

**MUSCLE SHOALS RESERVATION OPERATIONS
RELOCATION
DRAFT ENVIRONMENTAL ASSESSMENT
Colbert County, Alabama**

Prepared by:
TENNESSEE VALLEY AUTHORITY
Chattanooga, Tennessee

August 2016

To request further information, contact:
Dr. Charles Nicholson,
NEPA Compliance
Tennessee Valley Authority
400 West Summit Hill Drive, WT 11D
Knoxville, TN 37902
Phone: 865-632-3582

This page intentionally left blank

Table of Contents

CHAPTER 1 – PURPOSE AND NEED FOR ACTION.....	1
1.1 Introduction and Background	1
1.2 Purpose and Need	1
1.3 Decision to be Made	1
1.4 Summary of Proposed Action	1
1.5 Related Environmental Reviews	2
1.6 Scope of the Environmental Assessment	3
1.7 Public and Agency Involvement.....	3
1.8 Necessary Permits and Licenses.....	4
CHAPTER 2 – ALTERNATIVES	5
2.1 Description of Alternatives	5
2.1.1 Alternative A – The No Action Alternative	6
2.1.2 Alternative B – Construct a New Facility on Reservation Road	7
2.1.3 Alternative C – Modify the River Road Complex	8
2.1.4 Alternatives Considered but Eliminated from Further Discussion	8
2.2 Comparison of Alternatives	9
2.3 Identification of Avoidance, Minimization and Mitigation Measures	10
2.4 The Preferred Alternative	11
CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES.....	13
3.1 Air Quality.....	14
3.1.1 Affected Environment	14
3.1.2 Environmental Consequences.....	14
3.1.2.1 Alternative A – No Action	14
3.1.2.2 Alternative B – Construct a New Facility on Reservation Road.....	14
3.1.2.3 Alternative C – Modify the River Road Complex	15
3.2 Climate Change and Greenhouse Gases	16
3.2.1 Affected Environment	16
3.2.2 Environmental Consequences.....	17
3.2.2.1 Alternative A – No Action	17
3.2.2.2 Alternative B – Construct a New Facility on Reservation Road.....	17
3.2.2.3 Alternative C – Modify the River Road Complex	17
3.3 Land Use	17
3.3.1 Affected Environment	17
3.3.2 Environmental Consequences.....	19
3.3.2.1 Alternative A – No Action	19
3.3.2.2 Alternative B – Construct a New Facility on Reservation Road.....	19
3.3.2.3 Alternative C – Modify the River Road Complex	19
3.4 Prime Farmland.....	20
3.4.1 Affected Environment	20
3.4.2 Environmental Consequences.....	20
3.4.2.1 Alternative A – No Action	20
3.4.2.2 Alternative B – Construct a New Facility on Reservation Road.....	20
3.4.2.3 Alternative C – Modify the River Road Complex	21
3.5 Surface Water	21
3.5.1 Affected Environment	21
3.5.2 Environmental Consequences.....	24

Muscle Shoals Reservation Operations Relocation

3.5.2.1	Alternative A – No Action	24
3.5.2.2	Alternative B – Construct a New Facility on Reservation Road.....	24
3.5.2.3	Alternative C – Modify the River Road Complex	24
3.6	Vegetation	25
3.6.1	Affected Environment	25
3.6.2	Environmental Consequences.....	27
3.6.2.1	Alternative A – No Action	27
3.6.2.2	Alternative B – Construct a New Facility on Reservation Road.....	27
3.6.2.3	Alternative C – Modify the River Road Complex	27
3.7	Wildlife.....	28
3.7.1	Affected Environment	28
3.7.2	Environmental Consequences.....	29
3.7.2.1	Alternative A – No Action	29
3.7.2.2	Alternative B – Construct a New Facility on Reservation Road.....	29
3.7.2.3	Alternative C – Modify the River Road Complex	29
3.8	Threatened and Endangered Species	29
3.8.1	Affected Environment	29
3.8.1.1	Animals	30
3.8.1.2	Plants	33
3.8.1.3	Alternative B – Construct a New Facility on Reservation Road.....	34
3.8.1.4	Alternative C – Modify the River Road Complex	35
3.9	Solid/Hazardous Waste.....	35
3.9.1	Affected Environment	35
3.9.2	Environmental Consequences.....	36
3.9.2.1	Alternative A – No Action	36
3.9.2.2	Alternative B – Construct a New Facility on Reservation Road.....	36
3.9.2.3	Alternative C – Modify the River Road Complex	37
3.10	Socioeconomics	38
3.10.1	Affected Environment	38
3.10.1.1	Demographics	38
3.10.1.2	Economic Conditions	39
3.10.1.3	Community Facilities	40
3.10.1.4	Environmental Justice	40
3.10.2	Environmental Consequences.....	42
3.10.2.1	Alternative A – No Action	42
3.10.2.2	Alternative B – Construct a New Facility on Reservation Road.....	42
3.10.2.3	Alternative C – Modify the River Road Complex	43
3.11	Natural Areas, Parks and Recreation	43
3.11.1	Affected Environment	43
3.11.2	Environmental Consequences.....	45
3.11.2.1	Alternative A – No Action	45
3.11.2.2	Alternative B – Construct a New Facility on Reservation Road.....	45
3.11.2.3	Alternative C – Modify the River Road Complex	46
3.12	Transportation	46
3.12.1	Affected Environment	46
3.12.2	Environmental Consequences.....	47
3.12.2.1	Alternative A – No Action	47
3.12.2.2	Alternative B – Construct a New Facility on Reservation Road.....	47
3.12.2.3	Alternative C – Modify the River Road Complex	48
3.13	Visual Resources	48
3.13.1	Affected Environment	48

3.13.2 Environmental Consequences.....	49
3.13.2.1 Alternative A – No Action	49
3.13.2.2 Alternative B – Construct a New Facility on Reservation Road.....	49
3.13.2.3 Alternative C – Modify the River Road Complex	50
3.14 Cultural and Historic Resources	50
3.14.1 Affected Environment	50
3.14.1.1 Regulatory Framework for Cultural Resources.....	50
3.14.1.2 Area of Potential Effect	51
3.14.1.3 Previous Studies	52
3.14.2 Environmental Consequences.....	53
3.14.2.1 Alternative A – No Action	53
3.14.2.2 Alternative B – Construct a New Facility on Reservation Road.....	53
3.14.2.3 Alternative C – Modify the River Road Complex	53
3.15 Noise	54
3.15.1 Affected Environment	54
3.15.1.1 Noise Regulations	55
3.15.1.2 Background Noise Levels	56
3.15.1.3 Sources of Noise.....	56
3.15.2 Environmental Consequences.....	57
3.15.2.1 Alternative A – No Action	57
3.15.2.2 Alternative B – Construct a New Facility on Reservation Road.....	57
3.15.2.3 Alternative C – Modify the River Road Complex	58
3.16 Public Health and Safety.....	59
3.16.1 Affected Environment	59
3.16.2 Environmental Consequences.....	60
3.16.2.1 Alternative A – No Action	60
3.16.2.2 Alternative B – Construct a New Facility on Reservation Road.....	60
3.16.2.3 Alternative C – Modify the River Road Complex	61
3.17 Unavoidable Adverse Impacts	61
3.18 Relationship of Short-Term Uses and Long-Term Productivity	62
3.19 Irreversible and Irretrievable Commitments Effects Issues	62
3.20 Cumulative Effects	63
3.20.1 Scoping for Cumulative Effects Analysis.....	63
3.20.1.1 Identification of the Significant Cumulative Effects Issues.....	63
3.20.1.2 Geographic Area of Analysis	63
3.20.1.3 Identification of “Other Actions”	63
3.20.2 Analysis of Cumulative Effect.....	65
CHAPTER 4 – LITERATURE CITED	67
CHAPTER 5 – LIST OF PREPARERS	71
5.1 NEPA Project Management	71
5.2 Other Contributors.....	71

