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ENVIRONMENTAL ASSESSMENT

SEVERCORR 2 - CATALPA CREEK - LOWNDES COUNTY POWER SUPPLY IMPROVEMENT PROJECT

Lowndes County, Mississippi

TENNESSEE VALLEY AUTHORITY

JANUARY 2008

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ACRONYMS, ABBREVIATIONS, AND GLOSSARY OF TERMS USED

acre	A unit measure of land area equal to 43,560 square feet
AFB	Acronym for air force base
AMA	Acronym for American Medical Association
APE	Acronym for area of potential effect
arc furnace	In the arc furnace, recycled steel scrap is melted and converted into high-quality steel by using high-power electric arcs. The main task of most modern arc furnaces is to convert the solid raw materials to liquid crude steel as fast as possible and then refine further in subsequent secondary steelmaking processes.
BMP(s)	Acronym for best management practice(s), i.e., accepted construction practices designed to reduce environmental effects
CFR	Acronym for Code of Federal Regulations
CMF	Acronym for the Weyerhaeuser Company, Columbus Modified Fiber, an industrial facility that manufactures conditioned fiber from kraft pulp
conductors	Cables that carry electrical current
cultural resources	Archaeological and historic resources
danger tree	A tree located outside the ROW that could pose a threat of grounding a line if allowed to fall near a transmission line or a structure
EA	Acronym for environmental assessment
EMF(s)	Acronym for electric and magnetic field(s)
endangered species	A species in danger of extinction throughout all or a significant part of its range
EO	Acronym for Executive Order
EPA	Acronym for electric power association, the local distributor 4-County EPA
feller-buncher	A piece of heavy equipment that grasps a tree while cutting it, which can then lift the tree and place it in a suitable location for disposal. This equipment prevents trees falling into a sensitive area, such as a wetland.
forb	A herbaceous plant other than a grass or fern
GIS	Acronym for geographic information system
Golden Triangle	A region of Mississippi referring to the cities of Columbus, Starkville, and West Point
groundwater	Water located beneath the ground surface in the soil pore spaces or in the pores and crevices of rock formations.
ibid	Abbreviation for the Latin term, *ibidem*, meaning “in the same place”; refers to the immediately preceding work cited
kV	Abbreviation for kilovolt (one kV equals 1,000 volts)
mG	Abbreviation for milligauss, a unit used to measure EMF

MW	Abbreviation for megawatt (equal to one million watts)
n.d.	Indicates “no date” or date that Web site was accessed is unknown
NEPA	Acronym for National Environmental Policy Act
NESC	Acronym for National Electrical Safety Code
NIEHS	Acronym for National Institute of Health Sciences
NRCS	Acronym for Natural Resources Conservation Service
NRHP	Acronym for National Register of Historic Places
NRI	Acronym for Nationwide Rivers Inventory
right-of-way	A corridor containing a transmission line
riparian	Related to or located on the banks of a river or stream
ROW	Acronym for right-of-way
SHPO	Acronym for State Historic Preservation Officer
SMZ(s)	Acronym for streamside management zone(s)
SR	Acronym for State Route
substation	A facility connected to a transmission line used to reduce voltage so that electric power may be delivered to a local power distributor or user
substation vs. switching station	A substation contains breakers, switches, and transformers that convert transmission voltage to lower voltages, usually to serve a customer or lower-voltage TVA lines. A switching station lacks transformers and usually contains only breakers and switches to change line connections or sectionalize lines. Both are fenced and usually have a gravel surface.
surface water	Water collecting on the ground or in a stream, river, lake or wetland.It is naturally lost through evaporation and seepage into the groundwater.
switch	A device used to complete or break an electrical connection
tap line	An electric power line that connects an existing transmission line (at a tap point) to a substation
threatened species	A species likely to become endangered within the foreseeable future
transmission line	A series of electrical conductors (“wires”) and their supporting structures used to transmit electric power from one location to another
TVA	Acronym for Tennessee Valley Authority
TVARAM	Acronym for TVA Rapid Assessment Method
US	Acronym for U.S. Highway
U.S.	Abbreviation for United States
USACE	Acronym for the U.S. Army Corps of Engineers
USDA	Acronym U.S. Department of Agriculture
USEPA	Acronym for U.S. Environmental Protection Agency
wetland	A marsh, swamp, or other area of land where the soil near the surface is saturated or covered with water
WHO	Acronym for World Health Organization

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CHAPTER 1

1.0 PURPOSE OF AND NEED FOR ACTION

The Tennessee Valley Authority (TVA) owns and operates a system of transmission lines that move electric power throughout the TVA service area, which comprises most of Tennessee and portions of six adjacent states, and to adjacent utilities. The Golden Triangle area of Mississippi is experiencing significant industrial growth that requires transmission system upgrades to ensure a continued reliable power supply. TVA studies have determined that additional transmission capacity, along with increased system load flexibility, is needed to provide additional reliability and power quality in the area. If additional capacity and increased load flexibility needs are not addressed, reliability and stability of power generation will be affected for both TVA's current customers and for any new customers at the Lowndes County-Golden Triangle Megasite, including the SeverCorr mill expansion.

TVA has used the following criteria in evaluating alternatives for increasing transmission capacity into the Golden Triangle area:

- Maintain transmission system reliability pursuant to TVA's statutory responsibilities
- Minimize environmental impacts in keeping with TVA's commitment to resource stewardship
- Minimize costs as part of TVA's obligation to provide electric power at the lowest possible cost
- Meet the in-service dates of August 2008, September 2008, and May 2009—the earliest dates that are reasonably achievable

1.1. Proposed Action: Improve Power Supply in Lowndes County

The proposed action is to address significant growth in the Golden Triangle area by upgrading the existing transmission system in the Golden Triangle area and providing additional power supply to an existing industry at the Lowndes County-Golden Triangle Megasite and a new power supply to a proposed new industry on the adjacent Crossroads Megasite by constructing new transmission lines (Figure 1-1). This action would include:

- Constructing approximately 2 miles of new 161-kilovolt (kV) transmission line and a SeverCorr Switching Station. For purposes of this document, this 2-mile section of transmission line is referred to as the Columbus Modified Fiber (CMF)-SeverCorr section of the West Columbus-SeverCorr Transmission Line
- Constructing 2.7 miles of new 161-kV transmission line that would connect to the planned 4-County Electric Power Association (EPA) Catalpa Creek Substation. This 2.7-mile section of transmission line is referred to as the SeverCorr-Catalpa Creek Transmission Line.
- Constructing a 0.23-mile new transmission line tap to 4-County EPA's Stinson Creek Substation between two existing structures on the Columbus Air Force Base (Columbus AFB)-West Columbus Transmission Line and leads to the Columbus AFB Substation.
- Upgrading approximately 6 miles of the 46-kV Columbus AFB-West Columbus Transmission Line between structures 134A and Columbus AFB to 161-kV and

replacing approximately 20 structures. This 6-mile section of transmission line is referred to as Columbus AFB to West Columbus.

- Rebuilding 4.3 miles of existing 161-kV transmission lines in the vicinity of the proposed West Columbus Switching Station. Portions of the 4.3 miles of transmission line are referred to as West Point-Columbus (2.22 miles), Columbus AFB-West Columbus (1.15 miles), and West Columbus-SeverCorr (0.96 miles).
- Constructing a 161-kV West Columbus Switching Station on a new 19.8-acre site.
- Constructing a 161-kV SeverCorr Switching Station on 1.15 acres owned by SeverCorr.
- Installing additional facilities at the existing Columbus AFB 161-kV Substation.

The approximately 4.8 miles of new 161-kV transmission line would have a right-of-way (ROW) 100 feet in width and would occupy approximately 58.5 acres. The 10.3 miles of existing, 161-kV transmission line ROW are currently maintained and occupy approximately 128.6 acres. The SeverCorr Switching Station would consist of four A-frame-type structures, two placed in line with the existing West Point-SeverCorr No. 1 and No. 2 Transmission Line segments, one placed in line with the proposed Columbus Modified Fiber (CMF)-SeverCorr section of the West Columbus-SeverCorr Transmission Line, and one placed in line with the proposed SeverCorr-Catalpa Creek Transmission Line. This switching station site would be approximately 1.15 acres (176 feet by 285 feet) and would be located entirely on property previously graded and owned by SeverCorr. The West Columbus Switching Station would be constructed on a 19.8-acre site that would be purchased by TVA. Of the 19.8 acres, approximately 5 acres of the site would be graded. At the existing Columbus AFB Substation, two breakers, two A-frame structures, a 161-kV transformer, and a switch house would be installed. The A-frame structures would require the existing substation's north and south boundary fences to be moved slightly, increasing the fenced area by approximately 0.50 acre. Approximately 2.7 miles of new transmission line would serve a new industrial customer, and 2.0 miles of new transmission line would serve SeverCorr Inc. and would be in service by August and September 2008, respectively. The remaining system upgrades, including 0.23-mile Tap to Stinson Creek Substation, would be in service by May 2009.

In addition to the proposed transmission line and switching station construction activities, TVA would also complete the following measures:

- Deenergize and/or retire 46-kV facilities at TVA's Columbus AFB 161-kV Substation
- Retire or abandon to 4-County EPA the metering facilities at 4-County EPA's Bent Tree 46-kV Substation
- Replace the 161-kV relays at TVA's West Point and Lowndes 500-kV substations and TVA's Columbus 161-kV Substation
- Provide metering at the distributor's proposed new Stinson Creek 161-kV Substation
- Retire switches in the West Point-Columbus 46-kV Transmission Line
- Provide digital communication paths to the two new switching stations and the expanded Columbus AFB Substation by installing equipment at various sites that would transmit process data and equipment status from the switching stations to the TVA transmission and generation dispatchers.

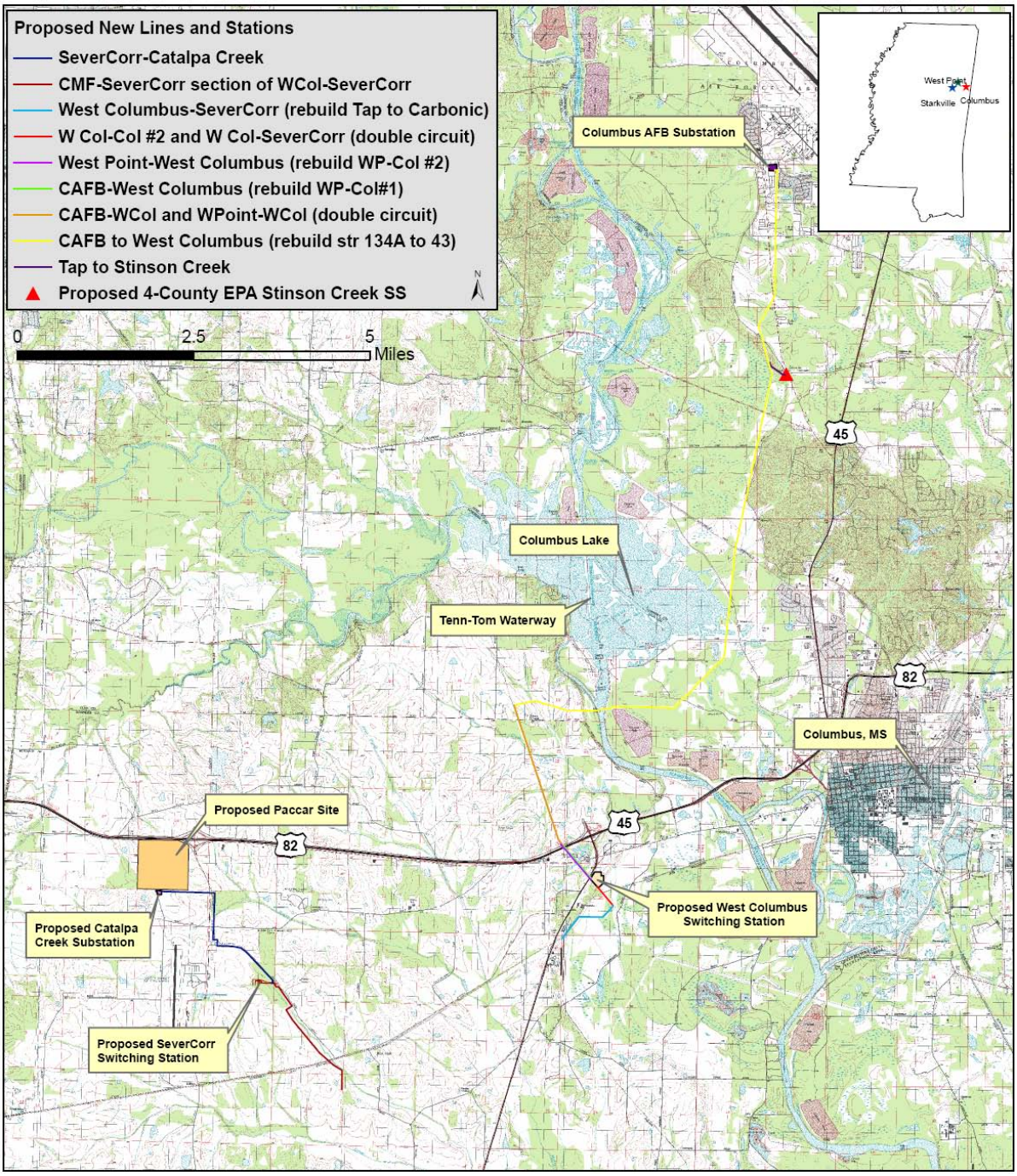

Figure 1-1. Locations for Proposed SeverCorr 2 - Catalpa Creek - Lowndes County Power Supply Improvement Project

1.2. Need

The TVA transmission system currently consists of about 17,000 miles of transmission line that connect TVA-owned generating facilities to a total of 1,015 wholesale delivery points and points of interconnection with neighboring power systems. The system also provides transmission services to several recently constructed generating facilities operated by independent power producers. The system serves an 80,000-square-mile area that includes portions of seven states including Mississippi.

The SeverCorr site is located at the Lowndes County-Golden Triangle Megasite west of Columbus, Mississippi. The 1,400-acre megasite is near the Golden Triangle Regional Airport and is in the heart of an area surrounded by the cities of Columbus, Starkville, and West Point. TVA serves the local distributor, 4-County EPA, with a service area that includes most of Lowndes County, Mississippi. However, due to the considerable load requirements for the new steel mill at the Lowndes County-Golden Triangle Megasite, TVA must provide direct service to this facility from its existing West Point 500-kV Substation. SeverCorr Inc. is a technologically advanced steel sheet mini-mill capable of producing critical steel applications for the automotive and appliance industries.

The SeverCorr mill currently requires 250 megawatts (MW) of load and includes a 130 MW direct current arc furnace. To meet this load, SeverCorr constructed a new 161-kV substation on the megasite adjacent to the new mill. TVA provided a general purpose transmission line (West Point-Columbus No. 1 Tap to SeverCorr) to serve the SeverCorr mill in October 2006. A second, direct feed transmission line (West Point-SeverCorr) to serve the plant's arc furnace was constructed and energized in May 2007. The direct feed was necessary because the arc furnace process produces sudden and large voltage fluctuations, known as harmonics, on the transmission line. These large fluctuations significantly reduce the power quality on any connecting existing transmission lines. Because of the harmonics, the direct feed is also called a "dirty" feed, while the general purpose line is referred to as the "clean" feed. These two transmission line connections were addressed in the March 2006 *West Point-SeverCorr 161-kV Transmission Line Environmental Assessment* (TVA 2006).

SeverCorr has requested a transmission line connection to its second arc furnace, which would require an additional load of 190 MW. To stabilize the voltage or load impact on the transmission grid that would result from this connection, a strong power source not shared with other loads would be required. For TVA to serve a load this size to industry standards, it would need to provide a second direct feed transmission line to SeverCorr. This would then become the new clean feed to SeverCorr, and the previous clean feed transmission line (energized in October 2006) would become the second dirty feed for the second arc furnace. Additionally, to improve the reliability of the two dirty feed lines a new SeverCorr Switching Station would need to be constructed adjacent to the existing SeverCorr 161-kV Substation (Figure 1-1). SeverCorr has requested an in-service date of September 2008.

An additional issue is that the Golden Triangle area has been experiencing significant industrial growth that to ensure a continued reliable power supply will require transmission system upgrades. TVA studies have shown that to help meet this demand, two new switching stations are needed near the West Point-Columbus No. 1 Tap to SeverCorr 161-kV Transmission Line and near the West Point-Lowndes 161-kV Tap to Columbus AFB Transmission Line (Figure 1-1). The switching stations would provide additional power reliability for the area. TVA would provide all of the necessary line connections into these

switching stations using existing ROWs by placing these facilities close to the intersection of the transmission lines.

In addition to these needs, a new industrial customer, PACCAR Inc., has announced plans to locate in the nearby Crossroads Megasite, located 11 miles west of Columbus. The site is bordered on the east by the Golden Triangle Regional Airport, on the south by Mims Road, and on the north by Frontage Road. The Crossroads Megasite is easily accessible from the cities of Columbus, West Point, and Starkville and is located an equal distance from Interstate 55 and Interstate 20. PACCAR would require a dedicated substation from 4-County EPA. TVA would provide a delivery point to the distributor's planned Catalpa Creek Substation from the new clean feed transmission line constructed for SeverCorr. These lines would be constructed concurrently. The distributor has requested this delivery point by August 2008.

4-County EPA has also requested that TVA provide a short 161-kV connection to its planned Stinson Creek Substation, located adjacent to the West Point-Columbus No. 1 Tap to Columbus AFB Transmission Line and near existing structure 78 (Figure 1-1). For TVA to provide a connection that would serve this substation, the existing adjacent transmission line that was constructed for 161-kV operation, but is currently operated as 46-kV would need to be upgraded to 161-kV operation. TVA has determined that a section of the West Point-Columbus No. 1 46-kV Tap to the Columbus AFB Transmission Line does not meet current National Electrical Safety Code (NESC) requirements for 161-kV operation and must be rebuilt using taller structures. This work would include tearing down and rebuilding a section of the Columbus AFB-West Columbus Transmission Line and replacing approximately 20 structures.

Collectively, these actions would meet the needs of industrial park customers and would help 4-County EPA improve the power supply system in the Golden Triangle area.

1.3. The Decision

The primary decision before TVA is whether to provide additional services to SeverCorr and to a new industry, both in Lowndes County, and whether to improve the electrical service in the 4-County EPA service area. If the transmission system is to be improved, other, secondary decisions are involved. These include the following considerations:

- The timing of improvements
- The best route for the new transmission lines and locations for the switching stations
- Determining any necessary mitigation and/or monitoring measures to implement to meet TVA standards and minimize potential damages to resources

1.4. Other Pertinent Environmental Reviews or Documentation

In 1995, TVA completed *Energy Vision 2020: An Integrated Resource Plan and Programmatic Environmental Impact Statement* (TVA 1995). This study addressed short- and long-term strategies that would enable TVA to meet the needs of its customers for electricity through the year 2020. It includes a description of TVA's transmission system.

In September 2005, TVA completed an environmental review, *Columbus Air Force Base 161-kV Substation and Tap From West Point-Lowndes 161-kV Transmission Line Environmental Assessment* (TVA 2005). This assessment addressed the need to increase the reliability, quality, and capacity of TVA's electrical supply to Columbus AFB and nearby portions of 4-County EPA's service area. TVA proposed to construct a new 161-kV substation and the associated 3.2-mile, 161-kV transmission line connection in Lowndes County. The substation is located on the south side of Columbus AFB adjacent to TVA's Columbus AFB 46-kV Substation. The transmission line connects this substation to TVA's West Point-Lowndes 161-kV Transmission Line. TVA also upgraded communications facilities at its West Point 500-kV and Columbus 161-kV substations. TVA completed the substation and transmission line in summer 2006.

An environmental review by TVA (2006), *West Point-SeverCorr 161-kV Transmission Line Environmental Assessment,* was completed in March 2006. This assessment addressed the need to provide a stable and reliable supply of electricity to the SeverCorr 161-kV Substation and SeverCorr steel mill at the Lowndes County-Golden Triangle Megasite as requested by SeverCorr Inc. TVA proposed to rebuild 14.7 miles of double-circuit, 161-kV transmission line on mostly existing ROW. In addition, 5.8 miles of new 161-kV transmission line was constructed between TVA's West Point 161-kV Substation and the new SeverCorr 161-kV Substation. TVA completed the general purpose transmission line (West Point-Columbus No. 1 Tap to SeverCorr) to serve the SeverCorr mill in October 2006. A second, direct feed transmission line (West Point-SeverCorr) to serve the plant's arc furnace was completed in May 2007.

1.5. Public Involvement

The following federal, state, and local agencies have been contacted to date by TVA concerning this project.

- Mississippi Department of Archives and History
- Mississippi Department of Environmental Quality
- Mississippi Department of Transportation
- Mississippi Development Authority
- Mississippi Public Service Commission
- U.S. Army Corps of Engineers
- U.S. Department of Agriculture

This proposal was reviewed in accordance with Executive Order (EO) 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), National Historic Preservation Act, Endangered Species Act, Section 404 of the Clean Water Act, and EO 12372 (Intergovernmental Review). Correspondence received related to this coordination is contained in Appendix A.

TVA held a public meeting in Columbus, Mississippi, on February 22, 2007. At this meeting, alternative locations for the proposed West Columbus Switching Station along with transmission line route alternatives were presented on topographical, aerial, and property maps (Figure 1-2). The route alternatives were designed to provide transmission line connections into the proposed switching station.

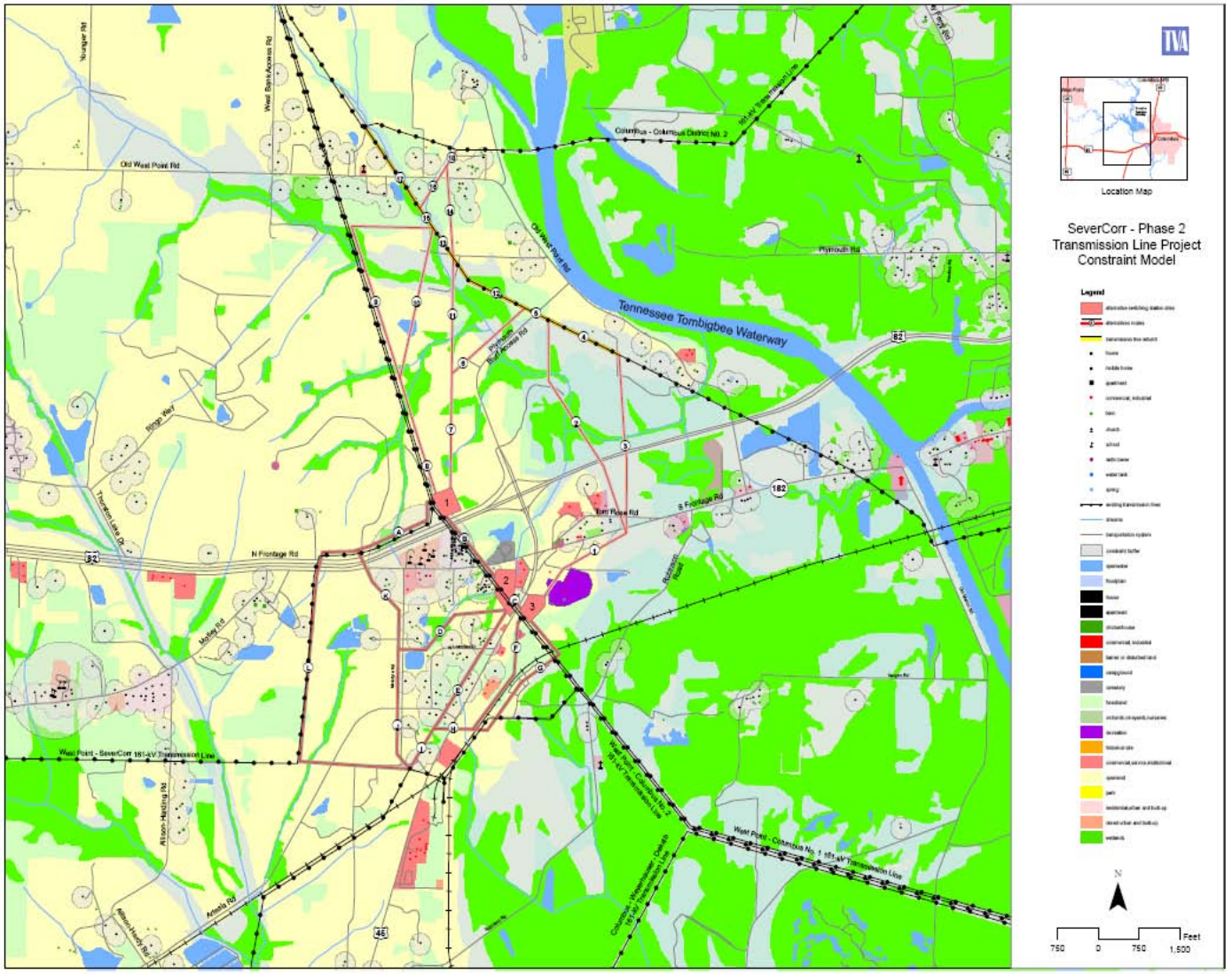

Figure 1-2. SeverCorr 2 - Catalpa Creek - Lowndes County Power Supply Improvement Project Route Alternatives Presented at Open House

During a 30-day public comment period following the open house, TVA accepted public comments on potential transmission line routes, switching station site locations, environmental impacts and other issues. A toll-free phone number and fax number were made available to facilitate comments. Many commenters provided information and land use updates that enhanced TVA's understanding of usage constraints.

TVA did not solicit comments for the following new transmission line sections at the open house:

- A 1.9-mile West Columbus-SeverCorr (CMF-SeverCorr) Transmission Line section needed to serve a second arc furnace located at the SeverCorr plant
- A 2.7-mile SeverCorr-Catalpa Creek Transmission Line to serve 4-County EPA's proposed Catalpa Creek Substation that would supply power for the new PACCAR plant
- A 0.23-mile transmission line Tap to Stinson Creek to serve 4-County EPA's planned Stinson Creek Substation

Most of the proposed routes for these sections of transmission line are located on industrial park or SeverCorr property that would be conveyed to TVA, and very few landowners would be impacted. In addition, the need to rebuild the West Point-Columbus No. 1 Tap to Columbus AFB Transmission Line from structure 134A to Columbus AFB was not identified until several weeks after the open house. All of the affected property owners along the section proposed for rebuild were notified of TVA's plans by letter; however, because no new owners would be affected by this work, additional public comment was not requested.

1.6. Issues to be Addressed

Resources that could be affected were identified initially through an internal scoping process. This list of issues was refined based on comments received during the public comment process. The major issues addressed in this environmental assessment (EA) are potential impacts to the following resources:

- Water quality for both surface water and groundwater
- Aquatic ecology
- Wildlife
- Vegetation
- Endangered and threatened species and their critical habitats
- Wetlands
- Floodplains
- Managed areas and ecologically significant sites
- Recreation
- Land use including prime farmland
- Visual resources
- Archaeological and historic resources

Potential effects related to air quality, hazardous and nonhazardous wastes, noise, and health and safety have been considered but because of the nature of the action did not require detailed evaluation.

1.7. Necessary Federal Permits or Licenses

A permit would be required from the Mississippi Department of Environmental Quality (MDEQ) for construction site storm water discharge for the transmission line construction. TVA's Transmission Construction organization would prepare the required erosion and sedimentation control plans and coordinate them with the appropriate state and local authorities. A permit would also be required for burning trees and other combustible materials removed during transmission line construction. TVA has received concurrence from the Mississippi State Historic Preservation Officer (SHPO).

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CHAPTER 2

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1. Introduction

Chapter 2: Alternatives Including the Proposed Action is the heart of this EA. This chapter contains the following five major sections:

- Description of Alternatives
- Description of Construction, Operation, and Maintenance of the Existing and Proposed 161-kV Transmission Lines and Switching Stations
- Project and Siting Alternatives
- Identification of the Switching Station Sites, Transmission Line Routes, and the Preferred Alternative

This chapter describes all of the alternatives explored and provides a detailed description of the necessary steps in constructing a transmission line and switching stations.

2.2. Description of Alternatives

2.2.1. *Alternative 1 – Do Not Construct 161-kV Transmission Lines and 161-kV Switching Stations (No Action Alternative)*

Under the No Action Alternative, TVA would not undertake the proposed action in the Golden Triangle area. With implementation of this alternative, the Lowndes County-Golden Triangle Megasite would not be able to support the new arc furnace at the SeverCorr steel mill. Furthermore, adoption of this alternative would limit the industries that would choose to locate to either of the megasites in the area. PACCAR would locate elsewhere. Reliability and stability of power generation would be affected for industries at the Lowndes County-Golden Triangle Megasite and Crossroads Megasite, including the SeverCorr mill expansion and PACCAR. It is possible that affected industries or 4-County EPA could undertake some of the identified activities. If this happened, potential impacts of those activities would be similar or worse than the impacts if TVA undertook the activities. Any such additional industrial customers on the TVA transmission system could cause overloading or stability problems to existing customers and still require some upgrading of transmission system capabilities.

2.2.2. *Alternative 2 – Construct 161-kV Transmission Lines and 161-kV Switching Stations (Action Alternative)*

Under the Action Alternative, TVA would upgrade the power supply in the Golden Triangle area. This would be accomplished by constructing approximately 15 miles of 161-kV transmission line and two new 161-kV switching stations in Lowndes County, Mississippi. Of the 15 miles of transmission line, approximately 10.3 miles of existing line would be rebuilt on an existing ROW, and 4.8 miles of new 100-foot ROW would be required for the construction of new transmission line. Most of the new transmission line ROW would be located on industrial park or SeverCorr property; approximately 6 acres would be located on private property. The West Columbus Switching Station would be located on approximately

20 acres of private property to be purchased by TVA, and the SeverCorr Switching Station would be located entirely on previously graded SeverCorr property. Implementation of this alternative would meet the power demands of SeverCorr, the Golden Triangle area, and PACCAR, the new industrial customer.

2.3. Description of Construction, Operation, and Maintenance of Existing and Proposed 161-kV Transmission Lines and Switching Stations

2.3.1. *Transmission Line Construction*

2.3.1.1. Right-of-Way Acquisition and Clearing

During the project scoping to identify potential transmission line routes that could serve the 4-County EPA project area, TVA identified several existing TVA-owned transmission line rights-of-way that could meet the project needs.

Using the existing ROWs compared to acquiring new ROW elsewhere minimizes the number of new landowners that would be affected by the construction of the transmission line in the project area, minimizes the number of miles of new transmission line needed, and reduces the potential for environmental impacts. Because no significant conflicts with either safety or natural and cultural resources were identified in the areas adjacent to the subdivisions that would require the removal of any buildings or the implementation of a nonstandard transmission line design, no alternate routes for these sections were developed.

Approximately 4.6 miles of new 100-foot ROW would be needed for the proposed transmission lines that would be located between TVA's existing West Point-Columbus No. 2 Tap to CMF 161-kV Transmission Line and 4-County EPA's planned Catalpa Creek 161-kV Substation. In addition, approximately 0.23 mile of new 100-foot ROW would be needed for the Tap to 4-County EPA's proposed Stinson Creek 161-kV Substation. Existing ROW would be utilized for the remaining transmission line work.

TVA would purchase easements from landowners for the new ROW on private land. These easements would give TVA the right to construct, operate, and maintain the transmission line, as well as to remove danger trees adjacent to the ROW. Danger trees are those trees that are located away from the cleared ROW, but are tall enough to pass within 10 feet of a conductor (the cables that carry the electrical current) or strike a structure should the tree fall toward the transmission line. Ownership of the land within the ROW would remain with the landowner, and a number of activities may be continued on the property by the landowner. However, the easement agreement prohibits certain activities such as the construction of buildings and any other activities within the ROW that could interfere with the transmission line or create a hazardous situation.

Because of the need to maintain adequate clearance between tall vegetation and transmission line conductors, as well as to provide access for construction equipment, most trees and shrubs would initially be removed from the entire width of both the new and existing ROW. Equipment used during this ROW clearing would include chain saws, skidders, bulldozers, tractors, and/or low ground-pressure feller-bunchers. Marketable timber would be salvaged where feasible; otherwise, woody debris and other vegetation would be piled and burned, chipped, or taken off site. In some instances, vegetation may be windrowed along the edge of the ROW to serve as sediment barriers.

Streamside management zones (SMZs) would be established along intermittent and perennial streams; their width would be based on stream characteristics, slope, soil types, and other factors (Muncy 1999). Vegetation removal in SMZs and wetlands would be restricted to trees tall enough, or with the potential to grow tall enough, to interfere with conductors. Clearing in SMZs would be accomplished using hand-held equipment or remote-handling equipment, such as a feller-buncher, in order to limit ground disturbance. In order to minimize potential impacts to SMZs and wetlands, *Tennessee Valley Authority Right-of-Way Clearing Specifications, Environmental Quality Protection Specifications for Transmission Line Construction,* and *Transmission Construction Guidelines Near Streams* (Appendices B, C, and D) would be followed in clearing and construction activities.

Subsequent to clearing and construction, vegetative cover on the ROWs would be restored as much as possible to its state prior to construction. Pasture areas would be reseeded with suitable grasses. Wooded areas would be restored using native grass and other low-growing species. Erosion controls would remain in place until the plant communities were fully established. Streamside areas would be revegetated as described in Appendices B through E.

The 10.3 miles of existing transmission line ROW are currently maintained by herbicide application or mechanical clearing activities on a three- to five-year cycle. Additional clearing may be necessary during reconstruction to remove any established woody vegetation.

2.3.1.2. Underground Transmission Lines

Underground transmission lines are quite common at distribution voltage levels of 13-kV to 46-kV normally seen along streets or in subdivisions. However, building underground transmission lines at the higher voltage level of 161-kV introduces several considerations. The major considerations are described below.

The conductor of choice would be a cross-linked polyethylene (XLPE), direct bury cable, which does not use a dielectric fluid for cooling. The cost of an underground 161-kV transmission line using XLPE cable would be more than 10 times that of a typical overhead 161-kV line. The increased cost is due primarily to the additional cost associated with trenching and/or directional boring to bury the cables, the cost of electrical cables, conduit, backfilling materials, manholes, risers, and redundant cables to guard against cable failure.

The environmental impacts associated with underground transmission lines could be greater than those for a comparable overhead line. To bury a typical 161-kV transmission circuit, a trench at least 48 inches wide and 60 inches deep would have to be dug. Digging such a large trench could have much greater impacts than a similar overhead line, depending on the length of underground line and whether it crosses streams, wetlands, and forested areas. In addition, given two equal voltage transmission lines, the electric and magnetic fields (EMFs) associated with an underground transmission line is higher because of the closer proximity to the buried conductors—approximately 60 inches deep.

