existing transmission pipelines to the extent practicable. In general, larger diameter transmission pipelines will be given preference over smaller diameter transmission pipelines. Collection and distribution pipelines will not be considered.
Railroads	Miles	Within 500 feet of the representative centerline	ESRI 2010	Preference will be given to Alternative Routes that follow existing linear railroad rights-of-way (ROWs) to the extent practicable. In general, wider railroad ROWs will be given preference over narrower railroad ROWs.
Publicly Maintained Federal, State, and County Roads	Miles	Within 500 feet of the representative centerline	ESRI 2010	Preference will be given to Alternative Routes that follow existing federal, state, and county roads to the extent practicable. In general, roads with a higher functional classification will be given preference over roads with a lower functional classification (e.g., highways will be given preference over collector roads). (Considered together with "Proximity to Existing Access Roads" below.)
Total Paralleling Existing Linear Infrastructure	Miles	Within 500 feet of the representative centerline	Clean Line 2013a[2]; Ventyx 2013[3]; ESRI 2010	This criterion will quantify the total distance that each Alternative Route parallels the existing infrastructure described above.

Table F-1
Summary of Siting Criteria for the Identification of the Alternative Routes and Selection of the Proposed Route

Criterion	Unit	Measure	Source[1]	Application of Siting Criterion
Land Cover				
Parcels and Parcel Boundaries	Number	Intersected by the representative centerline	Clean Line 2012[4]	The Routing Team will consider both the number of parcels crossed by each Alternative Route and where the Alternative Route crosses in relation to the parcel boundaries. The Routing Team will attempt to minimize parcel segmentation by crossing parcels near existing property boundaries to the extent practicable. In addition, preference will be given to Alternative Routes that intersect the fewest number of parcels to the extent practicable.
Agriculture and Open Lands	Miles	Distance along representative centerline	U.S. Geological Survey (USGS) National Agricultural Imagery Program (NAIP)Aerial Imagery 2010 and USGS National Land Cover Database (NLCD) 2006[5, 6]	The USGS NLCD 2006 land cover data will be queried for the following categories to identify agriculture and open lands: Barren Land, Shrub/Scrub, Grassland/ Herbaceous, Pasture/Hay, and Cultivated Crops. Constructing transmission lines in agricultural areas or open lands does not typically require land cover conversion, except at the structure's footprint. Preference will be given to Alternative Routes crossing agricultural or open lands as compared to forested and/or urban/developed areas. (Considered together with "Center Pivot Agricultural Fields" below.)
Forested Areas	Miles	Distance along representative centerline	USGS NAIP Aerial Imagery 2010 and USGS NLCD 2006[5, 6]	The USGS NLCD 2006 land cover data will be queried for the following categories to identify forested land cover: Deciduous Forest, Evergreen Forest, Mixed Forest, and Woody Wetlands. Constructing transmission lines within forested areas requires clearing of trees and continued maintenance of a permanent ROW, which may cause land cover conversion. Siting over/across forested areas will be avoided and/or minimized to the extent practicable.
Urban/Developed Areas	Miles	Distance along representative centerline	USGS NAIP Aerial Imagery 2010 and USGS NLCD 2006[5, 6]	The USGS NLCD 2006 land cover data will be queried for the following categories to identify urban/developed areas: Developed, Open Space; Developed, Low Intensity; Developed, Medium Intensity; and Developed, High Intensity. Locating transmission lines within urban/developed areas as defined by the USGS NLCD may result in land use conflicts that are difficult to minimize or mitigate. Preference will be given to Alternative Routes that avoid urban and developed areas. (Considered together with "Planned Development" below.)