List of Appendices

Appendix A – Consultation Correspondence	75
--	----

List of Tables

Table 2-1.	Primary Characteristics of the Proposed Facility	8
Table 2-2.	Summary and Comparison of Alternatives by Resource Area	9
Table 3-1.	Land Use/Land Cover within Each of the Proposed Development Sites and the Region	18
Table 3-2.	Soil Types Mapped within the Proposed Development Sites	20
Table 3-3.	Species of Conservation Concern within Colbert County	30
Table 3-4.	Habitat Requirements for Plant Species of Conservation Concern within the Vicinity of the Reservation.....	34
Table 3-5.	Demographic Characteristics	39
Table 3-6.	Employment Characteristics	40
Table 3-7.	Average Daily Traffic Volume (2014) on Roadways in Proximity to the Reservation	47
Table 3-8.	Common Indoor and Outdoor Noise Levels.....	55
Table 3-9.	Typical Construction Equipment Noise Levels.....	58
Table 3-10.	Summary of Other Past, Present or Reasonable Foreseeable Future Actions in the Vicinity of the Proposed Project	64

List of Figures

Figure 1-1.	Project Location	2
Figure 2-1.	View 1 – Conceptual Perspective Drawing of the Proposed Facility	6
Figure 2-2.	View 2 – Conceptual Perspective Drawing of the Proposed Facility	6
Figure 2-3.	Alternatives B and C Site Utilization Areas	7
Figure 3-1.	Selected Natural Resources within the Proposed Development Sites	23
Figure 3-2.	Land Cover within 5 Miles of the Proposed Development Sites	26
Figure 3-3.	Land Cover within Proposed Development Sites.....	27
Figure 3-4.	Natural Areas, Parks and Community Facilities within 5 Miles of the Proposed Development Sites.....	44

Symbols, Acronyms and Abbreviations

ADEM	Alabama Department of Environmental Management
AHWMMA	Alabama Hazardous Wastes Management and Minimization Act
ALNHP	Alabama Natural Heritage Program
APE	Area of Potential Effect
BMP	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO₂	Carbon Dioxide
CSC	Customer Service Center
dB	Decibels
dBA	A-Weighted Decibel
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
ESA	Endangered Species Act of 1973
FPPA	Farmland Protection Policy Act
GHG	Greenhouse Gas
HUD	U.S. Department of Housing and Urban Development
Hz	Hertz
IPP	Incident Prevention Plan
Ldn	Day-Night Sound
Leq	Equivalent Sound Level
MGD	Million Gallons Per Day
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_x	Nitrous Oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
RCRA	Resource Conservation and Recovery Act of 1976
RLMP	Reservoir Land Management Plans
RM	River Mile
SHPO	State Historic Preservation Officer
SO₂	Sulfur Dioxide
SO_x	Sulfur Oxides
SPCC	Spill Prevention, Control, and Countermeasures Plan
SWMU	Solid Waste Management Unit
TSC	Transmission Service Center
TVA	Tennessee Valley Authority
USCB	U.S. Census Bureau
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VOC	Volatile Organic Compound
vpd	Vehicles Per Day

This page intentionally left blank

CHAPTER 1 – PURPOSE AND NEED FOR ACTION

1.1 Introduction and Background

The Tennessee Valley Authority (TVA) assumed custody and control of the 3,036-acre Muscle Shoals/Wilson Dam Reservation in Colbert County, Alabama, in 1933 when Congress directed its transfer to TVA from the U.S. War Department. TVA has since managed 2,600 acres of this non-reservoir property as the Muscle Shoals Reservation (Reservation). Since acquisition of the land, TVA's programs have changed over time and accordingly, the amount of property at this location is no longer essential to its needs. In November 2012, the TVA Board of Directors approved the sale (disposal) of 1,000 acres of the Reservation. In accordance with its economic development mission, TVA believes the sale (i.e., disposal) and redevelopment of this property would help stimulate and grow the local and regional economy. Transferring this portion of the Reservation from TVA ownership would also help TVA reduce its operations and maintenance costs and reduce its environmental footprint.

1.2 Purpose and Need

The TVA Board voted to sell approximately 1,000 acres of the Reservation in November 2012 and the first sale of a portion of this land occurred on August 28, 2015. Several TVA operations require a continuous TVA staff presence on the Reservation for the foreseeable future. Therefore, the TVA operations that are located on the portions of the Reservation being sold must be relocated to either new or existing facilities on portions of the Reservation that TVA intends to retain for the foreseeable future. As part of its Strategic Real Estate Planning efforts to reduce ongoing operation and maintenance costs, TVA is also looking for opportunities to consolidate its operations and minimize occupied space. The proposed action would help meet this objective.

1.3 Decision to be Made

TVA must decide whether to relocate essential operations into a newly constructed facility and the location of this new facility on the Reservation, or to modify an existing facility on the Reservation to house the relocated essential operations. TVA's decision will consider factors such as potential environmental impacts, economics, availability of resources and TVA's long-term goals. This Environmental Assessment (EA) is prepared to support the decision-making process and determine whether an Environmental Impact Statement (EIS) should be prepared.

1.4 Summary of Proposed Action

TVA plans to relocate essential operations including the Customer Service Center (CSC), the Transmission Service Center (TSC), the Data Center and the Weather Monitoring Station from their current locations to new locations on the Reservation. The CSC and TSC currently occupy a shared facility at the corner of Garage Road and Hatch Boulevard on the Reservation. The Data Center and Weather Monitoring Station are currently located in the Environmental Research Center Building (Figure 1-1). The TSC, Data Center and Weather Monitoring Station would be relocated to a new facility that would either be a newly constructed complex or developed by constructing and renovating an existing complex. The CSC would likely be relocated to the Multi-Purpose Building on the Reservation; this relocation is outside the scope of this EA.