ROW requirements for underground and overhead transmission lines of the same voltage would be very similar. The major difference would be that additional restrictions would be necessary on use of the land area by the property owner in the vicinity of the buried underground cables. Furthermore, should a cable become damaged, it would require that the area be dug up again to replace the cable. This could result in extended power outages and additional environmental impacts.

Based on these facts, TVA does not propose underground transmission lines because the technology does not represent any significant reduction in land use or environmental impacts, and the costs would be substantially greater to build and maintain these lines.

2.3.1.3. Access Roads

Permanent access roads would be needed to allow vehicle access to each structure and other points along the new and existing ROWs. For the rebuild activity along the existing transmission lines, established access roads would be used for vehicle access. These roads include privately built farm and field roads, some of which may need upgrading. Upgrading would consist of minor grading and placement of gravel. No new access roads would be constructed.

Typically, access roads are located on the ROW wherever possible and designed to avoid severe slope conditions and to minimize stream crossings. The roads are usually about 20 feet wide and surfaced with dirt or gravel. Existing roads, some of which may need upgrading, would be used where possible. Along the new transmission line, TVA would obtain the necessary permissions for these access roads from landowners. Proposed access roads were identified and included in the environmental field review.

Culverts and other drainage devices, fences, and gates would be installed as necessary. Culverts installed in any permanent streams would be removed following construction. These activities would be covered under the stormwater permits obtained for clearing and construction of the transmission lines. However, in wet-weather conveyances, (i.e., streams that run only following a rainfall), they would be left or removed, depending on the wishes of the landowner or any permit that might apply. New access roads would be planted with approved seed mixtures following construction. Additional applicable TVA ROW Clearing and Environmental Quality Protection Specifications that would be followed are listed in Appendices B and C.

2.3.1.4. Construction Assembly Areas

A construction assembly area (laydown area) would be required for worker assembly, vehicle parking, and material storage. The site identified for this project is located at 30 Redi-Mix Road in Columbus, Mississippi (Figure 2-1). The approximately 7-acre site would be leased for the duration of the construction period. It consists of a relatively flat and previously cleared area adjacent to an existing paved road (State Route [SR] 182) near the proposed transmission line. The site was formerly a cement plant; all of the old buildings have been removed. The site is graveled and fenced, and TVA would install a gate. Site conditions could warrant some minor grading and the installation of drainage structures.

Trailers used during the construction process for material storage and office space would be parked at this location. TVA's *Site Clearing and Grading Specifications* (Appendix F) would be followed in clearing and constructions activities. Following the completion of construction activities, all trailers, unused materials, and construction debris would be removed from the site. No adverse environmental impacts were identified with use of this site as a construction assembly area, and no other alternate location that would have lesser impacts was identified.

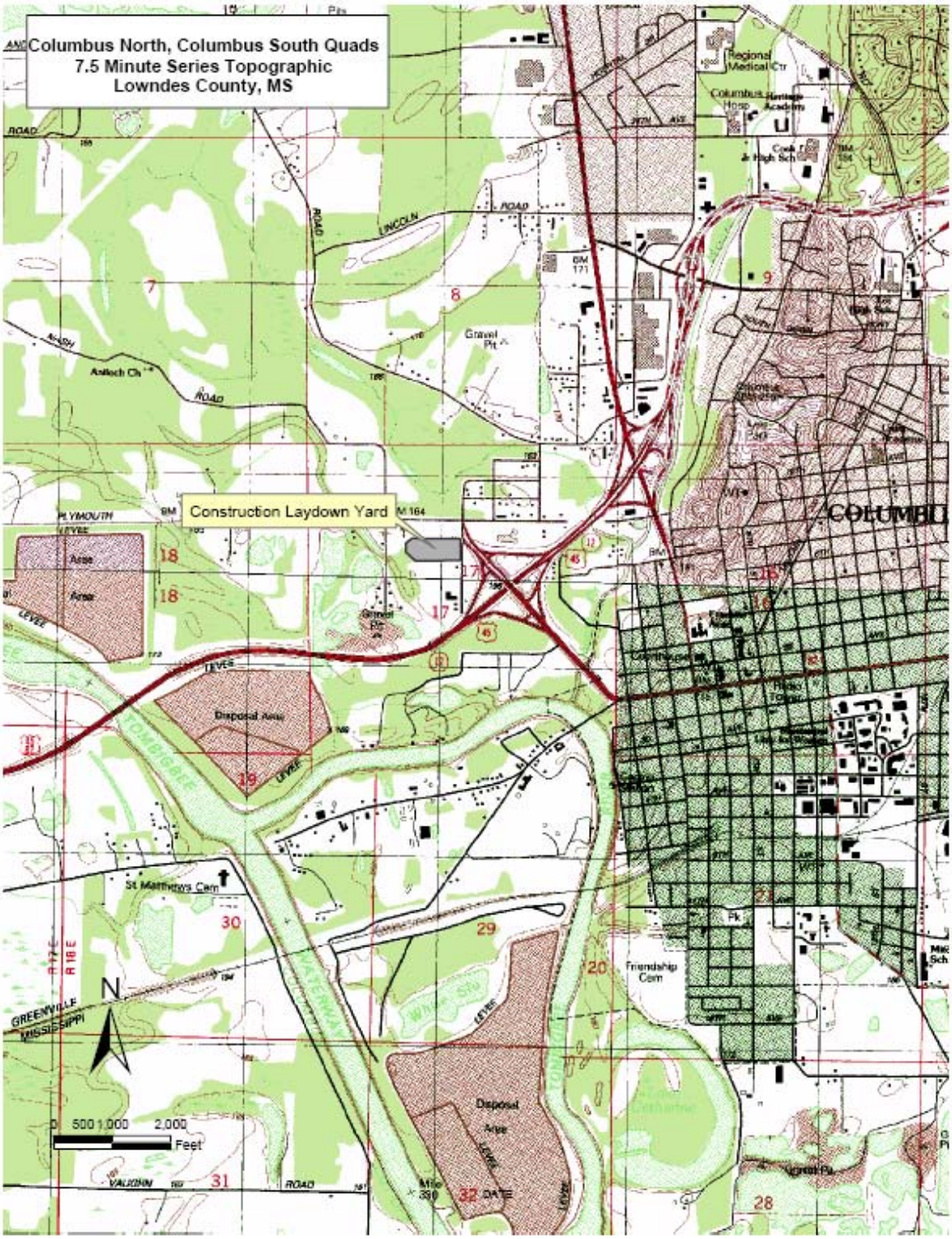

Figure 2-1. Location of Construction Laydown Yard

2.3.1.5. Structures and Conductors

The proposed 161-kV transmission line would utilize both single- and double-pole steel structures (Figure 2-2). Single poles would be used for all construction on new ROW and for most of the transmission line rebuilds on existing ROW. Some double poles would be utilized near the proposed West Columbus Switching Station. Structure heights would vary according to the terrain and would range between 90 and 100 feet.

Single Pole

Double Pole

Figure 2-2. Single-Pole and Double-Pole 161-kV Transmission Structures

Three conductors (the cables that carry the electrical current) are required to make up a circuit (transmission line) in alternating current transmission lines. For 161-kV transmission lines, each conductor is made up of a single cable. The conductors are attached to fiberglass or ceramic insulators suspended from the structure crossarms. A smaller overhead ground wire(s) is attached to the top of the structures. This ground wire may contain fiber optic communication cables.

Poles at angles in the transmission line may require supporting guy wires. Most poles would be imbedded directly in holes augured into the ground to a depth equal to 10 percent of the pole's length plus an additional 2 feet. The holes would normally be backfilled with the excavated material. In some cases, gravel or a cement-and-gravel mixture might be necessary. Some structures may be self-supporting (non-guyed) poles fastened to a concrete foundation that is formed and poured into an excavated hole.

A new tap structure as shown would be installed in between two single steel structures in the existing West Point-Columbus No. 2 Tap to CMF 161-kV Transmission Line. Two new single-line switches would be installed near the tap point. One would be located east of the

tap between structures 646 and 647; the second would be immediately north of the tap in the new line to SeverCorr.

Equipment used during the construction phase would include trucks, truck-mounted augers and drills, as well as tracked cranes and bulldozers. Low ground-pressure-type equipment would be used in specified locations (e.g., areas with soft ground) to reduce the potential for environmental impacts.

2.3.1.6. Conductor and Ground Wire Installation

Reels of conductor and ground wire would be delivered to various staging areas along the ROW. Prior to installing the conductors, temporary clearance poles would be installed at road and railroad crossings to reduce interference with traffic. Installation of conductors would begin with a small rope being pulled from structure to structure. This rope would then be connected to the conductor and ground wire and used to pull them down the line through pulleys suspended from the insulators mounted on the structures. A bulldozer and specialized tensioning equipment would be used to pull conductors and ground wires to the proper tension. Finally, the wires would be clamped to the insulators, and the pulleys would be removed.

2.3.2. *Switching Station Construction*

Two new 161-kV switching stations would be constructed: SeverCorr and West Columbus.

SeverCorr Switching Station

The SeverCorr Switching Station would consist of four A-frame structures. Two of the A-frame-type structures would connect to the West Point-SeverCorr No. 1 and No. 2 line segments (dirty feeds), one would connect to the proposed CMF-SeverCorr section of the West Columbus-SeverCorr Transmission Line (the new clean feed), and one would connect to the proposed SeverCorr-Catalpa Creek line segment. These structures would be located north of and directly adjacent to the existing SeverCorr Substation, which was built by and belongs to SeverCorr. These structures would initially be dead-end structures with provisions for a line circuit breaker to be installed. Once the breakers are installed, the structures and the immediate vicinity would be fenced and TVA would own the site in fee. This site would be approximately 176 feet by 285 feet (approximately 1.15 acres) and located on SeverCorr property. Environmental protection measures that would be applied during substation construction are listed in Appendix C.

West Columbus Switching Station

The West Columbus Switching Station would be located on a 19.8-acre site that would be purchased by TVA near the intersection of U.S. Highways (US) 82 and 45 in Columbus on the east side of US 45 and the existing West Point-Columbus No. 1 Transmission Line, in the vicinity of structures 155-157. The switching station would have five line terminations initially with provisions for two future connections. Approximately 15,000 cubic yards of cut and fill would be required for construction. Silt fences would be installed, and approximately 5 acres of the site would be graded. Site drainage structures would be installed. The switching station yard would be covered with crushed stone and fenced with chain link fencing 7-feet tall. An existing access road, about 1.1 miles long, would be upgraded. There would be no fill to raise the elevation of the road. Stone would be added to support truck wheel loads as necessary. The amount of stone would not exceed existing

ground or road elevation. A small ramp, 110 feet long, up to the station, would require about 665 cubic yards of fill. The unused portion of the site would be restored as practicable to its state prior to construction.

The major equipment in the switching station would consist of three 161-kV gas breakers, six switches, nine coupling-capacitor voltage transformers, two station service voltage transformers, bus (rigid overhead aluminum conductor) supports, a switch house, a potable water well, field lines (for the sewage disposal system), and two pull-off bays. The equipment would be interconnected with aluminum pipe and copper strand conductors. The conductors and some equipment would be supported on steel structures. Environmental protection measures that would be applied during construction are listed in Appendix C.

2.3.3. *Operation and Maintenance*

2.3.3.1. Inspection

Periodic inspections of TVA's transmission lines are performed from the ground and by aerial surveillance using a helicopter. These inspections, which occur on two- to three-year cycles after operation begins, are conducted to locate damaged conductors, insulators, or structures and to report any abnormal conditions that might hamper the normal operation of the line or adversely affect the surrounding area. During these inspections, the condition of vegetation within the ROW, as well as immediately adjoining the ROW, is noted. These observations are then used to plan corrective maintenance or routine vegetation management.

2.3.3.2. Vegetation Management

Management of vegetation along the ROW would be necessary to ensure access to structures and to maintain an adequate distance between transmission line conductors and vegetation. The transmission line would be designed to meet the 25-foot minimum clearance from the lowest point of the conductor sag to the tallest point of vegetation for a 161-kV transmission line.

Management of vegetation along the ROW would consist of two different activities: the felling of danger trees adjacent to the cleared ROW, as described in Section 2.3.1.1, and the control of vegetation within the cleared ROW.

Management of vegetation within the cleared ROW would use an integrated vegetation management approach designed to encourage low-growing plant species and discourage tall-growing plant species. A vegetation-reclearing plan would be developed for each transmission line segment based on the results of the periodic inspections described above. The two principal management techniques are mechanical mowing, using tractor-mounted rotary mowers, and herbicide application. Herbicides are normally applied in areas where heavy growth of woody vegetation is occurring on the ROW and mechanical mowing is not practical. Herbicides would be applied selectively by helicopter or from the ground with backpack sprayers or vehicle-mounted sprayers.

Any herbicides used would be applied in accordance with applicable state and federal laws and regulations and the commitments listed in this document. Only herbicides registered with the U.S. Environmental Protection Agency (USEPA) would be used. A list of the herbicides currently used by TVA in ROW management is presented in Appendix E. This

list may change over time as new herbicides are developed or new information on presently approved herbicides becomes available.

2.3.3.3. Structure Replacement

Other than vegetation management, little additional maintenance work would normally be required. The transmission line structures and other components typically last several decades. In the event that a structure must be replaced, the structure would normally be lifted out of the ground by crane-like equipment, and the replacement structure would be inserted into the same hole or an immediately adjacent hole. Access to the structures would be on existing roads where possible. Replacement of structures may require leveling the area surrounding the replaced structures, but there would be little, if any, additional area disturbance when compared to the initial installation of the structure.

2.4. Project and Siting Alternatives

As described in Section 1.5, TVA held a public meeting to present alternative locations for the proposed West Columbus Switching Station as well as two sets of alternative transmission line routes. The first set of alternative transmission line routes was designed to provide a new transmission line connection between the West Point-Columbus No. 1 Tap to Columbus AFB and a new West Columbus 161-kV Switching Station (Figure 1-2). The existing transmission line was constructed for 161-kV operation, but is currently operated as 46-kV and would need to be upgraded to meet the current NESC requirements. Additionally, this alternative route would require approximately 3 to 4 miles of new 161-kV transmission line. The second set of alternative transmission line routes was designed to connect the West Columbus Switching Station to an industrial area site west of the substation known as Columbus Modified Fiber (CMF) and SeverCorr Inc. (Figure 1-2). This route would require approximately 1 mile of new 161-kV transmission line.

These alternatives were developed based on the need to provide independent electrical paths to the new West Columbus Switching Station while maintaining reliable electrical service to the Golden Triangle area and providing power supply for the SeverCorr steel mill expansion.

Following the February 2007 open house, additional information provided by SeverCorr Inc. regarding the load characteristics of both its existing arc furnace and its proposed second arc furnace indicated that under typical operating conditions, a single transmission line could support the second arc furnace for temporary durations. That is, long-term operation with only a single line would not meet reliability standards, but short outages could be coordinated without negative system impacts or reliability reduction.

This additional information was very helpful in the evaluation of project alternatives because it would allow TVA to take certain transmission facilities out of service as needed to make system upgrades in the area. Specifically, it would mean that in emergencies, the second arc furnace could be supported by the recently completed West Point-SeverCorr dirty feed transmission line currently supporting the first arc furnace. With this information it was determined that the proposed transmission line routes identified and presented at the open house would not be required. Rather, the existing transmission lines serving the area could be upgraded to support the new load instead. As a result of these detailed SeverCorr studies, none of the transmission line route alternatives presented at the open house were

selected as the preferred routes to connect to the proposed West Columbus Switching Station.

Because of the developments that followed the open house, and because most of the proposed project activities would occur on either existing TVA ROW and substation property or on industrial park/SeverCorr property, the proposed location for the West Columbus Switching Station was the only action that required public input. Therefore, the following discussion includes the various resources used to determine the preferred site for the proposed West Columbus Switching Station.

The process of siting the West Columbus Switching Station adhered to the following basic steps used by TVA:

- Define the study area
- Collect data to minimize potential impacts to cultural and natural features.
- Develop potential sites
- Gather public input
- Incorporate public input into the final identification of the West Columbus Switching Station site

2.4.1. *Definition of Study Area*

The study area for the proposed West Columbus Switching Station was defined primarily by the need for the site to be located close to the intersection of other existing transmission lines thereby minimizing the length of new transmission line construction. As mentioned in Section 2.3.2, the switching station would initially have five line terminations with provisions for two future connections. Based on the location of the existing transmission lines, the study area was defined as an area located in Lowndes County on the Columbus South 7.5-minute quadrangle map. The study area boundary is defined by Old West Point Road to the north, the CMF Substation to the south, the Tombigbee River to the east, and McIntire Road to the west (Figure 1-2).

A geographic information system- (GIS) based map and color orthophotography were developed. The GIS data generated a “constraint” model that served to guide the siting process by identifying obvious siting conflicts or sensitive areas including, but not limited to, houses, streams, historical sites, and wetlands.

2.4.2. *Collect Data*

Geographic data, such as topography, land use, transportation, environmental features, cultural resources, near-term future development, and land conservation information were collected for the entire study area. Analysis of the data was aided by using GIS. This system allowed the multitude of factors of the study area to be examined simultaneously to develop and evaluate numerous options and scenarios to determine the switching station sites that would best meet project needs while avoiding or reducing potential environmental impacts.

Maps were created to show regional opportunities and constraints clearly. Sources included 1 inch = 500 feet aerial photography, county tax maps/property boundaries, U.S.

Geological Survey digital line graphs, digital elevation models, National Wetlands Inventory, and cultural resource data, among others. Aerial photography was interpreted to obtain land use and land cover data, such as forests, agriculture, wetlands, houses, barns, commercial and industrial buildings, churches, and cemeteries. Data were analyzed both manually and with GIS. Manual calculations from aerial photographs, tax maps, and other sources included the number of stream crossings and property parcels.

2.4.3. *Develop Potential Switching Station Sites*

From the information gathered during the electrical system's studies and data development phases, three potential sites were identified for the West Columbus Switching Station (Figure 1-2). The West Columbus Switching Station would require enough space to provide transmission line terminations for seven transmission lines. The initial layout would allow for the termination of five transmission lines—West Point, Columbus AFB, Columbus No. 1, Columbus No. 2, and SeverCorr. If the proposed switching station and transmission lines were constructed, the transmission line connections would be then made and the five transmission lines would be referred to as West Point-West Columbus, Columbus AFB-West Columbus, West Columbus-Columbus No. 1, West Columbus-Columbus No. 2, and West Columbus-SeverCorr (Figure 1-2). The West Columbus-SeverCorr Transmission Line would serve as the SeverCorr steel mill's new general purpose clean feed transmission line, and the current West Point-SeverCorr clean feed transmission line would become the dirty feed for the second arc furnace. The West Columbus-Columbus No. 1 Transmission Line section would result from connections at the new West Columbus Switching Station (i.e., this would not involve any rebuild on existing transmission line ROW).

Three sites were evaluated for the proposed West Columbus Switching Station site (Figure 1-2). Site 1 is in the northwest corner of the intersections of US 45 and US 82. This site is located in the southeast corner of a 450-acre parcel and is nearly ideal due to its proximity to the transmission facilities to be connected, open undeveloped land, easy access for construction and maintenance, and because part of the switching station could overlap an existing TVA easement.

Site 2 is a 12-acre parcel that was for sale at the time of evaluation. This site is located on the east side of US 45 south of US 82. This parcel was viewed as acceptable due to its availability, close proximity to the transmission lines, easy access for construction, and site characteristics appropriate for a switching station. This site has a creek on it that divides the contiguous area into two areas of approximately 8 acres and 4 acres.

Site 3 is located on a portion of a 90-acre parcel on the east side of US 45 south of US 82. It is just across the road from Site 2 and is bounded by an auto raceway on the north, a cellular phone tower on the south, and the highway on the east.

2.4.4. *Establish and Apply Siting Criteria*

2.4.4.1. Switching Station Site Criteria

The switching station siting criteria used in evaluating the three potential locations included engineering and construction feasibility, environmental effects, land use compatibility, and feasibility of transmission line connections.

Engineering and construction concerns take into account the suitability of the size of the site itself for grading, fencing, and security needs, along with evidence that the site is not in a 100-year floodplain, which requires filling to a final grade above flood level. These concerns also require locations near public roads to minimize construction of a lengthy access drive, development of a safe driveway connection with good sight distance in each direction, and ease of delivery of extremely large electrical equipment by heavy equipment-hauling contractors. Also to be considered are good site drainage, soils suitable for grading and foundation construction, minimal tree clearing needs, and availability of off-site electrical service and communications sources.

Environmental factors include the knowledge of locations at the site of threatened and endangered plant and animal species and their habitat, including locations around the perimeter of the site that would have to be crossed by future transmission line corridors. Other factors are historic structures or sites on or adjacent to the site; presence or proximity to prime farmland; and aquatic features crossing or touching the site.

Land use compatibility factors consist of the number of individual property tracts that make up the site; the current land use made by the owners of the site; number of houses on or near the site; and the level of visual impact to the surrounding area homes and traveling public.

Transmission line connections involve transmission line siting criteria including engineering and construction feasibility, environmental effects, and land use compatibility. This involves primarily the attempted avoidance of features and areas that are generally incompatible with transmission lines, while identifying other areas with more compatible land uses, thereby, creating lesser impacts.

2.4.4.2. Transmission Line Routing Criteria

TVA uses a set of evaluation criteria that represent opportunities and constraints for development of transmission line routes. Transmission line routes were evaluated according to these criteria relating to engineering, environmental, land use, and cultural concerns. Specific criteria are described below.

Engineering criteria include considerations such as total length of the transmission route, length of new ROW and rebuilt ROW, number of primary and secondary road crossings, the presence of pipeline and transmission line crossings, and total line cost.

Environmental criteria include the presence of slopes greater than 30 percent (steeper slopes have more potential for erosion and potentially greater water quality impacts), slopes between 20 and 30 percent, consideration of visual aesthetics, the number of forested acres within the proposed ROW, the number of open water crossings, presence of sensitive stream (i.e., those supporting endangered or threatened species) crossings, the number of perennial and intermittent stream crossings, presence of wetlands or rare species habitat, the number of natural area crossings, and proximity to wildlife management areas.

Land use criteria include the number of fragmented property parcels, proximity to schools, houses, commercial or industrial buildings, and barns.

Cultural resource criteria include the presence of archaeological and historic sites, churches, and cemeteries.

The new ROW for the West Columbus-SeverCorr and SeverCorr-Catalpa Creek transmission lines is constrained to land owned or optioned by the Lowndes County Industrial Board and the Golden Triangle Regional Airport Authority. The transmission line easement in these areas would be obtained by transfer of easement at no cost to TVA. The transmission line routes were coordinated with each organization to avoid or minimize conflict with current and planned industrial site development.

2.4.5. *Transmission Line Identification*

2.4.5.1. West Columbus-SeverCorr 161-kV Transmission Line

A new transmission line section would be installed from the existing West Point-Columbus No. 2 Tap to the CMF Transmission Line to the SeverCorr Substation. This new section would begin just east of the existing CMF facility (Figure 2-3).

A new tap structure would be installed approximately 150 feet west of structure 647 in the existing CMF tap line. Beginning at this tap structure, a new transmission line section would be constructed on new ROW to the SeverCorr Substation. This 1.9-mile line segment would be constructed on single-pole structures on 100-foot ROW.

Two switches would be installed near the tap point. One would be located east of the tap between structures 646 and 647 and the second just north of the tap in the new line to SeverCorr (Figure 2-3). At SeverCorr, the new transmission line would terminate into the existing clean feed bay. The current lines into the SeverCorr Substation would be reconfigured to provide three connections, one clean feed, and two dirty feed transmission lines.

2.4.5.2. SeverCorr-Catalpa Creek 161-kV Transmission Line

To supply power to a new industry (PACCAR Inc., which manufactures engines for Kenworth, Peterbilt, and DAF Trucks), TVA would extend the West Columbus-SeverCorr Transmission Line north approximately 2.7 miles to 4-County EPA's planned Catalpa Creek 161-kV Substation (Figure #). Because the new clean feed to SeverCorr Transmission Line to the SeverCorr plant must be in-service before the Catalpa Creek Transmission Line could be energized, it would be constructed concurrently with the West Columbus-SeverCorr Transmission Line.

The route would begin at a tap structure in the West Columbus-SeverCorr Transmission Line near the Tap to Golden Triangle Substation. It would proceed along the west side of Industrial Park Road before crossing near a convenience store at the intersection of Airport Road and Industrial Park Road. It would then proceed on the east side of an existing 4-County EPA distribution circuit transmission line until turning and following a line approximately 130 feet south of the northern boundary of the Golden Triangle Regional Airport. The line would continue across the new Catalpa Creek Substation site and terminate across Raymond Road. This termination point would be located to facilitate a future transmission line connection to Starkville. The new SeverCorr-Catalpa Creek Transmission Line would be located on property owned by SeverCorr, Lowndes County Industrial, a private landowner, and the PACCAR industry site (Figure 2-3).

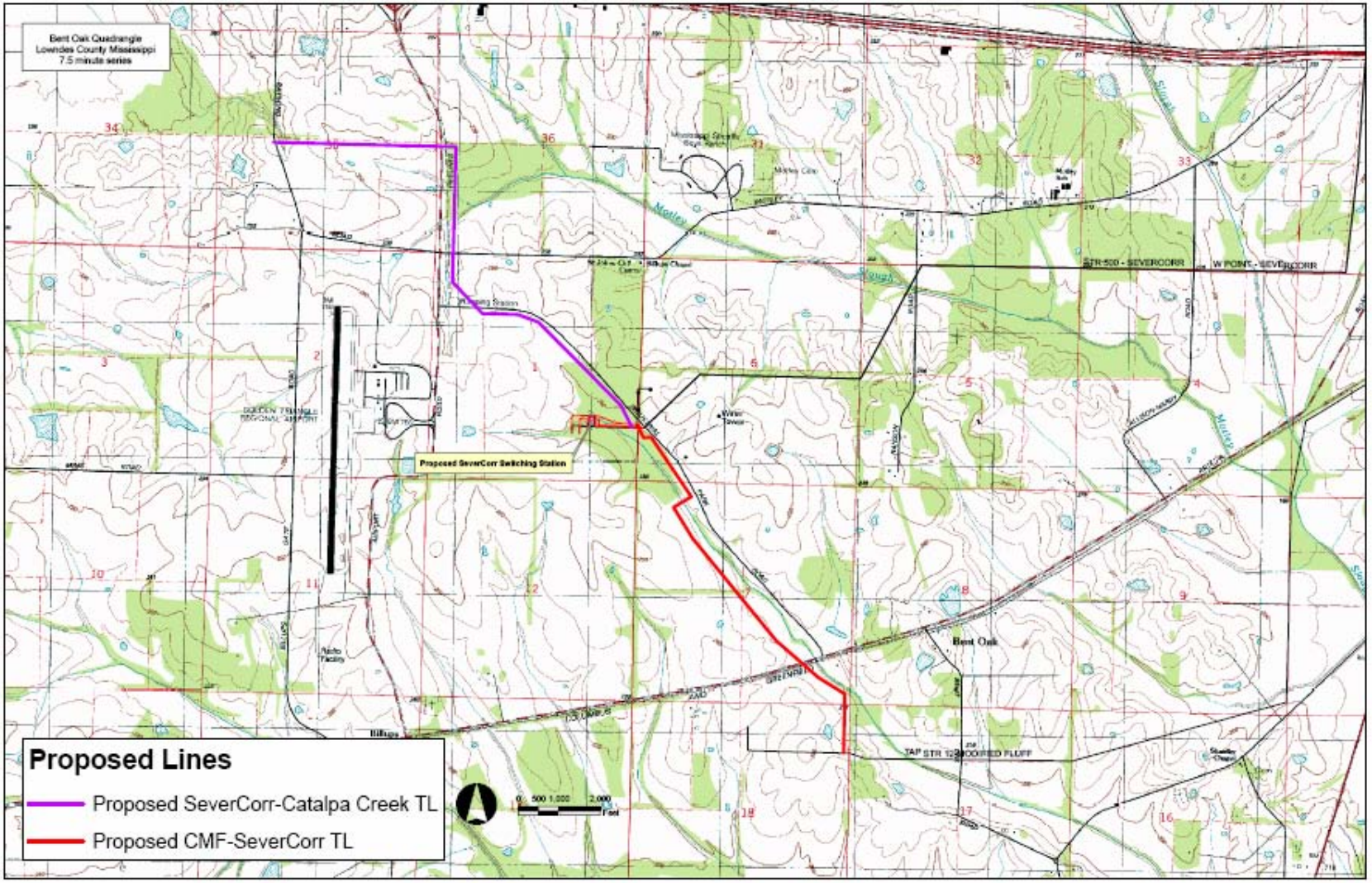

Figure 2-3. Proposed West Columbus-SeverCorr (Columbus Modified Fiber [CMF]-SeverCorr Segment), SeverCorr-Catalpa Creek, and SeverCorr Switching Station

2.4.5.3. Transmission Lines Associated With West Columbus Switching Station

Lines North of Proposed West Columbus Switching Station

Beginning near structure 128 in the existing West Point-Columbus No. 1 Transmission Line, TVA would demolish and rebuild the West Point-Columbus No. 1 Transmission Line as a double-circuit transmission line, with the West Point-Columbus No. 1 Transmission Line on the west side and a new Columbus AFB-West Columbus Transmission Line on the east side. This new double-circuit transmission line section would continue south until reaching the vicinity of the existing tap line to SeverCorr plant located on the north side of US 82. The West Point-Columbus No. 1 Transmission Line is currently the SeverCorr clean feed transmission line and would become known as the West Point-SeverCorr No. 2 Transmission Line, the second dirty feed transmission line serving the second arc furnace.

The new Columbus AFB-SeverCorr Transmission Line would continue south, following the existing West Point-Columbus No. 1 centerline ROW on new structures until reaching the new switching station.

The remaining West Point-Columbus No. 2 Transmission Line from the existing SeverCorr Tap to the West Columbus Switching Station would be rebuilt for higher capacity with the new transmission line named West Point-West Columbus Transmission Line. This would occur on an existing 150-foot ROW.

Lines South of West Columbus Switching Station

The existing West Point-Columbus No. 2 Transmission Line would be rebuilt as a double-circuit transmission line from the vicinity of West Columbus Switching Station to the existing Tap to CMF (structures 175 to 188). The west circuit would carry the new West Columbus-SeverCorr Transmission Line; the east circuit would carry the West Columbus-Columbus No. 2 Transmission Line. The existing West Point-Columbus No. 1 Transmission Line would simply reterminate into the West Columbus Switching Station, and the new line name would be West Columbus-Columbus No. 1 Transmission Line. This work would take place on existing 150-foot ROW, except from structure 188 to structure 12, which is a 75-foot ROW (Figure 2-4).

2.4.5.4. Stinson Creek 161-kV Delivery Point

The 4-County EPA has requested that TVA provide a 161-kV connection to its planned Stinson Creek Substation from the rebuilt Columbus AFB-West Columbus 161-kV Transmission Line (Section 2.4.5.3) once it has been upgraded to begin 161-kV operation.

The Stinson Creek site is adjacent to the 161-kV line near existing structure 78. TVA would provide a tap structure and line switches along with a short tap line to the pull-off structure at Stinson Creek Substation (Figure 2-5). This tap line would cross approximately 200 feet of property owned by Weyerhauser Corporation before entering the 4-County EPA site. The total length of line would be approximately 1,200 feet. The ROW would be 100 feet wide.