Table F-1
Summary of Siting Criteria for the Identification of the Alternative Routes and Selection of the Proposed Route

Criterion	Unit	Measure	Source[1]	Application of Siting Criterion
Structures				
K-12 Schools, Colleges and Universities	Number	0 to 100 feet from representative centerline	Clean Line 2013b[7]	Schools are sensitive land use features. Preference will be given to Alternative Routes that maximize the distance from these schools.
		100 to 250 feet from representative centerline		
		250 to 500 feet from representative centerline		
		500 to 1,000 feet from representative centerline		
Churches	Number	0 to 100 feet from representative centerline	Clean Line 2013b[7]	Churches (and other known places of religious congregation) are sensitive land use features. Preference will be given to Alternative Routes that maximize the distance from churches and other known places of religious congregation.
		100 to 250 feet from representative centerline		
		250 to 500 feet from representative centerline		
		500 to 1,000 feet from representative centerline		
Hospitals	Number	0 to 100 feet from representative centerline	Clean Line 2013b[7]	Hospitals are sensitive land use features. Preference will be given to Alternative Routes that maximize the distance from hospitals.
		100 to 250 feet from representative centerline		
		250 to 500 feet from representative centerline		
		500 to 1,000 feet from representative centerline		

Table F-1
Summary of Siting Criteria for the Identification of the Alternative Routes and Selection of the Proposed Route

Criterion	Unit	Measure	Source[1]	Application of Siting Criterion
Residences	Number	0 to 100 feet from representative centerline	Clean Line 2013c[8]	Residences are sensitive land use features. Preference will be given to Alternative Routes that maximize the distance from the greatest number of residences.
		100 to 250 feet from representative centerline		
		250 to 500 feet from representative centerline		
		500 to 1,000 feet from representative centerline		
Agricultural, Commercial, and Industrial Structures	Number	0 to 100 feet from representative centerline	Clean Line 2013c[8]	The National Electrical Safety Code specifies minimum clearance distances between the conductors and structures. Alternative Routes that cross structures typically require removal or relocation of those structures, increasing ROW acquisition and Project construction costs without corresponding or offsetting benefits. Preference will be given to Alternative Routes that would avoid these structures to the extent practicable.
		100 to 250 feet from representative centerline		
		250 to 500 feet from representative centerline		
		500 to 1,000 feet from representative centerline		
Government Jurisdictions[9]				
Cities and Towns	Miles	Distance along representative centerline	ESRI 2010	Locating transmission lines in areas of existing development within a city or town often results in land use conflicts that are difficult to minimize or mitigate. Preference will be given to Alternative Routes that avoid and/or minimize crossings within city or town limits, especially highly populated areas. (Considered together with "Planned Development" below.)
National Forests (U.S. Department of Agriculture Forest Service [USFS])[10(a)]	Miles	Distance along representative centerline within the administrative boundary and USDA Forest Service-owned lands. If within USDA Forest Service-owned lands, intersections will be quantified by Management Area	USFS 2003 and 2009	National Forests typically have high resource, recreation, and/or conservation values to be enjoyed by the greater public. In addition, National Forests typically consist of distinct management areas, within which siting of a transmission line may not be considered compatible with the prescribed use of the management area (e.g., Wilderness Areas and Research Natural Areas.) Siting over/across National Forests will be avoided and/or minimized to the extent practicable.

Table F-1
Summary of Siting Criteria for the Identification of the Alternative Routes and Selection of the Proposed Route