Muscle Shoals Reservation Operations Relocation

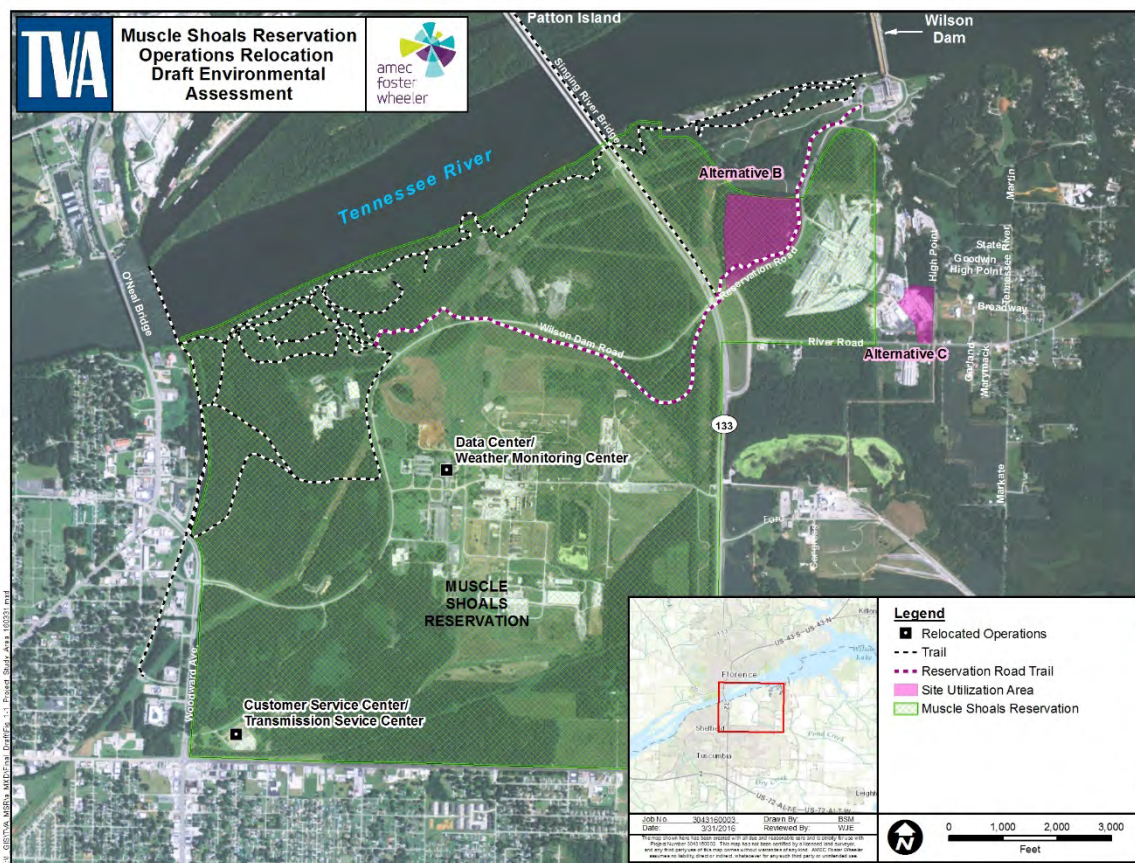


Figure 1-1. Project Location

1.5 Related Environmental Reviews

The following environmental reviews have been prepared for actions in the vicinity of the project location:

Muscle Shoals Outdoor Education and Recreation Area Improvements Environmental Assessment (TVA 2015). The EA addressed proposed improvements to the trail/recreation system located north of Reservation Road on the Reservation. Although the EA primarily addressed improvements proposed for three main trail heads, the Reservation Road Trail crosses the potentially affected area of the proposed operations relocation.

Muscle Shoals Reservation Redevelopment Final Environmental Impact Statement (TVA 2011). The EIS documented the potential environmental effects of the proposed sale of 1,400 acres of land on the Reservation in Colbert County, Alabama. After the final EIS was published, TVA worked with the local community to develop a comprehensive master plan to guide development of the land. During this process, TVA identified 400 acres of land that should be retained by TVA due to ongoing TVA business needs and limited development opportunities due to prior industrial operations. The TVA Board of Directors subsequently approved the disposal of approximately 1,000 acres instead of the 1,400 acres analyzed in the final EIS. The areas evaluated in this EA are not part of the 1,400 acres analyzed in

the EIS. However, the relocation of the operations currently on the land being disposed of is the action considered in this EA.

Muscle Shoals/Wilson Dam Reservation Land Use Plan Environmental Assessment (TVA 1996). TVA prepared this EA to evaluate land on the Reservation needed for TVA program uses and to identify areas that would be made available for external uses. The areas being considered for the relocated operations were allocated for Public Recreation and Open Space (Site B) and TVA Electric Utility Related Uses (Site C).

The description of the affected environment and the assessment of impacts contained in the documents listed above were used in support of the analyses of environmental resources in Chapter 3.

1.6 Scope of the Environmental Assessment

TVA prepared this EA to comply with the National Environmental Policy Act (NEPA), associated regulations promulgated by the Council on Environmental Quality (CEQ), and TVA's procedures for implementing NEPA. TVA considered the possible environmental effects of the proposed action and determined that the resources listed below are potentially impacted by the alternatives considered.

- Air Quality
- Noise
- Land Use
- Surface Water
- Vegetation
- Wildlife
- Threatened and Endangered Species
- Cultural and Historic Resources
- Visual Resources
- Natural Areas, Parks and Recreation
- Transportation
- Solid Waste and Hazardous Materials and Waste
- Socioeconomics and Environmental Justice

TVA's action would satisfy the requirements of Executive Order (EO) 11988 (Floodplains Management), EO 11990 (Protection of Wetlands), EO 12898 (Environmental Justice), EO 13112 (Invasive Species) and EO 13653 (Preparing the United States for the Impacts of Climate Change); and applicable laws including the National Historic Preservation Act (NHPA), Endangered Species Act (ESA), Clean Water Act, Clean Air Act, and Resource Conservation and Recovery Act (RCRA).

1.7 Public and Agency Involvement

TVA is issuing this draft EA for public review and comment. Its availability was announced in a TVA news release and in an advertisement in the Florence *TimesDaily* newspaper. The draft EA was also posted on TVA's website. Notifications of its availability were sent by mail or email to local, state and federal agencies and to individuals and organizations that had previously expressed an interest in the development of the Reservation. TVA has consulted with the Alabama State Historic Preservation Office and federally recognized tribes under Section 106 of the NHPA and is consulting with the U.S. Fish and Wildlife Service under Section 7 of the ESA. These consultations are described in more detail in Sections 3.14 and 3.8, respectively.

1.8 Necessary Permits and Licenses

The proposed action would be subject to the following environmental permit requirements and regulations:

- Alabama Department of Environmental Management (ADEM) General National Pollutant Discharge Elimination System (NPDES) Permit for stormwater discharge associated with construction activity.
- ADEM Construction Best Management Practices Plan to outline effective erosion and sediment controls for the General NPDES Permit.
- Potential modification of the existing NPDES Permit ALG140643 to address changes in surface water discharges resulting from the construction of the new facility.
- Notification to ADEM of planned alterations to the area covered by the Alabama Hazardous Wastes Management and Minimization Act (AHWMMA) permit (U.S. Environmental Protection Agency [USEPA] ID # AL2 640 090 005) for the TVA Power Service Center area.

CHAPTER 2 – ALTERNATIVES

2.1 Description of Alternatives

Two sites on the reservation have been identified for construction of the new facility to house the relocated operations. Minimal requirements for the facility include the following:

- 10,000 square feet (sf) office and support building,
- 4,000 sf of hardened structure for data center and weather station,
- 12,600 sf climate-controlled truck garage,
- Parking to accommodate up to 40 employees, plus additional personnel for area-wide meetings,
- 8,500 sf truck and equipment shed building with hazardous material (hazmat) storage,
- 3-acre graveled storage/lay-down yard for transmission facility components (e.g., poles, insulators, conductors and transformers) and
- Two detention basins for stormwater.

Although still in the early design phase, it is expected that the facility would likely be one story tall with an elevated roof over the truck garage area, would be enclosed by security fencing and would require electric, natural gas, potable water, sanitary wastewater and communications services. A diesel-fueled generator would be installed to provide backup electrical power. Fuel for the generator would be stored in an above-ground double-walled storage tank.

To help meet its building energy management and sustainability objectives, the site and building design would incorporate requirements of EO 13423 and EO 13514 on Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings and the associated Guiding Principles for New Construction and Major Renovation. These design components include onsite detention of storm water runoff, and the incorporation of measures designed to optimize energy performance, protect and conserve water, enhance indoor environmental quality, and reduce environmental impact of materials. .

Conceptual perspective drawings of the proposed facility are shown on Figure 2-1 and Figure 2-2.