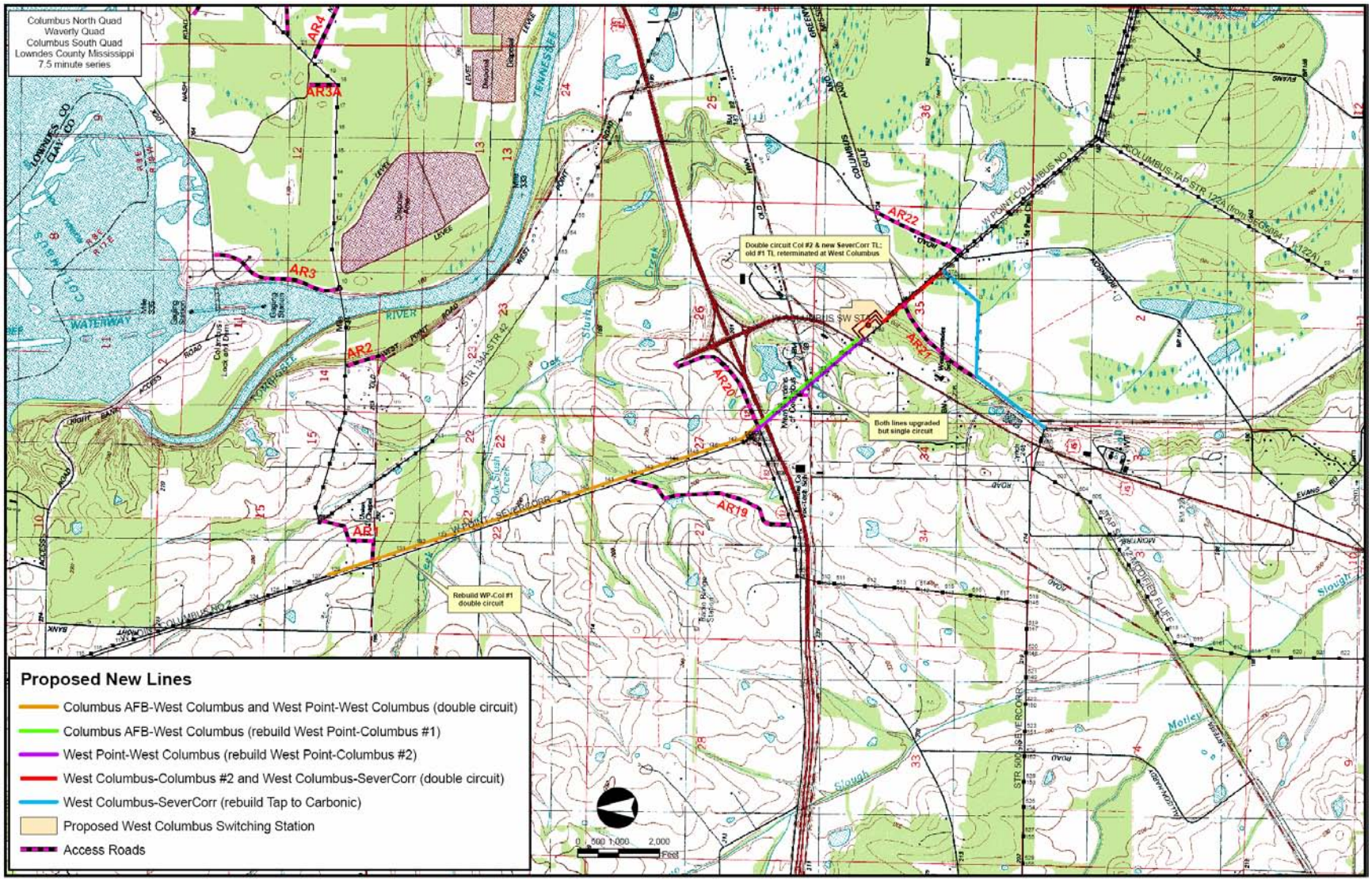

Figure 2-4. West Columbus-Switching Station and Associated Transmission Lines

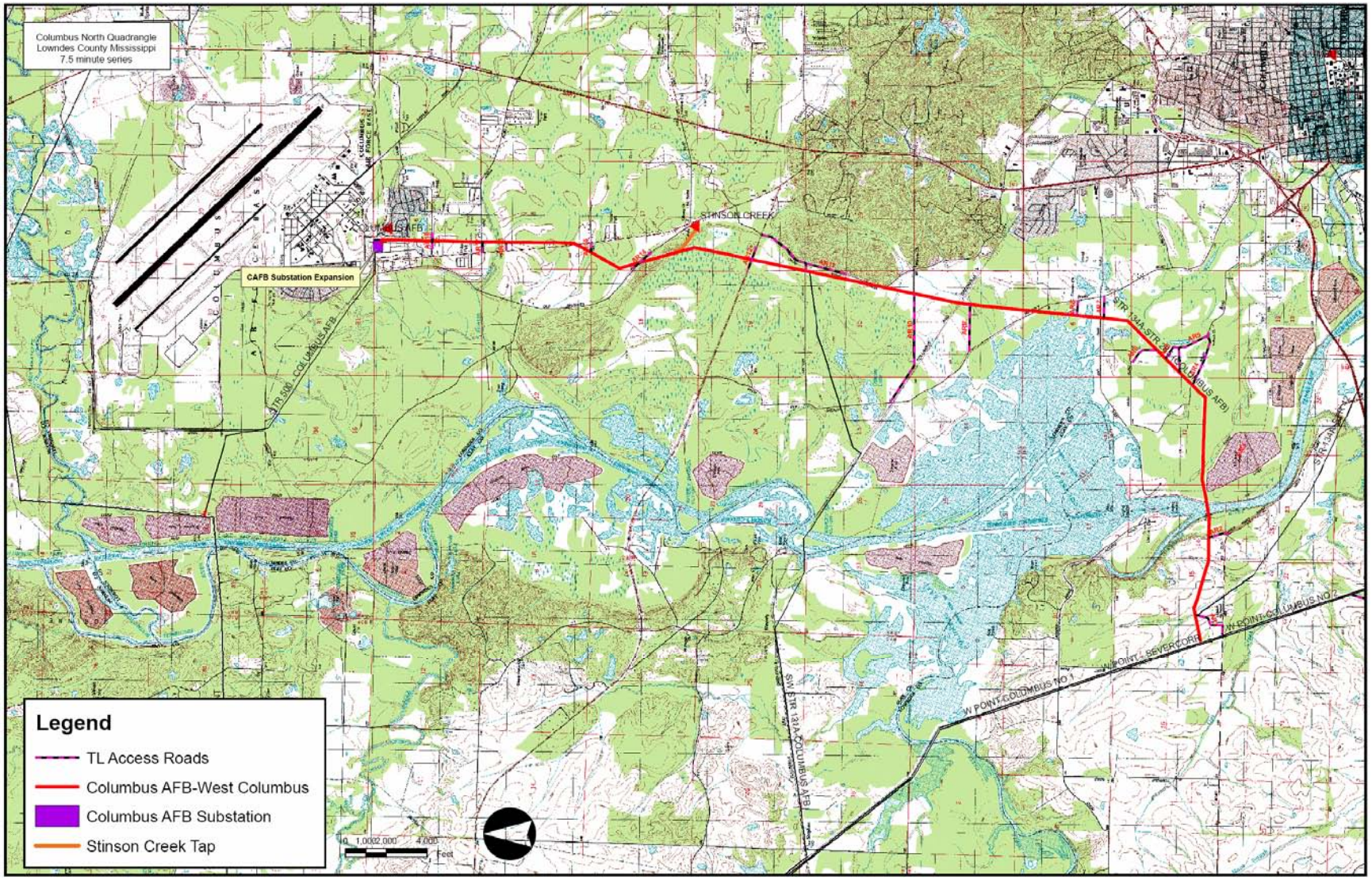

Figure 2-5. Columbus Air Force Base (CAFB)-West Columbus Transmission Line, Tap to Stinson Creek, and Columbus Air Force Base Substation Expansion

2.4.5.5. West Point-Columbus No. 1 Tap to Columbus Air Force Base

Although 161-kV constructed, the existing West Point-Columbus No. 1 Transmission Line is currently being operated at 46-kV. TVA studies indicated that upgrades would be required to meet current NESC clearance standards for 161-kV operation. TVA would completely rebuild 4.8 miles from structure 134A to structure 43 and replace approximately 20 structures in the section from structure 44 to Columbus AFB (Figure 2-5). Near Columbus AFB, in the span between structures 107 and 108, a dead-end structure would be placed so that the line could be reterminated to the existing structure 525 of the Lowndes-West Point Tap to Columbus AFB. This structure would be located so that a tangent span could be installed to structure 525 nearby. The ROW from structure 134A to structure 43 is 75 feet wide. The ROW from structure 44 to Columbus AFB is 100 feet wide. Upon completion of the expansion of TVA's existing Columbus AFB 161-kV Substation and the West Columbus Switching Station, the West Point-Columbus No. 1 and Lowndes-West Point Tap to Columbus AFB line sections would become the Columbus AFB-West Columbus 161-kV Transmission Line.

2.4.6. *Switching Station Site Evaluation*

2.4.6.1. SeverCorr Switching Station

A new switching station would be required to improve the reliability of SeverCorr's two dirty feed lines. Only one option was considered for this site due to land availability (SeverCorr would provide, at no cost to TVA, an area adjacent to its existing SeverCorr 161-kV Substation) and proximity to the connecting transmission lines.

2.4.6.2. West Columbus Switching Station

Following the public open house and the subsequent comment period, each West Columbus Switching Station site alternative was evaluated using the updated constraint model and information obtained during the public involvement.

Of those who attended the public meeting or submitted comments, land use was the most important concern of the majority of those expressing an opinion.

Site 1 met all of the necessary criteria for a switching station site: close proximity to the transmission facilities to be connected, open undeveloped land, easy access for construction and maintenance, as well as the fact that part of the switching station could overlap an existing TVA easement. However, the site was under development by the owner for commercial ventures, and further pursuit of this site was deemed impractical. Site 1 was therefore not selected as the preferred site.

Site 2 was also an acceptable location early in the process; however, the necessary site acreage requirements were later increased and, consequently, there was not enough contiguous space available on this site. As a result, Site 2 was not selected as the preferred site.

Site 3 is currently undeveloped with no known plans for development. This site would provide the appropriate site characteristics necessary for a switching station, as described in Section 2.4.4, and is still within a reasonable distance of the transmission facilities. Site 3 was selected for the more detailed evaluation needed for determining its suitability. The preliminary data from soil borings and site inspections found no obstacles for continued

detailed design of a site plan and, consequently, Site 3 was selected as the preferred location for the substation alternative site.

2.4.7. *Switching Station Site Considered But Not Selected*

Barton Ferry Switching Station
Initially, the proposal included a third switching station denoted the Barton Ferry Switching Station. Two sites were considered for this switching station. The first site was at the 161-kV tap point for Columbus AFB. This site would have placed the Barton Ferry Switching Station along the Tombigbee River within the 100-year floodplain. Previous line switches and tap structures would have to be elevated in order to accommodate the location, and cost became a more important factor. While there are two U.S. Army Corps of Engineers' (USACE) soil disposal areas along the Tombigbee River located outside of the floodplain, these areas would not provide a suitable foundation for the switching station. If existing material were removed from these areas and fill were brought in, the expense for developing the site would have doubled. The material being removed would also have to be transported and disposed of in an approved landfill. Initially, two options were considered for the Barton Ferry Switching Station. The first option was for Barton Ferry to be located at the 161-kV tap point for Columbus AFB. This option would have placed the Barton Ferry Switching Station along the Tombigbee River within the 100-year floodplain. Previous line switches and tap structures would have to be elevated in order to accommodate the location, and additional cost became a factor. While there are two U.S. Army Corps of Engineers' (USACE) soil disposal areas along the Tombigbee River located outside of the floodplain, these areas would not provide a suitable foundation for the switching station. If existing material were removed from these areas and fill were brought in, the expense for developing the site would have doubled. The material being removed would also have to be transported and disposed of in an approved landfill. TVA did not approach the USACE about these sites because a more practical option along existing transmission line easement was under consideration.

The second site was alongside the existing Columbus AFB Substation. Using this site would have required changing the Tap to Columbus AFB from single circuit to double circuit approximately 3 miles to Columbus AFB. This site also was not optimal because of the cost and impact of constructing 3 miles of new transmission line and because the Tap to Columbus AFB line segment could not be out of service for an extended period.

After further analysis, TVA determined that it would be possible to provide satisfactory system operation without constructing a third switching station by modifying the system protection and control scheme. This could be accomplished by locating the line breakers and equipment at the existing Columbus AFB Substation and using the existing Lowndes-West Point Tap to Columbus AFB line segment without modification.

The second option was to rebuild the Tap to Columbus AFB from single circuit to double circuit approximately 3 miles to Columbus AFB and place the new switching station alongside the existing Columbus AFB Substation. This option was rejected due to the cost and impact of constructing 3 miles of new transmission line and because the Tap to Columbus AFB line segment could not be out of service for an extended period.

The proposed Barton Ferry Switching Station Options 1 and 2 were not selected due to budget and accessibility concerns, and another option outside of the Barton Ferry area was developed. It was recognized during early site evaluation that the Barton Ferry site would

need to be elevated because it is located in a floodplain. However, detailed evaluations during preliminary environmental review indicated that the early cost estimates were not realistic and that actual site development costs would be significantly higher. Further, proposed steps to control the escalating cost of the site would have required compromises in the site's accessibility under certain conditions. None of these concerns were viewed favorably for future operation and maintenance of the facility.

A key constraint in the location of the Barton Ferry site was the need to have the station located near the Lowndes-West Point Transmission Line to facilitate a loop line connection. However, TVA determined that it would be possible to provide satisfactory system operation without having this loop connection to the Barton Ferry Station and breakers by modifying the system protection and control scheme. This determination created the option of locating the line breakers and equipment at the existing Columbus AFB Substation and using the existing Lowndes-West Point Tap to Columbus AFB line segment without modification.

Because the cost of adding breakers was included in the Barton Ferry Station, moving these breakers to Columbus AFB Substation would mean all other costs associated with the Barton Ferry Station would be avoided. Recognizing that the Columbus AFB option would provide a satisfactory solution by alleviating environmental concerns of locating in the floodplain and provide significant cost savings over the Barton Ferry option, TVA decided to cancel the proposed Barton Ferry Switching Station and install breakers and associated equipment on either side of the terminal span at Columbus AFB Substation.

2.4.8. *Switching Station Site Identification*

2.4.8.1. SeverCorr Switching Station

A new SeverCorr Switching Station would be constructed adjacent to SeverCorr's 161-kV Substation to improve the reliability of the two dirty feed lines and provide connections for the two new transmission lines north and south of SeverCorr. This switching station would consist of four A-frame-type structures, two of which would be connected to the West Point-SeverCorr No. 1 and No. 2 lines (dirty feeds), one that would connect to the proposed CMF-SeverCorr segment of the West Columbus-SeverCorr Transmission Line (the new clean feed), and one that would connect to the proposed SeverCorr-Catalpa Creek line segment. These structures would initially be dead-end structures with provisions for a line circuit breaker to be installed. Once the breakers are installed, the structures and the immediate vicinity would be fenced and TVA would own the site in fee. This site would be approximately 176 feet by 285 feet and would be located on previously disturbed SeverCorr property (Figures 2-3 and 2-6).

2.4.8.2. West Columbus Switching Station

TVA would construct a new 161-kV switching station on approximately 20 acres near the intersection of US 82 and US 45 in Columbus. The site is located on the east side of US 45 and the existing West Point-Columbus No. 1 Transmission Line near structures 155 to 157 (Figure 2-4).

Figure 2-6. Aerial Photograph of Proposed SeverCorr Switching Station Site

The West Columbus Switching Station would have five line terminations initially with provisions for two future connections. It would be located adjacent to the existing West Point-Columbus No. 1 and West Point-Columbus No. 2 transmission lines. These lines would be reconstructed at the switching station and reterminated into new circuit breaker locations at the switching station. The new SeverCorr Transmission Line (clean feed) would terminate at the switching station, creating a new West Columbus-SeverCorr line segment.

2.4.8.3. Expansion of Existing Columbus Air Force Base 161-kV Substation

TVA would install additional facilities at the existing Columbus AFB 161-kV Substation. This area was reviewed as part of TVA's 2005 EA, *Columbus Air Force Base 161-kV Substation and Tap From West Point-Lowndes 161-kV Transmission Line*. TVA would install two A-frame dead-end structures, two breakers, a transformer, and a switch house at the Columbus AFB Substation site. The A-frame structures would be installed on each side of the current terminal span into Columbus AFB Substation. The maximum height of the new equipment would be 70 feet.

The location of the A-frame structure to the north would require the existing substation north boundary fence to be moved approximately 50 feet north, adding an area of approximately 50 feet by 148 feet or 0.17 acre. The location of the A-frame structure to the south would require the existing fenced area to be increased by an area of approximately 150 feet by 105 feet or 0.36 acres (Figures 2-5 and 2-7). All work would take place on previously disturbed substation property and would be located entirely outside of Columbus AFB property boundaries.

2.5. Identification of the Preferred Alternative

Alternative 2 – Construct 161-kV Transmission Lines and 161-kV Switching Stations (Action) is TVA's preferred alternative. TVA would rebuild 10.3 miles of existing 161-kV, mostly single-circuit transmission line, construct 4.8 miles of new 161-kV transmission line, and construct two 161-kV switching stations on approximately 21 acres of land. The proposed project would affect approximately 59 acres of new ROW and 129 acres of existing ROW. This responds to the identified need while minimizing potential cost and environmental impacts. It extensively uses existing infrastructure and ROWs and locates facilities on previously disturbed areas.

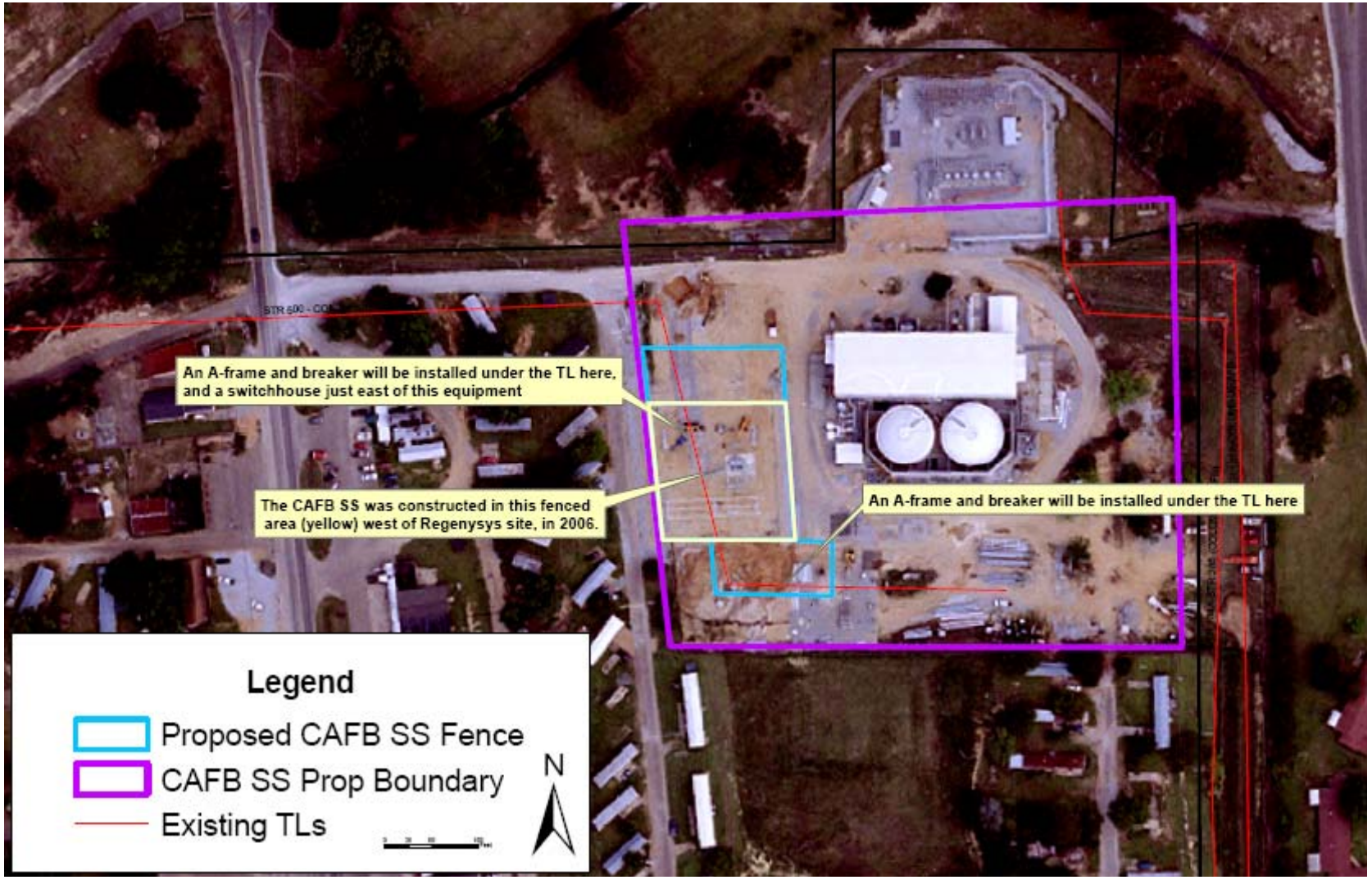

Figure 2-7. Aerial Photograph of Proposed Columbus Air Force Base Substation (CAFB SS) Expansion Site

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CHAPTER 3

3.0 AFFECTED ENVIRONMENT

Introduction

This chapter describes the existing condition of the environmental resources and those environmental resources that could be affected by the proposed actions. The affected environment descriptions below are based on field surveys conducted in 2007, on published and unpublished reports, and on personal communications with resource experts. This information establishes the baseline conditions against which the decision maker and the public can compare the potential effects of the alternatives under consideration.

3.1. Groundwater

The project area is located in the Southeastern Plains ecoregion (Chapman et al. 2004) and is underlain by the Black Warrior River aquifer and a confining unit. The Black Warrior River aquifer consists of an interbedded mix of fluvial sand and gravel, deltaic sand, silt and clay, and marginal marine sand, silt, and clay. The Black Warrior River aquifer includes unnamed water-yielding rocks of Early Cretaceous Age and the Tuscaloosa Group, the Eutaw-McShan Formations, and the Coffee Sand of Late Cretaceous Age. The Black Warrior River aquifer is confined by a thick sequence of clay and marl of the Selma Group, which effectively separates it from overlying rocks of the Mississippi embayment aquifer system (Renken 1998).

The relatively impermeable Selma Group directly underlies most of the project area. The Eutaw-McShan aquifer lies beneath the Selma Group and consists of interbedded green, iron rich sands, silts, and clays. The Tuscaloosa aquifer system lies below the Eutaw-McShan aquifer and is comprised of four hydraulically connected regional aquifers, i.e., the Gordo, Coker, Massive Sand, and undifferentiated Lower Cretaceous sediments. These aquifers generally consist of interbedded sands, gravels, silts, and clays. The Eutaw-McShan, the Gordo, and the Coker aquifers are sources for large pumping stations used for municipal, industrial, and domestic water supplies in the project area (MDEQ 2004).

Groundwater is abundant throughout Mississippi. In the project area, public and private wells pump water from several aquifers. Deep wells are used to supply public water systems from deeper aquifers, while private wells are usually cased in shallow aquifers. Contamination of groundwater occurs when contaminants such as pesticides and fertilizers from agriculture runoff seep into the aquifer. Most public water sources are protected from contamination due to the depth of the wells that are naturally protected by overlying clay (confining) layers. Groundwater is the primary source for public water supply for Lowndes County (USEPA 2007).

<u>West Columbus-SeverCorr-Catalpa Creek Transmission Lines and SeverCorr Switching Station</u>

There are two public water supply wells within the West Columbus-SeverCorr section of the proposed project. These wells are deep, greater than 200 feet, are capped by a confining unit, and are supplied by the Massive Sand and the Coker aquifers. The proposed new transmission line would intersect the State Designated Source Water Protection Areas for these wells. The SeverCorr-Catalpa Creek line segment and the SeverCorr Switching

Station site lie within the same State Designated Source Water Protection Areas as the West Columbus-SeverCorr section of the project.

Columbus AFB-West Columbus Transmission Line and Tap to Stinson Creek
There are 13 public water supply wells within the Columbus AFB-West Columbus 161-kV Transmission Line section of the proposed project. These wells are a cluster of shallow wells that are less than 200 feet deep and capped by a confining unit. All of these wells are supplied by the Eutaw-McShan aquifer. The existing line, north of structure 95, intersects all nine State Designated Source Water Protection Areas for these wells. The 161-kV Tap to Stinson Creek Substation is not within a State Designated Source Water Protection Area.

West Columbus Switching Station and Associated Transmission Lines
There are two public water supply wells within the West Columbus Switching Station section of the project. The ROW south of the West Columbus Switching Station intersects the State Designated Source Water Protection Areas for these wells. These wells are supplied by the Gordo aquifer and are considered deep, greater than 200 feet deep, and are capped by a confining unit. The West Columbus Switching Station site is outside the State Designated Source Water Protection Areas for these wells.

3.2. Surface Water

Precipitation in the project area averages about 56 inches per year with the wettest month in April at 5.5 inches and the driest month in October at 3.2 inches. The average annual air temperature is 63 degrees Fahrenheit (°F), ranging from a monthly average of 43°F in January to 82°F in July. Stream flow varies with rainfall and averages about 20 inches of runoff per year or approximately 1.5 cubic feet per second per square mile of drainage area.

The project area drains to the Tombigbee River (and Columbus Lake) in the vicinity of River Mile 333. The project also drains to its tributaries including Magowah Creek (via Gilmer Creek and its tributary Motley Slough), Catalpa Creek, Oak Slush Creek, and Stinson Creek. The streams associated with each section of the project are listed in Table 3-1. Columbus Lake is classified by the state (MDEQ) for recreation. The remaining streams are classified for fish and wildlife. Magowah Creek, Catalpa Creek, Oil Slush Creek, and Stinson Creek are on the state 303 (d) list due to impaired aquatic life support from biological impairment.

Table 3-1. Receiving Streams Associated With Each Section of the Proposed Project Area

Project Section	Receiving Stream						
	Tombigbee	Magowah	Gilmer	Motley	Catalpa	Oak Slush	Stinson
1. West Columbus-SeverCorr Transmission Line	X		X	X			
2. SeverCorr Switching Station	X		X				
3. SeverCorr-Catalpa Creek Transmission Line	X	X	X	X	X		
4. Tap to Stinson Creek	X						
5. Columbus AFB-West Columbus Transmission Line	X					X	X
6. West Columbus Switching Station	X					X	

3.3. Aquatic Ecology

The proposed transmission lines, switching stations, and access roads would cross streams within the upper Tombigbee River watershed in the Southeastern Plains ecoregion (Chapman et al. 2004). Streams in the Southeastern Plains are characterized by low-gradient meandering systems that are often entrenched. Only large streams have permanent flow and can develop broad floodplains subjected to frequent and prolonged flooding. These floodplains support relatively unique forested wetlands. The upper Tombigbee historically supported 113 freshwater species. However, habitat in the river system has been substantially altered by construction of the Tennessee-Tombigbee Waterway, and several species have been eliminated from the system (Boschung and Mayden 2004; Ross 2001). Consequently, the remaining fish community structure has moved from typical riverine assemblages to assemblages tolerant of impoundments.

Field surveys were conducted during June and October 2007 to document the presence of watercourses and aquatic habitat types along the proposed transmission line ROWs, switching stations sites, and access roads. Surveys identified 41 watercourses that would be crossed. These include 9 perennial streams, 14 intermittent streams, 12 wet-weather conveyances, two embayments of Columbus Lake, and four farm ponds. Comments and conditions of these streams can be found in Appendix F.

Because transmission line construction and maintenance activities mainly affect riparian conditions and instream habitat, TVA evaluated the condition of both of these at each stream crossing along the proposed route. From these habitat assessments, riparian condition was assigned to one of three classes to indicate the current condition of streamside vegetation across the length of the proposed transmission line (Table 3-2).

Table 3-2. Riparian Condition of Streams Located Within the Proposed Transmission Line Rights-of-Way, Switching Station Sites, and Access Roads

Class	Perennial	Intermittent	Total
Forested	2	5	7
Partially Forested	4	3	7
Nonforested	3	6	9
Total	9	14	23

The riparian-condition-assigned classes are as follows:

- **Forested** - Riparian area is fully vegetated with trees, shrubs, and herbaceous plants. Vegetative disruption from mowing or grazing is minimal or not evident. Riparian width extends more than 60 feet on both sides of the stream.
- **Partially forested** - Sparse trees and/or scrub-shrub vegetation are present within a band of riparian vegetation 20 to 60 feet wide on both sides of the stream. . Disturbance of the riparian zone is apparent.
- **Nonforested** - Few to no trees are present within the riparian zone. Significant clearing has occurred, usually associated with pasture or cropland.

3.4. Vegetation

The proposed project occurs in the Southeastern Plains ecoregion (Chapman et al. 2004). The region is typified by irregular plains and thin deposits of windblown silt (loess).

Streams are generally low gradient with sandy substrates. Land cover in this region is a patchwork of agricultural and forested land where oak-pine and western mesophytic forests were once dominant.

The vegetation classes observed within the switching station sites, proposed and existing ROW, and access roads were herbaceous vegetation, evergreen-deciduous forest, deciduous forest, and shrublands.

Approximately 85 percent of the proposed project area is considered herbaceous vegetation in the form of agricultural fields, pastures, existing transmission line ROW, and emergent wetlands. Common row crops observed were soybeans and corn. Grasses such as Bahia grass, Bermuda grass, crabgrass, Dallas grass, Johnson grass, rye grass, tall fescue, and Vasey's grass were commonly found. Forbs observed include asters, blackberries, black-eyed Susan, buttonweed, Chinese lespedeza, green dragon, goldenrod, ironweed, Queen Anne's lace, sneezeweed, tickseed, verbena, and wild onion. Several woody, exotic invasive species were found within the proposed ROW including autumn olive and Chinese tallow tree. Emergent wetlands account for approximately 8 percent of the total proposed project area. Common species observed in emergent wetlands include grasses, sedges, and rushes such as barnyard grass, broomsedge, sugarcane plume grass, wedgescale grass, manna grass, and Japanese stiltgrass. Several species of sedge were present along with beaked rush, soft rushes, and spike rushes. Forb species include cattails, St. John's wort, hibiscus, ballonvine, Indian heliotrope, lizard's tail, smartweed,

camphorweed, meadow beauty, and several species of water primrose. Invasive exotic species observed in aquatic habitats include water hyacinth, hydrilla, spike watermilfoil, and parrot watermilfoil.

The forested areas observed are evergreen-deciduous and deciduous forest make up approximately 15 percent of the proposed project area.

Dominant vegetation observed within the evergreen-deciduous forest includes loblolly pine and eastern red cedar along with overstory deciduous trees such as chinkapin oak, southern shagbark hickory, Ohio buckeye, osage orange, and Shumard's oak. Carolina buckthorn, eastern redbud, roughleaf dogwood, slippery elm, smooth sumac, and toothache tree occurred in the understory. Woody vines found include rattan vine and McCartney's rose. Smooth yellow false foxglove, German iris, ditch stonecrop, penstemon, little headed nut rush, and slender woodoats were observed in the herb layer.

Deciduous forest occurs as bottomland hardwood forest within the floodplain of rivers, creeks, and streams. Dominant overstory species observed include bald cypress, tupelo gum, eastern cottonwood, green ash, overcup oak, and water hickory. The understory contains buttonbush, Drummond's red maple, black willow, and tag alder. Woody vines observed include muscadine, summer grape, heartleaf pepper vine, and Virginia creeper. Lizard's tail, bog hemp, hog peanut, and several grasses and sedges are representative of the flora observed on the forest floor.

The remaining one percent of the proposed project area is shrubland occurring as scrub-shrub wetlands. This vegetation type was growing on the edges of the emergent wetlands and was interspersed within the bottomland hardwood forest. Dominant woody species observed were black willow, buttonbush, elderberry, tag alder, silky dogwood, tall false indigo, and Drummond's red maple. The herbaceous layer is diverse with axilflower, lizard's tail, ovate false fiddleleaf, false daisy, and many species of grasses and sedges.

Four of Mississippi's top 10 invasive exotic plant species (Chinese tallow tree, Chinese privet, Japanese honeysuckle, and water hyacinth) occur within the Columbus AFB-West Columbus Transmission Line project area (Winters et al. 2001). According to the U.S. Department of Agriculture (USDA) 2007 Plants Database, Chinese tallow tree has not previously been reported from this area of the state. It reproduces easily, spreads quickly, and is difficult to control because of its long taproot. Chinese tallow tree can invade high-quality, undisturbed forests and wet areas such as stream banks and ditches. It displaces native vegetation and alters soil conditions due to the high amount of tannins present in the leaf litter (Douce et al. 2007). Three small populations totaling less than 0.5 acre were observed and marked in the field. Other invasive exotic plant species observed include autumn olive, Brazilian vervain, Japanese stilt grass, and mimosa. Several species of invasive aquatic plant species were observed including hydrilla, parrot watermilfoil, and spike watermilfoil.

This project is divided into six sections: West Columbus-SeverCorr and SeverCorr Switching Station, SeverCorr-Catalpa Creek, Tap to Stinson Creek, Columbus AFB-West Columbus and West Columbus Switching Station and associated transmission lines. Each section is described in more detail below.

West Columbus-SeverCorr Transmission Line and SeverCorr Switching Station
Fifty-nine percent of proposed ROW is herbaceous vegetation primarily found on mowed roadsides and old fields. Deciduous forest (bottomland hardwood forest) occupies the remaining 41 percent of the proposed ROW. Much of the forest is less than 25 years old, though about 0.3 mile of ROW dissects mature bottomland forest containing overstory trees upwards of 2 feet in diameter. Osage orange is dominant with box elder, Chinese privet, green ash, redbud, rough dogwood, smooth hackberry, swamp holly, and willow oak. Several state-listed Ohio buckeye trees were observed within the ROW. The Ohio buckeye is uncommon in Mississippi and is considered a rare plant species (Table 3-3). Poison ivy, Virginia creeper, and supple-jack were the common woody vines observed. Herbaceous species observed include Cherokee sedge and striate mannagrass. The proposed switching station site has been graded and is mostly gravel.

SeverCorr-Catalpa Creek Transmission Line
Approximately 70 percent of the proposed ROW is herbaceous vegetation composed predominately of cultivated fields and mowed areas. The remaining 30 percent is deciduous forest with green ash, honey locust, nutmeg hickory, osage orange, shagbark hickory, and Shumard's oak present. The herbaceous plants observed were diverse, particularly in the moister areas, and include green dragon, Indian pink, tall bellflower, and yellow passionflower.

Tap to Stinson Creek
The proposed 0.23-mile 161-kV Tap to Stinson Creek would be new transmission line through a wetland area of clear-cut forest. Young tree species observed include bald cypress and river birch. Other species observed include buttonbush, cinnamon fern, Japanese stiltgrass, netted chain fern, orange jewelweed, saltbush, and sensitive fern.

Columbus AFB-West Columbus Transmission Line
This section occurs entirely within about 6 miles of existing ROW. The transmission line ROW is mostly herbaceous vegetation with young tree growth and shrubs. The invasive exotic Chinese tallow tree was observed within the southern portion of the transmission line. Much of the ROW south of the Tap to Stinson Creek is emergent and scrub-shrub wetlands. A large population of Ohio buckeye, a state-listed species, was observed within and outside of the ROW west of the Tombigbee River. In some drier areas, plains tickseed is abundant.

West Columbus Switching Station and Associated Transmission Lines
Vegetation at the proposed switching station site is comprised of disturbed herbaceous vegetation, deciduous forest, and an area of Black Belt Prairie. The disturbed herbaceous vegetation, which covers 63 percent of the switching station site, was observed in the northwest portion of the site nearer to US 45. Green ash is the most common overstory species in the deciduous forest vegetation type, but eastern red cedar is present, too. Deciduous forest covers 22 percent of the switching station site and is located to the southeast of the disturbed herbaceous vegetation.

A 2.8-acre globally rare Black Belt Prairie was observed on the southeast section of the proposed switching station property. This community is ranked G1, critically imperiled with a very high risk of extinction due to extreme rarity, very steep declines, or other factors and is extremely rare over its entire range (NatureServe 2007). Nearly all examples of this plant community have been lost due to human disturbances, primarily agriculture. This

community was formerly more widespread and extended in an arc across eastern Mississippi into central Alabama (Barone 2005). The Black Belt Prairie occurring on the switching station site is a high-quality remnant containing numerous species indicative of the rare community and a relatively small proportion of nonnative species cover. Prairie species observed at the site include green milkweed, limestone wild-petunia, little bluestem, sideoats gramma, white prairie clover, whorled rosinweed, and yellow coneflower. In addition, one previously unrecorded population of the state-listed white heath aster was observed on the site.

The transmission line associated with the West Columbus Switching Station area is entirely within existing ROW. North of US 82, most of the area is mowed with the exception of some stream crossings. Almost all of the vegetation is herbaceous. Young tree growth and shrubs border the ROW edges. South of US 82, wetlands and upland areas occur within the ROW. Plants observed include purple prairie clover, white prairie clover, and yellow coneflower.

3.5. Wildlife

The project area includes proposed new and existing ROWs, access roads, and switching station sites. Habitats observed within the proposed project area have been impacted heavily by previous development and agricultural practices. The project area is primarily early successional habitats, dominated by herbaceous vegetation in existing transmission line ROWs surrounded by a landscape of cropland and pasture with small patches of mixed hardwoods, eastern red cedar, and pines. The remaining portions of the project area are mixed evergreen-deciduous forest and deciduous forest. Refer to Section 3.4 for a more detailed vegetative description.