Criterion	Unit	Measure	Source[1]	Application of Siting Criterion
National Wildlife Refuges (NWRs) (U.S. Fish and Wildlife Service [USFWS])[10(a)]	Miles	Distance along representative centerline	USFWS 2012b	NWRs are established to conserve, manage, and, where appropriate, restore, fish, wildlife, and plant resources and their habitat. Siting over/across NWRs will be avoided and/or minimized to the extent practicable.
National Parks (National Park Service [NPS])[10(a)]	Miles	Distance along representative centerline	ESRI 2010	National Park lands typically contain important recreational, natural, and/or cultural or historic resources. In addition, National Parks often have high utilization rates by the public for diverse public purposes (e.g., outdoor recreation, community and cultural events). Preference will be given to Alternative Routes that avoid and/or minimize crossing National Parks to the extent practicable.
U.S. Department of Defense (DOD) Lands[10(a)]	Miles	Distance along representative centerline	ESRI 2010	DOD lands represent specific resources utilized by our nation's military. Siting over/across or near DOD lands often triggers irreconcilable land use conflicts. DOD lands are also typically subject to access restrictions that would affect Project construction, operation, and maintenance. Siting over/near DOD lands will be avoided to the extent practicable.
State Parks[10(b)] (Tennessee Department of Environment and Conservation [TDEC], Division of Parks and Conservation, State Parks)	Miles	Tennessee State Parks, distance along representative centerline	ESRI 2010; U.S. Department of Energy (DOE) Scoping Comments 2013; TDEC 2011	Lands owned by state governments for conservation and/or recreation, such as State Parks, contain important and/or sensitive natural and recreational resources. In addition, many of these areas have high utilization rates by the public for diverse purposes (e.g., outdoor recreation, community and cultural events). Siting over/across State Parks land will be avoided and/or minimized to the extent practicable.
State-Owned Wildlife Management Areas (WMAs)[10(b)] (owned by Tennessee Wildlife Resources Agency [TWRA])	Miles	Tennessee state-owned WMAs, distance along representative centerline	TWRA 2007	State agencies own and manage WMAs to preserve and/or protect fish and wildlife resources. All or portions of state-owned WMAs may be managed or designated for public hunting areas, fishing, game management areas, migratory bird refuges, recreational uses, wildlife habitat, and/or waterfowl refuges. Siting over/across state-owned WMAs will be avoided and/or minimized to the extent practicable.

Table F-1
Summary of Siting Criteria for the Identification of the Alternative Routes and Selection of the Proposed Route

Criterion	Unit	Measure	Source[1]	Application of Siting Criterion
Tennessee Natural Areas[10(b)] (TDEC, Division of Natural Areas, Natural Areas Program)	Miles	Distance along representative centerline	TDEC 2011	Tennessee Natural Areas are components of the Tennessee Outdoor Recreation Area System (TORAS) that include lands that exhibit significant natural, historical, cultural, or recreational resources. Siting over/across Tennessee Natural Areas will be avoided and/or minimized to the extent practicable.
County, City, and Town owned Lands that are managed for conservation or recreation	Miles	Distance along representative centerline	ESRI 2010; DOE 2013; [11]	Lands owned by local governments for conservation and/or recreation purposes, such as city and county parks, contain important and/or sensitive natural and/or recreational resources. In addition, many of these areas are utilized by the public for diverse purposes (e.g., outdoor recreation, community and cultural events). Siting over/across local government-owned lands will be avoided and/or minimized to the extent practicable.
Tribal Trust Lands and Allotments	Miles	Distance along representative centerline	Clean Line 2013d; BIA n.d.(a) and n.d.(b)	Tribal Trust lands are held by the federal government for the beneficial interest of Native Americans. These lands may contain religious and/or cultural resources. Siting over/across Tribal Trust lands and allotments will be avoided and/or minimized to the extent practicable.
Conservation Easements or Areas[11]				
Federal Conservation Easements	Miles	Distance along representative centerline	USDA Natural Resources Conservation Service (NRCS) n.d.; The Conservation Registry 2012	Conservation easements are in place to protect, enhance and restore ecosystem resources, wildlife, and habitat. Preference will be given to Alternative Routes that avoid and/or minimize crossing lands known to be subject to federal conservation easements to the extent practicable.
Soil, Geologic, or Topographic Resources				
Prime Farmland	Miles	Distance along representative centerline	USDA NRCS 2012 (Soil Survey Geographic [SSURGO] database)	Prime farmlands are federally or state-designated soil types that have the best combination of physical and chemical characteristics for producing crops. Preference will be given to Alternative Routes that minimize crossing prime farmlands to the extent practicable.