Figure 2-1. View 1 – Conceptual Perspective Drawing of the Proposed Facility

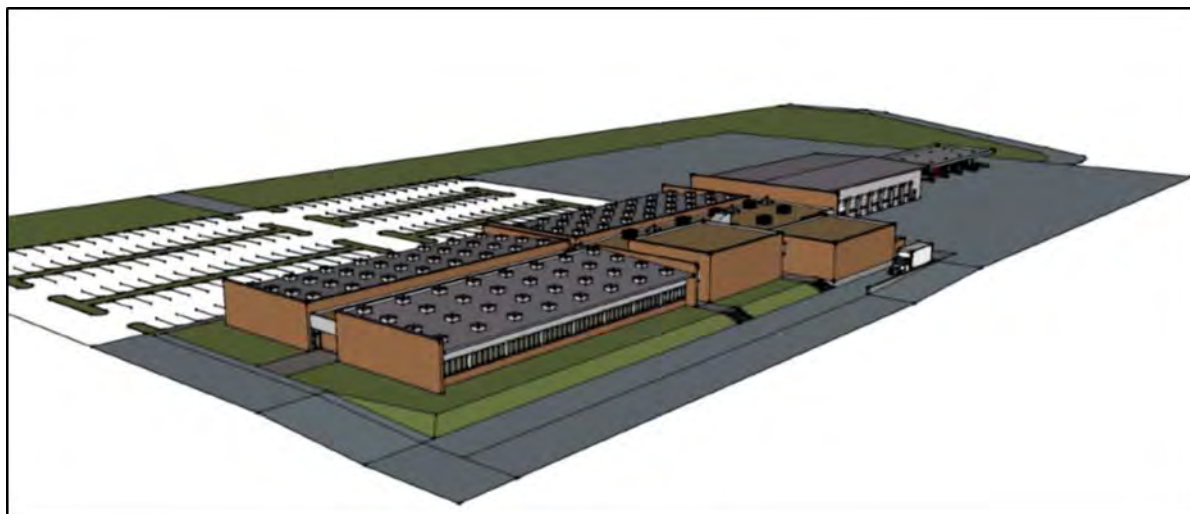


Figure 2-2. View 2 – Conceptual Perspective Drawing of the Proposed Facility

The No Action Alternative and two alternative sites for construction of a new facility to house the relocated operations are evaluated in this EA. These alternatives are described below.

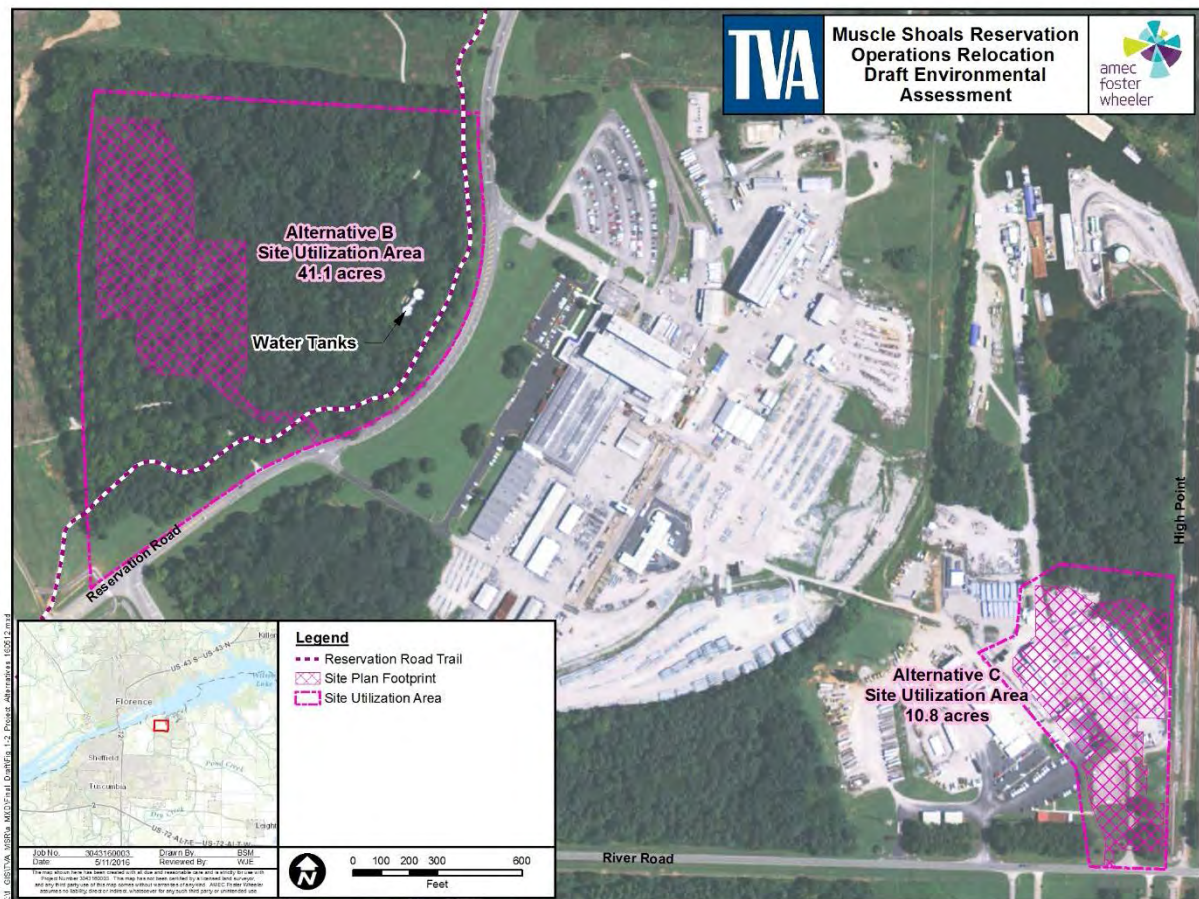
2.1.1 Alternative A – The No Action Alternative

Under this alternative, the potentially affected TVA operations would remain in their present locations. Once the areas they occupy are sold, TVA would have to lease the existing occupied space from the new owners. No construction or demolition activities would be undertaken by TVA as part of this alternative.

The No Action Alternative would not meet the Purpose and Need for the proposed action as it would not result in the consolidation of operations into areas of the Reservation TVA intends to retain. However, this alternative is used as a benchmark or baseline to evaluate the environmental effects of the action alternatives.

2.1.2 Alternative B – Construct a New Facility on Reservation Road

Under this alternative, TVA would relocate the subject operations to a newly constructed facility on a previously undeveloped, greenfield site within the Reservation. The site for this alternative is located on the north side of Reservation Road just east of the intersection with Route 157 (Figure 2-3). A tentative layout has been developed for this site and it is expected that approximately 11 acres of the 41.1-acre site would be utilized for development of the facility based on a design resembling that of the tentative layout. For the purposes of this analysis however, the full 41.1 acre site is considered to be the impact area for this alternative (see Figure 2-3). The water tanks located on the site would not be affected and may be incorporated into the project design. Utility services currently available at the site include water and electricity. Gas and sanitary sewer are available nearby and development at this site would require minor work to connect to the existing lines.



One or two facility access roads would be constructed, one of which intersects Reservation Road across from the existing access on the south side of Reservation Road. The access roads would be paved and if needed, new left turn lanes would be provided on Reservation Road. TVA would coordinate this effort with the local road authority and adhere to all applicable design and construction specifications. The need for a second facility access road has not been determined at this time. This road, if determined necessary, would be constructed within the Site Utilization Area outlined in Figure 2-3 and sited in a manner to minimize impacts to traffic on Reservation Road, the Reservation Road Trail, and other environmental resources.

2.1.3 Alternative C – Modify the River Road Complex

Under this alternative, TVA would modify the complex of buildings on River Road near its intersection with High Point Avenue to house the relocated operations (see Figure 1-1). Modification would require demolition and new construction. A tentative layout developed for this site indicated that approximately 7 to 8 acres of the 10.8-acre previously developed site would be utilized for development of the facility (see Figure 2-3).

Access to this site would be from River Road and would utilize the existing entrance, although some modification to the alignment of the entrance may be needed to accommodate the final building design. If a new left turn lane is needed from River Road, TVA would coordinate with the local road authority and adhere to all applicable design and construction specifications. Construction of the complex at this site would require demolition of up to 10 buildings and other structures on the site. TVA would demolish the buildings, structures, and appurtenances within the hatched area shown in Figure 2-3. Salvageable material would be reclaimed or recycled to the extent practicable. Existing operations would be relocated to other portions of the reservation that TVA plans to retain.

Although this site utilizes a previously disturbed area, Alternative C offers less flexibility in design given spatial constraints presented by the current uses at the site.

A summary of the primary characteristics of the proposed facility are provided in Table 2-1.