Approximately 84 percent of the project area is early successional habitat dominated by herbaceous vegetation and consists of agricultural fields, pastures, existing ROWs, and emergent wetlands (the latter making up of 8 percent of the total project area). In addition, 1 percent of the project area is scrub-shrub wetlands associated with emergent wetlands. Common birds observed in upland early successional habitats included mourning dove, yellow-breasted chat, white-eyed vireo, eastern kingbird, field sparrow, eastern bluebird, northern mockingbird, eastern meadowlark, brown thrasher, prairie warbler, eastern towhee, and northern bobwhite quail. Other animals found in these habitats are black racer, five-lined skink, white-tailed deer, eastern cottontail, Virginia opossum, coyote, cotton rat, and white-footed mouse. The emergent and scrub-shrub wetlands host several amphibians and reptiles such as cricket frogs, southern leopard frog, snapping turtle, and cottonmouth. Several birds are associated with these wetlands and include green heron, great-blue heron, great egret, cattle egret, common yellow-throat, red-winged blackbird, and marsh wren.

The remaining 15 percent of the project area is forested and includes mixed evergreen-deciduous and deciduous forests (primarily bottomland hardwood forest). Birds observed in forested habitats include yellow-billed cuckoo, red-eyed vireo, wood thrush, pileated woodpecker, downy woodpecker, red-bellied woodpecker, Carolina chickadee, summer tanager, blue jay, northern cardinal, and American crow. Other species known to occur are eastern box turtle, eastern gray squirrel, broadhead skink, and fence lizard. Species observed that are more commonly found in the bottomland deciduous portion of the forested habitats include prothonotary warbler, green heron, wood duck, and barred owl.

Animals using these wet forested habitats are American beaver, raccoon, green treefrog, and Cope's gray treefrog.

One heron colony but no caves are known from within 3 miles of the proposed project area. The heron colony occurs approximately 0.33 mile from the Columbus AFB-West Columbus line segment. No additional caves, heron colonies, or other unique habitats were observed during field investigations. The project area does not contain any designated critical habitat for federally listed species.

This review is divided into six sections: West Columbus-SeverCorr and SeverCorr Switching Station, SeverCorr-Catalpa Creek, Tap to Stinson Creek, Columbus AFB-West Columbus, and West Columbus Switching Station and associated transmission lines. Each section is described in more detail below.

West Columbus-SeverCorr Transmission Line and SeverCorr Switching Station

The proposed transmission line route is 59 percent early successional habitat, consisting of mowed road shoulders and old fields. Young, bottomland hardwood forest accounts for the remaining area. Although it was dry at the time of survey, the bottomland forest showed evidence of vernal pools. These bottomland forest areas likely host species such as cricket frogs, crayfish, marbled salamanders, and spotted salamanders when wet. River cooters use stream habitat in this area. Broadhead skink, eastern box turtle, eastern gray squirrel, raccoon, green treefrog, and Cope's gray treefrog were observed in this habitat. Mourning dove, brown thrasher, red-winged blackbird, eastern bluebird, eastern cottontail, Virginia opossum, white-tailed deer, and five-lined skink were observed within the early successional habitats. The proposed switching station site is within the SeverCorr industrial site footprint, has been graded, and is mostly gravel.

SeverCorr-Catalpa Creek Transmission Line

Approximately 70 percent of the proposed SeverCorr-Catalpa Creek line segment is herbaceous vegetation, which is mostly composed of agricultural fields and mowed areas. The remaining 30 percent of the project area is deciduous forest. Species such as eastern meadowlark, eastern bluebird, mourning dove, prairie warbler, eastern cottontail, and white-tailed deer were observed in the early successional habitats. Within the forested habitats, birds such as American crow, Carolina chickadee, summer tanager, red-shouldered hawk, blue jay, pileated woodpecker, and northern cardinal were observed. Other animals found include eastern box turtle, broadhead skink, Cope's gray treefrog, and eastern gray squirrel.

Tap to Stinson Creek

The Tap to Stinson Creek Substation would be a new transmission line segment that crosses a forested area that is mostly clear-cut. Field sparrow, yellow-breasted chat, and five-lined skink were observed in the clear-cut area.

Columbus AFB-West Columbus Transmission Line

The majority of this 6-mile section occurs primarily as early successional habitat in the form of agricultural fields and pasture. Birds observed within the early successional habitats include eastern kingbird, purple martin, eastern bluebird, northern mockingbird, mourning dove, eastern meadowlark, brown thrasher, northern cardinal, and prairie warbler. Other animals observed include white-tailed deer, eastern cottontail, Virginia opossum, and five-lined skink. Scrub-shrub and emergent wetlands with adjacent bottomland forest are present in association with the Tombigbee River and Columbus Lake. The scrub-shrub and

emergent wetlands in these areas host species such as cattle egret, great egret, red-winged blackbird, southern leopard frog, cricket frog, and cottonmouth. Wood duck, prothonotary warbler, barred owl, raccoon, American beaver, green treefrog, and Cope's gray treefrog were observed within the adjacent bottomland forests.

West Columbus Switching Station and Associated Transmission Lines

This proposed switching station site is 63 percent early successional habitat consisting primarily of disturbed herbaceous vegetation, 22 percent deciduous forest, and 2.8 acres of remnant Black Belt Prairie. The switching station site also includes a 0.25-acre pond and one ephemeral stream. Birds such as eastern kingbird, eastern bluebird, eastern meadowlark, northern bobwhite quail, northern mockingbird, mourning dove, brown thrasher, and prairie warbler were observed within the early successional habitats. Other animals occurring in the forested habitat include white-tailed deer, nine-banded armadillo, raccoon, eastern box turtle, and five-lined skink. The pond may host snapping turtle, Cope's gray treefrog, and crayfish, with cricket frogs using the stream habitat.

The transmission lines associated with the switching station occur entirely within existing ROW. Early successional habitat consisting of pasture, old-field, a few planted wildlife plots, and residential areas make up most of the transmission line ROW and switching station site. However, one large wetland and several streams occur in the ROW. Birds such as eastern kingbird, purple martin, eastern bluebird, eastern meadowlark, northern bobwhite quail, northern mockingbird, mourning dove, brown thrasher, and prairie warbler were observed within the early successional habitats. Other animals occurring include white-tailed deer, eastern cottontail, nine-banded armadillo, raccoon, eastern box turtle, and five-lined skink. The wetland habitat hosts great egret, red-winged blackbird, cattle egret, snapping turtle, Cope's gray treefrog, and crayfish, with river cooters using the stream habitat.

3.6. Endangered and Threatened Species

3.6.1. *Aquatic Animals*

The TVA Natural Heritage database indicated that five federally endangered mussel species, six state-listed mussel species, and 12 state-listed fish species have been reported in Lowndes County, Mississippi (Table 3-3). Although federally designated critical habitat segments for southern clubshell, orange-nacre mucket, ovate clubshell, and Alabama moccasinshell are present in the Buttahatchee River, Yellow Creek, and Luxapallila Creek, the proposed switching stations, new transmission lines, and the existing transmission lines to be upgraded are not located within these watersheds. Adverse impacts to listed aquatic species present in these watersheds are not expected because of the transmission line and switching station construction, operation, or maintenance. The federally listed species are described below in more detail.

Alabama moccasinshell, orange-nacre mucket, ovate clubshell, southern clubshell, and southern combshell (as well as the state-listed species present in the system) typically inhabit relatively undisturbed streams with sand, gravel, and cobble shoal areas. Habitat modification, sedimentation, and water quality degradation represent major threats to these species. Decline in the populations of these species in Mississippi is due to changes in river and stream channels resulting from impoundments, dredging, or mining, and historic or episodic pollution events (NatureServe 2007). All of these mussels were widely distributed in the Tombigbee system, but have been eliminated from significant portions of

their historic range in the Tombigbee system due to impoundments and channel alteration resulting from construction of the Tennessee-Tombigbee Waterway. Current threats to these species include habitat modification, sedimentation, and water quality degradation (ibid).

Table 3-3. Endangered, Threatened, and Other Aquatic Animal Species of Conservation Concern Known From the Lowndes County, Mississippi, Project Area

Common Name	Scientific Name	Status[a]	
		Federal	State
Fish			
Alabama hog sucker	*Hypentelium etowanum*	-	NOST(S3)
Alabama shiner	*Cyprinella callistia*	-	NOST(S2)
Black redhorse[b]	*Moxostoma duquesnei*	-	NOST(S1)
Blue sucker[b]	*Cycleptus elongatus*	-	NOST(S3)
Crystal darter	*Crystallaria asprella*	-	END(S1)
Fluvial shiner[b]	*Notropis edwardraneyi*	-	NOST(S1)
Frecklebelly madtom[b]	*Noturus munitus*	-	END(S2)
Freckled darter	*Percina lenticula*	-	NOST(S2)
Mobile logperch	*Percina kathae*	-	NOST(S2S3)
Rock darter	*Etheostoma rupestre*	-	NOST(S3)
Southern sand darter	*Ammocrypta meridiana*	-	NOST(S3)
Striped bass[b]	*Morone saxatilis*	-	NOST(S1)
Mussels			
Alabama hickorynut	*Obovaria unicolor*	-	NOST(S1S2)
Alabama moccasinshell	*Medionidus acutissimus*	THR	END(S1)
Alabama spike	*Elliptio arca*	-	NOST(S1S2)
Orange-nacre mucket	*Lampsilis perovalis*	THR	END(S1)
Ovate clubshell	*Pleurobema perovatum*	END	END(S1)
Ridged mapleleaf	*Quadrula rumphiana*	-	NOST(S2)
Rough fatmucket	*Lampsilis straminea straminea*	-	NOST(S2)
Southern clubshell	*Pleurobema decisum*	END	END(S1)
Southern combshell	*Epioblasma penita*	END	END(S1)
Southern hickorynut	*Obovaria jacksoniana*	-	NOST(S1)
White heelsplitter	*Lasmigona complanata*	-	NOST(S2)

[a]Status codes: END = Endangered; NOST= No Status but tracked by the Mississippi State Heritage Project; THR = Threatened; State ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S#S# = A range of ranks because the exact rarity is uncertain (e.g., S1S2)
[b]Species found in the potentially affected watersheds within 10 miles

3.6.2. *Plants*

The TVA Natural Heritage database indicated no federally listed plant species are known from Lowndes County, Mississippi. However, 29 state-listed plant species have been recorded from the county (Table 3-4). During botanical field surveys conducted in June and September 2007, no federally listed and two state-listed plant species, Ohio buckeye and white heath aster, were observed in the project area.

Table 3-4. Plant Species of Conservation Concern Known From Lowndes County, Mississippi

Common Name	Scientific Name	Status[a]	
		Federal	State
American colombo	*Swertia caroliniensis*	-	NOST(S2S3)
Big shellbark hickory	*Carya laciniosa*	-	NOST(S2S3)
Bur oak	*Quercus macrocarpa*	-	NOST(S2)
Eastern eulophus	*Perideridia americana*	-	NOST(S1S2)
Large-flowered evening-primrose	*Oenothera grandiflora*	-	NOST(S1)
Limestone Adder's-tongue	*Ophioglossum engelmannii*	-	NOST(S1)
Lobed tickseed	*Coreopsis auriculata*	-	NOST(S2S3)
Mountain holly	*Ilex montana*	-	NOST(S3?)
Narrow flowered beard-tongue	*Penstemon tenuiflorus*	-	NOST(S3S4)
Nebraska sedge	*Carex jamesii*	-	NOST(S1S2)
Ohio buckeye	*Aesculus glabra*	-	NOST(S2)
Prairie parsley	*Polytaenia nuttallii*	-	NOST(S2)
Prairie-iris	*Nemastylis geminiflora*	-	NOST(S2)
Pumpkin ash	*Fraxinus profunda*	-	NOST(S3)
Rough rattlesnake-root	*Prenanthes aspera*	-	NOST(S2)
Scarlet Indian-paintbrush	*Castilleja coccinea*	-	NOST(S1)
Sharp sepal beard-tongue	*Penstemon tenuis*	-	NOST(S2S3)
Shinners' false-foxglove	*Agalinis pseudaphylla*	-	NOST(S2)
Shootingstar	*Dodecatheon meadia*	-	NOST(S2)
Slender sedge	*Carex gracilescens*	-	NOST(S2S3)
Small-toothed sedge	*Carex microdonta*	-	NOST(S2?)
Southern meadow-rue	*Thalictrum debile*	-	NOST(S1S2)
Spreading bladder-pod	*Lesquerilla gracilis*	-	NOST(S2)
Stiff greenthreads	*Thelesperma filifolium*	-	NOST(S1)
Turk's-cap lily	*Lilium superbum*	-	NOST(S3S4)
Vase-vine leather-flower	*Clematis beadlei*	-	NOST(S1)
White dog's tooth violet	*Erythronium albidum*	-	NOST(S2)
White heath aster	*Aster ericoides*	-	NOST(S2)
Wild hyacinth	*Camassia scilloides*	-	NOST(S2S3)

[a]Status codes: NOST = Listed by the state of Mississippi but not assigned a status; State ranks: S1 = Critically Imperiled, less than 5 known occurrences; S2 = Imperiled, less than 20 known occurrences; S3 = Rare or Uncommon, 21 to 100 known occurrences; S#S# = A range of ranks because the exact rarity is uncertain (e.g., S1S2); S#? = Inexact numeric rank (e.g., S2?)

During June 2007 botanical field surveys, several previously unreported occurrences of Ohio buckeye were observed within and adjacent to three line segments. Approximately 100 individual Ohio buckeyes were found in the Columbus AFB-West Columbus ROW with an additional 300 occurring outside the ROW. A few Ohio buckeyes were observed along the edge of and outside the ROW of the West Columbus-SeverCorr-Catalpa Creek line segment.

Ohio buckeye is a native, medium-sized deciduous tree that grows 30 to 50 feet tall. It is typically found on mesophytic sites in western Pennsylvania, Ohio, and southern Michigan, west to Illinois and central Iowa. Its range extends south to eastern Kansas, southwestern Oklahoma, and central Texas, east to western Arkansas and Tennessee, with outlying populations in central Alabama and eastern Mississippi (Virginia Tech Department of Forestry 2007).

One previously unreported occurrence of white heath aster was found in two small patches on the West Columbus Switching Station site during September 2007 botanical field surveys. One area consists of 30 plants, and the second has 10 plants. This plant species is known from five counties in Mississippi. It is most often found in chalk prairie remnants in Mississippi and its range extends north from Arizona, north to North Dakota and Canada, east to Maine, and south to Georgia (USDA 2007).

Plant species listed as rare in the state of Mississippi are not assigned an official state status, such as endangered or threatened. Instead, the Mississippi Natural Heritage Program follows the ranking system developed by The Nature Conservancy to indicate the relative rarity of state-listed species. Although Ohio buckeye and white heath aster are rare in Mississippi, they are not rare on a global scale. The global ranking for these species is G5 (demonstrably secure globally), although they might be quite rare in parts of their range, especially in peripheral areas such as Mississippi. Due to their limited distribution in Mississippi, they are both considered to be imperiled (S2) with less than 20 known occurrences.

3.6.3. *Terrestrial Animals*

The TVA Natural Heritage database indicated that there are no federally listed animal species reported from Lowndes County and two state-listed species reported from within 3 miles of the proposed action (Table 3-5). No federally listed or state-listed terrestrial animals were observed in the project area during field investigations conducted June and September 2007.

Table 3-5. State-listed Terrestrial Animals Species Known from the Lowndes County, Mississippi, Analysis Area

Common Name	Scientific Name	Status[a]	
		Federal	State
Bald eagle	*Haliaeetus leucocephalus*	-	END (S2)
Black-knobbed map turtle	*Graptemys nigrinoda*	-	END (S2)

[a]Status codes: END = Endangered; State rank: S2 = Very Rare or Imperiled

The bald eagle has recently been removed from the endangered species list but is still protected by the National Bald Eagle Management Guidelines and the Bald and Golden Eagle Protection Act and associated management guidelines. Bald eagles nest in forested areas near large bodies of water, such as rivers and reservoirs, where they forage. Three pairs of bald eagles have been recorded nesting in Lowndes County by the USACE during their annual surveys of the area. One active nest was observed in spring 2007, and several old nests dating back to 1996 (Hartley 2007), are known from around Officer's Lake. The active nest is 0.6 mile west of the Columbus AFB-West Columbus line segment and 0.6 mile from the nearest structures proposed to be rebuilt. Proposed access roads are 0.6 mile and 0.8 mile away and already exist. Another pair of bald eagles has been nesting around Tibbee Creek, approximately 2.1 miles from the proposed project area. The nest of a third pair had been nesting near Hairston Bend on the Tennessee-Tombigbee Waterway, approximately 10 miles southeast of the proposed project sites, and has not been active since 1999.

Suitable habitat for bald eagles exists on two sections of the proposed rebuild section of the Columbus AFB-West Columbus Transmission Line. The first area occurs where the transmission line crosses the Tennessee-Tombigbee Waterway, and the surrounding habitat is mature mixed forest. A second area of suitable bald eagle habitat exists in sloughs associated with the eastern edge of Columbus Lake with mature mixed forest surrounding the existing line. Though suitable bald eagle habitat occurs, no individuals or nests were observed during field surveys conducted in June 2007.

Black-knobbed map turtles are found in moderate-flowing streams with sand or clay bottoms and abundant basking structure (Ernst et al. 1994). Numerous records of this species have been reported from nearby Tombigbee River. Although moderately suitable habitat occurs in the Tombigbee River where it is crossed by the existing Columbus AFB-West Columbus line segment, no suitable habitat was found during field surveys conducted in June 2007.

3.7. Wetlands

Wetlands are areas inundated by surface water or groundwater such that vegetation (hydrophytes) adapted to saturated soil conditions are prevalent. Wetland substrates consist predominantly of undrained hydric soil, soils that are saturated with water and usually deprived of oxygen. Examples include swamps, marshes, bogs, wet meadows, and some shoreline fringes. In June and August 2007, ground surveys were conducted to delineate wetland areas within the existing and proposed transmission line ROWs that make up the proposed project area.

Wetland determinations were performed according to the USACE standards, which require documentation of hydrophytic (i.e. wet-site) vegetation, hydric soil, and wetland hydrology (Environmental Laboratory 1987; Reed 1997; U.S. Department of Defense and USEPA 2003). Broader definitions of wetlands, such as that used by the U.S. Fish and Wildlife Service (Cowardin et al. 1979) and the TVA Environmental Review Procedures definition (TVA 1983), were also considered in this review. Using a TVA-developed modification of the Ohio Rapid Assessment Method (Mack 2001) specific to the TVA region (TVARAM), wetlands were categorized by their functions, sensitivity to disturbance, rarity, and irreplaceability. The categorization was used to evaluate impacts and to determine the appropriate levels of mitigation for wetland impacts.

TVARAM classifies wetlands into three categories. Category 1 wetlands are considered “limited quality waters” and represent degraded aquatic resources that have limited potential for restoration and such low functionality that lower standards for avoidance, minimization, and mitigation can be applied. Category 2 includes wetlands of moderate quality and wetlands that are degraded but have reasonable potential for restoration. Avoidance and minimization are the preferred mitigation measures for Category 2 wetlands. Category 3 includes wetlands of very high quality or of regional/statewide concern, such as wetlands that provide habitat for endangered or threatened species.

The proposed project areas are located on existing and proposed new transmission line ROWs and switching station sites within the upper Tombigbee watershed, whose major hydrologic feature includes the Tennessee-Tombigbee Waterway and Columbus Lake. The project areas cross a landscape with bottomland forests, although the majority of the project area consists of scrub-shrub and herbaceous upland and wetland communities, with portions of the line crossing cropland, industrial sites, residential areas, creeks, and

drainage ways. Eighteen wetlands comprising 18.13 wetland acres were identified within the proposed project areas (Table 3-6).

Table 3-6. Wetland Areas on the Proposed Project Sites

Project Area	Total Wetland Acreage on ROW	Forested Wetland Acreage	Structure location (Structure in wetland)
West Columbus-SeverCorr	0.37	0.37	NA-new line
SeverCorr-Catalpa Creek	no wetlands		
Tap to Stinson Creek	0.17	0.00	NA-new line
Columbus AFB-West Columbus	13.57	0.15	18, 19, 37, 38, 39, 74, 75, 76, 77
West Columbus Switching Station and Associated Transmission Lines	4.02	0.40	1, 2, 3, 4, 187
TOTAL ACRES	**18.13**	**0.92**	

NA = Not applicable

West Columbus-SeverCorr Transmission Line and SeverCorr Switching Station
Two wetlands were identified within the proposed new ROW for this transmission line (Table 3-7). No wetlands occur on the proposed switching station site.

Table 3-7. Wetlands in the West Columbus-SeverCorr Project Area

Wetland Identification	Type[a]	Wetland Acreage on ROW	Estimated Forested Wetland Acreage	Structure location (Structure in wetland)	TVARAM Category (score)
W001C	PFO1A	0.19	0.19	NA-new line	2 (35)
W002C	PFO1E	0.18	0.18	NA-new line	3 (63)
TOTAL ACRES		**0.37**	**0.37**		

[a]Classification codes as defined in Cowardin et al. 1979: PFO1 = palustrine forested, broadleaf deciduous; A = temporarily flooded; E = seasonally flooded/saturated

Wetland 001C (W001C) is a forested wetland with 0.19 acre located on the proposed ROW, but which extends east and west of the ROW for approximately 15 acres. W001C exhibits hydric soils and is hydrologically connected to the Tennessee-Tombigbee Waterway via an unnamed tributary of Gilmer Creek. Dominant hydrophytic vegetation includes cottonwood, black willow, and green ash.

Wetland 002C (W002C) is a forested wetland with 0.18 acre located on the proposed ROW, but which extends north of the ROW for approximately 15 acres. W002C exhibits hydric soils and is hydrologically connected to the Tennessee-Tombigbee Waterway via an unnamed tributary of Gilmer Creek. Dominant hydrophytic vegetation includes bastard willow, green ash, and sugarberry.

SeverCorr-Catalpa Creek Transmission Line
No wetlands were identified along the proposed route of this transmission line (Table 3-6).

Tap to Stinson Creek and Columbus AFB-West Columbus Transmission Line
One wetland was identified within the proposed tap route and 12 wetlands were identified within the proposed rebuild project area (Table 3-8).

Table 3-8. Wetlands in the Columbus Air Force Base-West Columbus Project Area

Wetland Identification	Type[a]	Wetland Acreage on ROW	Estimated Forested Wetland Acreage	Structure location (Structure in wetland)	TVARAM Category (score)
W004	PEM1/PFO1B	0.22	0.00	134A-1	2 (39.5)
W005	PSS1/PFO1B	0.70	0.00	8-9	3 (61)
W006	PEM1/PFO6B	0.12	0.00	8-9	3 (61)
W007	PFO6B	1.00	0.00	11-12	3 (76)
W008	PEM1/PFO6E	1.77	0.00	17 (18,19) 20	3 (62)
W009	PEM/PFO1C	0.56	0.15	20-21	3 (62)
W010	PEM/PFO1A	0.26	0.00	24-25	3 (61)
W011	PEM1/PFO6E	0.71	0.00	26-27 27-28	3 (70.5)
W012	PAB3/PSS1H	1.25	0.00	32-33	2 (43.5)
W013	PEM1/PFO1A	2.86	0.00	36 (37, 38, 39) 40	2 (58)
W014	PEM1/PFO6F	3.27	0.00	(74, 75, 76, 77) -78	3 (82)
W015	PEM/PSS1E/PFO1E	0.17	0.00	NA-new line	3 (82)
RW001	PEM1B/PFO1B	0.85	0.00	56	2 (45)
	TOTAL ACRES	**13.74**	**0.15**		

[a]Classification Codes as defined in Cowardin et al. 1979: PEM1 = palustrine emergent, persistent vegetation; PSS1 = palustrine scrub-shrub, broadleaf deciduous; PFO1 = palustrine forested, broadleaf deciduous; PAB3 = palustrine aquatic bed, rooted vegetation; 6 = deciduous; A = temporarily flooded; B = saturated; C = seasonally flooded; E = seasonally flooded/saturated; F = semipermanently flooded; H = permanently flooded

Wetland 004 (W004) is maintained as 0.22 acre of emergent wetland between structures 134A and 1 within the existing transmission line corridor. This wetland becomes forested north and south of the line and is estimated to be 3 acres. W004 is located on a floodplain terrace, exhibits hydric soils, and is hydrologically connected to the Tennessee-Tombigbee Waterway via an unnamed tributary of Oak Slush Creek. W004 is dominated by hydrophytic vegetation, including field crown grass, fog fruit, black willow saplings, and various curly docks.

Wetland 005 (W005) is maintained as 0.70 acre of scrub-shrub wetland between structures 8 and 9 within the existing transmission line corridor This wetland becomes forested north and south of the transmission line, totaling approximately 5 to 10 acres. W005 is located in a topographic drainage, exhibits hydric soils, and is hydrologically connected to the Tennessee-Tombigbee Waterway. W005 is dominated by hydrophytic vegetation, including green ash and American elm saplings.

Wetland 006 (W006) is maintained as 0.12 acre of emergent wetland between structures 8 and 9 within the existing transmission line corridor. This wetland becomes forested north and south of the line, connecting to the same 5- to 10-acre wetland complex associated

with W005. W006 exhibits hydric soils and is hydrologically connected to the Tennessee-Tombigbee Waterway. Dominant hydrophytic vegetation observed includes common rush, lizard's tail, and bulrush.

Wetland 007 (W007) consists of 1.00 acre of emergent wetland between structures 11 and 12. This wetland contains a man-made dike across a slough and several small drainage ditches. This wetland extends north and south of the ROW as part of a forested wetland complex that totals approximately 500 acres. W007 exhibits hydric soils and is hydrologically connected to the Tennessee-Tombigbee Waterway. Dominant hydrophytic vegetation observed within the ROW includes soft path rush, rice cut grass, and panic grass.

Wetland 008 (W008) is maintained as 1.77 acres of emergent wetland between structures 17 and 20 within the existing transmission line corridor (structures 18 and 19 are located inside the wetland boundary). This wetland becomes forested east and west of the line and is approximately 50 acres. W008 exhibits hydric soils and is hydrologically connected to the Tennessee-Tombigbee Waterway. W008 is dominated by hydrophytic vegetation, including pathrush species, sedge species, lizard's tail, and panic grass.

Wetland 009 (W009) comprises 0.56 acre between structures 20 and 21 within the existing transmission line corridor. Of the 0.56 acre located within the corridor, 0.15 acre is forested wetland, and 0.41 acre is emergent wetland. This wetland extends east and west of the ROW as part of a large (approximately 50 acres) forested wetland complex. W009 exhibits hydric soils and is hydrologically connected to the Tennessee-Tombigbee Waterway. W009 is dominated by hydrophytic vegetation, including water tupelo, cherry bark oak, water hickory, fiddle leaf, and cocklebur.

Wetland 010 (W010) is maintained as 0.26 acre of emergent wetland between structures 24 and 25 within the existing transmission line corridor. This wetland extends east and west of the ROW as part of an estimated 10-acre wetland complex. W010 exhibits hydric soils and is hydrologically connected to the Tennessee-Tombigbee Waterway. W010 is dominated by hydrophytic vegetation, including lizard's tail, camphorweed, and Virginia dayflower.

Wetland 011 (W011) crosses the existing transmission line ROW between structures 26, 27, and 28, for a total of 0.71 acre of emergent wetland within the ROW. This wetland extends east and west of the ROW as part of an estimated 200-acre wetland complex. W011 exhibits hydric soils and is hydrologically connected to the Tennessee-Tombigbee Waterway. W011 is dominated by hydrophytic vegetation, including panic grass, pathrush, lizard's tail, and curlytop knotweed.

Wetland 012 (W012) comprises a scrub-shrub wetland with an aquatic bed, totaling 1.25 acres between structures 32 and 33 within the existing ROW. This wetland extends east and west of the ROW as part of a 5- to 10-acre forested wetland. W012 exhibits hydric soils and is hydrologically connected to the Tennessee-Tombigbee Waterway. W012 is dominated by hydrophytic vegetation, including smooth alder, persimmon, peppervine, and wisteria.

Wetland 013 (W013) is maintained as 2.86 acres of emergent wetland between structures 36 and 40 on the existing transmission line ROW (structures 37, 38, and 39 are located within the wetland boundary). This wetland extends east and west of the ROW as part of a forested wetland complex estimated to be 5 to 10 acres. W013 exhibits hydric soils and is

hydrologically connected to the Tennessee-Tombigbee Waterway. W013 is dominated by hydrophytic vegetation, including flat sedge, giant cane, bulrush, and pathrush.

Wetland 014 (W014) is maintained as 3.27 acres of emergent wetland between structures 74 and 78 on the existing ROW (structures 74, 75, 76, and 77 are located within the wetland boundary). This wetland extends outside the ROW to the east and west, and south to structure 69. The wetland complex is approximately 250 acres and is connected to Wetland 015 on the Tap to Stinson Creek Substation. W014 exhibits hydric soils and is hydrologically connected to the Tennessee-Tombigbee Waterway. Dominant hydrophytic vegetation includes panic grass, sensitive fern, path rush, beggar's tickseed, and rice cut grass.

Wetland 015 (W015) is a scrub-shrub/emergent wetland complex connected to W014 on the Columbus AFB-West Columbus section of the SeverCorr project. W015 covers 0.17 acre within the proposed ROW. This wetland extends west of the ROW as part of an approximately 250-acre wetland complex. W015 exhibits hydric soils and is hydrologically connected to the Tennessee-Tombigbee Waterway. Dominant hydrophytic vegetation observed includes cattail, buttonbush, and Nepalese brown top.

Wetland RW001 (RW001) is maintained as 0.85 acre of emergent wetland between structures 55 and 57 on the existing transmission line ROW (structure 56 is located within the wetland boundary). This wetland extends outside of the ROW. The wetland complex totals several hundred acres. RW001 exhibits hydric soils and is hydrologically connected to the Tennessee-Tombigbee Waterway. Dominant hydrophytic vegetation includes panic grass, giant goldenrod, giant ironweed, sugarcane plume grass, and Vasey's grass.

West Columbus Switching Station and Associated Transmission Lines

No wetlands were identified on the proposed switching station site; however, three wetlands were identified within the existing transmission line ROW proposed for rebuild (Table 3-9).

Table 3-9. Wetlands in the West Columbus Switching Station Project Area

Wetland Identification	Type[a]	Wetland Acreage on ROW	Estimated Forested Wetland Acreage	Structure location (Structure in wetland)	TVARAM Category (score)
W001	PSS1C	0.03	0.00	5-6	2 (33.5)
W002	PEM1/PFO1C	2.75	0.00	(1, 2, 3, 4)	3 (67.5)
W003	PEM1/PFO1A	1.24	0.40	(187) 188	3 (67.5)
	TOTAL ACRES	**4.02**	**0.40**		

[a]Classification codes as defined in Cowardin et al. 1979: PEM1 = palustrine emergent, persistent vegetation; PSS1 = palustrine scrub-shrub, broadleaf deciduous; PFO1 = palustrine forested, broadleaf deciduous; A = temporarily flooded; C = seasonally flooded

Wetland 001 (W001) is a scrub-shrub wetland with 0.03 acre located on the existing ROW between structures 5 and 6. This wetland extends outside the ROW for an estimated 5 to 10 acres. W001 exhibits hydric soils and is hydrologically connected to the Tennessee-Tombigbee Waterway. Dominant hydrophytic vegetation includes green ash, dogwood, and cottonwood saplings.

Wetland 002 (W002) and Wetland 003 (W003) are part of the same wetland complex that crosses the ROW in two locations at a bend in the West Point-Columbus No. 2 line segment at structures 1-4 and 187-188 (structures 1-4 and 187 are located inside the wetland boundary). This wetland is part of a large bottomland complex that totals approximately 75 acres, with 3.99 acres located within the ROW proposed for rebuild. The majority of this acreage is maintained as emergent; however, a 0.40-acre portion along the west side of the ROW in W003 is forested wetland. W002 and W003 exhibit hydric soils and are hydrologically connected to the Tennessee-Tombigbee Waterway via an unnamed tributary. Dominant hydrophytic vegetation observed includes cattails, cocklebur, lizard's tail, fog fruit, black willow, cottonwood, and green ash.

Summary

All of the wetlands identified within the proposed project areas function in storm water retention, erosion control, toxicant absorption, flood control, and offer wildlife habitat. Wetlands W001C, W001, W004, W012, W013, and RW001 scored in Category 2 using the TVARAM, which indicates these wetlands are of good condition and therefore provide these beneficial wetland functions to a moderate extent. Wetlands W002C, W002, W003, W005, W006, W007, W008, W009, W010, W011, W014, and W015 scored in Category 3 using the TVARAM, which indicates these wetlands are of high quality and therefore function in providing these beneficial wetland functions at a superior level (Mack 2001).

Wetlands W001, W008, W013, and W014 contain existing structures within proposed rebuild areas. Wetlands W001C, W002C, W003, and W009 contain forested wetland acreage within the proposed rebuild/new ROW areas. All of the identified wetland areas appear to be jurisdictional. Total wetland area identified within the proposed project areas is 18.13 acres. Total forested wetland is 0.92 acres. Fourteen existing transmission line structures occur within delineated wetland boundaries (Table 3-6). No new structures would be placed in wetlands within the proposed new transmission line ROW. No wetlands were identified along the reviewed access roads, other than those wetland areas delineated within the existing and proposed transmission line corridors where potential access for structure replacement/installation may take place.

3.8. Floodplains

As a federal agency, TVA is subject to the requirements of EO 11988 (Floodplain Management). The objective of EO 11988 is "…to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative" (U.S. Water Resource Council 1978). The EO is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances. The EO requires that agencies avoid the 100-year floodplain unless it is the only practicable alternative.

West Columbus-SeverCorr-Catalpa Creek and SeverCorr Switching Station

The proposed West Columbus-SeverCorr and SeverCorr-Catalpa Creek line segments and access roads cross the 100-year floodplain of an unnamed tributary to Mayo Slough and Motley Slough, respectively, in Lowndes County.

Tap to Stinson Creek and Columbus AFB-West Columbus
The existing transmission line and some of the associated access roads cross the identified 100-year floodplain. The proposed tap would not be located within the 100-year floodplain of the Tombigbee River, along with other floodplain areas in Lowndes County, Mississippi.

West Columbus Switching Station and Associated Transmission Lines
The proposed switching station is not within the identified 100-year floodplain. The transmission lines and some access roads cross the identified 100-year floodplains of the Tombigbee River and Oak Slush Creek, along with other floodplain areas in Lowndes County.

3.9. Prime Farmland

Prime farmland soils, as defined by the USDA, are those soils with the best combination of physical and chemical properties for production of agricultural crops. The concern that continued conversion of prime farmland to nonagricultural use would deplete the nation's resource of productive farmland prompted creation of the 1981 Federal Farmland Protection Policy Act. This act set guidelines that require all federal agencies to identify prime farmland proposed to be converted to nonagricultural land use and evaluate the impact of the conversion.