Table F-1
Summary of Siting Criteria for the Identification of the Alternative Routes and Selection of the Proposed Route

Criterion	Unit	Measure	Source[1]	Application of Siting Criterion
Farmlands of Statewide Importance	Miles	Distance along representative centerline	USDA NRCS 2012 (SSURGO database)	Farmlands of Statewide Importance are identified by the NRCS as the most suitable land for producing food, feed, fiber, forage, and oilseed crops within a state. Preference will be given to Alternative Routes that minimize the crossing of Farmlands of Statewide Importance to the extent practicable.
Slopes Greater than 20%	Miles	Distance along representative centerline	USGS 2009	Areas with steep slopes have a higher risk of erosion. Potential mass movement can cause instability affecting structure locations, can pose construction constraints, and can increase maintenance hazards. Preference will be given to Alternative Routes that avoid and/or minimize crossing slopes greater than 20% to the extent practicable.
Karst Areas	Miles	Distance along representative centerline	USGS 2005[12]; USFWS n.d.	Karst geology may include areas of subsurface hazards, surface subsidence, and sinkhole development, which impact the engineering integrity of structures. Additionally, subsurface caverns/caves provide potential wildlife habitat, particularly for bat species. Preference will be given to Alternative Routes that avoid and/or minimize crossing karst areas to the extent practicable.
Airport/Airfields				
Military Airports, Federal Aviation Administration (FAA)-Registered Public Airports, and FAA-Registered Private Airports (will be reported separately for Military, Public, and Private)	Miles	Within FAA-restricted airspace	FAA 2010; BTS 2013	Vertical obstructions, such as transmission structures, in proximity to military airports or airfields may intrude on regulated or commonly used airplane flight/glide paths. Preference will be given to Alternative Routes that minimize interference with FAA-restricted airspace, and known flight paths and glide slopes to the extent practicable.
	Number	Within 1 mile of the representative centerline		
Other Private Airstrips and Helipads	Number	Within 1 mile of the representative centerline	Clean Line 2013e[13]	Vertical obstructions, such as transmission structures, in proximity to private airstrips and helipads may intrude on commonly used aircraft flight/glide paths. Preference will be given to Alternative Routes that minimize interference with flight paths and glide slopes associated with known private airstrips or helipads to the extent practicable.

Table F-1
Summary of Siting Criteria for the Identification of the Alternative Routes and Selection of the Proposed Route

Criterion	Unit	Measure	Source[1]	Application of Siting Criterion
Biological Resources				
USFWS-Designated Critical Habitat	Miles	Distance along representative centerline	USFWS 2012a	Critical habitat has been designated by the USFWS to help support endangered or threatened species. Preference will be given to Alternative Routes that avoid and/or minimize crossings of USFWS-designated critical habitat for federally listed threatened or endangered species to the extent practicable.
State Natural Heritage Program Species Location Data-Occurrence Records	Number of Occurrence Records	Within 1 mile of the representative centerline	Tennessee Natural Heritage Program n.d.[14]	The Natural Heritage occurrence data identify the location of known occurrences of sensitive species. Preference will be given to Alternative Routes that include fewer occurrences of species sensitive to electric transmission infrastructure to the extent practicable.
Potential Occurrence Areas for Federally Threatened and/or Endangered Bats	Miles	Distance along representative centerline (Indiana bat potential occurrence areas)	USFWS 2009[15]	The Indiana bat is a federally listed endangered bat species. Preference will be given to Alternative Routes that avoid and/or minimize potential occurrence areas to the extent practicable (Considered together with "Forested Area" above).
Water Resources				
Wetlands	Miles	Distance along representative centerline (non-forested wetlands)	USFWS 2012[16]	The Clean Water Act and other federal laws and programs promote wetland protection. Wetlands often serve important ecosystem functions, including as habitat for plants and wildlife, and filtering systems within watersheds. Preference will be given to Alternative Routes that avoid and/or minimize the number and length of crossings of wetlands systems, particularly forested wetlands.
	Miles	Distance along representative centerline (forested wetlands)		
	Number	Non-forested wetland crossings greater than 1,000 feet		
	Number	Forested wetland crossings greater than 1,000 feet		

Table F-1
Summary of Siting Criteria for the Identification of the Alternative Routes and Selection of the Proposed Route