Table 2-1. Primary Characteristics of the Proposed Facility

Project Feature	Characteristic	Alternative B	Alternative C
Facility Construction	Permanent use area	Ca. 11 acres	Less than 10.8 acres
	Demolition	None	Up to 10 structures
Employment Workforce	Construction	20 to 50	20 to 50
	Operation	No change from existing (up to 40 employees)	No change from existing (up to 40 employees)
Land Use	Site Land Use	Greenfield site with developed recreational trail	Previously disturbed site

2.1.4 Alternatives Considered but Eliminated from Further Discussion

The potential alternative of modifying the Western Area Radiological Laboratory was eliminated from further consideration for the following reasons: (1) a large volume of cut

and fill would be required to accommodate the necessary facility components; (2) due to the need to relocate current tenants and decommission parts of the laboratory facility, the facility would likely not be ready to accommodate the relocated operations in a timely manner; and (3) the facility location would not align with TVA's long-term strategic plan to consolidate continuing operations east of Highway 133.

2.2 Comparison of Alternatives

The environmental impacts of potentially affected resources associated with Alternatives B and C are analyzed in detail in this EA and are summarized in Table 2-2. These summaries are derived from the information and analyses provided in the Affected Environment and Environmental Consequences sections of each resource in Chapter 3.

Table 2-2. Summary and Comparison of Alternatives by Resource Area

	Alternative A – No Action	Alternative B – Construct a New Facility on Reservation Road	Alternative C – Modify River Road Complex
Air Quality	No impact.	Temporary minor impacts during construction from fugitive dust and emissions from equipment and vehicles. Minor impact during operation from combustion of natural gas used for heating.	Although still short-term and minor, this impact would be incrementally larger than Alternative B because these construction-related impacts include demolition of existing buildings and removal of existing asphalt pavement.
Climate Change	No impact.	No impact.	No impact.
Land Use	No impact.	Change from open space/ recreation to commercial/ industrial.	No impact.
Prime Farmland	No impact.	Minor impact.	No impact.
Surface Water	No Impact	Minor impacts due to increased impervious surface.	No impact.
Vegetation	No impact.	Minor impact.	Negligible impact.
Wildlife	No impact.	Minor impact due to loss of forested habitat.	Negligible impact.
Threatened and Endangered Species	No impact.	Minor impact due to loss of suitable roosting habitat.	No impact.
Solid and Hazardous Waste	No impact.	Minor impact in solid waste production during construction.	Minor impact from waste generated by building demolition.
Socioeconomics and Environmental Justice	No negative impact. Loss of short term positive economic impacts associated with construction activities.	Short-term positive economic impact associated with construction activities. No disproportionate impacts to low income or minority populations.	Short-term positive economic impact associated with construction activities. No disproportionate impacts to low income or minority populations.

Muscle Shoals Reservation Operations Relocation

	Alternative A – No Action	Alternative B – Construct a New Facility on Reservation Road	Alternative C – Modify River Road Complex
Natural Areas, Parks and Recreation	No impact	Temporary minor impacts during construction to users of the Reservation Road Trail. Permanent impacts to the trail from construction of one or two road crossings. Permanent loss of public land available for recreation and open space use.	No impact.
Transportation	No impact.	Minor impact from construction of new intersection on Reservoir Road. Negligible impact from operations.	Minor temporary impact due to additional trucks needed to haul off construction debris. Negligible operational impact.
Visual Resources	No impact	Minor impact due to change in visual landscape. Impact would be minimized due to maintenance of a vegetated buffer.	No impact.
Cultural Resources	No impact.	No impact.	No impact.
Noise	No impact.	Minor impact during construction.	Minor impact during construction.
Public Health and Safety	No impact.	Potential for motorized vehicle/trail user accidents at recreation trail crossing(s) of access road(s).	No impact.
Cumulative Impact	No impact.	No impact.	No impact.

2.3 Identification of Avoidance, Minimization and Mitigation Measures

Measures identified in Chapter 3 to avoid, minimize, or reduce adverse impacts to the environment are summarized below. Project-specific best management practices (BMPs) are also identified.

- TVA would consider the location of the paved trail complex on the north side of Reservation Road in the development of the final design of the new facility to avoid trail closure and reduce effects on trail usage.
- Short-term fugitive dust emissions from site preparation and construction would be controlled by wet suppression and other BMPs.
- Project-specific BMPs would be developed under the NPDES Construction Storm Water Permit to ensure that all surface waters are protected from construction and operational impacts.
- Per EO 13112, disturbed areas would be revegetated with native or non-native, non-invasive plant species to avoid the introduction or spread of invasive species.
- Construction and Demolition Waste – Construction debris and excess materials will be disposed of properly.

- Fuel/Lube/Insulation Oil – Proper spill prevention measures will be taken to reduce the potential for spills.
- Subcontractor and prime contractor employees require Occupational Safety and Health Administration (OSHA) 1910.120 training.
- Due to the loss of potentially suitable roosting habitat for endangered bat species, mitigation measures specified during Section 7 consultation with U.S. Fish and Wildlife (USFWS) will be implemented.
- As a minimization measure TVA would maintain at least a 100-foot vegetative buffer along both sides of the Reservation Road Trail and the trail would remain open during construction.
- Trail crossings would be marked with the appropriate signage and pavement striping.

2.4 The Preferred Alternative

TVA has identified Alternative B – Construct a New Facility on Reservation Road as the preferred action alternative for the proposed relocation of the TVA operations on the Reservation. Alternative B is preferred because the site offers greater development flexibility, would not displace existing operations on the Alternative C site, and would allow easier access for both visitor and large truck traffic.

TVA will make its final decision after consideration of input from the public and the results of ongoing design and cost analyses. The alternative which best meets the purpose and need of the project will be selected as the preferred alternative.

This page intentionally left blank

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the baseline environmental conditions (affected environment) of environmental resources in the project area and the anticipated environmental consequences that would occur from implementation of the alternatives identified for further study as described in Chapter 2. TVA considered all appropriate environmental factors potentially affected by the proposed project as part of this analysis. From this review, TVA was able to focus its environmental review on specific resources and eliminate others from further evaluation.

Given the nature of the project, the following resources are not found in the study area or would not be impacted by any of the project alternatives. These include:

Aquatic Ecology. As a result of a field survey conducted in February 2016, the wet weather conveyance located in Alternative B is considered to have a very low water permanence and is not considered an aquatic habitat. Alternative C is a previously disturbed site and surface water resources are not present. During construction and operation, runoff from the site would be minimized with the use of proper BMPs. Thus, there would be no impacts to aquatic ecology associated with implementation of any of the alternatives.

Geology and Soils. Proposed construction activities are expected to result in relatively shallow site excavations. Site grading would be limited and the design of the complex would adhere to design codes for earthquake resistance. BMPs would be used during construction activities to minimize and restore areas disturbed during construction which would limit soil erosion. Therefore, there would be limited impacts to geology and soil resources associated with the implementation of Alternative B or C.

Groundwater. Groundwater resources within the vicinity of the project area are likely to include shallow surficial groundwater and deeper, water-bearing geologic formations (TVA 2011). Because excavations of the site are expected to be shallow and because the facility will not require groundwater wells for either production or public water supply, no effects on deeper water-bearing groundwater resources is expected. Any incidental groundwater encountered during excavation of foundations is expected to be only temporarily impacted during construction.

Wetlands. No wetlands were identified during field surveys within the limits of Alternative B. Alternative C is a previously disturbed site and wetlands are not present. Thus, there would be no wetland impacts associated with implementation of any of the alternatives.

Floodplains. Alternatives B and C are depicted on Colbert County, Alabama, Flood Insurance Rate Maps as being located outside the limits of the 100-year floodplain (Federal Emergency Management Agency 2016). There would be no impacts to floodplains or floodplain resources due to construction proposed under either of the alternatives, which would be consistent with EO 11988.

A discussion of resources retained for detailed analysis is provided in the following sections.