Prime farmland soils are not present on either the 1.15 acre proposed SeverCorr Switching Station site or the 19.8-acre proposed West Columbus Switching Station site (Brent 1979). The proposed new transmission lines and transmission lines to be rebuilt do cross prime farmland.

3.10. Visual Resources

Visual resources are evaluated based on existing landscape character, distances of available views, levels of constituent sensitivity from viewing positions, human perceptions of landscape beauty/sense of place (scenic attractiveness), and the degree of visual unity and wholeness of the natural landscape in the course of human alteration (scenic integrity).

West Columbus-SeverCorr Transmission Line and SeverCorr Switching Station
The existing landscape character is predominantly rural/light industrial within the area of the proposed action. Agricultural fields are interspersed with forests and pine plantations in the area. Motorists traveling Artesia Road have foreground views of existing transmission line structures, light industrial facilities, a railroad line, and few private residences. Employees at businesses located along Industrial Park Road and motorists traveling the two-lane roadway connecting Airport Road with Artesia Road have similar views. Industrial operations appear to increase in frequency to the north and approaching Airport Road.

Scenic attractiveness within the area is common, and the scenic integrity is moderate to low.

SeverCorr-Catalpa Creek Transmission Line
The existing landscape character surrounding the proposed tap line is light industrial and pastoral. There are few private residences in the vicinity. Topography is gently sloping to flat. Vegetation patterns include mowed areas and agricultural fields. There are four secondary/tertiary roadways in the vicinity that experience moderate to low traffic. The

Golden Triangle Regional Airport lies to the south and west. Presently, Airport Road is under construction to improve traffic flow to the airport and adjacent industrial parks. There are existing transmission and distribution lines visible from positions within the foreground (0 feet up to 0.5 mile from the observer) viewing distance.

Scenic attractiveness within the area is common, and the scenic integrity is moderate to low.

Tap to Stinson Creek

The existing landscape character near the proposed Stinson Creek Tap is suburban/rural residential. Bottomland forest lies to the west approaching the Tennessee-Tombigbee Waterway. Stinson Creek Road, a tertiary travel way connecting SR 373 with a USACE developed recreation area and sparsely populated residential areas, lies to the north. Jess Lyons Road is east of the proposed tap location and serves as a secondary connector between SR 373 and US 45. The surrounding topography is gently sloping, and vegetation patterns range from existing ROW to forest. Viewing positions exist primarily along the three roadways that intersect near the tap location within the foreground (0 feet up to 0.5 mile from the observer) viewing distance. The existing transmission line is not readily visible to motorists due to existing vegetation.

Scenic attractiveness within the area is common, and the scenic integrity is moderate to low.

Columbus AFB-West Columbus Transmission Line

The existing landscape character ranges from commercial/light industrial near the northern portion of the proposed rebuild to light commercial/rural residential near the portions of the proposed rebuild located along SR 373 south to uninhabitable lowland areas surrounding the Tennessee-Tombigbee Waterway. The existing 46-kV structures are visible from residences and businesses near the ROW and from positions along roadways in the vicinity.

Topography is generally moderately sloping to flat. Vegetation along the proposed ROW ranges from mowed areas to mature forest near the Tennessee-Tombigbee Waterway. The waterway is visible from several positions along the ROW. The existing 46-kV line crosses the reservoir just downstream of Columbus Lock and Dam.

Scenic attractiveness ranges from common to minimal, and scenic integrity is moderate to low.

West Columbus Switching Station and Associated Transmission Lines

The existing landscape character within the vicinity of the proposed action is predominantly rural, with areas of light commercial activity surrounding the intersection of US 45 and US 82. Vegetation patterns include mowed areas, agricultural fields, and forest. Topography within the area is gently sloping. The existing West Point-Columbus transmission lines are visible from within the foreground viewing distance to motorists traveling Old West Point Road, Plymouth Bluff Access Road, US 82, Old US 82, and US 45. There are few private residences near the proposed ROW. However, traffic in the vicinity is moderate to heavy, with approximately 15,000 vehicles per day passing the US 82 transmission line crossing and approximately 8,400 vehicles per day passing the US 45 transmission line crossing (Mississippi Department of Transportation 2005).

Scenic attractiveness within the area is common, and the scenic integrity is moderate.

3.11. Recreation, Parks, and Natural Areas

West Columbus-SeverCorr Transmission Line and SeverCorr Switching Station
No managed areas and/or ecologically significant sites, Nationwide Rivers Inventory (NRI) streams, or Wild and Scenic Rivers are within 3 miles of this portion of the proposed transmission line and switching station site.

SeverCorr-Catalpa Creek Transmission Line
No managed areas and/or ecologically significant sites, NRI streams, or Wild and Scenic Rivers are within 3 miles of this portion of the proposed transmission line.

Tap to Stinson Creek
The 161-kV Tap to Stinson Creek Substation is 1.5 miles southeast of DeWayne Hayes Recreation Area, 2.1 miles east of the Tennessee-Tombigbee Waterway, 2.3 miles south of Columbus Military Reservation, and 2.6 miles northeast of Waverly Ferry Recreation Area. (See Columbus AFB-West Columbus above (Section 3.11) for descriptions of other areas.)

No NRI streams or Wild and Scenic Rivers are within 3 miles of this portion of the proposed transmission line.

Columbus AFB-West Columbus Transmission Line
This 5.9-mile segment of transmission line crosses the Tennessee-Tombigbee Waterway between structures 9 and 10 (Figure 2-5). The Tennessee-Tombigbee Waterway, built and managed by USACE, connects the Tennessee and Tombigbee rivers and provides a shorter alternative navigational route to the Gulf of Mexico. In addition to its navigational purpose, the waterway offers many opportunities for economic development and outdoor recreation including boating, swimming, camping, hunting, and fishing.

The transmission line crosses Plymouth Bluff Nature and Cultural Study Center, one of two environmental centers along the Tennessee-Tombigbee Waterway. Plymouth Bluff Center is a 190-acre riverfront facility that is owned by the USACE and leased to Mississippi University for Women for operation and maintenance. The center's features include a conference center; guest rooms; nature and fitness trails; and a Cretaceous fossil bed, a unique geological feature of the area. The center is open to the public. Although the transmission line crosses the center's property, it is approximately 1.0 mile south of the center's facilities and the fossil bed on Plymouth Bluff.

A Tennessee-Tombigbee Waterway recreation area, Stennis East Bank/West Bank Recreation Area (formerly Columbus Recreation Area), is adjacent to John C. Stennis Lock and Dam and is approximately 0.2 mile north of the transmission line at the Tennessee-Tombigbee crossing. Operated by USACE, the area has facilities for boating, fishing, fish cleaning, multiuse courts, a walking track, play areas, amphitheater, and large covered shelters. Access to Stennis West Bank is limited; facilities include a fishing dock.

The transmission line in the area between structures 32 and 35 crosses Tennessee-Tombigbee's Columbus Lake. The largest of the 10 impoundments along the Tennessee-Tombigbee Waterway, Columbus Lake is approximately 23 miles long and covers over

8,900 acres. It is a popular fishing lake, and national fishing tournaments are hosted on the lake. Hunting of deer and waterfowl is allowed in certain areas.

Three additional Tennessee-Tombigbee Waterway recreation areas are within 3 miles of the transmission line at either structure 43 (the north end of the 4.6-mile tear-down, rebuild section), structures 75-78 (replacement of structures to bring to 161-kV capability), or structures 107-108 (placement of a dead-end structure at Columbus AFB). These include the following facilities:

- Waverly Ferry Recreation Area, on the west bank of the Tennessee-Tombigbee, is approximately 2.6 miles west of the transmission line at structure 43 and at structures 75-78. Managed by USACE, its facilities include a boat ramp, play area, covered shelters, and restrooms.
- DeWayne Hayes Recreation Area on the east bank of the Tennessee-Tombigbee is a 100-acre park approximately 0.9 mile west of the transmission line at structure 95. Managed by USACE, its facilities include class A campsites with amenities (bathhouses and toilets), boat ramps, fishing access and fish cleaning station, multiuse courts, play areas, and trails.
- Town Creek Recreation Area on the banks of the old Tombigbee River is a 27-acre park and offers both class A and primitive campsites. Kennedy Lake, on site, is used for fishing, swimming, and boating. A nature trail circles the lake. This recreation area is approximately 2.7 miles west of the transmission line.

The north end of the transmission line is adjacent to the Columbus Military Reservation, home of the Columbus AFB, 14th Flying Training Wing of the Air Education and Training Command. Managed by the U.S. Air Force, the reservation covers over 6,000 acres and is 5 miles north of the city of Columbus in Lowndes County.

One NRI stream, Buttahatchee River, is approximately 3 miles north of the transmission line. Buttahatchee River, from River Mile 0 at the confluence with Tombigbee River to River Mile 40 at the Alabama state line, is recognized by the National Park Service for its scenic, recreational, geologic, fish and wildlife, historic, and cultural values. This segment of the river also is a designated critical habitat for several mussel species (Section 3.6.1).

West Columbus Switching Station and Associated Transmission Lines

The access roads and transmission lines north of the West Columbus Switching Station are 0.5 mile west of Plymouth Bluff Center, 1.3 miles southwest of Stennis East Bank/West Bank Recreation Area, and 1.8 miles south of Columbus Lake. The proposed 19.8-acre site of the West Columbus Switching Station is approximately 2.4 miles west of the Tennessee-Tombigbee Waterway. The access roads and transmission lines south of the West Columbus Switching Station are approximately 2.9 miles west of Luxapalila Creek Recreation Area. This 310-acre tract along the Tennessee-Tombigbee Waterway at River Mile 329 and Luxapalila Creek is managed by USACE; a boat ramp and picnic shelters are features. (See Columbus AFB-West Columbus Transmission Line (Section 3.11.) for descriptions of other areas.)

No NRI streams or Wild and Scenic Rivers are within 3 miles of this portion of the proposed work.

3.12. Cultural Resources

Central Mississippi has been the location of human occupation for over 12,000 years. The prehistory and history of the area is generally divided into six broad periods: Paleo-Indian (11,000 to 8000 B.C.); Archaic (8000 to 1600 B.C.); Woodland (1600 B.C. to A.D. 1000); Mississippian (A.D. 1000 to 1700); and Historic (A.D. 1700 to present). Prehistoric land use and settlement varies during each period, but generally, short- and long-term habitation sites are located on floodplains and alluvial terraces along rivers and tributaries. Specialized campsites tend to be located on older alluvial terraces and in the uplands.

The Historic Period is represented by settlement in the region by Europeans, European Americans, and African Americans and the subsequent removal of Native American tribes. The dominant tribes in the area in this period were the Chickasaw, Choctaw, and the Natchez. It is generally believed that deSoto's expedition entered the area and stayed with the Chickasaw in the winter of 1540-41. Later excursions into the area by French, Spanish, and English traders, and explorers occurred during the 17th and 18th centuries. Clashes between the native Choctaw and Chickasaw and Europeans continued through the 18th century. The Mississippi territory was created in 1798 and was admitted into statehood in 1817. In 1830, Lowndes County was created from the southern part of Monroe County, and Clay County was formed in 1871 from part of Lowndes and other surrounding counties.

TVA has identified the area of potential effect (APE) for archaeological resources to be approximately 16 miles of transmission line ROW (about 187 acres), 26 acres for the associated switching stations and 20 access roads where ground-disturbing activities would take place.

The APE for historic architectural resources included all areas within view of the proposed facilities plus an approximately 0.5-mile radius in which proposed construction may lie within view of historic resources. Viewsheds to and from the project area were terminated where topography and vegetation obstructed lines of sight.

A background search was conducted and identified two archaeological resources (22LO564 and 22LO993) and three historic/architectural resources (5030, 5031, and 5032) previously recorded within the proposed APE. Archaeological resources 22LO564 and 22LO993 are both open habitations that are considered ineligible for listing in the National Register of Historic Places (NRHP). Historic/architectural resources 5031 and 5032 have been destroyed since their initial recordation. Resource 5030 is considered ineligible for listing in the NRHP due to lack of architectural distinction and loss of integrity caused by modern alterations.

The archaeological surveys (D'Angelo 2007, 2005) identified four previously unrecorded archaeological resources (AR1, AR2, AR3, and AR4) within the APE. AR1 through AR4 are all lithic scatters and are considered ineligible for listing in the NRHP. One cemetery, located along the 0.23-mile Tap to Stinson Creek, contains several marked and unmarked graves. The transmission line would span the cemetery and have no structures situated on it.

The historic/architectural survey (ibid) identified five previously unrecorded historic resources, all of which are residential structures (HS-1 through HS-5), within the proposed APE. Historic resources HS-1 through HS-5 are considered ineligible for listing in the NRHP due to lack of architectural distinction and loss of integrity caused by modern alterations.

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CHAPTER 4

4.0 ENVIRONMENTAL CONSEQUENCES

Introduction

The potential effects of the No Action Alternative and the Action Alternative on the various resources described in Chapter 3 are provided in this chapter, which is organized similarly to Chapter 3. Under the No Action Alternative, TVA would continue to operate and maintain the existing transmission lines. The lines would be operated with a high-risk level of interruption in certain situations. The local distributor or other entities would likely have to address the power supply problems eventually, which could result in impacts similar to or greater than those described below for the Action Alternative depending on what actions they take.

4.1. Groundwater

4.1.1. *Alternative 1 – No Action*

Under the No Action Alternative, the proposed transmission lines and switching stations would not be constructed, and there would be no effects to groundwater resources or geological features. No additional effects to these resources are expected.

4.1.2. *Alternative 2 – The Action Alternative*

Portions of the existing and proposed ROW are located within State Designated Source Water Protection Areas for public water supply. However, the entire project area is underlain by the Selma Group, which acts as a confining unit by separating the surface area from the aquifers below. This confining unit would provide adequate protection from potential groundwater contamination. Best management practices (BMPs) would be used during construction to minimize potential sediment infiltration (Muncy 1999). During revegetation and maintenance activities, use of fertilizers and herbicides would be applied according to the manufacturers' labels. Herbicides with groundwater contamination warnings would not be used in the entire project area due to extensive groundwater use in the area. With the use of BMPs, impacts to groundwater from the proposed action would be insignificant.

4.2. Surface Water

4.2.1. *Alternative 1 – No Action*

Under the No Action Alternative, TVA would not undertake the proposed action. Thus, there would be no effects to surface water quality because there would be no change from the current situation. For similar reasons, no additional or cumulative effects to surface waters are expected from implementing the No Action Alternative.

4.2.2. *Alternative 2 – The Action Alternative*

Soil disturbances associated with access roads, ROW clearing, switching station site grading, and other construction activities can potentially result in adverse water quality impacts. Stream bank erosion and sedimentation can clog small streams, increase nutrient inflows, and threaten aquatic life. Removal of the tree canopy along stream crossings can increase water temperatures, algal growth, dissolved oxygen depletion, and adverse impacts to aquatic biota. Improper use of herbicides to control vegetation can result in runoff to streams and subsequent aquatic impacts.

However, TVA routinely includes precautions in the design, construction, and maintenance of its transmission lines and switching stations to minimize these potential impacts. Permanent stream crossings would be designed not to impede runoff patterns and the natural movement of aquatic fauna. Temporary stream crossings and other construction and maintenance activities would comply with appropriate state permit requirements and TVA requirements as described in Muncy (1999). Canopies in all SMZs would be left undisturbed unless there were no practicable alternative. ROW maintenance would employ manual and low-impact methods wherever possible. In areas requiring chemical treatment, only USEPA-registered herbicides would be used in accordance with label directions, designed in part to restrict applications near receiving waters and to prevent unacceptable aquatic impacts. Proper implementation of these controls is expected to result in only minor temporary impacts to surface waters. No cumulative impacts are anticipated.

4.3. Aquatic Ecology

4.3.1. *Alternative 1 – No Action*

Under the No Action Alternative, TVA would not undertake the proposed transmission system construction activities; therefore, the current condition of aquatic resources within these areas would not be changed.

4.3.2. *Alternative 2 – The Action Alternative*

The proposed actions could affect aquatic life either directly by alteration of habitat conditions within streams or indirectly due to modification of the riparian zone and storm water runoff resulting from construction and maintenance activities. Potential impacts due to removal of streamside vegetation within the riparian zone include increased erosion and siltation, increased stream temperatures, and loss of instream habitat. Other potential construction and maintenance impacts include alteration of stream banks and stream bottoms by heavy equipment and runoff of herbicides into streams. Siltation has a detrimental effect on many aquatic animals (including fish and mussels) adapted to riverine environments. Water cloudiness, also known as turbidity, caused by suspended sediment can negatively impact spawning and feeding of many fish species (Sutherland et al. 2002). Mussel species adapted to a sand-and-gravel bottom environment cannot survive in one composed of fine sediment and are quickly destroyed by silt that clogs the gills, thereby smothering the animal (Parmalee and Bogan 1998).

In order to minimize potential impacts to aquatic life, BMPs as outlined in Muncy (1999) would be applied to all construction and maintenance activities. Additionally, all watercourses identified during the field surveys were assigned a category of protection level

In order to minimize potential impacts to aquatic life, BMPs as outlined in Muncy (1999) would be applied to all construction and maintenance activities. Additionally, all watercourses identified during the field surveys were assigned a category of protection level that depending on the category could warrant additional protection measures as defined in Appendix D and Muncy (1999). The width of the SMZs is determined by the type of watercourse, primary use of the water resource, topography, or other physical barriers (ibid). SMZ width is measured along the slope in linear feet on each side from the edge of the water body to the toe of the road or other surface disturbance. Regardless of width, the SMZ must provide effective sediment protection for the watercourse (ibid). Category A - Standard Stream Protection measures would be applied to all perennial and intermittent streams and ponds (ibid). This category of protection is based on the variety of species and habitats that exist in the streams as well as the state and federal requirements to avoid harming certain species (Appendix D). Appendix F lists the various streams that would be crossed by the proposed transmission lines and protective measures that would be used at each crossing.

Watercourses that convey only surface water during storm events (i.e., wet-weather conveyances) and that could be affected by the proposed project would be protected by standard BMPs as identified in Muncy (1999). These BMPs are designed in part to minimize disturbance of riparian areas, and subsequent erosion and sedimentation that can be carried to streams. Wet-weather conveyances are included on transmission line design drawings, and protection of these areas is addressed through the storm water permitting process.

With respect to the watercourses within the proposed project area, with proper implementation of the appropriate stream protection requirements and the use of standard BMPs as outlined in Muncy (1999), all potential direct, indirect, or cumulative impacts to aquatic communities or habitat as a result of the construction, operation, and maintenance of the proposed actions would be insignificant.

4.4. Vegetation

4.4.1. *Alternative 1 – No Action*

Under the No Action Alternative, plant communities would experience change over time resulting from numerous natural and anthropogenic factors. Driving factors causing changes in plant communities include human population dynamics, changes in land use patterns, and natural processes like succession. If the project did not occur and no other development or disturbance took place, the Black Belt Prairie remnant located on the West Columbus Switching Station site would experience a slow shift toward increased dominance by woody vegetation. In addition, adoption of the No Action Alternative would allow the Chinese tallow tree populations to remain in the ROW. Routine transmission line maintenance with herbicides may remove some trees, but it would not eliminate all of the trees. Mechanical removal alone would cause prolific root sprouting thereby increasing the number of Chinese tallow tree stems on site. Allowing the plants to remain would contribute to an increase in the extent and severity of Chinese tallow tree beyond its known range. The populations of Chinese tallow tree observed along the Columbus AFB-West Columbus ROW are north of the documented range of the species (USDA 2007).

4.4.2. *Alternative 2 – The Action Alternative*

Adoption of the Action Alternative would not result in significant impacts to terrestrial communities. Actions under this alternative would result in upgrades of existing structures and transmission lines as well as vegetation clearing for new transmission lines and switching stations. The work on existing infrastructure would occur in areas heavily disturbed by previous ROW construction and maintenance that do not contain rare or intact plant communities. Areas requiring construction of new infrastructure contain both disturbed and relatively undisturbed sites, but nearly all these communities are common and well represented throughout the region. The Black Belt Prairie located on the West Columbus Switching Station site is an exception and is an example of a rare plant community. Implementation of mitigation measures discussed in section 4.4.3 would reduce impacts to the globally rare Black Belt Prairie plant community.

The proposed construction activities on the Columbus AFB-West Columbus line segment have the potential to contribute to the spread of Chinese tallow tree by producing more open, disturbed habitat favorable for establishment of nonnative species. Revegetation with noninvasive species using approved TVA methods (Muncy 1999) and implementation of the commitment to remove Chinese tallow trees in the Columbus AFB-West Columbus project area would minimize the potential impacts caused by the spread of invasive exotic plant species. TVA would eradicate Chinese tallow trees in the ROW using herbicides because mechanical removal alone would cause prolific root sprouting, thereby increasing the number of tallow tree stems on site. Project-related impacts would be insignificant.

4.4.3. *Mitigation Measures*

Grading activities within the Black Belt Prairie portion of the West Columbus Switching Station site would be limited to a small area (approximately 500 square feet) along the northwest side of the 2.8-acre prairie community. The graded area would be less than 0.5 percent of the total prairie community area. During construction, vegetation management would be accomplished through mechanical clearing; no herbicides would be used. Clearing of woody vegetation would be accomplished by using a feller-buncher or other low ground-pressure equipment No future construction that would appreciably alter the plant community would take place within the Black Belt Prairie; these activities include excavating large areas, road building, placing fill material on the site, storing building or other materials on site, grading the site, or otherwise damaging the community by disturbing the soil profile. If small areas within the prairie boundary need to be revegetated, only annual rye and brown top millet would be used. This information would be included on the switching station and transmission line final design drawings.

Chinese tallow trees have been flagged between existing structures 11 and 12 and on the edge of the ROW near structures 31 and 32 (Figure 2-5) and would be eradicated from the proposed project area using a one time herbicide application approximately 2 weeks prior to any clearing activities in these areas. Effective controls would be accomplished by using herbicides such as trilogy, imazapyr, or hexazinone. In addition to foliar application, herbicides would be applied to cut stems or injected into the bark.

Cumulative Impacts
Cumulative impacts to the Black Belt Prairie and populations of white heath aster are expected to be negligible or potentially beneficial because of the mitigation measures by TVA to protect the site. Black Belt Prairie remnants are becoming increasingly rare due to

agricultural activities and fire suppression (NatureServe 2007). The mitigation measures prohibiting activities that appreciably alter the plant community would act to minimize potential impacts to the site. Clearing trees that currently occur on the site using minimally damaging methods would increase habitat for prairie vegetation allowing the white heath aster (Section 4.4.3.) and other prairie plants to expand into the cleared area.

Converting forestland to managed ROW for construction of the proposed transmission line would be long term in duration but insignificant when compared to the amount of forested land in the region. Completion of the project, as currently proposed, would result in clearing of about 23.4 acres of forest. As of 1994, it is estimated that Lowndes and the four adjacent Mississippi counties (Clay, Monroe, Noxubee, and Oktibbeha) had over 1,000,000 acres of forested land (U.S. Forest Service 2004).

4.5. Wildlife

4.5.1. *Alternative 1 – No Action*

Under the No Action Alternative, the proposed transmission line and switching station construction activities would not occur, and the project area would likely continue in its current condition. Therefore, adoption of the No Acton Alternative is not expected to result in project-related impacts to wildlife populations or habitats in the project area.

4.5.2. *Alternative 2 – The Action Alternative*

Under the Action Alternative, several transmission lines and switching stations would be constructed, or rebuilt. The existing habitats in the project area are common, heavily disturbed by agricultural practices and development, and similar to the surrounding landscape. The proposed new transmission lines at West Columbus-SeverCorr-Catalpa Creek and the Tap to Stinson would convert approximately 19 acres of forested habitat to maintained, early successional habitats in ROWs. The proposed switching station sites would require the clearing of approximately 4 acres of forested habitat. The proposed upgrades for the existing Columbus AFB-West Columbus line and the existing transmission lines associated with the West Columbus Switching Station would not change any habitat types, and these areas would continue to be maintained as early successional habitats. Wildlife observed in the project area is also considered common, both locally and regionally. Wildlife currently using the project area would be displaced during construction activities, but would not be significantly impacted, as individuals would be able to move into the abundant similar habitats in the surrounding landscape.

One heron colony has been recorded within 3 miles of the Columbus AFB-West Columbus line segment, but no other heron colonies, caves, or other unique terrestrial habitats were found in the project area during field investigations. The heron colony known from the vicinity is at such a distance away (0.33 mile) from the project area that it would not be affected by the proposed actions under this alternative.

Cumulative Impacts

The proposed project would clear or convert approximately 23 acres of forested habitat to early successional habitats. However, overall habitat changes would be minimal, as existing habitats along the proposed transmission line routes are largely fragmented and heavily impacted by agricultural practices. Further fragmentation of these habitats would

not be exceptional. This alternative is not expected to have significant cumulative effects on terrestrial wildlife or their habitats.

4.6. Endangered and Threatened Species

4.6.1. *Alternative 1 – No Action*

Under the No Action Alternative, TVA would not undertake the proposed actions to address electric power needs, and no impacts to endangered and threatened species resulting from the Action Alternative would occur. The status and conservation of the potentially affected listed species would continue to be determined by the actions of others. Changes to the area would nonetheless occur over time, as factors such as population trends, land use and development, quality of air/water/soil, recreational patterns, and cultural, ecological, and educational interests change within the area.

If no project-related activities occurred and no other development or disturbance took place, populations of Ohio buckeye would persist in their current condition for the foreseeable future. Similarly, populations of white heath aster would persist for long periods, but eventual declines would occur as shading resulting from woody species invasion increased.

4.6.2. *Alternative 2 – The Action Alternative*

Implementation of the Action Alternative would not affect any federally listed species or critical habitat; however, one state-listed plant species would be affected. Potential impacts are described below for aquatic animals, terrestrial plants, and terrestrial animals.

4.6.2.1. Aquatic Animals

The federally listed Alabama moccasinshell, orange-nacre mucket, ovate clubshell, southern clubshell, and southern combshell are known to occur in the Buttahatchee River and Luxapallila Creek in Lowndes County, Mississippi. However, the proposed switching stations, new transmission lines, and the existing transmission lines to be upgraded are not located within these watersheds. No federally listed or state-listed aquatic species are located in the McCower's Creek watershed associated with the proposed West Columbus-SeverCorr-Catalpa Creek line segments. Therefore, no direct, indirect, or cumulative impacts to listed aquatic species present in these watersheds are expected because of the transmission line and switching station construction, operation, or maintenance.

The state-listed striped bass, blue sucker, black redhorse, frecklebelly madtom, and fluvial shiner are present in the Tombigbee watershed (Tombigbee River and Columbus Lake) in Lowndes County, Mississippi. Transmission construction activities would occur within these watersheds. Soil-disturbing activities and removal of riparian vegetation adjacent to these water bodies have potential to cause direct and indirect effects to populations of these species. With proper implementation of appropriate stream protection requirements and use of BMPs, there would be only minimal, temporary adverse effects to state-listed aquatic species because of the transmission line construction, operation, or maintenance.

Cumulative Impacts

All construction and maintenance activities associated with these transmission lines and switching stations would be conducted according to BMPs as outlined in Muncy (1999). Potential impacts to surface water quality would be minor and temporary. No permanent

changes to instream habitat, aquatic communities, or listed species would occur, and no cumulative impacts to these resources are expected to result from these activities.

4.6.2.2. Plants

The state-listed Ohio buckeye occurs in four sections of the project area including Columbus AFB-West Columbus line segment, West Columbus Switching Station, West Columbus-SeverCorr line segment, and SeverCorr-Catalpa Creek line segment. Over 400 new individual trees were observed during field surveys of the project area. Eight trees would be impacted during new construction activities. Approximately 100 Ohio buckeye trees would be impacted as a result of transmission line upgrades and maintenance. These trees would be removed from existing ROW because, as a safely precaution, TVA requires a 25-foot clearance between the tallest vegetation and the lowest sag of a 161-kV transmission line (Section 2.3.3.2.). The trees grow too tall (30 to 50 feet) to remain in the existing ROW. Even though this species is considered imperiled in Mississippi, at least 1,500 individuals are known to occur in the state in 18 different locations. These include unrecorded populations discovered in the area surrounding the SeverCorr steel mill in the past two years. Due to the number of populations found in Mississippi, the viability of the species in the project area and the state would not be adversely affected by the proposed action.

One previously unreported population of the state-listed white heath aster was observed in the Black Belt Prairie remnant adjacent to the West Columbus Switching Station site that would be purchased by TVA. The white heath aster occurs within the Black Belt Prairie remnant that would be protected by mitigation measures described in Section 4.4.3. Consequently, this species would not be adversely impacted and overall impacts on it could be beneficial.

Cumulative Impacts

Cumulative impacts to the state-listed Ohio buckeye would not be significant because new populations observed during past and recent surveys for this project and the West Point-SeverCorr 161-kV Transmission Line indicate that the species is not as rare as previously thought. Approximately 100 trees would be removed under the Action Alternative. In 2006, approximately 1,200 individual trees were removed during construction activities for the West Point-SeverCorr 161-kV Transmission Line project (TVA 2006). Although numerous trees were lost because of the previous construction activities, the number of trees known from Mississippi would still be greater after completion of this project than before initiation of West Point-SeverCorr 161-kV Transmission Line project because of the discovery of unrecorded trees. Only 10 populations with approximately 250 individual trees were known from Mississippi prior to the discovery of Ohio buckeye populations numbering over 2,000 individual trees in 2006 (TVA 2006),. Currently, after implementation of the Action Alternative, 18 occurrences and about 1,500 individual trees would be known to occur in Mississippi.

Cumulative impacts to populations of white heath aster are expected to be negligible or potentially beneficial because of TVA's planned mitigation measures to protect the Black Belt Prairie at the West Columbus Switching Station site. Black Belt Prairie remnants are becoming increasingly rare due to agricultural activities and fire suppression (NatureServe 2007), and white heath aster is largely confined to this and similar habitats in Mississippi. The previously unrecorded occurrence of white heath aster would be protected by mitigation measures described in Section 4.4.3. Planned protective measures would allow

the plants to continue living and may increase habitat for prairie vegetation allowing population of white heath aster and other prairie plants to expand into the cleared area.

4.6.2.3. Terrestrial Animals

All current and past bald eagle nest locations are 0.6 mile away or greater from the locations of the proposed activities, and none of the proposed actions would affect these nest sites.

Although suitable bald eagle habitat exists in forested habitat surrounding two sections of the existing Columbus AFB-West Columbus line segment, no bald eagle individuals or nests were found in these areas during field investigations June 27 and 28, 2007. The USACE surveys this area annually, and bald eagles are not known from either of these sites. Because the proposed rebuilding activities are minimal and would be contained within the existing ROW, there would be minimal to no disturbance of the surrounding forest, and the proposed rebuild activities on the Columbus AFB-West Columbus Transmission Line would not affect this suitable habitat or bald eagles in general.

Although suitable habitat for the state-listed black-knobbed map turtle exists where the Tombigbee River crosses the Columbus AFB-West Columbus line segment, no individuals were observed during field investigations. The proposed rebuild of this transmission line would not affect this habitat, and no project-related activities would affect this species or its habitat. The proposed project would not directly, indirectly, or cumulatively affect these or any other federally or state-listed terrestrial animal species or their habitats.

4.7. Wetlands

Activities in wetlands are regulated under Section 404 and Section 401 of the Clean Water Act and addressed by EO 11990. Section 404 requires certain activities in jurisdictional wetlands be authorized by the USACE and this is done through a Nationwide General Permit or Individual Permit issued. Section 401 requires water quality certification by the state for certain projects permitted by the federal government (Strand 1997). EO 11990 requires agencies to minimize wetland destruction, loss, or degradation, and preserve and enhance natural and beneficial wetland values, while carrying out agency responsibilities. TVARAM is used as an aid in guiding wetland mitigation decisions consistent with TVA's independent responsibilities under the National Environmental Policy Act (NEPA) and EO 11990.

4.7.1. *Alternative 1 – No Action*

Under the No Action Alternative, no disturbance to wetlands within the proposed transmission line ROW or switching station construction sites would occur. Therefore, no wetlands would be affected. TVA would continue to maintain vegetation in existing ROWs, and BMPs would be used for all maintenance activities to ensure that wetland impacts are temporary and insignificant.

4.7.2. *Alternative 2 – The Action Alternative*

The proposed switching station construction and transmission line construction and rebuild project would have impacts on wetland areas. Anticipated wetland impacts could result from the following actions: (1) the conversion of 0.92 acre of forested wetland in W001C, W002C, W003, and W009 to a scrub-shrub wetland; (2) accessing structures located in

wetlands W001, W008, W013, W014, and RW001 for upgrade activities; and (3) long-term maintenance of the new and rebuilt transmission lines. Because the forested wetland acreage proposed for clearing is all part of much larger forested wetland complexes, the functions these larger wetland areas provide would be maintained sufficiently post conversion. Potential impacts resulting from access across wetlands during the proposed transmission line construction/rebuild would be minimized sufficiently by following BMPs (Muncy 1999). No new structures would be placed in wetlands during the proposed new transmission line construction. Similarly, BMPs would be used for all transmission line maintenance activities to ensure that wetland impacts are temporary and insignificant. The trees in the forested wetlands would be cut and removed by a feller-buncher, and downed trees would not remain in the forested wetland areas. Therefore, the conversion of 0.92 acre of forested wetland (0.73-acre TVARAM Category 3 and 0.19-acre TVARAM Category 2) to emergent/scrub-shrub and the use of BMPs to minimize impacts associated with construction, vehicular access, and long-term maintenance, collectively, help ensure that potential impacts to the wetland areas within the project sites are insignificant.

4.8. Floodplains

4.8.1. *Alternative 1 – No Action*

Under the No Action Alternative, the proposed transmission line and switching stations would not be constructed. Therefore, no floodplains or their functions would be affected under this alternative.

4.8.2. *Alternative 2 – The Action Alternative*

West Columbus-SeverCorr and SeverCorr-Catalpa Creek Transmission Lines
The proposed transmission line segments cross a floodplain area in Lowndes County, Mississippi. Consistent with EO 11988, an overhead transmission line and related support structures are considered a repetitive action in the 100-year floodplain. The construction of the support structures for the power line are not expected to result in any increase in flood hazard, either as a result of increased flood elevations or changes in flow-carrying capacity of the streams being crossed. To minimize adverse impacts on natural and beneficial floodplain values, the ROW would be revegetated where natural vegetation is removed. BMPs would be used during construction activities.

Some of the access roads would involve construction in the 100-year floodplain. Consistent with EO 11988, a road is considered a repetitive action in the 100-year floodplain. To minimize adverse impacts, any road construction in the 100-year floodplain would be done in such a manner that upstream flood elevations would not be increased.

Tap to Stinson Creek and Columbus AFB-West Columbus Transmission Line
The proposed Tap to Stinson Creek would not involve construction within the 100-year floodplain, which would be consistent with EO 11988.