Criterion	Unit	Measure	Source[1]	Application of Siting Criterion
Floodplains	Miles	Distance along representative centerline (100-year floodplain)	Federal Emergency Management Agency (FEMA) 2012	Construction within a floodplain may impair the ability of land to store and dissipate floodwaters and may require special engineering or construction methods. While the Project cannot entirely avoid floodplains, preference will be given to Alternative Routes that minimize the length of crossings of mapped floodplains to the extent practicable.
	Number	Floodplain crossings greater than 1,000 feet		
Major Waterbodies and Reservoirs	Number	Intersected by the representative centerline	ESRI 2012; USGS 2010; Clean Line 2013f	Crossing a major waterbody (generally defined as greater than 100 feet wide) may result in additional environmental impacts when compared to smaller waterbodies or upland areas, and/or may require special engineering or construction methods. While the Project cannot entirely avoid these waterbodies, preference will be given to Alternative Routes that minimize the number and lengths of crossings of major waterbodies and reservoirs.
	Miles	Distance along representative centerline		
State-Designated Waterbodies with Special Significance	Number	Intersected by the representative centerline	TDEC, Outstanding National Resource Waters and Exceptional Tennessee Waters n.d[17]	Crossing a state-designated waterbody with special significance may result in additional environmental impacts or require special engineering or construction methods. While the Project cannot entirely avoid these waterbodies, preference will be given to Alternative Routes that minimize the number of crossings of state-designated waterbodies.
Other Waterbodies	Number	Intersected by the representative centerline	USGS 2012a	Other Waterbodies are defined as all hydrographic categories in the StreamRiver feature of the NHD. Crossing a waterbody may result in additional environmental impacts and/or may require special engineering or construction methods. Preference will be given to Alternative Routes that minimize the number of crossings of Other Waterbodies.
Springs	Number	Within 250 feet of the representative centerline	USGS 2012a; DOE 2013	Natural springs are environmentally sensitive areas and often provide headwaters of streams or contribute to stream flow. Preference will be given to Alternative Routes that avoid and/or minimize crossing natural springs to the extent practicable.
		Within 500 feet of the representative centerline		

Table F-1
Summary of Siting Criteria for the Identification of the Alternative Routes and Selection of the Proposed Route

Criterion	Unit	Measure	Source[1]	Application of Siting Criterion
Wild and Scenic Rivers	Number	Intersected by the representative centerline	USFS 2009	The Wild and Scenic Rivers System was created to preserve certain rivers with outstanding natural, cultural, and recreational values. Preference will be given to Alternative Routes that avoid and/or minimize crossings of river segments designated as Wild and Scenic Rivers to the extent practicable.
Visual/Cultural Resources				
Federally and State-Designated Scenic Routes, Trails, and Byways[10]	Number	Intersected by the representative centerline	ESRI 2010; NPS 2013	Federally and state-designated scenic routes, trails, and byways have been designated because of exceptional cultural, historical, visual, and/or aesthetic resources. Preference will be given to Alternative Routes that avoid scenic routes, trails, and byways to the extent practicable.
Sites on the National Register of Historic Places (NRHP)	Number	Within 0.25 miles of the representative centerline	NPS 2012	Sites are listed on the NRHP because of their cultural and historical value. Preference will be given to Alternative Routes that avoid and/or minimize impacts to registered NRHP sites.
Recorded Cultural or Historical Sites	Number	Within 0.25 miles of the representative centerline	SWCA Environmental Consultants n.d.	Recorded Cultural and Historical Sites represent cultural and historical resources. Preference will be given to Alternative Routes that avoid and/or minimize impacts to these cultural and historical sites.
Cemeteries	Number	Within 500 feet of the representative centerline	Clean Line 2013g[7], ESRI 2010	Cemeteries have cultural, historical, and social value. Preference will be given to Alternative Routes that avoid known cemeteries to the extent practicable.
Environmentally Regulated Sites				
Known Contaminated Sites	Number	Within 0.25 miles of the representative centerline	U.S. Environmental Protection Agency (USEPA) 2013	Ground disturbance during construction, maintenance and/or decommissioning in or near known contaminated sites, waste cleanup areas, and sites in need of remediation may expose the environment, construction workers, and/or the general population to contaminants. In addition, these sites may require temporary or permanent removal/relocation of transmission lines during future site remediation. Preference will be given to Alternative Routes that avoid known contaminated sites to the extent practicable.