3.1 Air Quality

3.1.1 Affected Environment

The Clean Air Act regulates the emission of air pollutants and, through its implementing regulations establishes National Ambient Air Quality Standards (NAAQS) for several “criteria” pollutants that are designed to protect the public health and welfare with an ample margin of safety. The criteria pollutants are ozone, particulate matter, carbon monoxide (CO), nitrous oxides (NO_x), sulfur dioxide (SO₂) and lead.

There are two types of NAAQS: primary standards (set to protect public health) and secondary standards (set to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation and buildings). Specified geographic areas are designated as attainment, nonattainment or unclassifiable for specific NAAQS. Areas with ambient concentrations of criteria pollutants exceeding the NAAQS are designated as nonattainment areas and new emissions sources to be located in or near these areas are subject to more stringent air permitting requirements.

The air quality in Colbert County, Alabama meets applicable federal and state air quality standards. Colbert County and the surrounding counties (Franklin, Lauderdale and Lawrence counties in Alabama as well as Tishomingo County in Mississippi) are all in attainment with applicable NAAQS (USEPA 2016) and ambient air quality standards referenced in the ADEM Administrative Code, Title 335-3 (ADEM Administrative Code 2016). The proposed facilities would be subject to both federal and state regulations. These regulations impose permitting requirements and specific standards for expected air emissions. The standards and regulations that pertain to the centers include ADEM Administrative Code, 335-3-4-.02 Fugitive Dust and Fugitive Emissions.

3.1.2 Environmental Consequences

3.1.2.1 Alternative A – No Action

Under the No Action Alternative, the potentially affected TVA operations would remain in their present locations and no construction or demolition activities would occur. Implementing the No Action Alternative would not result in any changes to existing air quality.

3.1.2.2 Alternative B – Construct a New Facility on Reservation Road

3.1.2.2.1 Construction Impacts

Transient air pollutant emissions would occur during the construction phase. Construction-related air quality impacts would primarily result from site preparation and the operation of construction vehicles and equipment and worker personnel vehicles. The daily workforce during construction is expected to be approximately 20 to 50 workers.

Combustion of gasoline and diesel fuels by internal combustion engines (vehicles, generators, construction equipment, etc.) would occur during construction and would generate local emissions of particulate matter, NO_x, CO, volatile organic compounds (VOC) and SO₂. These emissions would be small and would result in negligible impacts to air quality.

Site preparation and vehicular traffic over paved and unpaved roads at the site also would result in the emission of fugitive dust during active construction periods. Based on analyses conducted at other construction sites, it is expected that the largest fraction (greater than 95 percent by weight) of fugitive dust emissions would be deposited within the construction site boundaries. To minimize air impacts TVA requires all contractors to keep construction equipment properly maintained and to use BMPs (such as covered loads and wet suppression) to minimize fugitive dust.

Air quality impacts from construction activities would be temporary (11 to 18 months) and would depend on both man-made factors (intensity of activity, control measures) and natural factors such as wind speed and direction, soil moisture, etc. However, even under unusually adverse conditions, these emissions from construction activities would have, at most, a minor transient impact on air quality and would be well below the applicable ambient air quality standards.

Overall, the potential impacts to air quality from construction related activities on local and regional air quality would be minimal.

3.1.2.2.2 Operational Impacts

It is probable that the new facility would use natural gas for heating and combustion of this gas would generate minor air impacts. Composed primarily of methane, emissions associated with the combustion of natural gas are carbon dioxide (CO₂) and water vapor and very small amounts of NO_x, and SO₂, virtually no ash or particulate matter, and lower levels of CO and other reactive hydrocarbons than other fossil fuels. The new facility would not regularly generate other air emissions, except for occasions when a diesel backup generator/emergency generator would be operated. The backup generator would emit NO_x, CO, particulate matter, SO₂ and hydrocarbons but would be operated infrequently and typically for short periods of time. It is anticipated that typical backup generator operation is 50 hours per year, with a maximum expected usage of 200 hours per year. The backup generator would be operated in compliance with applicable regulations and monitoring of generator emissions is not currently required. Therefore, the impacts to air quality from operating the backup generator would be insignificant.

In addition, the TSC has approximately 20 service vehicles (pickup trucks and automobiles) as well as three 18-wheel trucks and one bulldozer that are used for service and maintenance activities. These vehicles will generate local emissions of particulate matter, NO_x, CO, VOCs and SO₂. Use of this equipment would be similar to current conditions; therefore there would be no substantive change in emissions associated with the operations at the new facility and no new impact to existing air quality is anticipated.

3.1.2.3 ***Alternative C – Modify the River Road Complex***

3.1.2.3.1 Construction Impacts

As with Alternative B, construction activities under Alternative C would generate transient air emissions. In addition, under this alternative, demolition of several on-site buildings and removal of existing asphalt pavement would generate fugitive dust which would result in an increase in emissions as compared to Alternative B. However, these air emissions would be short-term and relatively minor and would be minimized through use of BMPs described under Alternative B.

3.1.2.3.2 Operational Impacts

As with Alternative B, there would be no substantive change in air emissions associated with operations at the new facility. Therefore, there would be no impact to existing air quality.

3.2 Climate Change and Greenhouse Gases

3.2.1 Affected Environment

“Climate change” refers to any substantive change in measures of climate, such as temperature, precipitation, or wind (TVA 2011). The 2014 National Climate Assessment concluded that global climate is projected to continue to change over this century and beyond. The amount of warming projected beyond the next few decades, by these studies, is directly linked to the cumulative global emissions of greenhouse gasses (e.g., CO₂, methane) and particles. The 2014 National Climate Assessment concluded that by the end of this century, a 3° Fahrenheit (F) to 5°F rise can be projected under the lower emissions scenario and a 5°F to 10°F rise for a higher emissions scenario (Melillo et al. 2014). As with all future scenario modeling exercises, there is an important distinction to be made between a “prediction” of what “will” happen and a “projection” of what future conditions are likely given a particular set of assumptions (Melillo et al. 2014).

The southeastern United States is one of the few regions globally that does not exhibit an overall warming trend in surface temperature over the 20th century. This “warming hole” also includes part of the Great Plains and Midwest regions in the summer. Historically, temperatures increased rapidly in the southeast during the early part of the 20th century, then decreased rapidly during the middle of the 20th century. Since the 1960s, temperatures in the southeast have been increasing. Recent increases in temperature in the southeast have been most pronounced in the summer season, particularly along the Gulf and Atlantic coasts. However, temperature trends in the southeast over the period of 1895 to 2011 are found to be statistically insignificant for any season. In the southeast, the number of extreme hot days has tended to decrease or remain the same, while the number of very warm summer nights has tended to increase. The number of extreme cold days has tended to decrease. Global warming is a long-term trend, but that does not mean that every year will be warmer. Day-to-day and year-to-year changes in weather patterns will continue to produce variation, even as the climate warms. Generally, climate change results in Earth’s lower atmosphere becoming warmer and moister, resulting in the potential for more energy for storms and certain severe weather events. Trends in extreme rainfall vary from region to region. Generally, Muscle Shoals experiences a temperate climate with adequate rainfall throughout the year, hot and humid summers and cool, damp winters.

In 2013, worldwide man-made annual CO₂ emissions were estimated at 36 billion tons, with sources within the United States responsible for 14 percent of this total (Le Quéré et al. 2014). According to the official U.S. Greenhouse Gas Inventory, electric utilities in the United States were estimated to emit 2.039 billion tons, roughly 32 percent of the U.S. total in 2012 (USEPA 2014).

Other activities that increase CO₂ emissions include land or forest clearing and land use changes associated with land development projects; construction activities involving use of fossil-fuel-powered equipment (e.g., bulldozers, loaders, haulers, trucks, generators, etc.); increases in demand for electric power due to greater industrial, residential, or commercial activity; and changes to amounts and patterns of traffic flow. Additionally development of

parks and protection of forested areas that absorb and store CO₂ serve to remove excess CO₂ in the atmosphere, a process known as carbon sequestration.