The Columbus AFB-West Columbus Transmission Line crosses several floodplain areas in Lowndes County, Mississippi. Consistent with EO 11988, an overhead transmission line and related support structures are considered a repetitive action in the 100-year floodplain. The construction of the support structures for the transmission line is not expected to result in any increase in flood hazard, either because of increased flood elevations or changes in

flow-carrying capacity of the streams crossed. To minimize adverse impacts to natural and beneficial floodplain values, the ROW would be revegetated where vegetation is removed. BMPs would be used during construction activities.

Some of the access roads would involve construction in the 100-year floodplain. Consistent with EO 11988, a road is considered a repetitive action in the 100-year floodplain. To minimize adverse impacts, any road construction in the 100-year floodplain would be done in such a manner that upstream flood elevations would not be increased. Portions of access roads AR3, 4, 5, 6, 9, and 10 are located within the Tombigbee River 100-year floodway. To prevent an obstruction in the 100-year floodway and possible unacceptable increases in flood elevations, any fill, gravel, or other modifications would be removed after construction of the project, and the roads would be returned to their preconstruction conditions.

West Columbus Switching Station and Associated Transmission Lines

The proposed West Columbus Switching Station would not be located within the 100-year floodplain, which would be consistent with EO 11988. The associated transmission lines cross several floodplain areas in Lowndes County, Mississippi. Consistent with EO 11988, an overhead transmission line and related support structures are considered a repetitive action in the 100-year floodplain. The construction of the support structures for the power line would not be expected to result in any increase in flood hazard, either as a result of increased flood elevations or changes in flow-carrying capacity of the streams being crossed. To minimize adverse impacts on natural and beneficial floodplain values, the ROW would be revegetated where natural vegetation is removed, and the removal of unique vegetation would be avoided. BMPs would be used during construction activities.

Access roads AR20 and 23 would involve construction in the 100-year floodplain. Consistent with EO 11988, a road is considered a repetitive action in the 100-year floodplain. To minimize adverse impacts, any road construction in the 100-year floodplain would be done in such a manner that upstream flood elevations would not be increased. A portion of access road AR24 is located within the Tombigbee River 100-year floodway. To prevent an obstruction in the 100-year floodway and possible unacceptable increases in flood elevations, any fill, gravel, or other modifications would be removed after construction of the project, and the roads would be returned to their preconstruction conditions.

Cumulative Impacts

There are no anticipated cumulative adverse floodplain impacts resulting from construction of the switching stations and the transmission lines. The SeverCorr and West Columbus Switching Stations would be located outside the 100-year floodplain. Potential adverse floodplain impacts resulting from construction of the transmission line support structures would be minimized, and any road construction in the 100-year floodplain would be done in such a manner that upstream flood elevations would not be increased.

4.9. Prime Farmland

4.9.1. *Alternative 1 – No Action*

Under the No Action Alternative, the new transmission lines, the three switching stations, and upgrades to existing transmission lines would not be constructed and, therefore, no environmental impacts to land use or prime farmland would occur. Changes to these features as well as their management objectives would nonetheless occur over time as

other factors such as population trends, land use and development, quality of air/water/soil, recreation patterns, and cultural, ecological, and educational interests change within the area.

4.9.2. *Alternative 2 – The Action Alternative*

No prime farmland occurs on the SeverCorr or West Columbus Switching Station sites and therefore there would be no permanent conversion of prime farmland to non-farm uses. Prime farmland does occur within the ROWs of the proposed new transmission lines and transmission lines to be upgraded. Although construction activities may result in a short-term disruption of farming activities, no loss of prime farmland or long-term disruption of farming activities would occur.

4.10. Visual Resources

Visual consequences were examined in terms of visual changes between the existing landscape and proposed actions, sensitivity of viewing points available to the public, their viewing distances, and visibility of proposed changes. Scenic integrity indicates the degree of intactness or wholeness of the landscape character. These measures help identify changes in visual character based on commonly held perceptions of landscape beauty and the aesthetic sense of place.

4.10.1. *Alternative 1 – No Action*

Under this alternative, the new transmission lines would not be constructed, switching stations would not be constructed, and the existing transmission lines would not be upgraded. Visual resources would not be affected if the No Action Alternative were adopted. Because the visual character would be unchanged under this alternative, no additional effects to visual quality are anticipated if the No Action Alternative were adopted.

4.10.2. *Alternative 2 – The Action Alternative*

<u>West Columbus-SeverCorr Transmission Line and SeverCorr Switching Station</u>
Under the Action Alternative, TVA would tap the existing transmission line and provide service to the SeverCorr Switching Station located approximately 2 miles to the northwest. Motorists would have foreground views of the proposed transmission line along 100-foot ROW to the south of Artesia Road at the roadway crossing. Views would be brief for those traveling east and west and would occur between structures. The views would remain in context with existing transmission and distribution lines that are presently visible near the industrial park. Views for motorists and employees along Industrial Park Road would be similar to other areas, as the proposed route would parallel the roadway for 1.4 miles before terminating at the SeverCorr Switching Station. Potential effects to visual resources associated with the proposed action would be insignificant.

<u>SeverCorr-Catalpa Creek Transmission Line</u>
Views of the proposed tap line would be available to employees in the industrial park, regional airport visitors, motorists, and a small number of residences. Views of the 161-kV structures, conductors, and associated ROW would remain similar in context with the existing transmission lines presently visible. Motorists traveling Airport Road would have additional views along the ROW to the west; however, these views would be brief. Viewer groups would have discordant views associated with construction of the proposed tap line,

including ROW clearing. These views would be temporary in nature and impacts would be confined to the project area. Impacts to visual resources associated with the proposed action would be insignificant.

Tap to Stinson Creek
Views of the proposed action would generally be available from within the foreground viewing distance to motorists and residents traveling SR 373, Stinson Creek Road, or Jess Lyons Road. The duration of view would be brief and in context with existing distribution lines presently visible. Impacts to visual resources associated with the proposed action would be insignificant.

Columbus AFB-West Columbus Transmission Line
Motorists, residents, and employees of businesses located near the existing transmission line would have foreground (0 feet up to 0.5 mile from the observer) views of construction activity related to the proposed action. Views would include increased equipment and personnel operating within the ROW, construction of access roadways, and the use of temporary material and staging areas. Upon completion, views of the 161-kV structures and ROW would appear similar in context to the existing 46-kV structures and ROW. Impacts to visual resources associated with the proposed action would be insignificant.

West Columbus Switching Station and Associated Transmission Lines
Views of the proposed action would be limited to the positions along primary and secondary roadways previously described. Visually discordant elements that would be visible during the construction phases may include increased equipment and personnel along the existing ROW, the use of material and equipment staging areas, and construction of the switching station and access roads near the transmission line. The construction of a 161-kV switching station would be viewed in context of existing light commercial operations surrounding the intersections of SR 45 and US 82 where existing transmission lines and a distributor substation are presently visible. Impacts to visual resources associated with the proposed action would be insignificant.

4.11. Recreation, Parks, and Natural Areas

4.11.1. *Alternative 1 – No Action*

Under the No Action Alternative, the proposed action would not be undertaken, and no changes would be made. Implementation of the No Action Alternative would result in no effects to managed areas in the proposed project area. Changes to these features as well as their management objectives would nonetheless occur over time as other factors such as population trends, land use and development, quality of air/water/soil, recreational patterns, and cultural, ecological, and educational interests within the area change.

4.11.2. *Alternative 2 – The Action Alternative*

Under this alternative, TVA would implement the proposed work as described in Chapter 2. Of the six portions of the proposed action, only two, Columbus AFB-West Columbus line segment and the West Columbus Switching Station site, have natural areas within 0.5 mile of the project area. Because the Columbus AFB-West Columbus ROW and transmission line are existing, changes in structure height may be more visible, but not be a significant

change. Impacts to nearby natural areas are anticipated during the removal and rebuild phase because of noise and other construction activities near public areas. However, because the construction phase is short-term, impacts would be temporary and insignificant. The West Columbus Switching Station site is within 0.5 mile of Plymouth Bluff Center. The effects of constructing and operating a switching station are sufficiently confined to the immediate area of the switching station site that there would be no impacts on this natural area.

Columbus AFB-West Columbus Transmission Lines

The proposed transmission line would cross USACE land, including Plymouth Bluff Center, the Tennessee-Tombigbee Waterway, and Columbus Lake, on an existing TVA 75-foot ROW. This transmission line would also come within 0.25 mile of Stennis East Bank/West Bank Recreation Area. The proposed work on USACE lands would involve removing the existing 46-kV transmission line and replacing it with a new 161-kV transmission line for 4.8 miles. Wooden structures approximately 75-80 feet tall would be replaced with single steel-pole structures approximately 90 feet tall. Because the ROW and transmission line are existing, changes in structure height may be more visible, but not be a significant change. Impacts to these areas are anticipated during the removal and rebuild phase because of noise and other construction activities within highly used public areas. However, because the construction phase is short-term, and any impacts would be temporary and insignificant. Although property owners have already been contacted about the proposed work, USACE and Mississippi University for Women personnel would be informed of the work schedule prior to beginning the proposed work.

The northernmost section of the Columbus AFB-West Columbus Transmission Line is adjacent to the Columbus Military Reservation. Because this area of the transmission line is not on U.S. Air Force property and is an existing line and ROW, no impacts to the reservation are anticipated.

Buttahatchee River and the other managed areas along this corridor—Waverly Ferry, DeWayne Hayes, and Town Creek recreation areas—would not likely be impacted by the proposed activities because the work is of sufficient distance (1.6 to 3.0 miles) from them.

West Columbus Switching Station

This portion of the proposed project is within 0.5 mile of Plymouth Bluff Center. The nature of the proposed work, building and operating a switching station are sufficiently confined to the immediate area of the switching station site that there would be no impacts on this natural area. Other managed areas near the switching station, Stennis East Bank/West Bank Recreation Area, Columbus Lake, the Tennessee-Tombigbee Waterway, and Luxapalila Creek Recreation Area, would not likely be impacted by the proposed work because the work is of sufficient distance (1.3 to 2.9 miles) from them.

Tap to Stinson Creek

This portion of the proposed project has no natural areas within 0.5 mile of the work. Managed areas within 3 miles of this site include DeWayne Hayes Recreation Area, the Tennessee-Tombigbee Waterway, Columbus Military Reservation, and Waverly Ferry Recreation Area. No impacts from the proposed project are anticipated to these managed areas because the work is of sufficient distance (1.5 to 2.6 miles) from them.

4.12. Cultural Resources

4.12.1. *Alternative 1 – No Action*

Under the No Action Alternative, there would be no changes from the current situation. Thus, there would be no direct or additional effects to any historical or archaeological resources.

4.12.2. *Alternative 2 – The Action Alternative*

The four previously unrecorded archaeological resources (AR1 through AR4) and the five previously unrecorded historic resources (HS-1 through HS-5) within the proposed APE are all considered ineligible for listing in the NRHP. The proposed tap line to Stinson Creek would cross a cemetery considered ineligible for the NRHP. No structures would be located within the cemetery and it would not be adversely affected.

TVA has determined that the proposed undertaking would have no effect on any historic properties that are listed in, or eligible for listing in, the NRHP. The Mississippi SHPO has concurred with TVA's findings.

4.13. Post-Construction Effects

4.13.1. *Electric and Magnetic Fields*

For the planning of new transmission line ROWs, TVA's transmission line route selection team uses a constraint model that places a 300-foot-radius buffer around occupied buildings, except schools, for which a 1,200-foot buffer is used. The purpose of these buffers is to reduce potential land use conflicts with yard trees, outbuildings, and ancillary facilities, to reduce potential visual impacts, and to reduce exposure to the magnetic field produced by the transmission line. Application of these constraints typically requires trade offs and balancing, and TVA can and does deviate from the constraints. These constraints are not applied to the use of existing transmission line ROWs. Property owners are free to build houses and other structures up to the edge of TVA's ROWs within these constraint distances.

Transmission lines, like all other types of electrical wiring, generate both electric and magnetic fields (EMFs). The voltage on the conductors of the transmission line generates an electric field that occupies the space between the conductors and other conducting objects such as the ground, transmission line structures, or vegetation. A magnetic field is generated by the current (movement of electrons) in the conductors. The strength of the field depends on the current, design of the line, and distance from the line.

The fields from a transmission line are reduced by mutual interference of the electrons that flow around and along the conductors and between the conductors; the result is dissipation of the already low energy. Most of this energy is dissipated on the ROW, and the residual very low amount is reduced to background levels near the ROW or energized equipment.

Magnetic fields can induce currents in conducting objects. Electric fields can create static charges in ungrounded, conducting materials. The strength of the induced current or charge under a transmission line varies with (1) the strength of the electric or magnetic field, (2) the size and shape of the conducting object, and (3) whether the conducting object is grounded. Induced currents and charges can cause shocks under certain conditions by making contact with objects in an electric or magnetic field.

The proposed transmission lines, like other transmission lines, have been designed to minimize the potential for such shocks. This is done, in part, by maintaining sufficient clearance between the conductors and objects on the ground. Stationary conducting objects, such as metal fences, pipelines, and highway guard rails, that are near enough to the transmission lines to develop a charge (typically these would be objects located within the ROW) would be grounded by TVA to prevent them from being a source of shocks.

Under certain weather conditions, high-voltage transmission lines, such as the proposed 161-kV lines, may produce an audible low-volume hissing or crackling noise. This noise is generated by the corona resulting from the dissipation of energy and heat as high voltage is applied to a small area. Under normal conditions, corona-generated noise is not audible. The noise may be audible under some wet conditions, and the resulting noise level off the ROW would be well below the levels that can produce interference with speech. Corona is not associated with any adverse health effects in humans or livestock.

Other public interests and concerns have included potential interference with AM radio reception, television reception, satellite television, and implanted medical devices. If interference occurs with radio or television reception, it would be due to unusual failures of power line insulators or poor alignment of the radio or television antenna and the signal source. Both conditions are correctable and would be repaired if reported to TVA.

Implanted medical devices historically had a potential for power equipment strong-field interference when they came within the influence of low-frequency, high-energy workplace exposure. However, the older devices and designs (i.e., more than five to 10 years old) have been replaced with different designs and different shielding that eliminate the potential for interference from external field sources up to and including the most powerful magnetic resonance imaging medical scanners. Unlike high-energy radio frequency devices that can still interfere with implanted medical devices, low-frequency and low-energy powered electric or magnetic devices no longer potentially interfere (Journal of the American Medical Association [JAMA] 2007).

Research has been done on the effects of EMF on animal and plant behavior, growth, breeding, development, reproduction, and production. This research has been conducted in the laboratory and under environmental conditions, and no adverse effects on health or the above considerations have been reported for the low-energy power frequency fields (World Health Organization [WHO] 2007a). Effects associated with ungrounded, metallic objects and the accumulated static charge and discharge in dairy facilities have been found when the connections from a distribution line meter have not been properly installed on the farm side of a distribution circuit.

TVA substations and transmission lines are built with overhead ground wires that would lead a lightning strike into the ground for dissipation. Thus, a safety zone is created under the ground wires at the top of structures and along a line, for at least the width of the ROW or within a substation. The National Electrical Safety Code is strictly followed when installing, repairing, or upgrading TVA lines, substations, or equipment.

There is some public concern as to the potential for adverse health effects that may be related to long-term exposure to EMFs. A few studies of this topic have raised questions about cancer and reproductive effects on the basis of biological responses observed in cells or in animals or on associations between surrogate measures of power line fields and certain types of cancer. Research has been ongoing for several decades.

The consensus of scientific panels reviewing this research is that the evidence does not support a cause-and-effect relationship between EMFs and any adverse health outcomes (e.g., American Medical Association [AMA] 1994; National Research Council 1997; National Institute of Environmental Health Sciences [NIEHS] 2002). Some research continues of the statistical association between magnetic field exposure and a rare form of childhood leukemia known as acute lymphocytic leukemia. A recent review of this topic by the WHO (International Association for Research on Cancer 2002) concluded that this association is very weak, and there is inadequate evidence to support any other type of excess cancer risk associated with exposure to EMFs.

TVA follows medical and health research related to EMF, along with media coverage and reports, that may not have been peer reviewed by scientists or medical personnel. No controlled laboratory research has demonstrated a cause-and-effect relationship between low-frequency electric or magnetic fields and health effects or adverse health effects even when using field strengths many times higher than those generated by power transmission lines. Statistical studies of overall populations and increased use of low-frequency electric power have found no associations (WHO 2007b).

Neither medical specialists nor physicists have been able to form a testable concept of how these low-frequency, low-energy power fields could cause health effects in the human body where natural processes produce much higher fields. To date, there is no agreement in the scientific or medical research communities as to what, if any, electric or magnetic field parameters might be associated with a potential health effect in a human or animal. There are no scientifically or medically defined safe or unsafe field strengths for low-frequency, low-energy power substation or line fields.

The current and continuing position of the scientific and medical communities' regarding the research and any potential for health effects from low-frequency power equipment or line fields is that there are no reproducible or conclusive data demonstrating an effect or an adverse health effect from such fields (WHO 2007c). In the United States, national organizations of scientists and medical personnel have recommended no further research on the potential for adverse health effects from such fields (AMA 1994; U.S. Department of Energy 1996; NIEHS 1998).

Although no federal standards exist for maximum EMF strengths for transmission lines, two states (New York and Florida) do have such regulations. Florida's regulation is the more restrictive of the two with field levels being limited to 150 milligauss (mG) at the edge of the ROW for lines of 230-kV and less. The expected magnetic field strength at the edge of the ROWs associated with the currently proposed action falls well within these standards.

In light of all of the above, the construction and operation of the proposed transmission lines and switching stations are not anticipated to cause any significant EMF-related impacts.

4.13.2. *Lightning Strike Hazard*

TVA transmission lines are built with overhead ground wires that lead a lightning strike into the ground for dissipation. Thus, a safety zone is created under the ground wires at the top of structures and along the line for at least the width of the ROW. The National Electrical Safety Code is strictly followed when installing, repairing, or upgrading TVA lines or equipment. Transmission line structures, as well as switching station structures are well

grounded, and the conductors are insulated from the structure. Therefore, touching a structure supporting a transmission line poses no inherent shock hazard.

4.13.3. *Transmission Structure Stability*

The pole structures (Figure 2-2) that would be used on the proposed transmission lines have demonstrated a good safety record. Unlike lattice-type structures, they are difficult to climb without special equipment. They are not prone to rot or crack like wooden poles, nor are they subject to substantial storm damage due to their low cross-section in the wind. Additionally, all TVA transmission structures are examined visually at least once a year. Thus, the proposed structures do not pose any significant physical danger. For this reason, TVA does not typically construct barricades or fences around structures.

4.13.4. *Noise and Odor*

During construction of the proposed transmission lines, equipment would generate noise above ambient levels. Because of the short construction period, noise-related effects are expected to be temporary and insignificant. In the more densely populated areas along the ROW, construction techniques would be used to limit noise as much as possible. For similar reasons, noise related to periodic line maintenance is also expected to be insignificant. In residential areas, the need for periodic ROW vegetation maintenance, i.e., mowing, would be limited or nonexistent. Construction and operation of the line are not expected to produce any noticeable odors.

Additionally, no significant long-term impacts related to noise are expected as a result of the operation of the switching stations, substations or transmission lines. It is expected that circuit breakers at the switching and substations could occasionally open to disconnect part of the transmission system during incidents such as excessive current or voltage fluctuations. The resulting noise could startle people nearby; however, because of the infrequent occurrences, it would not result in a significant impact. As described in Section 4.13.1, high voltage lines may also produce noise under certain atmospheric conditions. Off the ROW, this noise is below the level that would interfere with speech.

4.13.5. *Other Impacts*

No significant impacts are expected to result from the relatively short-term activities of construction, such as noise, air quality, and solid waste. Appendices B and C contain procedures for dealing with these issues.

4.13.6. *Alternative 1 – No Action*

Under the No Action Alternative, no new EMFs would be created from the construction of the proposed transmission lines. The electrical loading on portions of TVA's existing transmission system would likely be increased, resulting in increases in EMFs. However, this increase would not result in any significant impacts.

4.13.7. *Alternative 2 – The Action Alternative*

EMFs would be produced along the length of the proposed transmission lines. The strength of the fields within and near the ROW would vary with the electric load on the line as well as with the terrain. Public exposure to EMFs would be determined by final routing

decisions, and would change over time after the line is completed as adjacent land uses change. As described above, TVA would minimize public exposure to EMFs through engineering features and line routing decisions. No significant impacts from EMFs are anticipated.

Transmission line structures are well grounded, and the conductors are insulated from the ground. Therefore, touching a structure supporting a transmission line poses no inherent shock hazard. Additionally, TVA transmission lines are built with overhead ground wires that would lead a lightning strike into the ground for dissipation. Thus, a safety zone is created under the ground wires at the top of structures and along a line for at least the width of the ROW. The National Electrical Safety Code is strictly followed when installing, repairing, or upgrading TVA lines or equipment.

The structures that would be used on the proposed transmission lines have demonstrated a good safety record. All TVA transmission structures are examined visually at least once a year. Thus, the proposed structures do not pose any significant physical danger.

During construction of the proposed transmission lines and switching stations, equipment would generate some noise above ambient levels. Because of the general lack of nearby sensitive receptors and the short construction period, noise-related effects are expected to be temporary and insignificant. For similar reasons, noise related to periodic line maintenance is also expected to be insignificant. Construction and operation of the transmission lines and switching stations are not expected to produce any noticeable odors.

4.14. Unavoidable Adverse Effects

The construction and operation of the proposed transmission lines and switching stations would result in unavoidable adverse effects to several resources. Many adverse effects associated with the switching stations and transmission line routes were reduced to acceptable levels via avoidance during the site location and transmission line routing process. Some other potentially adverse effects could be minimized by mitigation and monitoring procedures specified in Section 4.16 of this EA. As previously stated, clearing for the switching stations and the associated transmission line connections would result in the removal of approximately 23 acres of forest.

Adverse effects resulting from the Action Alternative that cannot be avoided include the following:

- The switching station locations would be graveled. Trees would not be permitted to grow within the transmission line ROWs or to a determined height adjacent to the ROW that would endanger the transmission line.
- Clearing and construction would result in the disruption of some wildlife, but no permanent habitat changes would occur except in the wooded areas previously described.
- Any burning of cleared material would result in some short-term air pollution.
- Clearing, tree removal, and excavation for pole erection would result in a small amount of localized siltation.
- The tree canopy at stream crossings would be removed.

- Localized increases in noise would occur during construction and some later maintenance activities.
- Future land use restrictions would apply within the ROWs
- Changes would occur to scenery along the ROW both short-term from construction equipment and ground-disturbing activities, later during periodic removal of vegetation from the ROW, and long-term from the cleared ROW and the addition of metal structures and conductors. Transmission line and switching station visibility are accounted for and reduced through the siting process; however, there would be some degree of visual effect on the landscape in the project area.

4.15. Relationship Between Local Short-Term Uses of the Environment and Long-Term Productivity

The construction and operation of the proposed transmission lines and switching stations would maintain and improve the reliability of electric service in the Lowndes County-Golden Triangle area. This would help support the economic and population growth that is presently occurring in the proposed project area and the quality of life that depends on adequate and reliable supplies of electric energy. This would be accomplished by a localized shift of a small amount of land to use for electric power transmission. If, during the useful life of the transmission line, it is no longer needed or technology renders it obsolete, it can be removed with relatively little difficulty. The land encumbered by the ROW could be returned to its previous use or used for other purposes.

The proposed action would result in both short-term and long-term effects on vegetation, especially in forested areas where potential forest productivity, including timber and associated wildlife production, would be lost from within the ROW where these resources now exist.

The principal change in short-term use of transmission line ROWs would be the exclusion of trees and permanent structures. The amount of forest being lost would be approximately 24.3 acres within the ROW. Subject to these restrictions, property within a ROW can still be used for many purposes, including farming. Approximately 8 acres would devoted to the switching station sites and this use would preclude other uses for the lives of these facilities. These minimal constraints on other uses would be outweighed by the social and economic benefits of the project.

There would be long-term effects on land use within the ROW due to restrictions on building construction. The ROW cannot support building construction for the life of the project, but the social and economic benefits of the project should outweigh this small loss. Additional long-term effects would occur on scenery in the project area near the new sections of transmission line ROW and switching stations due to the visual intrusions of the transmission structures and conductors. These short-term and long-term effects have been, to the extent possible, minimized during project planning.

4.16. Environmental Commitments and Standard Practices

4.16.1. *Summary of Proposed Nonroutine Mitigation Measures*

- Grading activities within the Black Belt Prairie portion of the West Columbus Switching Station site would be limited to a small area (approximately 500 square feet) along the northwest side. Vegetation management would be accomplished through mechanical clearing; no herbicides would be used. Clearing of woody vegetation would be accomplished by using a feller-buncher or other low ground-pressure equipment. No future construction that would permanently alter the plant community would take place within the Black Belt Prairie; these activities include excavating large areas, road building, placing fill material on the site, storing building or other materials on site, grading the site, or otherwise damaging the community by disturbing the soil profile. If small areas within the prairie boundary need to be revegetated, only annual rye and brown top millet would be used.
- Chinese tallow trees, which have been flagged between existing structures 11 and 12 and on the edge of the ROW near structures 31 and 32, would be removed from the proposed project area using a one time herbicide application approximately 2 weeks prior to any clearing activities in these areas. Effective control would be accomplished by using herbicides such as trilogy, imazapyr, or hexazinone. In addition to foliar application, herbicides would be applied to cut stems or injected into the bark.

4.16.2. *Environmental Protection Procedures*

- In areas identified as SMZ, Category A, use Standard Stream Protection measures as defined in Table 9 of *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities* (Muncy 1999) and *TVA Transmission Line Construction Guidelines Near Streams* (Appendix D) during clearing, construction, and maintenance activities.
- Locations identified as wet-weather conveyances use BMPs as defined in Chapter VI of Muncy 1999.
- Wetland BMPs would be implemented as defined in Muncy 1999.

4.16.3. *Standard Environmental Protection Procedures*

- The retired wood-pole structures would be given to local property owners for restrictive reuse or disposed of. Some epoxy arms may contain a lead pin, so the epoxy arms would be checked for lead. Any lead present would be removed and placed in a separate bin for recycle; the epoxy arms would be sent to a disposal facility. The insulators would be sent to a disposal facility, and the retired conductor would be recycled. The retired transmission line switches would be sent to TVA's Investment Recovery program for possible reuse or sale, and the switch structures would be recycled.

- The West Columbus Switching Station site is a greenfield site. Any spoil generated from the construction of the facilities would be spread along the perimeter of the site and revegetated. Any spoil generated at the Columbus AFB Substation from the installation of the new equipment and second transformer bank would be tested for contamination and taken to a state certified landfill if necessary.

Bent Tree 46-kV Substation

- If the retired current transformers and potential transformers, which are compound-filled, are not retained by the Starkville Transmission Service Center, they would be sent to Investment Recovery.
- The retired meter would be sent to System Applied Maintenance for reuse or to Investment Recovery.

West Point 500-kV, Lowndes 500-kV, and Columbus 161-kV Substations

- The retirement of any electromechanical relays not wanted by the Transmission Service Center would be sent to Investment Recovery.

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CHAPTER 5

5.0 LIST OF PREPARERS

5.1. NEPA Project Management

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Involvement:	Purpose of and Need for Action, Alternatives including the Proposed Action

Anita E. Masters

Position:	Senior NEPA Specialist, TVA Environmental Stewardship and Policy, Chattanooga, Tennessee
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5.2. Other Contributors

W. Nannette Brodie

Position:	Senior Environmental Scientist, TVA Research & Technology Applications, Chattanooga, Tennessee
Education:	B.S., Environmental Science; B.S., Geology; Professional Geologist
Experience:	12 years in Environmental Analyses, Surface Water Quality, and Groundwater Hydrology Evaluations
Involvement:	Groundwater/Surface Water

Patricia B. Cox

Position:	Senior Botanist, TVA Environmental Stewardship and Policy, Knoxville, Tennessee
Education:	Ph.D., Botany (Plant Taxonomy and Anatomy); M.S. and B.S., Biology
Experience:	30 years in Plant Taxonomy at the Academic Level; 3 years with TVA Heritage Project
Involvement:	Vegetation and Threatened and Endangered Plants

Adam J. Dattilo

Position:	Botanist, TVA Environmental Stewardship and Policy, Knoxville, Tennessee
Education:	M.S., Forestry; B.S., Natural Resource Conservation Management
Experience:	7 years in Ecological Restoration and Ecology, 3 years in Botany
Involvement:	Vegetation and Threatened and Endangered Plants

Britta P. Dimick

Position:	Wetlands Biologist, TVA Environmental Stewardship and Policy, Knoxville, Tennessee
Education:	M.S., Botany-Wetlands Ecology Emphasis; B.A., Biology
Experience:	9 years in Wetlands Assessments and Botanical Surveys; 3 years in Wetlands Regulations and NEPA Compliance
Involvement:	Wetlands

Jenny K. Fiedler
Position: Terrestrial Zoologist, TVA Environmental Stewardship and Policy, Knoxville, Tennessee
Education: M.S., Wildlife Science; B.S., Biology-Environmental Emphasis
Experience: 8 years in Field Biology; 3 years in NEPA Compliance
Involvement: Terrestrial Ecology, Threatened and Endangered Species

John Higgins
Position: Water Quality Specialist, TVA River Operations, Chattanooga, Tennessee
Education: Ph.D., Environmental Engineering; B.S. and M.S., Civil Engineering; Registered Professional Engineer
Experience: 31 years in Environmental Engineering and Water Resources Management
Involvement: Surface Water and Wastewater

Clinton E. Jones
Position: Aquatic Community Ecologist, TVA Environmental Stewardship and Policy, Knoxville, Tennessee
Education: B.S., Wildlife and Fisheries Science
Experience: 15 years in Environmental Consultation and Fisheries Management
Involvement: Aquatic Ecology and Aquatic Threatened and Endangered Species

P. Alan Mays
Position: Environmental Scientist, TVA Research & Technology Applications, Knoxville, Tennessee
Education: B.S., Plant and Soil Science
Experience: 30 years in Soil-Plant-Atmospheric Studies
Involvement: Prime Farmland

Roger A. Milstead
Position: Manager, TVA Flood Risk and Data Management, Knoxville, Tennessee
Education: B.S., Civil Engineering; Registered Professional Engineer
Experience: 30 years in Floodplain and Environmental Evaluations
Involvement: Floodplains

Jason M. Mitchell
Position: Natural Areas Biologist, TVA Environmental Stewardship and Policy, Knoxville, Tennessee
Education: M.P.A. (Environmental Policy); B.S., Wildlife and Fisheries Science
Experience: 13 years in Natural Resource Planning and Ecological Assessment with Emphasis on Sensitive Resources
Involvement: Natural Areas

Richard L. Pflueger

Position:	Recreation Specialist, TVA Environmental Stewardship and Policy, Muscle Shoals, Alabama
Education:	M.B.A.; B.S., Accounting
Experience:	29 years in Recreation Resources and Economic Development
Involvement:	Recreation

Larry R. Pounds

Position:	Contract Plant Biologist, TVA Environmental Stewardship and Policy, Knoxville, Tennessee
Education:	Ph.D., Plant Ecology; M.A., Mathematics
Experience:	21 years in Botany
Involvement:	Botany

Jon C. Riley

Position:	Landscape Architect, TVA Environmental Stewardship and Policy, Muscle Shoals, Alabama
Education:	Bachelor of Landscape Architecture, Associate Member American Society of Landscape Architects
Experience:	8 years in Site Planning, Design, and Visual Resource Management
Involvement:	Land Use and Visual Resources

Marianne M. Shuler

Position:	Archaeologist Technician, TVA Environmental Stewardship and Policy, Knoxville, Tennessee
Education:	B.A., Religion/Middle Eastern Archaeology
Experience:	6 years in Middle Eastern Archaeology; 5 years in Southeastern U.S. Archaeology
Involvement:	Cultural Resources

J. Hunter Terrell

Position:	Contract Aquatic Community Ecologist, TVA Environmental Stewardship and Policy, Knoxville, Tennessee
Education:	B.A., Environmental Studies
Experience:	2 years in Heritage Database Maintenance, 7 months in Environmental Review
Involvement:	Aquatic Ecology/Threatened and Endangered Species

Jan K. Thomas

Position:	Contract Natural Areas Specialist, TVA Environmental Stewardship and Policy, Knoxville, Tennessee
Education:	M.S., Human Ecology
Experience:	10 years in Health and Safety Research, Environmental Restoration, Technical Writing; 3 years in Natural Area Reviews
Involvement:	Managed Areas and Sensitive Ecological Sites

W. Richard Yarnell

Position:	Archaeologist, TVA Environmental Stewardship and Policy, Knoxville, Tennessee
Experience:	36 Years Cultural Resource Management
Involvement:	Cultural Resources

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CHAPTER 6

6.0 LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES ARE SENT

Federal Agencies

U.S. Army Corps of Engineers
Mr. Tad M. Zebryk

U.S. Department of Agriculture
Mr. Rodney Dowdy

State Agencies and Organizations

Mississippi Department of Archives and History
Mr. H.T. Holmes

Mississippi Department of Environmental Quality
Mr. Jay Barkley

Mississippi Department of Transportation
Mr. Harry Lee James

Mississippi Development Authority
Mr. Kenneth Calvin

Mississippi Public Service Commission
Mr. Bo Robinson

Northeast Mississippi Planning and Development District
Mr. Don Elder

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CHAPTER 7

7.0 LITERATURE CITED

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Appendix A – Correspondence

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MISSISSIPPI Department of
MDAH
ARCHIVES & HISTORY

HISTORIC PRESERVATION
PO Box 571, Jackson, MS 39205-0571
601-576-6940 • Fax 601-576-6955
mdah.state.ms.us

September 6, 2007

Dr. Thomas O. Maher
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902-1499

RE: Cultural Resource Survey for 5.2 miles of proposed transmission line and approximately 30 acres for two proposed substations for the Severcorr Jupiter project, MDAH Project Log #07-156-07, Lowndes County

Dear Dr. Maher:

We have reviewed the cultural resources survey report by Dr. James J. D'Angelo, Principal Investigator, TRC, received on July 25, 2007, for the above referenced undertaking, pursuant to our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. After review, we concur with the established APE and with the recommendations of the report. Specifically, we concur that the Dupree Family Cemetery, located within the corridor of the proposed Stinson Creek transmission line, be avoided during construction and maintenance of the line. With that recommendation, we have no objections to the proposed project.

There remains the possibility that unrecorded cultural resources may be encountered during the project. Should this occur, we would appreciate your contacting this office immediately in order that we may offer appropriate comments under 36 CFR 800.13.