Table F-1
Summary of Siting Criteria for the Identification of the Alternative Routes and Selection of the Proposed Route

Criterion	Unit	Measure	Source[1]	Application of Siting Criterion
Engineering Considerations				
Total Length of the Transmission Line	Miles	Distance along representative centerline	Calculated by ESRI ArcMap	Total length of the transmission line will be used as a criterion to correlate to land requirements and construction impacts. Preference will be given to Alternative Routes of shorter overall length.
Electrical Transmission Line Crossings	Number	69kV - 345kV intersected by the representative centerline	Clean Line 2013a[2]	Crossing over other high-voltage transmission lines can result in greater ROW requirements, the need for specialty structures, and increased maintenance hazards for both lines. Preference will be given to Alternative Routes with fewer crossings of other transmission lines greater than 69 kV, and especially lines greater than 345 kV.
		Greater than 345kV intersected by the representative centerline		
Transmission Pipeline Crossings[3]	Number	Intersected by the representative centerline	Ventyx 2013[3]	Crossing transmission pipelines with an electrical transmission line can result in greater ROW requirements, the need for specialty structures, special construction methods, and increased maintenance hazards for both facilities. Preference will be given to Alternative Routes with fewer pipeline crossings to the extent practicable.
Major Road Crossings	Number	Intersected by the representative centerline	ESRI 2010	Crossing major roads (defined as interstates; freeways; U.S. and state highways; major streets and roads; primary, secondary, and local roads; access ramps; ferry crossings; and other major thoroughfares within the United States) with an electrical transmission line can result in greater ROW requirements, the need for specialty structures, special construction methods, and increased maintenance hazards for both facilities. Preference will be given to Alternative Routes with fewer major road crossings to the extent practicable.
Railroad ROW Crossings	Number	Intersected by the representative centerline	ESRI 2010	Crossing railroad ROWs with an electrical transmission line can result in greater ROW requirements, the need for specialty structures, special construction methods, and increased maintenance hazards for both facilities. Preference will be given to Alternative Routes with fewer railroad crossings to the extent practicable.

Table F-1
Summary of Siting Criteria for the Identification of the Alternative Routes and Selection of the Proposed Route

Criterion	Unit	Measure	Source[1]	Application of Siting Criterion
Criteria Without Standardized Geographic Information System (GIS) Datasets or Requiring Combined Use of a GIS Dataset and Other Non-GIS Sources[30]				
Topography/Digital Elevation Data	N/A	N/A	National Geographic Society 2013	Topographic features (e.g. hills, valleys, ravines, plains) can affect constructability and engineering design; the effect these features have on routing is site-dependent and context-sensitive. The Routing Team will use professional judgment while reviewing topographic maps to evaluate the alignment of each Alternative Route in relation to topography.
Center Pivot Agricultural Fields	N/A	N/A	USGS 2010; DOE 2013	Obstructing the movement of a center pivot irrigation system can interfere with the efficacy and operation of these systems. Preference will be given to Alternative Routes that avoid and/or minimize interference with center pivot irrigation systems. (Considered together with "Agriculture and Open Lands" above.)
Planned Development	N/A	N/A	DOE 2013	Locating transmission lines within areas planned for commercial and/or residential development (e.g., office parks or residential subdivisions) often results in land use conflicts that are difficult to minimize or mitigate. Planned development will be identified by review of information provided by stakeholders and review of scoping comments. Preference will be given to Alternative Routes that avoid and/or minimize crossings of known planned development to the extent practicable. (Considered together with "Cities and Towns and Urban/Developed Areas" above.)
Proximity to Existing Access Roads	N/A	N/A	USGS 2010; National Geographic Society 2013; ESRI 2010	Siting an electric transmission line ROW in proximity to existing roads that could be used during construction and operation would require fewer new access roads, likely resulting in fewer environmental and land use impacts. Preference will be given to Alternative Routes with greater access or proximity to existing roads. (Considered together with "Publicly Maintained Federal, State, and County Roads" above.)
Aerial Imagery	N/A	N/A	USGS 2010	The Routing Team will review aerial imagery to evaluate and verify siting criteria as appropriate.