3.2.2 Environmental Consequences

3.2.2.1 Alternative A – No Action

Implementing the No Action Alternative would not result in any new emissions of greenhouse gases and, therefore, this alternative would not impact climate change.

3.2.2.2 Alternative B – Construct a New Facility on Reservation Road

3.2.2.2.1 Construction Impacts

CO₂ emissions would occur during the construction phase. Construction-related CO₂ emissions would be primarily related to the combustion of gasoline and diesel fuels by internal combustion engines (vehicles, generators, construction equipment, etc.). In addition, removal of at least 11 acres of forest cover from the site would contribute to greenhouse gas (GHG) emissions because when forests are cleared, stored carbon may be released into the atmosphere. The tree removal would also reduce the long-term potential of the trees to continue storing carbon. The total amount of these GHG emissions would be small and would last for a short time (11 to 18 months). These emissions would not adversely affect regional GHG levels with no discernable link or effect to particular changes in global climate. Therefore, this alternative would not result in noticeable impacts on climate change.

3.2.2.2.2 Operational Impacts

The GHG emissions associated with operation of the facility would be similar to current to conditions and would not create a new impact on climate change.

3.2.2.3 Alternative C – Modify the River Road Complex

The GHG emissions associated with construction and operation of the facility under Alternative C would be likely be similar to or slightly greater than that of Alternative B. While there would be much less tree removal under Alternative C than Alternative B, with reduced emissions of GHGs and loss of associated carbon storage potential, this would likely be offset by the additional GHG emissions resulting from the demolition of the buildings on the Alternative C site. Implementation of Alternative C would not have a noticeable impact on climate change.

3.3 Land Use

3.3.1 Affected Environment

Alternative Sites B and C are located on the Reservation along the south shore of the Wilson Reservoir, which is an impoundment of the Tennessee River formed by Wilson Dam. The Reservation is comprised of approximately 2,600 acres that were acquired from the War Department in 1933. TVA manages much of this land, including the Alternative B and C sites, according to the 1996 Reservation Land Management Plan (TVA 1996). Within this plan, most of the Alternative B site and adjacent areas north of Reservation Road on the eastern portion of the site are zoned for Public Recreation and Open Space. A narrow strip adjacent to Reservation Road on the eastern portion of the site is zoned for TVA Electric Utility Related Uses. The Alternative C site and adjacent areas south and east of Reservation Road are zoned for TVA Electric Utility Related Uses.

Muscle Shoals Reservation Operations Relocation

In order to update old reservoir land management plans (RLMPs) and apply the standard RLMP zoning scheme to all reservoir lands, including parts of the Reservation, TVA has initiated an effort to revise or develop RLMPs for several reservoirs including Wilson Reservoir. These RLMPs are the subject of an EIS scheduled to be completed in 2017. In the proposed new RLMP for Wilson Reservoir, the area that includes most of the Alternative B site is proposed to be zoned for TVA Project Operations (Zone 2) (TVA 2015b). Project Operations is defined as land that includes all of TVA reservoir lands currently used for TVA operations and public works projects. The Alternative C site is outside the scope of the revised RLMP and will remain as currently zoned – TVA Electric Utility Related Uses.

Land use/land cover, based on the National Land Cover Database, for the Alternative B and Alternative C sites and the surrounding area is mostly developed low intensity and developed open space (Table 3-1). Other common land use types include hay/pasture, open water and cultivated crops.

Table 3-1. Land Use/Land Cover within Each of the Proposed Development Sites and the Region

Land Use Type	Area Within Alternative B (acres)	Area Within Alternative C (acres)	Area within 5-mi Radius (acres)
Emergent Herbaceous Wetlands			26.6
Barren Land			59.0
Herbaceous	1.5		530.6
Evergreen Forest			730.5
Mixed Forest			842.1
Developed, High Intensity			1312.1
Shrub/Scrub			1891.3
Woody Wetlands			2175.1
Developed, Medium Intensity			3094.9
Deciduous Forest	37.3	1.2	4443.0
Cultivated Crops			5271.9
Open Water			5825.8
Hay/Pasture			6302.7
Developed, Open Space			8693.9
Developed, Low Intensity	2.3	9.6	9065.1
Total	41.1	10.8	50,264.9

Source: Homer et al. 2015

Currently, there is limited development at Site B as the site remains mostly forested. Site B is bordered by Reservation Road on the south and east, utility corridors and Highway 133 on the west, and utility corridors on the north; therefore, there are no immediately adjacent businesses or residences. However, there is a TVA operated facility on the south side of Reservation Road between the two alternative site locations. The lands between Site B and the Tennessee River are also undeveloped and include portions of the Muscle Shoals National Recreational Trail system.

Site C is almost completely developed with buildings and paved areas. It is surrounded by some low-density residential development to the south and east along with some agricultural land use and undeveloped land.

The city of Muscle Shoals has zoned lands adjacent to the eastern and southern boundaries of the alternative sites as mostly heavy industrial, bounded by some residential parcels on the east and south. The primary occupant of the industrial area is Occidental Chemical Corporation located to the south of River Road. The Reservation and alternative site locations are not within the corporate limits of any of the surrounding cities and are not zoned by them. Development at either site would offer no known conflicts with any plans, programs, or activities of the Shoals Economic Development Authority, Northwest Alabama Council of Local Governments, Top of Alabama Regional Council of Governments, or any other similar county-level planning or economic development organizations.

3.3.2 Environmental Consequences

3.3.2.1 Alternative A – No Action

Under Alternative A, no construction or demolition activities would be undertaken by TVA. Therefore, there would be no changes to land use.

3.3.2.2 Alternative B – Construct a New Facility on Reservation Road

Implementation of this alternative would result in development of the site for light industrial use, a major change that is incompatible with the current Public Recreation and Open Space zoning of the site. However, under the proposed new RLMP being developed by TVA, the area that includes Site B is proposed to be rezoned for TVA Project Operations. The proposed development of the site would be consistent with that proposed revised land plan. Given that the property is on the Reservation and near other TVA facilities, light industrial use would not be an incompatible use with the surrounding land uses to the east and south. Light industrial uses would not be incompatible with any presently known local, regional, or state agency plans.

At least 11 acres of Site B would be cleared, graded and developed to support TVA operations. Any cleared areas not used for permanent facilities would be replanted with native or non-native, non-invasive species which would allow portions of the property to return to a vegetative state.

While a portion of the lands within the area for Site B would be converted from undeveloped, recreational use to light industrial, the proposed land use of the site is consistent with the proposed future zoning of the site and, therefore, would be developed in a manner consistent with planned future land development. The acreage proposed to be converted comprises a small proportion of the large area of undeveloped land within a 5-mile radius of the site (see Section 3.6, Vegetation). Much of this undeveloped land, however, is in private ownership and does not provide the same public recreation and open space values as does Site B. Because of the small acreage involved, impacts to land use from construction and operations at Site B would be minor.

3.3.2.3 Alternative C – Modify the River Road Complex

Alternative C would result in no change to the land use at the River Road Complex and the construction of the facility would be compatible with its current zoning for TVA Electric Utility Related Uses. Construction of the new facility would not result in conversion of any land uses to industrial facilities as it is proposed within an existing industrial area.

3.4 Prime Farmland

3.4.1 Affected Environment

Prime farmland is land with soils capable producing high yields of food, feed, forage, fiber and oilseed crops with minimal expenditure of energy and economic resources. The 1981 Farmland Protection Policy Act (FPPA) and its implementing regulations (7 Code of Federal [CFR] Part 658) require all federal agencies to evaluate impacts to prime and unique farmland prior to permanently converting land to a use incompatible with agriculture.

Within Sites B and C, approximately 26.5 acres and 1.3 acres, respectively, are mapped as prime farmland soils (Table 3-2). It should be noted, however, that some of these lands mapped as having prime farmland soils have been disturbed and partly developed and, therefore, do not retain their original prime farmland characteristics. Such areas, as well as areas containing prime farmland soils within areas formally zoned by a municipality for non-agricultural uses are not considered prime farmland under the FPPA.