Please provide a copy of this letter to Dr. D'Angelo. If you need further information, please let us know.

Sincerely,

Jim Woodrick
Review and Compliance Officer

FOR: H.T. Holmes
State Historic Preservation Officer

c: Clearinghouse for Federal Programs

MISSISSIPPI DEPARTMENT of ARCHIVES AND HISTORY

MDAH

HISTORIC PRESERVATION
Ken P'Pool, Director
PO Box 571, Jackson, MS 39205-0571
601-576-6940 • Fax 601-576-6955
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November 20, 2007

Dr. Thomas O. Maher
Manager, Cultural Resources
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902-1499

RE: Cultural Resources Survey for Proposed Transmission Line Replacement Work Associated with Phase 2 of the Severcorr Project, MDAH Project Log #10-166-07, Lowndes County

Dear Dr. Maher:

We have reviewed the cultural resources survey report by Dr. James J. D'Angelo, Principal Investigator, received on October 22, 2007, for the above referenced undertaking, pursuant to our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. After review, we concur that no cultural resources listed in or eligible for listing in the National Register of Historic Places will be affected the proposed undertaking. Specifically, we concur that sites 22Lo1004, 22Lo1005, 22Lo1006 and 22Lo1007 are either ineligible for listing in the NRHP and/or lack sufficient research potential for further investigation. We also concur that the Simpson House (5030) in ineligible for listing in the NRHP.

There remains the possibility that unrecorded cultural resources may be encountered during the project. Should this occur, we would appreciate your contacting this office immediately in order that we may offer appropriate comments under 36 CFR 800.13.

Please provide a copy of this letter to Dr. D'Angelo. If you have any questions, please let us know.

Sincerely,

Jim Woodrick
Review and Compliance Officer

FOR: H.T. Holmes
State Historic Preservation Officer

c: Clearinghouse for Federal Programs

Harry Lee James
Deputy Executive Director/
Chief Engineer

Brenda Znachko
Deputy Executive Director/
Administration

MDOT
MISSISSIPPI DEPARTMENT OF TRANSPORTATION

Larry L. "Butch" Brown
Executive Director

Steven K. Edwards
Director
Office of Intermodal Planning

Willie Huff
Director
Office of Enforcement

P. O. Box 1850 / Jackson, Mississippi 39215-1850 Telephone (601) 359-7249 / FAX (601) 359-7050 / GoMDOT.com

September 5, 2007

Mr. Todd C. Liskey
Tennessee Valley Authority
Siting and Environmental Design
Missionary Ridge Place (MR 4G)
1101 Market Street
Chattanooga, Tennessee 37402-2801

RE: SEVERCORR PHASE 2/CATALPA CREEK PROJECT

Dear Mr. Liskey:

This is in reference to TVA's project mailed to me on August 6, 2007

The project, as described by the project summary, creates no incompatibility in our area of planning at this time.

Sincerely,

Harry Lee James, P.E., PS
Deputy Executive Director/Chief Engineer

HLJ:cle

pc: Mr. David Foster, Assistant Chief Engineer – Preconstruction
Mr. William M. Jamieson, District Engineer

Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2801

Mr. Todd C. Liskey
Tennessee Valley Authority
Siting and Environmental Design
Missionary Ridge Place (MR 4G)
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dear Mr. Liskey:

SEVERCORR PHASE 2/CATALPA CREEK PROJECT

This is in reference to TVA's project mailed to me on August 6, 2007.

The project, as described by the project summary, creates no incompatibility in our area of planning at this time.

William M. Jamison Jr
Signature

District Engineer
Title

MDOT
Agency

P.O. Box 2060
Address

Tupelo, Ms 38803-2060

Printed on recycled paper

UNITED STATES DEPARTMENT OF AGRICULTURE
LOWNDES COUNTY FARM SERVICE AGENCY
2282 MARTIN LUTHER KING DRIVE SUITE 3
COLUMBUS, MISS. 39705

9/28/07

Dear Mr.Liskey:

I have attempted to identify areas of CRP on your maps. Map 2 does not cross any CRP acreage. On map 1 & 3 I identified areas of CRP where it appears you will cross. Those landowners involved need to submit in writing to this office the proposed use, duration of disturbance, acreage involved etc. prior to any activity being conducted. Disturbing the cover on CRP can not be done without prior approval from NRCS and FSA.

If you have any questions please call this office at 328-5921, ext. 2.

Sincerely,

Rodney L. Dowdy
County Executive Director
Lowndes County FSA

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Appendix B – Tennessee Valley Authority Right-of-Way Clearing Specifications

1. General - The clearing contractor shall review the environmental evaluation documents (categorical exclusion checklist, environmental assessment, or environmental impact statement) for the project or proposed activity, along with all clearing and construction appendices, conditions in applicable general and/or site-specific permits, the storm water pollution prevention plan, and any Tennessee Valley Authority (TVA) commitments to property owners. The contractor shall then plan and carry out operations using techniques consistent with good engineering and management practices as outlined in TVA's best management practices (BMPs) manual (Muncy 1992, and revisions thereto). The contractor will protect areas that are to be left unaffected by access or clearing work at and adjacent to all work sites. In sensitive areas and their buffers, the contractor will retain as much native ground cover and other vegetation as possible.

   If the contractor fails to use BMPs or to follow environmental expectations discussed in the prebid or prework meeting or present in contract specifications, TVA will order corrective changes and additional work as deemed necessary in TVA's judgment to meet the intent of environmental laws and regulations or other guidelines. Major violations or continued minor violations will result in work suspension until correction of the situation is achieved or other remedial action is taken at the contractor's expense. Penalty clauses may be invoked as appropriate.

2. Regulations - The clearing contractor shall comply with all applicable federal, state, and local environmental and antipollution laws, regulations, and ordinances including without limitation all air, water, solid and hazardous waste, noise, and nuisance laws, regulations, and ordinances. The contractor shall secure or ensure that TVA has secured all necessary permits or authorizations to conduct work on the acres shown on the drawings and plan and profile for the contract. The contractor's designated project manager will actively seek to prevent, control, monitor, and safely abate all commonly recognized forms of workplace and environmental pollution. Permits or authorizations and any necessary certifications of trained or licensed employees shall be documented with copies submitted to TVA's right-of-way inspector or construction environmental engineer before work begins. The contractor will be responsible for meeting all conditions specified in permits. Permit conditions shall be reviewed in prework discussions.

3. Land and Landscape Preservation - The clearing contractor shall exercise care to preserve the condition of cleared soils by avoiding as much compacting and deep scarring as possible. As soon as possible after initial disturbance of the soil and in accordance with any permit(s) or other state or local environmental regulatory requirements, cover material shall be placed to prevent erosion and sedimentation of water bodies or conveyances to surface water or groundwater. In areas outside the clearing, use, and access areas, the natural vegetation shall be protected from damage. The contractor and his employees must not deviate from delineated access routes or use areas and must enter the site at designated areas that will be marked. Clearing operations shall be conducted to prevent any unnecessary destruction, scarring, or defacing of the remaining natural vegetation and adjacent surroundings in the vicinity of the work. In sensitive public or environmental areas, appropriate buffer

zones shall be observed and the methods of clearing or reclearing modified to protect the buffer and sensitive area. Some areas may require planting native plants or grasses to meet the criteria of regulatory agencies or commitments to special program interests.

4. Streamside Management Zones - The clearing contractor must leave as many rooted ground cover plants as possible in buffer zones along streams and other bodies of water or wet-weather conveyances thereto. In such streamside management zones (SMZ), tall-growing tree species (trees that would interfere with TVA's National Electrical Safety Code clearances) shall be cut, and the stumps may be treated to prevent resprouting. Low-growing trees identified by TVA as marginal electrical clearance problems may be cut, and then stump treated with growth regulators to allow low, slow-growing canopy development and active root growth. Only approved herbicides shall be used, and herbicide application shall be conducted by certified applicators from TVA's Transmission, Operations, and Maintenance (TOM) organization after initial clearing and construction. Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment, such as a feller-buncher. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. Disturbed soils in SMZs must be stabilized by appropriate methods immediately after the right-of-way is cleared. Stabilization must occur within the time frame specified in applicable storm water permits or regulations. Stumps within SMZs may be cut close to the ground but must not be removed or uprooted. Trees, limbs, and debris shall be immediately removed from streams, ditches, and wet areas using methods that will minimize dragging or scarring the banks or stream bottom. No debris will be left in the water or watercourse. Equipment will cross streams, ditches, or wet areas only at locations designated by TVA after the application of appropriate erosion control BMPs consistent with permit conditions or regulatory requirements.

5. Wetlands - In forested wetlands, tall trees will be cut near the ground, leaving stumps and roots in place. The cambium may be treated with herbicides applied by certified applicators from the TOM organization to prevent regrowth. Understory trees that must be initially cut and removed may be allowed to grow back or may be treated with tree growth regulators selectively to slow growth and increase the reclearing cycle. The decision will be situationally made based on existing ground cover, wetland type, and tree species since tall tree removal may "release" understory species and allow them to grow quickly to "electrical clearance problem" heights. In many circumstances, herbicides labeled for water and wetland use may be used in reclearing.

6. Sensitive Area Preservation - If prehistoric or historic artifacts or features that might be of archaeological significance are discovered during clearing or reclearing operations, the activity shall immediately cease within a 100-foot radius, and a TVA right-of-way inspector or construction environmental engineer and the Cultural Resources Program manager shall be notified. The site shall be protected and left as found until a determination about the resources, their significance, and site treatment is made by TVA's Cultural Resources Program. Work may continue beyond the finding zone and the 100-foot radius beyond its perimeter.

7. Water Quality Control - The contractor's clearing and disposal activities shall be performed using BMPs that will prevent erosion and entrance of spillage,

contaminants, debris, and other pollutants or objectionable materials into drainage ways, surface water, or groundwater. Special care shall be exercised in refueling equipment to prevent spills. Fueling areas shall be remote from any sinkhole, crevice, stream, or other water body. Open burning debris will be kept away from streams and ditches and shall be incorporated into the soil.

The clearing contractor will erect and (when TVA or contract construction personnel are unable) maintain BMPs such as silt fences on steep slopes and adjacent to any stream, wetland, or other water body. BMPs will be inspected by the TVA field engineer or other designated TVA or contractor personnel routinely and during periods of high runoff, and any necessary repairs will be made as soon as practicable. BMP inspections will be conducted in accordance with permit requirements. Records of all inspections will be maintained on site, and copies of inspection forms will be forwarded to the TVA construction environmental engineer.

8. Turbidity and Blocking of Streams - If temporary clearing activities must interrupt natural drainage, appropriate drainage facilities and erosion/sediment controls shall be provided to avoid erosion and siltation of streams and other water bodies or water conveyances. Turbidity levels in receiving waters or at storm water discharge points shall be monitored, documented, and reported if required by the applicable permit. Erosion and sediment control measures such as silt fences, water bars, and sediment traps shall be installed as soon as practicable after initial access, site, or right-of-way disturbance in accordance with applicable permit or regulatory requirements.

   Mechanized equipment shall not be operated in flowing water except when approved and, then, only to construct necessary stream crossings under direct guidance of TVA. Construction of stream fords or other crossings will only be permitted at approved locations and to current TVA construction access road standards. Material shall not be deposited in watercourses or within stream bank areas where it could be washed away by high stream flows. Any clearing debris that enters streams or other water bodies shall be removed as soon as possible. Appropriate U.S. Army Corps of Engineers and state permits shall be obtained for stream crossings.

9. Air Quality Control - The clearing or reclearing contractor shall take appropriate actions to limit the amount of air emissions created by clearing and disposal operations to well within the limits of clearing or burning permits and/or forestry or local fire department requirements. All operations must be conducted in a manner that prevents nuisance conditions or damage to adjacent land crops, dwellings, highways, or people.

10. Dust and Mud Control - Clearing activities shall be conducted in a manner that minimizes the creation of fugitive dust. This may require limitations as to type of equipment, allowable speeds, and routes utilized. Control measures such as water, gravel, etc., or similar measures may be used subject to TVA approval. On new construction sites and easements, the last 100 feet before an access road approaches a county road or highway shall be graveled to prevent transfer of mud onto the public road.

11. Burning - The contractor shall obtain applicable permits and approvals to conduct controlled burning. The contractor will comply with all provisions of the permit, notification, or authorization including burning site locations, controlled draft, burning hours, and such other conditions as stipulated. If weather conditions such as wind

speed or wind direction change rapidly, the contractor's burning operation may be temporarily stopped by TVA's field engineer. The debris to be burned shall be kept as clean and dry as possible and stacked and burned in a manner that produces the minimum amount of smoke. Residue from burning will be disposed of according to permit stipulations. No fuel starters or enhancements other than kerosene will be allowed.

12. Smoke and Odors - The contractor will properly store and handle combustible and volatile materials that could create objectionable smoke, odor, or fumes. The contractor shall not burn oil or refuse that includes trash, rags, tires, plastics, or other manufactured debris.

13. Vehicle Exhaust Emissions - The contractor shall maintain and operate equipment in a manner that limits vehicle exhaust emissions. Equipment and vehicles will be kept within the manufacturers' recommended limits and tolerances. Excessive exhaust gases will be eliminated, and inefficient operating procedures will be revised or halted until corrective repairs or adjustments are made.

14. Vehicle Servicing - Routine maintenance of personal vehicles will not be performed on the right-of-way. However, if emergency or "have to" situations arise, minimal/temporary maintenance to personal vehicles will occur in order to mobilize the vehicle to an off-site maintenance shop. Heavy equipment will be serviced on the right-of-way, except in designated sensitive areas. The clearing or reclearing contractor will properly maintain these vehicles with approved spill protection controls and countermeasures. If emergency maintenance in a sensitive or questionable area arises, the area environmental coordinator or construction environmental engineer will be consulted. All wastes and used oils will be properly recovered, handled, and disposed/recycled. Equipment shall not be temporarily stored in stream floodplains, whether overnight or on weekends or holidays.

15. Noise Control - The contractor shall take steps to avoid the creation of excessive sound levels for employees, the public, or the site and adjacent property owners. Concentration of individual noisy pieces as well as the hours and locations of operation should be considered.

16. Noise Suppression - All internal combustion engines shall be properly equipped with mufflers. The equipment and mufflers shall be maintained at peak operating efficiency.

17. Sanitation - A designated representative of TVA or the clearing contractor shall contact a sanitary contractor who will provide sanitary chemical toilets convenient to all principal points of operation for every working party. The facilities shall comply with applicable federal, state, or local health laws and regulations. They shall not be located closer than 100 feet to any stream or tributary or to any wetland. The facilities shall be required to have proper servicing and maintenance, and the waste disposal contractor shall verify in writing that the waste disposal will be in state-approved facilities. Employees shall be notified of sanitation regulations and shall be required to use the toilet facilities.

18. Refuse Disposal - The clearing or reclearing contractor shall be responsible for daily cleanup and proper labeling, storage, and disposal of all refuse and debris on the site produced by his operations and employees. Facilities that meet applicable regulations

and guidelines for refuse collection will be required. Only approved transport, storage, and disposal areas shall be used.

19. Brush and Timber Disposal (Reclearing) - The reclearing contractor shall place felled tree boles in neat stacks at the edge of the right-of-way, with crossing breaks at least every 100 feet. Property owner requests shall be reviewed with the project manager or right-of-way specialist before accepting them. Lop and drop activities must be specified in the contract and on plan and profile drawings with verification with the right-of-way specialist before conducting such work. When tree trimming and chipping is necessary, disposal of the chips on the easement or other locations on the property must be with the consent of the property owner and the approval of the right-of-way specialist. No trees, branches, or chips shall remain in a surface water body or be placed at a location where washing into a surface water or groundwater source might occur.

20. Brush and Timber Disposal (Initial Clearing) - For initial clearing, trees are commonly part of the contractor's contract to remove as they wish. Trees may be removed from the site for lumber or pulpwood or they may be chipped or stacked and burned. All such activities must be coordinated with the TVA field engineer, and the open burning permits, notifications, and regulatory requirements must be met. Trees may be cut and left in place only in areas specified by TVA and approved by appropriate regulatory agencies. These areas may include sensitive wetlands or SMZs where tree removal would cause excessive ground disturbance or in very rugged terrain where windrowed trees are used as sediment barriers along the edge of the right-of-way.

21. Restoration of Site - All disturbed areas, with the exception of farmland under cultivation and any other areas as may be designated by TVA's specifications, shall be stabilized in the following manner unless the property owner and TVA's engineer specify a different method:

    A. The subsoil shall be loosened to a minimum depth of 6 inches if possible and worked to remove unnatural ridges and depressions.

    B. If needed, appropriate soil amendments will be added.

    C. All disturbed areas will initially be seeded with a temporary ground cover such as winter wheat, rye, or millet, depending on the season. Perennials may also be planted during initial seeding if proper growing conditions exist. Final restoration and final seeding will be performed as line construction is completed. Final seeding will consist of permanent perennial grasses such as those outlined in TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities.* Exceptions would include those areas designated as native grass planting areas. Initial and final restoration will be performed by the clearing contractor.

    D. TVA holds the option, depending upon the time of year and weather condition, to delay or withdraw the requirement of seeding until more favorable planting conditions are certain. In the meantime, other stabilization techniques must be applied.

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Appendix C – Tennessee Valley Authority Environmental Quality Protection Specifications for Transmission Line Construction

1. General – Tennessee Valley Authority (TVA) and/or the assigned contractor shall plan, coordinate, and conduct operations in a manner that protects the quality of the environment and complies with TVA's environmental expectations discussed in the preconstruction meeting. This specification contains provisions that shall be considered in all TVA and contract construction operations. If the contractor fails to operate within the intent of these requirements, TVA will direct changes to operating procedures. Continued violation will result in a work suspension until correction or remedial action is taken by the contractor. Penalties and contract termination will be used as appropriate. The costs of complying with the Environmental Quality Protection Specifications are incidental to the contract work, and no additional compensation will be allowed. At all structure and conductor pulling sites, protective measures to prevent erosion will be taken immediately upon the end of each step in a construction sequence, and those protective measures will be inspected and maintained throughout the construction and right-of-way rehabilitation period.

2. Regulations - TVA and/or the assigned contractor shall comply with all applicable federal, state, and local environmental and antipollution laws, regulations, and ordinances related to environmental protection and prevention, control, and abatement of all forms of pollution.

3. Use Areas - TVA and/or the assigned contractor's use areas include but are not limited to site office, shop, maintenance, parking, storage, staging, assembly areas, utility services, and access roads to the use areas. The construction contractor shall submit plans and drawings for their location and development to the TVA engineer and project manager for approval. Secondary containment will be provided for fuel and petroleum product storage pursuant to 29CFR1910.106(D)(6)(iii)(OSHA).

4. Equipment - All major equipment and proposed methods of operation shall be subject to the approval of TVA. The use or operation of heavy equipment in areas outside the right-of-way, access routes, or structure, pole, or tower sites will not be permitted without permission of the TVA inspector or field engineer. Heavy equipment use on steep slopes (greater than 20 percent) and in wet areas will be held to the minimum necessary to construct the transmission line. Steps will be taken to limit ground disturbance caused by heavy equipment usage, and erosion and sediment controls will be instituted on disturbed areas in accordance with state requirements.

   No subsurface ground-disturbing equipment or stump-removal equipment will be used by construction forces except on access roads or at the actual structure, pole, or tower sites, where only footing locations and controlled runoff diversions shall be created that disturb the soil. All other areas of ground cover or in-place stumps and roots shall remain in place. (Note: Tracked vehicles disturb surface layer of the ground due to size and function.) Some disking of the right-of-way may occur for proper seedbed preparation.

   Unless ponding previously occurred (i.e., existing low-lying areas), water should not be allowed to pond on the structure sites except around foundation holes; the water must

be directed away from the site in as dispersed a manner as possible. At tower or structure sites, some means of upslope interruption of potential overland flow and diversion around the footings should be provided as the first step in construction-site preparation. If leveling is necessary, it must be implemented by means that provide for continuous gentle, controlled, overland flow or percolation. A good grass cover, straw, gravel, or other protection of the surface must be maintained. Steps taken to prevent increases in the moisture content of the in-situ soils will be beneficial both during construction and over the service life of any structure.

5. Sanitation - A designated TVA or contractor representative shall contact a sanitary contractor who will provide sanitary chemical toilets convenient to all principal points of operation for every working party. The facilities shall comply with applicable federal, state, or local health laws and regulations. They shall not be located closer than 100 feet to any stream or tributary or to any wetland. The facilities shall be required to have proper servicing and maintenance, and the waste disposal contractor shall verify in writing that the waste disposal will be in state-approved facilities. Employees shall be notified of sanitation regulations and shall be required to use the toilet facilities.

6. Refuse Disposal - Designated TVA and/or contractor personnel shall be responsible for daily inspection, cleanup, and proper labeling, storage, and disposal of all refuse and debris produced by his operations and by his employees. Suitable refuse collecting facilities will be required. Only state-approved disposal areas shall be used. Disposal containers such as dumpsters or roll-off containers shall be obtained from a proper waste disposal contractor. Solid, special, construction/demolition, and hazardous wastes as well as scrap are part of the potential refuse generated and must be properly managed with emphasis on reuse, recycle, or possible give away, as appropriate, before they are handled as waste. Contractors must meet similar provisions on any project contracted by TVA.

7. Landscape Preservation - TVA and its contractors shall exercise care to preserve the natural landscape in the entire construction area as well as use areas, in or outside the right-of-way, and on or adjacent to access roads. Construction operations shall be conducted to prevent any unnecessary destruction, scarring, or defacing of the natural vegetation and surroundings in the vicinity of the work.

8. Sensitive Areas Preservation - Certain areas on site and along the right-of-way may be designated by the specifications or the TVA engineer as environmentally sensitive. These areas include but are not limited to areas classified as erodible, geologically sensitive, scenic, historical and archaeological, fish and wildlife refuges, water supply watersheds, and public recreational areas such as parks and monuments. Contractors and TVA construction crews shall take all necessary actions to avoid adverse impacts to these sensitive areas and their adjacent buffer zones. These actions may include suspension of work or change of operations during periods of rain or heavy public use; hours may be restricted or concentrations of noisy equipment may have to be dispersed. If prehistoric or historic artifacts or features are encountered during clearing or construction operations, the operations shall immediately cease for at least 100 feet in each direction, and TVA's right-of-way inspector or construction superintendent and Cultural Resources Program shall be notified. The site shall be left as found until a significance determination is made. Work may continue elsewhere beyond the 100-foot perimeter.

9. Water Quality Control - TVA and contractor construction activities shall be performed by methods that will prevent entrance or accidental spillage of solid matter, contaminants, debris, and other objectionable pollutants and wastes into flowing caves, sinkholes, streams, dry watercourses, lakes, ponds, and underground water sources.

   The clearing contractor will erect and (when TVA or contract construction personnel are unable) maintain best management practices (BMPs) such as silt fences on steep slopes and adjacent to any stream, wetland, or other water body. Additional BMPs may be required for areas of disturbance created by construction activities. BMPs will be inspected by the TVA field engineer or other designated TVA or contractor personnel routinely and during periods of high runoff, and any necessary repairs will be made as soon as practicable. BMP inspections will be conducted in accordance with permit requirements. Records of all inspections will be maintained on site, and copies of inspection forms will be forwarded to the TVA construction environmental engineer.

   Acceptable measures for disposal of waste oil from vehicles and equipment shall be followed. No waste oil shall be disposed of within the right-of-way, on a construction site, or on access roads.

10. Turbidity and Blocking of Streams - Construction activities in or near SMZs or other bodies of water shall be controlled to prevent the water turbidity from exceeding state or local water quality standards for that stream. All conditions of a general storm water permit, aquatic resource alteration permit, or a site-specific permit shall be met including monitoring of turbidity in receiving streams and/or storm water discharges and implementation of appropriate erosion and sediment control measures.

    Appropriate drainage facilities for temporary construction activities interrupting natural site drainage shall be provided to avoid erosion. Watercourses shall not be blocked or diverted unless required by the specifications or the TVA engineer. Diversions shall be made in accordance with TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities.*

    Mechanized equipment shall not be operated in flowing water except when approved and, then, only to construct crossings or to perform required construction under direct guidance of TVA. Construction of stream fords or other crossings will only be permitted at approved locations and to current TVA construction access road standards. Material shall not be deposited in watercourses or within stream bank areas where it could be washed away by high stream flows. Appropriate U.S. Army Corps of Engineers and state permits shall be obtained.

    Wastewater from construction or dewatering operations shall be controlled to prevent excessive erosion or turbidity in a stream, wetland, lake, or pond. Any work or placing of equipment within a flowing or dry watercourse requires the prior approval of TVA.

11. Clearing - No construction activities may clear additional site or right-of-way vegetation or disturb remaining retained vegetation, stumps, or regrowth at locations other than the structure sites and conductor setup areas. TVA and the construction contractor(s) must provide appropriate erosion or sediment controls for areas they have disturbed that have previously been restabilized after clearing operations. Control measures shall be

implemented as soon as practicable after disturbance in accordance with applicable federal, state, and/or local storm water regulations.

12. Restoration of Site - All construction disturbed areas, with the exception of farmland under cultivation and any other areas as may be designated by TVA's specifications, shall be stabilized in the following manner unless the property owner and TVA's engineer specify a different method:

    A. The subsoil shall be loosened to a minimum depth of 6 inches if possible and worked to remove unnatural ridges and depressions.

    B. If needed, appropriate soil amendments will be added.

    C. All disturbed areas will initially be seeded with a temporary ground cover such as winter wheat, rye, or millet, depending on the season. Perennials may also be planted during initial seeding if proper growing conditions exist. Final restoration and final seeding will be performed as line construction is completed. Final seeding will consist of permanent perennial grasses such as those outlined in TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities.* Exceptions would include those areas designated as native grass planting areas. Initial and final restoration will be performed by the clearing contractor.

    D. TVA holds the option, depending upon the time of year and weather condition, to delay or withdraw the requirement of seeding until more favorable planting conditions are certain. In the meantime, other stabilization techniques must be applied.

13. Air Quality Control - Construction crews shall take appropriate actions to minimize the amount of air pollution created by their construction operations. All operations must be conducted in a manner that avoids creating a nuisance and prevents damage to lands, crops, dwellings, or persons.

14. Burning - Before conducting any open burning operations, the contractor shall obtain permits or provide notifications as required to state forestry offices and/or local fire departments. Burning operations must comply with the requirements of state and local air pollution control and fire authorities and will only be allowed in approved locations and during appropriate hours and weather conditions. If weather conditions such as wind direction or speed change rapidly, the contractor's burning operations may be temporarily stopped by the TVA field engineer. The debris for burning shall be piled and shall be kept as clean and as dry as possible, then burned in such a manner as to reduce smoke. No materials other than dry wood shall be open burned. The ash and debris shall be buried away from streams or other water sources and shall be in areas coordinated with the property owner.

15. Dust and Mud Control - Construction activities shall be conducted to minimize the creation of dust. This may require limitations as to types of equipment, allowable speeds, and routes utilized. Water, straw, wood chips, dust palliative, gravel, combinations of these, or similar control measures may be used subject to TVA's approval. On new construction sites and easements, the last 100 feet before an access

road approaches a county road or highway shall be graveled to prevent transfer of mud onto the public road.

16. Vehicle Exhaust Emissions - TVA and/or the contractors shall maintain and operate equipment to limit vehicle exhaust emissions. Equipment and vehicles that show excessive emissions of exhaust gasses and particulates due to poor engine adjustments or other inefficient operating conditions shall not be operated until corrective repairs or adjustments are made.

17. Vehicle Servicing - Routine maintenance of personal vehicles will not be performed on the right-of-way. However, if emergency or "have to" situations arise, minimal/temporary maintenance to personal vehicles will occur in order to mobilize the vehicle to an off-site maintenance shop. Heavy equipment will be serviced on the right-of-way except in designated sensitive areas. The Heavy Equipment Department within TVA or the construction contractor will properly maintain these vehicles with approved spill prevention controls and countermeasures. If emergency maintenance in a sensitive or questionable area arises, the area environmental coordinator or construction environmental engineer will be consulted. All wastes and used oils will be properly recovered, handled, and disposed/recycled. Equipment shall not be temporarily stored in stream floodplains, whether overnight or on weekends or holidays.

18. Smoke and Odors - TVA and/or the contractors shall properly store and handle combustible material that could create objectionable smoke, odors, or fumes. The contractor shall not burn refuse such as trash, rags, tires, plastics, or other debris.

19. Noise Control - TVA and/or the contractor shall take measures to avoid the creation of noise levels that are considered nuisances, safety, or health hazards. Critical areas including but not limited to residential areas, parks, public use areas, and some ranching operations will require special considerations. TVA's criteria for determining corrective measures shall be determined by comparing the noise level of the construction operation to the background noise levels. In addition, especially noisy equipment such as helicopters, pile drivers, air hammers, chippers, chain saws, or areas for machine shops, staging, assembly, or blasting may require corrective actions when required by TVA.

20. Noise Suppression - All internal combustion engines shall be properly equipped with mufflers as required by the Department of Labor's *Safety and Health Regulations for Construction*. TVA may require spark arresters in addition to mufflers on some engines. Air compressors and other noisy equipment may require sound-reducing enclosures in some circumstances.

21. Damages - The movement of construction crews and equipment shall be conducted in a manner that causes as little intrusion and damage as possible to crops, orchards, woods, wetlands, and other property features and vegetation. The contractor will be responsible for erosion damage caused by his actions and especially for creating conditions that would threaten the stability of the right-of-way or site soil, the structures, or access to either. When property owners prefer the correction of ground cover condition or soil and subsoil problems themselves, the section of the contract dealing with damages will apply.

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Appendix D – Tennessee Valley Authority Transmission Construction Guidelines Near Streams

Even the most carefully designed transmission line project eventually will affect one or more creeks, rivers, or other type of water body. These streams and other water areas are protected by state and federal law, generally support some amount of fishing and recreation, and, occasionally, are homes for important and/or endangered species. These habitats occur in the stream and on strips of land along both sides (the streamside management zone [SMZ]) where disturbance of the water, land, or vegetation could have an adverse effect on the water or stream life. The following guidelines have been prepared to help Tennessee Valley Authority (TVA) Transmission Construction staff and their contractors avoid impacts to streams and stream life as they work in and near SMZs. These guidelines expand on information presented in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities.*

Three Levels of Protection

During the preconstruction review of a proposed transmission line, TVA Environmental Stewardship and Policy staff will have studied each possible stream impact site and will have identified it as falling into one of three categories: (A) standard stream protection, (B) protection of important permanent streams, or (C) protection of unique habitats. These category designations are based on the variety of species and habitats that exist in the stream as well as state and federal requirements to avoid harming certain species. The category designation for each site will be marked on the plan and profile sheets. Construction crews are required to protect streams and other identified water habitats using the following pertinent set(s) of guidelines:

(A) Standard Stream Protection

This is the standard (basic) level of protection for streams and the habitats around them. The purpose of the following guidelines is to minimize the amount and length of disturbance to the water bodies without causing adverse impacts on the construction work.

Guidelines:

1. All construction work around streams will be done using pertinent best management practices (BMPs) such as those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities,* especially Chapter 6, “Standards and Specifications.”

2. All equipment crossings of streams must comply with appropriate state permitting requirements. Crossings of all drainage channels, intermittent streams, and permanent streams must be done in ways that avoid erosion problems and long-term changes in water flow. Crossings of any permanent streams must allow for natural movement of fish and other aquatic life.

3. Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The

method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. Stumps can be cut close to ground level but must not be removed or uprooted.

4. Other vegetation near streams must be disturbed as little as possible during construction. Soil displacement by the actions of plowing, disking, blading, or other tillage or grading equipment will not be allowed in SMZs; however, a minimal amount of soil disturbance may occur as a result of clearing operations. Shorelines that have to be disturbed must be stabilized as soon as feasible.

(B) Protection of Important Permanent Streams

This category will be used when there is one or more specific reason(s) why a permanent (always-flowing) stream requires protection beyond that provided by standard BMPs. Reasons for requiring this additional protection include the presence of important sports fish (trout, for example) and habitats for federal endangered species. The purpose of the following guidelines is to minimize the disturbance of the banks and water in the flowing stream(s) where this level of protection is required.

Guidelines:

1. Except as modified by guidelines 2-4 below, all construction work around streams will be done using pertinent BMPs such as those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities,* especially Chapter 6, “Standards and Specifications.”

2. All equipment crossings of streams must comply with appropriate state (and, at times, federal) permitting requirements. Crossings of drainage channels and intermittent streams must be done in ways that avoid erosion problems and long-term changes in water flow. Proposed crossings of permanent streams must be discussed in advance with Environmental Stewardship and Policy staff and may require an on-site planning session before any work begins. The purpose of these discussions will be to minimize the number of crossings and their impact on the important resources in the streams.

3. Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. Cutting of trees near permanent streams must be limited to those required to meet National Electrical Safety Code and danger tree requirements. Stumps can be cut close to ground level but must not be removed or uprooted.

4. Other vegetation near streams must be disturbed as little as possible during construction. Soil displacement by the actions of plowing, disking, blading, or other tillage or grading equipment will not be allowed in SMZs; however, a minimal amount of soil disturbance may occur as a result of clearing operations. Shorelines that have to be disturbed must be stabilized as soon as possible and revegetated as soon as feasible.

(C) Protection of Unique Habitats

This category will be used when, for one or more specific reasons, a temporary or permanent aquatic habitat requires special protection. This relatively uncommon level of protection will be appropriate and required when a unique habitat (for example, a particular spring run) or protected species (for example, one that breeds in a wet-weather ditch) is known to occur on or adjacent to the construction corridor. The purpose of the following guidelines is to avoid or minimize any disturbance of the unique aquatic habitat.

Guidelines:

1. Except as modified by Guidelines 2-4 below, all construction work around the unique habitat will be done using pertinent BMPs such as those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities,* especially Chapter 6, "Standards and Specifications."

2. All construction activity in and within 30 meters (100 feet) of the unique habitat must be approved in advance by Environmental Stewardship and Policy staff, preferably as a result of an on-site planning session. The purpose of this review and approval will be to minimize impacts on the unique habitat. All crossings of streams also must comply with appropriate state (and, at times, federal) permitting requirements.

3. Cutting of trees within 30 meters (100 feet) of the unique habitat must be discussed in advance with Environmental Stewardship and Policy staff, preferably during the on-site planning session. Cutting of trees near the unique habitat must be kept to an absolute minimum. Stumps must not be removed, uprooted, or cut shorter than 0.30 meter (1 foot) above the ground line.

4. Other vegetation near the unique habitat must be disturbed as little as possible during construction. The soil must not be disturbed by plowing, disking, blading, or grading. Areas that have to be disturbed must be stabilized as soon as possible and revegetated as soon as feasible, in some cases with specific kinds of native plants. These and other vegetative requirements will be coordinated with Environmental Stewardship and Policy staff.