Notes:

1. The source information reflects data available to Clean Line as of the date of this publication.
2. Clean Line created this dataset based on aerial photo interpretation of existing transmission lines and transmission lines under construction in 2013.
3. The Ventyx dataset (2013) includes both intrastate and interstate pipelines. Each pipeline has been assigned pipeline operator and diameter attributes. This dataset also includes information about proposed pipeline projects.
4. Parcel data for Tipton and Shelby Counties, Tennessee, were obtained directly from the individual county property appraiser's offices in 2012.
5. The Routing Team compared the USGS NLCD data against aerial imagery. The USGS NLCD 2006 land cover data was queried for the following categories to identify forested wetlands: 90-Woody Wetlands. The USGS NLCD 2006 land cover data will be queried for the following categories to identify non-forested wetlands: 95-Emergent Herbaceous Wetlands.
6. According to the USGS Fact Sheet (http://pubs.usgs.gov/fs/2012/3020/fs2012-3020.pdf accessed on May 21, 2013) posted on February 23, 2012, the NLCD 2006 Land Use Land Cover (LULC) data are the most recent data available: "The next version of NLCD, entitled NLCD 2011, is currently (2012) in production. NLCD 2011 will update NLCD products to a nominal year of 2011 in all 50 States and Puerto Rico, and will continue to provide a national assessment of land cover change back to either 2001 or 2006. NLCD 2011 is scheduled for public release in December 2013."
7. Clean Line created a data layer based on ESRI 2010 data supplemented with aerial photointerpretation and field verification surveys conducted in 2012 and 2013.
8. Structure data were compiled through a review of stakeholder comments obtained by Clean Line (2010-2012) and scoping comments received by the DOE during the scoping period, digitization of structure rooftops based on aerial photointerpretation, and subsequent field verification surveys conducted from public roads in 2012 and 2013.
9. Clean Line considered crossings of and proximity to lands owned or managed by federal, state, and/or local governments amongst its siting criteria in recognition of the fact that such properties contain natural and manmade resources (such as sensitive animal habitat, cultural/historical resource sites, heavily used recreational areas, and civil infrastructure,). Clean Line considered these resources as just one criterion out of many in its route development process; no higher or lower priority is assigned to these resources compared to any of the other siting criteria.
10. (a) Federal Lands included: National Forests, National Wildlife Refuges, National Parks, USACE owned lands, Non-USACE Department of Defense owned lands, Bureau of Reclamation owned lands.
    (b) Tennessee State Lands include State Parks, Wildlife Management Areas and a State Natural Area. State Parks include: Fort Pillow State Historic Park and Meeman-Shelby Forest State Park. Wildlife Management Areas include: Eagle Lake Refuge Wildlife Management Area and John Tully Wildlife Management Area. Meeman-Shelby Forest State Natural Area is also included.
11. No known State of Tennessee conservation easements occur in the Project area; therefore no data sources for this criterion in this state are listed.
12. The Routing Team relied upon a national dataset of karst and pseudokarst topography (areas of karst-like terrain produced by processes other than the dissolution of rock) produced by the USGS.
13. Clean Line created a Private Airstrips and Helipads data layer based on aerial photointerpretation, comments obtained during Clean Line stakeholder outreach (2010-2013), and DOE Scoping Comments (2013).
14. Each state's Natural Heritage Program provided recorded occurrence locations of species that are considered endangered, threatened, rare, or imperiled, as well as outstanding natural communities, geologic features, and colonial bird nesting sites.
15. Indiana bat source was the Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision, USFWS (April 2007), Great Lakes-Big Rivers Region-Region 3, Fort Snelling, Minnesota (USFWS 2007);
16. The USFWS NWI 2012 data was queried for the following categories to identify forested wetlands: PF01 through PF07. The USFWS NWI 2012 data was queried for the following categories to identify nonforested wetlands: PEM1, PEM2, and PEM5, and PSS1 through PSS7.
17. Contaminated, high-quality waters, water protection areas, and sensitive fisheries habitat will be avoided to the extent possible.

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