Additional Help

If you have questions about the purpose or application of these guidelines, please contact your supervisor or the environmental coordinator in the local Transmission Service Center.

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Comparison of Guidelines Under the Three Stream and Water Body Protection Categories (page 1)

Guidelines	A: Standard	B: Important Permanent Streams	C: Unique Water Habitats
1. Reference	• All TVA construction work around streams will be done using pertinent BMPs such as those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities,* especially Chapter 6, BMP "Standards and Specifications."	Except as modified by guidelines 2-4 below, all construction work around streams will be done using pertinent BMPs such as those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities,* especially Chapter 6, BMP "Standards and Specifications."	• Except as modified by guidelines 2-4 below, all construction work around the unique habitat will be done using pertinent BMPs such as those described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities,* especially Chapter 6, BMP "Standards and Specifications."
2. Equipment Crossings	• All crossings of streams must comply with appropriate state and federal permitting requirements. • Crossings of all drainage channels, intermittent streams, and permanent streams must be done in ways that avoid erosion problems and long-term changes in water flow. • Crossings of any permanent streams must allow for natural movement of fish and other aquatic life.	• All crossings of streams must comply with appropriate state and federal permitting requirements. • Crossings of drainage channels and intermittent streams must be done in ways that avoid erosion problems and long-term changes in water flow. • Proposed crossings of permanent streams must be discussed in advance with Environmental Stewardship and Policy staff and may require an on-site planning session before any work begins. The purpose of these discussions will be to minimize the number of crossings and their impact on the important resources in the streams.	• All crossings of streams also must comply with appropriate state and federal permitting requirements. • All construction activity in and within 30 meters (100 feet) of the unique habitat must be approved in advance by Environmental Stewardship and Policy staff, preferably as a result of an on-site planning session. The purpose of this review and approval will be to minimize impacts on the unique habitat.

Comparison of Guidelines Under the Three Stream and Water Body Protection Categories (page 2)

Guidelines	A: Standard	B: Important Permanent Streams	C: Unique Water Habitats
3. Cutting Trees	• Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. • Stumps can be cut close to ground level but must not be removed or uprooted.	• Cutting of trees with SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment (e.g., a feller-buncher) that would result in minimal soil disturbance and damage to low-lying vegetation. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. • Cutting of trees near permanent streams must be limited to those meeting National Electrical Safety Code and danger tree requirements. • Stumps can be cut close to ground level but must not be removed or uprooted.	• Cutting of trees within 30 meters (100 feet) of the unique habitat must be discussed in advance with Environmental Stewardship and Policy staff, preferably during the on-site planning session. Cutting of trees near the unique habitat must be kept to an absolute minimum. • Stumps must not be removed, uprooted, or cut shorter than 1 foot above the ground line.
4. Other Vegetation	• Other vegetation near streams must be disturbed as little as possible during construction. • Soil displacement by the actions of plowing, disking, blading, or other tillage or grading equipment will not be allowed in SMZs; however, a minimal amount of soil disturbance may occur as a result of clearing operations. • Shorelines that have to be disturbed must be stabilized as soon as feasible.	• Other vegetation near streams must be disturbed as little as possible during construction. • Soil displacement by the actions of plowing, disking, blading, or other tillage or grading equipment will not be allowed in SMZs; however, a minimal amount of soil disturbance may occur as a result of clearing operations. • Shorelines that have to be disturbed must be stabilized as soon as possible and revegetated as soon as feasible.	• Other vegetation near the unique habitat must be disturbed as little as possible during construction. • The soil must not be disturbed by plowing, disking, blading, or grading. • Areas that have to be disturbed must be stabilized as soon as possible and revegetated as soon as feasible, in some cases with specific kinds of native plants. These and other vegetative requirements will be coordinated with Environmental Stewardship and Policy staff.

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Appendix E – Tennessee Valley Authority Environmental Protection Procedures Right-of-Way Vegetation Management Guidelines

1.0 Overview

A. The Tennessee Valley Authority (TVA) must manage the vegetation on its rights-of-way and easements to ensure emergency maintenance access and routine access to structures, switches, conductors, and communications equipment. In addition, TVA must maintain adequate clearance, as specified by the National Electrical Safety Code, between conductors and tall-growing vegetation and other objects. This requirement applies to vegetation within the right-of-way as well as to trees located off the right-of-way.

B. Each year TVA assesses the conditions of the vegetation on and along its rights-of-way. This is accomplished by aerial inspections, periodic field inspections, aerial photography, and information from TVA personnel, property owners, and the general public. Important information gathered during these assessments includes the coverage by various vegetation types, the mix of plant species, the observed growth, the seasonal growing conditions, and the density of the tall vegetation. TVA also evaluates the proximity, height, and growth rate of trees adjacent to the right-of-way that may be a danger to the line or structures.

C. TVA right-of-way specialists develop a vegetation reclearing plan that is specific to each line segment and is based on terrain conditions, species mix, growth, and density.

2.0 Right-of-Way Management Options

A. TVA uses an integrated vegetation management approach. In farming areas, TVA encourages property owner management of the right-of-way using low-growing crops. In dissected terrain with rolling hills and interspersed woodlands, TVA uses mechanical mowing to a large extent.

B. When slopes become hazardous to farm tractors and rotary mowers, TVA may use a variety of herbicides specific to the species present with a variety of possible application techniques. When scattered small stands of tall-growing vegetation are present and access along the right-of-way is difficult or the path to such stands is very long, herbicides may be used.

C. In very steep terrain, in sensitive environmental areas, in extensive wetlands, at stream banks, and in sensitive property owner land use areas, hand clearing may be utilized. Hand clearing is recognized as one of the most hazardous occupations documented by the Occupational Safety and Health Administration. For that reason, TVA is actively looking at better control methods, including use of low-volume herbicide applications, occasional single tree injections, and tree growth regulators.

D. TVA does not encourage tree reclearing by individual property owners because of the high hazard potential of hand clearing, possible interruptions of the line, and

electrical safety considerations for untrained personnel that might do the work. Private property owners may reclear the right-of-way with trained reclearing professionals.

E. Mechanical mowers not only cut the tall saplings and seedlings on the right-of-way, they also shatter the stump and the supporting near-surface root crown. The tendency of resistant species is to resprout from the root crown, and shattered stumps can produce a multistem dense stand in the immediate area. Repeated use of mowers on short cycle reclearing with many original stumps regrowing in the above manner can create a single species thicket or monoculture. With the original large root system and multiple stems, the resistant species can produce regrowth at the rate of 5-10 feet in a year. In years with high rainfall, the growth can reach 12-15 feet in a single year. These dense, monoculture stands can become nearly impenetrable for even large tractors. Such stands have low diversity and little wildlife food or nesting potential and become a property owner's concern. Selective herbicide application may be used to control monoculture stands.

F. TVA encourages property owners to sign an agreement to manage rights-of-way on their land for wildlife under the auspices of "Project Habitat," a joint project by TVA, BASF, and wildlife organizations, e.g., National Wild Turkey Federation, Quail Unlimited, and Buckmasters. The property owner maintains the right-of-way in wildlife food and cover with emphasis on quail, turkey, deer, or other wildlife. A variation used in or adjacent to developing suburban areas is to sign agreements with the developer and residents to plant and maintain wildflowers on the right-of-way.

G. TVA places strong emphasis on managing rights-of-way in the above manner. When the property owners do not agree to these opportunities, TVA must maintain the right-of-way in the most environmentally acceptable, cost-effective, and efficient manner possible.

3.0 Herbicide Program

A. TVA has worked with universities (such as Mississippi State University, University of Tennessee, Purdue University, and others), chemical manufacturers, other utilities, U.S. Department of Transportation, U.S. Fish and Wildlife Service (USFWS), and U.S. Forest Service (USFS) personnel to explore options for vegetation control. The results have been strong recommendations to use species-specific, low-volume herbicide applications in more situations. Research, demonstrations, and other right-of-way programs show a definite improvement of rights-of-way treated with selective low-volume applications of new herbicides using a variety of application techniques and timing.

B. Low-volume herbicide applications are recommended since research demonstrates much wider plant diversity after such applications. There is better ground erosion protection, and more wildlife food plants and cover plants develop. In most situations, there is increased development of wild flowering plants and shrubs. In conjunction with herbicides, the diversity and density of low-growing plants provide control of tall-growing species through competition.

C. Wildlife managers often request the use of herbicides in place of rotary mowing in order to avoid damage to nesting and tunneling wildlife. This method retains ground

cover year-round with a better mix of food species and associated high-protein insect populations for birds in the right seasons. Most also report less damage to soils (even when compared with rubber-tired equipment).

D. Property owners interested in tree production often request the use of low-volume applications rather than hand- or mechanical clearing because of the insect and fungus problems in damaged vegetation and debris left on the right-of-way. The insect and fungus invasions, such as pine tip moth, oak leaf blight, sycamore and dogwood blight, etc., are becoming widespread across the nation.

E. Best management practices (BMPs) governing application of herbicides are contained within *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities,* which is incorporated by reference. Herbicides can be liquid, granular, or powder and can be applied aerially or by ground equipment and may be selectively applied or broadcast, depending on the site requirements, species present, and condition of the vegetation. Water quality considerations include measures taken to keep herbicides from reaching streams whether by direct application or through runoff of or flooding by surface water. "Applicators" must be trained, licensed, and follow manufacturers' label instructions, U.S. Environmental Protection Agency (USEPA) guidelines, and respective state regulations and laws.

F. When herbicides are used, their potential adverse impacts are considered in selecting the compound, formulation, and application method. Herbicides that are designated "Restricted Use" by USEPA require application by or under the supervision of applicators certified by the respective state control board. Aerial and ground applications are either done by TVA or by contractors in accordance with the following guidelines identified in TVA's BMPs manual:

    1. The sites to be treated are selected and application directed by the appropriate TVA official.

    2. A preflight walking or flying inspection is made within 72 hours prior to applying herbicides aerially. This inspection ensures that no land use changes have occurred, that sensitive areas are clearly identified to the pilot, and that buffer zones are maintained.

    3. Aerial application of liquid herbicides will normally not be made when surface wind speeds exceed 5 miles per hour, in areas of fog, or during periods of temperature inversion.

    4. Pellet application will normally not be made when the surface wind speeds exceed 10 miles per hour or on frozen or water-saturated soils.

    5. Liquid application is not performed when the temperature reaches 95 degrees Fahrenheit or above.

    6. Application during unstable, unpredictable, or changing weather patterns is avoided.

    7. Equipment and techniques are used that are designed to ensure maximum control of the spray swath with minimum drift.

8. Herbicides are not applied to surface water or wetlands unless specifically labeled for aquatic use. Filter and buffer strips will conform at least to federal and state regulations and any label requirements. The use of aerial or broadcast application of herbicides is not allowed within a streamside management zone (SMZs) (200 feet minimum width) adjacent to perennial streams, ponds, and other water sources. Hand application of certain herbicides labeled for use within SMZs is used only selectively.

9. Buffers and filter strips (200 feet minimum width) are maintained next to agricultural crops, gardens, farm animals, orchards, apiaries, horticultural crops, and other valuable vegetation.

10. Herbicides are not applied in the following areas or times: (a) in city, state, and national parks or forests or other special areas without written permission and/or required permits, (b) off the right-of-way, and (c) during rainy periods or during the 48-hour interval prior to rainfall predicted with a 20 percent or greater probability by local forecasters, when soil active herbicides are used.

G. Table 1 - Herbicides Currently Used on TVA Rights-of-Way

Trade Name	Active Ingredients	Label Signal Word
Accord	Glyphosate/Liquid	Caution
Arsenal	Imazapyr/Liquid/Granule	Caution
Escort	Metsulfuron Methyl/Dry Flowable	Caution
Garlon	Triclopyr/Liquid	Caution
Garlon 3A	Triclopyr/Liquid	Danger
Transline	Clopyralid/Liquid	Caution
Pathfinder II	Triclopyr/RTU	Caution
Krenite S	Fosamine Ammonium	Caution
Spike 20P	Tebuthiuron	Caution
Chopper	Imazapyr/RTU	Caution
Roundup	Glyphosate/Liquid	Caution
Roundup Pro	Glyphosate	Caution

H. Table 2 - Preemergent Herbicides Currently Used for Bare Ground Areas on TVA Rights-of-Way and Substations

Trade Name	Active Ingredients	Label Signal Word
Topsite	Diuron/Imazapyr	Caution
SpraKil SK-26	Tebuthiuron and Diuron	Caution
Sahara	Diuron/Imazapyr	Caution

I. Table 3 - Tree Growth Regulators (TGRs) Currently Used on TVA Rights-of-Way

Trade Name	Active Ingredients	Label Signal Word
TGR	Flurprimidol	Caution
Profile 2SC	TGR-paclobutrazol	Caution

TGRs may be used on tall trees that have special circumstances where they must be trimmed on a regular cycle.

J. TVA currently utilizes Activate Plus, manufactured by Terra, as an adjuvant to herbicides to improve the performance of the spray mixture. Application rates are consistent with the USEPA-approved label. The USFWS has expressed some concern on toxicity effects of surfactants on aquatic species. TVA is working in coordination with Mississippi State University and chemical companies to evaluate efficacy of additional low-toxicity surfactants, including LI700 as manufactured by Loveland Industries, through side-by-side test plots in the SMZs of area transmission lines.

K. The herbicides and TGRs listed above have been evaluated in extensive studies in support of registration applications and label requirements. Many have been reviewed in the USFS vegetation management environmental impact statements (EISs), and those evaluations are incorporated here by reference (USFS 1989a, 1989b, 2002a, and 2002b). To access electronic copies of these USFS EISs, see http://www.fs.fed.us/r8/planning/documents/vegmgmt/. The result of these reviews has been a consistent finding of limited environmental impact beyond that of control of the target vegetation. All the listed herbicides have been found to be of low environmental toxicity when applied by trained applicators following the label and registration procedures, including prescribed measures, such as buffer zones, to protect threatened and endangered species.

L. The rates of application utilized are those listed on the USEPA-approved label and consistent with utility standard practice throughout the Southeast. TVA currently uses primarily low-volume applications of foliar and basal applications of Accord (glyphosate) and Accord- (glyphosate) Arsenal (imazapyr) tank mixes. Glyphosate is one of the most widely used herbicidal active ingredients in the world and has been continuously the subject of numerous exhaustive studies and scrutiny to determine its potential impacts on humans, animals, and the environment.

4.0 Accord

A. Accord is labeled for vegetation management in forestry and utility right-of-way applications. It has a full aquatics label, and can be applied to emergent weeds in all bodies of fresh and brackish water. There is limited restriction on the use of treated water for irrigation, recreation, or domestic purposes. Accord is applied to the foliage of actively growing plants. The active ingredient is absorbed through the leaves and rapidly moves throughout the plant. Glyphosate prevents the plant from producing amino acids, which are unique to plants and which are building blocks of plant proteins. The plant, unable to make proteins, stops growing and dies.

B. The favorable environmental fate characteristic of Accord herbicide and its major metabolite (breakdown product) aminomethylphosphonic acid (AMPA) is well known. Continuing research is underway with more than 400 studies conducted to

date in the laboratory and under field use conditions. These studies show rapid breakdown, little soil or plant debris retention, and little vertical movement into soil below the surface.

C. Glyphosate is naturally degraded by microbes in soil and water under both aerobic (with oxygen) and anaerobic (without oxygen) conditions. AMPA is further degraded in soil and sediments to phosphorus, nitrogen, hydrogen, and carbon dioxide. Glyphosate binds rapidly and completely to a wide range of soils and sediment when introduced into the environment. This essentially eliminates movement in the soil. The average half-life of glyphosate in soils is less than 45 days. Half-life for the dissipation of glyphosate in environmental waters ranges from 1.5 to 14 days.

D. Glyphosate is nontoxic to birds, mammals, and bees and has been shown not to bioaccumulate, since it acts in plants through an enzyme system that does not exist in animals or humans.

5.0 Arsenal

A. Arsenal (imazapyr) has been similarly tested, and it is found to have low leaching potential in soils. When available on or in the soil, it is broken down rapidly by soil microbes to naturally occurring compounds. When not available, imazapyr is bound tightly to soil colloids and is unavailable for movement. The half-life in soil is 25 to 65 days.

B. Extensive chronic and acute toxicity studies have made Arsenal a USEPA-classified herbicide as practically nontoxic to humans, mammals, birds, fish, aquatic invertebrates, and insects. The chronic studies demonstrate that Imazapyr is non-teratrogenic, non-mutagenic, and not a carcinogen.

C. The mode of action suppresses amino acids of the plant via an enzyme system containing acetohydroxy acid synthase. This enzyme system does not exist in other forms of life, including humans and animals.

6.0 References

U.S. Forest Service. 1989a. *Vegetation Management in the Coastal Plain/Piedmont Final Environmental Impact Statement*, Volumes I and II. Southern Region Management Bulletin R8-MB-23, January 1989. Atlanta, Ga.: USDA Forest Service.

———. 1989b. *Vegetation Management in the Appalachian Mountains Final Environmental Impact Statement*, Volumes I and II. Southern Region Management Bulletin R8-MB-38, July 1989. Atlanta, Ga.: USDA Forest Service.

———. 2002a. *Vegetation Management in the Appalachian Mountains Final Environmental Impact Statement Supplement*. Southern Region Management Bulletin R8-MB-97A, October 2002. Atlanta, Ga.: USDA Forest Service.

———. 2002b. *Vegetation Management in the Coastal Plain/Piedmont Final Environmental Impact Statement Supplement*. Southern Region Management Bulletin R8-MB-98A, October 2002. Atlanta, Ga.: USDA Forest Service.

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Appendix F – Tennessee Valley Authority Site Clearing and Grading Specifications

1. General - The project manager with the clearing and/or grading contractor(s) shall review the environmental evaluation documents for the project or proposed activity (categorical exclusion checklist, environmental assessment, or environmental impact statement) along with all clearing and construction appendices, conditions in applicable general and/or site-specific permits, the storm water pollution prevention plan, open burning or demolition notification requirements, and any Tennessee Valley Authority (TVA) commitments to property owners. The contractor shall then plan and carry out operations using techniques consistent with good engineering and storm water management practices as outlined in TVA's best management practices (BMPs) manual. The contractor will protect areas that are to be left unaffected by access or clearing work at and adjacent to all work sites. In sensitive areas and their buffers, the contractor will retain as much native ground cover and other vegetation as possible. BMPs shall be installed before general site clearing or grading, with progressive stabilization BMPs applied from the perimeter toward the interior work areas as grading is completed. Any stabilized area that must be disturbed in subsequent steps shall have temporary BMPs installed until work is completed and the area is restabilized.

   If the contractor fails to use BMPs or to follow environmental expectations discussed in the prebid, prework meeting or present in contract specifications, TVA will order corrective changes and additional work, as deemed necessary in TVA's judgment, to meet the intent of environmental laws and regulations or other guidelines. Major violations or continued minor violations will result in work suspension until correction of the situation is achieved or other remedial action is taken at the contractor's expense. Penalty clauses may be invoked as appropriate.

2. Regulations - The clearing contractor shall comply with all applicable federal, state, and local environmental and antipollution laws, regulations, and ordinances, including without limitation, all air, water, solid and hazardous waste, noise, and nuisance laws, regulations, and ordinances. He or she shall secure, or ensure that TVA has **secured, all necessary permits and authorizations and made all appropriate notifications** to conduct work on the acres shown on the drawings and plan and profile for the contract. The contractor's designated project manager will actively seek to prevent, control, monitor, and safely abate all commonly recognized forms of workplace and environmental pollution. Permits or authorizations and **any necessary certifications of trained employees knowledgeable of environmental requirements shall be documented** with copies submitted to TVA's project manager or environmental specialist before work begins. The **contractor and subcontractors will be responsible for meeting all** conditions **specified in permits.** Permit conditions shall be reviewed in prework discussions.

3. Land and Landscape Preservation - The contractor shall exercise care to preserve the condition of cleared soils by avoiding as much compacting and deep scarring as possible in areas not to be developed for buildings, structures, or foundations. As soon as possible after initial disturbance of the soil and in accordance with any permit(s) or other state or local environmental regulatory requirements, cover material shall be placed to prevent erosion and sedimentation of water bodies or conveyances to

surface water or groundwater. The placement of erosion/sediment controls shall begin at the perimeter and work progressively to the interior of the site. Repeated work in an area will require establishment of a ground cover immediately after each disturbance is completed. In areas outside the clearing, borrow, fill, or use and access areas, the natural vegetation shall be protected from damage. The contractor and his or her employees and subcontractors must not deviate from delineated access routes or use areas and must enter the site(s) at designated areas that will be marked. Clearing operations shall be conducted to prevent any unnecessary destruction, scarring, or defacing of the remaining natural vegetation and adjacent surroundings in the vicinity of the work. In sensitive public or environmental areas, appropriate buffer zones shall be observed by modifying the methods of clearing or reclearing, grading, borrow, or fill so that the buffer and sensitive area are protected. Some areas may require planting native low-growing plants or grasses to meet the criteria of regulatory agencies, executive orders, or commitments to special program interests.

4. Streamside Management Zones - The clearing and/or grading contractor(s) must leave as many rooted ground cover plants as possible in buffer zones along streams and other bodies of water or wet-weather conveyances thereto. In such streamside management zones (SMZs), tall-growing tree species (trees that would interfere with TVA's National Electrical Safety Code clearances) shall be cut, and the stumps may be treated to prevent resprouting. Low-growing trees identified by TVA as marginal electrical clearance problems may be cut and then the stump treated with growth regulators to allow low, slow-growing canopy development and active root growth. Only approved herbicides shall be used, and herbicide application shall be conducted by certified applicators from the Transmission Operations and Maintenance (TOM) organization after initial clearing and construction. Cutting of trees within SMZs must be accomplished by using either hand-held equipment or other appropriate clearing equipment, such as a feller-buncher. The method will be selected based on site-specific conditions and topography to minimize soil disturbance and impacts to the SMZ and surrounding area. Disturbed soils in SMZs must be stabilized by appropriate methods immediately after the access or site is cleared. Stabilization must occur within the time frame specified in applicable storm water permits or regulations. Stumps within SMZs may be cut close to the ground but must not be removed or uprooted. Trees, limbs, and debris shall be prevented from falling into water bodies or immediately removed from streams, ditches, ponds, and wet areas using methods that will minimize dragging or scarring the banks or stream bottom. No debris will be left in the water or watercourse. Equipment will cross streams, ditches, or wet areas only at locations designated by TVA after the application of appropriate erosion-control BMPs and consistent with permit conditions or regulatory requirements.

5. Wetlands - In forested wetlands, tall trees will be cut near the ground, leaving stumps and roots in place. The cambium may be treated with herbicides applied by certified applicators from the TOM organization to prevent regrowth. Understory trees that must be initially cut and removed may be allowed to grow back or may be treated with tree growth regulators selectively to slow growth and increase the reclearing cycle. The decision will be situationally made based on existing ground cover, wetland type, and tree species, since tall tree removal may "release" understory species and allow them to quickly grow to "electrical clearance problem" heights. In many circumstances, herbicides labeled for water and wetland use may be used in reclearing.

At substation, switching stations, and communications sites, wetlands are avoided unless there is no feasible alternative.

6. Sensitive Area Preservation - If prehistoric or historic artifacts or features that might be of archaeological or historical significance are discovered during clearing, grading, borrow, or fill operations, the activity shall immediately cease within a 100-foot radius, and a TVA project manager, an environmental specialist, and the TVA Cultural Resources program manager shall be notified. The site shall be protected and left as found until a determination about the resources, their significance, and site treatment is made by TVA's Cultural Resources Program. Work may continue beyond the finding zone and the 100-foot radius beyond its perimeter.

7. Water Quality Control - The contractor's clearing, grading, borrow and fill, and/or disposal activities shall be performed using BMPs that will prevent erosion and entrance of spillage, contaminants, debris, and other pollutants or objectionable materials into drainageways, surface waters, or groundwater. Special care shall be exercised in refueling equipment to prevent spills. Fueling areas shall be remote from any sinkhole, crevice, stream, or other water body. Open burning debris shall be kept away from streams and ditches and shall be incorporated into the soil. Only materials allowed to be burned under an open burning permit may be incorporated into the soil.

   The clearing and grading contractor(s) and subcontractors will erect and (when TVA or contract construction personnel are unable) maintain BMPs, such as silt fences, on steep slopes and adjacent to any steam, wetland, or other water body. BMPs will be inspected by the TVA field engineer or other designated TVA or contractor personnel routinely and at least as frequently as required by the permit or good management practices and during periods of high runoff; any necessary repairs will be made as soon as practicable. BMP runoff sampling will be conducted in accordance with permit requirements. Records of all inspections and sampling will be maintained on site, and copies of inspection forms and sampling results will be forwarded to the TVA environmental specialist.

8. Turbidity and Blocking of Streams - If temporary clearing, grading, borrow, or fill activities must interrupt natural drainage, appropriate drainage facilities and erosion/sediment controls shall be provided to avoid erosion and siltation of streams and other water bodies or water conveyances. In Tennessee, conditions of an Aquatic Resource Alteration Permit shall be met. Turbidity levels in receiving waters or at storm water discharge points shall be monitored, documented, and reported if required by the applicable permit. Erosion and sediment control measures such as silt fences, water bars, and sediment traps shall be installed as soon as practicable after initial access, site, borrow, fill, or right-of-way disturbance and after sequential disturbance of stabilized areas due to stepwise construction requirement in accordance with applicable permit or regulatory requirements.

   On rights-of-way, mechanized equipment shall not be operated in flowing water except when approved and then only to construct necessary stream crossings under direct guidance of TVA.

   Construction of stream fords or other crossings will only be permitted at approved locations and to current TVA design or construction access road standards. At any construction site, material shall not be deposited in watercourses or within stream bank

areas where it could be washed away by high stream flows. Any clearing debris that enters streams or other water bodies shall be removed immediately. Appropriate U.S. Army Corps of Engineers and state permits shall be obtained for stream or wetland crossings.

9. Air Quality Control - The clearing or grading contractor shall take appropriate actions to limit the amount of air emissions created by clearing and disposal operations to be well within the limits of clearing or burning permits and/or forestry or local fire department requirements. All operations must be conducted in a manner that prevents nuisance conditions or damage to adjacent land, crops, dwellings, highways, or people. If building renovation or demolition is involved, the required air quality organization shall be notified the minimum 10 days in advance, and if the start date is delayed, renotified to start the clock again.

10. Dust and Mud Control - Clearing, grading, borrow, fill, or transport activities shall be conducted in a manner that minimizes the creation of fugitive dust. This may require limitations as to type of equipment, allowable speeds, and routes utilized. Control measures such as water, gravel, etc., or similar measures may be used subject to TVA approval. On new construction sites and easements, the last 100 feet before an access road approaches a county road or highway shall be graveled to prevent transfer of mud onto the public road.

11. Burning - The contractor shall obtain applicable permits and approvals to conduct controlled burning. The contractor will comply with all provisions of the permit, notification or authorization including burning site locations, controlled draft, burning hours, and such other conditions as stipulated. If weather conditions such as wind speed or wind direction change rapidly, the contractor's burning operation may be temporarily stopped by TVA's field engineer. The debris to be burned shall be kept as clean and dry as possible and stacked and burned in a manner that produces the minimum amount of smoke. Residue from burning will be disposed of according to permit stipulations. No fuel starters or enhancements other than kerosene will be allowed.

12. Smoke and Odors - The contractor will properly store and handle combustible and volatile materials that could create objectionable smoke, odor, or fumes. The contractor shall not burn oil or refuse that includes trash, rags, tires, plastics, or other manufactured debris.

13. Vehicle Exhaust Emissions - The contractor shall maintain and operate equipment in a manner that limits vehicle exhaust emissions. Equipment and vehicles will be kept within the manufacturer's recommended limits and tolerances. Excessive exhaust gases will be eliminated, and inefficient operating procedures will be revised or halted until corrective repairs or adjustments are made.

14. Vehicle Servicing - Routine maintenance of vehicles will not be performed on the site, right-of-way, or access route. However, if emergency or “have to” situations arise, minimal/temporary maintenance to vehicles will occur in order to mobilize the vehicle to an off-site maintenance shop. Some heavy equipment may have to be serviced on the right-of-way, site, or access route, except in designated sensitive areas. The clearing, grading, borrow, or fill contractor will properly maintain these vehicles with approved spill protection controls and countermeasures. If emergency maintenance in a

sensitive or questionable area arises, the Area Environmental Program Administration or project manager will be consulted. All wastes and used oils will be properly recovered, handled, and disposed/recycled. Equipment shall not be temporarily stored in stream floodplains, whether overnight or on weekends or holidays.

15. Noise Control - The contractor shall take steps to avoid the creation of excessive sound levels for employees, the public, or the site and adjacent property owners. Concentration of individual noisy pieces as well as the hours and locations of operation should be considered.

16. Noise Suppression - All internal combustion engines shall be properly equipped with mufflers. The equipment and mufflers shall be maintained at peak operating efficiency.

17. Sanitation - A designated representative of TVA or the clearing, grading, borrow, fill, or construction contractor shall contract a sanitary contractor who will provide sanitary chemical toilets convenient to all principal points of operation for every working party and at each construction step. The facilities shall comply with applicable federal, state, or local health laws and regulations. They shall not be located closer than 100 feet to any stream or tributary or to any wetland. The facilities shall be required to have proper servicing and maintenance, and the waste disposal contractor shall verify in writing that the waste disposal will be in state-approved facilities. Employees shall be notified of sanitation regulations and shall be required to use the toilet facilities.

18. Refuse Disposal - The clearing, grading, borrow, fill, or construction contractor and subcontractor(s) shall be responsible for daily cleanup and proper labeling, storage, and disposal of all refuse and debris on the site produced by his or her operations and employees. Facilities that meet applicable regulations and guidelines for refuse collection will be required. Only approved transport, storage, and disposal areas shall be used. Records of waste generation shall be maintained for a site and shall be provided to the project manager and environmental specialist assigned to the project.

19. Brush and Timber Disposal (Initial Clearing) - For initial clearing, trees are commonly part of the contractor’s contract to remove as they wish. Trees may be removed from the site for lumber or pulpwood, or they may be chipped or stacked and burned. All such activities must be coordinated with the TVA field engineer and the open burning permits; notifications and regulatory requirements must be met. On rights-of-way, trees may be cut and left in place only in areas specified by TVA and approved by appropriate regulatory agencies. These areas may include sensitive wetlands or SMZs where tree removal would cause excessive ground disturbance or in very rugged terrain where windrowed trees are used as sediment barriers along the edge of the right-of-way, site, or access.

    Trees that have been cut may not be left on a substation, switching station, or communications site.

20. Restoration of Site - All disturbed areas, with the exception of farmland under cultivation and any other areas as may be designated by TVA's specifications, shall be stabilized in the following manner unless the property owner and TVA's engineer specify a different method:

A. The subsoil shall be loosened to a minimum depth of 6 inches if possible and worked to remove unnatural ridges and depressions.

B. If needed, appropriate soil amendments will be added.

C. All disturbed areas will initially be seeded with a temporary ground cover such as winter wheat, rye, or millet, depending on the season. Perennials may also be planted during initial seeding if proper growing conditions exist. Final restoration and final seeding will be performed as line, site, or communications facilities construction is completed. Final seeding will consist of permanent perennial grasses such as those outlined in TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities.* Exceptions would include those areas designated as native grass planting areas. Initial and final restoration will be performed by the clearing contractor with emphasis on using landscaping materials provided in guidelines for low maintenance native vegetation use.

D. TVA holds the option, depending upon the time of year and weather condition, to delay or withdraw the requirement of seeding until more favorable planting conditions are certain. In the meantime, other stabilization techniques must be applied.

E. Vegetation designated by the Federal Invasive Species Council must be eliminated at the work site, and equipment being transported from location to location must be inspected to ensure removal and destruction of live material.

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Appendix G – Watercourses Crossed by the Proposed SeverCorr 2 – Catalpa Creek – Lowndes County Power Improvement Project

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SeverCorr 2 - Catalpa Creek - Lowndes County Power Supply Improvement Project			
Sequence Identification	**Stream Category**	**SMZ Category**	**Field Notes**
A. Columbus AFB-West Columbus			
011	Intermittent	SMZ A	6-foot-wide, 3-foot-deep channel; incised banks 15 feet deep; slope 125 percent on both banks
012	Intermittent	SMZ A	5-foot-wide, 3-foot-deep channel
013	Perennial	SMZ A	Tombigbee River; 600+ feet across
014	Pond	SMZ A	Pond
015	Embayment	SMZ A	Embayment; part of Columbus Lake
016	Embayment	SMZ A	Embayment; part of Columbus Lake
017	Perennial	SMZ A	Tributary (backwater) to Columbus Lake
018	Perennial	SMZ A	15 feet wide by 10 feet deep
R001	Perennial	SMZ A	6-foot by 4-foot channel with sand/silt substrate; channel disturbed by cattle; residual pools downstream of crossing
B. West Columbus-SeverCorr and SeverCorr Switching Station			
001C	Perennial	SMZ A	15-foot-wide, 8-foot-deep channel; forested; sewage treatment plant located east of stream
002C	Perennial	SMZ A	4-foot-wide, 1-foot-deep channel; forested; sedimentation deposits present on bank vegetation
003C	Intermittent	SMZ A	4-foot-wide, 1- to 2-foot-deep channel
004C	Intermittent	SMZ A	4-foot-wide, 1- to 2-foot-deep channel
C. West Columbus Switching Station			
001	Pond	SMZ A	Farm pond
002	Intermittent	SMZ A	Large 18-foot-wide by 8-foot-deep channel
003	Intermittent	SMZ A	Large 18-foot-wide by 8-foot-deep channel
004	Pond	SMZ A	Farm pond
005	Intermittent	SMZ A	5 feet wide, 3 feet deep; culverted at road
006	Intermittent	SMZ A	3-foot-wide, 2-foot-deep channel
007	Intermittent	SMZ A	
008	Intermittent	SMZ A	
009	Intermittent	SMZ A	.
010	Perennial	SMZ A	
D. 161-kV Tap to Stinson Creek			
019	Perennial	SMZ A	3-foot-wide by 3-foot-deep channel in old clearing; good water flow present at time of survey
E. SeverCorr-Catalpa Creek			
005C	Intermittent	SMZ A	6-foot-wide by 6-foot-deep channel; forested; no water, but live mussels present
006C	Perennial	SMZ A	10-foot-wide by 1-foot-deep channel; forested; mussels present
007C	Intermittent	SMZ A	Feeds perennial stream 006C
008C	Pond	SMZ A	Large pond
009C	Intermittent	SMZ A	8-foot-wide by 4-foot-deep channel; located in wooded corridor between two fields

Note: Wet weather conveyances are considered watercourses but are not captured in a table.