Table 3-2. Soil Types Mapped within the Proposed Development Sites

Soil Mapping Unit	Prime Farmland	Area (acres)	Percent of Area
Alternative B		41.1	
Decatur Silt Loam	Yes	10.3	25.1
Fullerton-Bodine Complex	No	14.6	35.5
Fullerton Cherry Silt Loam	Yes	16.2	39.3
Alternative C		10.8	
Fullerton-Bodine Complex	No	3.1	28.6
Decatur Silt Loam	Yes	1.3	12.2
Urban Land	No	6.4	59.2

Because Site C is developed for industrial use and not capable of supporting agricultural production, it is not considered prime farmland under the FPPA.

3.4.2 Environmental Consequences

3.4.2.1 Alternative A – No Action

Under Alternative A, the potentially affected TVA operations would remain in their present locations and no new development would occur within the Reservation. Because there would be no ground-disturbing activities, there would be no impacts to prime farmland soils.

3.4.2.2 Alternative B – Construct a New Facility on Reservation Road

Alternative B would result in the clearing of forested, undeveloped land for the construction of the new facility. Impacts from construction and operation of the new facility could impact at least 11 acres of the 26.5 acres of prime farmland soils on Site B. The loss of lands mapped as including prime farmland and the associated loss of potential crop production is minor when compared to the amount of land designated as prime farmland within the surrounding region. Approximately 159,870 acres (40.1 percent) of the area within Colbert County have soils classified as prime farmland. Therefore, the loss of on-site lands designated as having prime farmland is minor when compared to the amount of land designated as prime farmland within the surrounding region.

3.4.2.3 Alternative C – Modify the River Road Complex

Alternative C would result in minor impacts to soils previously mapped as having prime farmland characteristics. However, in consideration of the previously disturbed characteristics of this alternative site from prior industrial use, prime farmland is expected to be absent. Therefore, implementation of this alternative would not result in a change to the current use or conditions of prime farmland soils.

3.5 Surface Water

3.5.1 Affected Environment

The Reservation is located along the southern shore of the Tennessee River/Pickwick Reservoir immediately downstream of Wilson Dam. Most of the area encompassed by the proposed site alternatives drains to a section of the Tennessee River that is managed by TVA as part of the Wilson Reservoir and the Wilson Dam tailwater. While Site B drains to a stream that enters the Tennessee River downstream of Wilson Dam, the closest TVA ecological health monitoring station is approximately 12 mi downstream and includes contributions from the Florence and Sheffield urban areas. Therefore, the conditions within Wilson Reservoir are discussed in this EA as it represents the nearest surrogate waterbody. The overall ecological health condition of Wilson Reservoir rated poor in 2012 (TVA 2012). Ratings for Wilson Reservoir have fluctuated in a pattern that generally follows reservoir flow conditions. Like most Tennessee River main-stem reservoirs, Wilson tends to rate better in years with higher flow and worse in dry years that result in extended periods of low flow.

The Tennessee River including both the Tennessee River/Pickwick Reservoir immediately downstream of Wilson Dam has been assessed for water quality and habitat through the Clean Water Act 305(b) assessment and reporting requirements. The State of Alabama has identified this segment of the Tennessee River as a Category 5 water, with public water supply and fish and wildlife as the intended beneficial uses.

The portion of the Tennessee River downstream of Wilson Dam near the project area was added to the 303(d) list of impaired waters by ADEM in 2014 due to impairment caused by nutrients from agriculture (ADEM 2014). Studies have found the reservoir to be eutrophic with an average Trophic State Index in the range of 57 to 61, well within the eutrophic classification range of 50 to 69. Characteristics of eutrophic water bodies include high nutrient levels and periodic low dissolved oxygen, which may cause death to aquatic animals. In an effort to manage eutrophic conditions ADEM developed nutrient criteria to determine nutrient levels that are protective of the beneficial uses designated for each reservoir. During the criteria development process, historical data are studied to provide an overall perspective of the condition of each reservoir. Nutrient levels which correlate with reservoir conditions that support beneficial use are used to establish nutrient criteria on an individual reservoir basis. The 2014 305(b) report indicates nutrient criteria were developed in 2002 for this portion of the Tennessee River.

TVA has taken action to improve water quality and flows within its reservoirs. Most notably, TVA monitors the ecological condition of its reservoirs as part of the Vital Signs Monitoring Program ([http:// www.tva.gov/Environment/Environmental-Stewardship/Water-Quality/Reservoir-Health-Ratings/Wilson-Reservoir](http://www.tva.gov/Environment/Environmental-Stewardship/Water-Quality/Reservoir-Health-Ratings/Wilson-Reservoir)), which was initiated by TVA in 1990. Reservoirs throughout the Tennessee Valley have been monitored for physical and chemical characteristics of waters, sediment contaminants, benthic macroinvertebrates (bottom-dwelling animals such as worms, mollusks, insects, and snails living in or on the

sediments), and fish community assemblage. Five key indicators (i.e., dissolved oxygen, chlorophyll, fish, bottom life, and sediment contaminants) are monitored and contribute to a final rating that describes the "health" and integrity of an aquatic ecosystem. The reservoir ecological health evaluation system is reviewed each year, and improvements needed to address problems are identified. These improvements include installing equipment to add oxygen to the water as it flows through dams and adjusting reservoir flows. The overall ecological health condition of Wilson Reservoir rated poor in 2012 (TVA 2012). Ratings for Wilson Reservoir have fluctuated in a pattern that generally follows reservoir flow conditions, primarily due to the influence of flows on dissolved oxygen in the forebay. Like most Tennessee River main-stem reservoirs, Wilson tends to rate better in years with higher flow and worse in dry years that result in extended periods of low flow.

Alternative B encompasses an area of approximately 41.1 acres of wooded, undeveloped land. A field survey conducted in February 2016 delineated one wet weather conveyance within Site B that conveys runoff and drainage north to the Tennessee River (Figure 3-1). This resource is linear feature that bisects the survey area from south to north. Based upon field review, the wet weather conveyance on Site B is not considered to be jurisdictional. Therefore, the placement of fill or other impacts to it would not require a permit from the USACE, provided the USACE concurs with TVA's non-jurisdictional determination. Stormwater runoff from the TVA facility on the south side of Reservation Road passes under Reservation Road in a culvert and discharges into a stream just north of Site B. At the time of the survey, the wet weather conveyance was a dry channel with occasional pools of standing water located within a deeply incised ravine. The drainage area of the channel upstream of where it crosses through Site B is estimated to be 17 acres based on available topographic information, although the actual drainage area could be different as a result of land grading and the constructed drainage system. The total drainage area for the wet weather conveyance at the downstream northern boundary of Alternative B is estimated to be 47 acres.

Alternate C encompasses an area of approximately 10.8 acres of mostly existing developed land. The area is located at a local highpoint and appears to generate stormwater runoff that may flow to two different streams which then discharge to the Tennessee River. The southern portion of the site, approximately 6 acres, flows south for a distance of approximately 0.5 mi to Pond Creek, a stream with a relatively large drainage area of approximately 2.6 square miles that flows westerly and into the Tennessee River below Wilson Dam. Pond Creek has been identified by ADEM (2014) as an "industrial and agricultural" stream that is impaired due to organic enrichment and metals. A Total Daily Maximum Load report for Pond Creek was scheduled for completion in 2015 (ADEM 2014), but is currently unavailable. The draft 2016 303(d) list replaces the target completion date with a priority rating and lists the Pond Creek total maximum daily load as low priority (ADEM 2016). The northern portion of Alternative C drains northerly a short distance (approximately 400 feet from the northern edge of site boundary) to the Fleet Hollow drainage, an embayment in Wilson Reservoir immediately upstream of Wilson Dam.

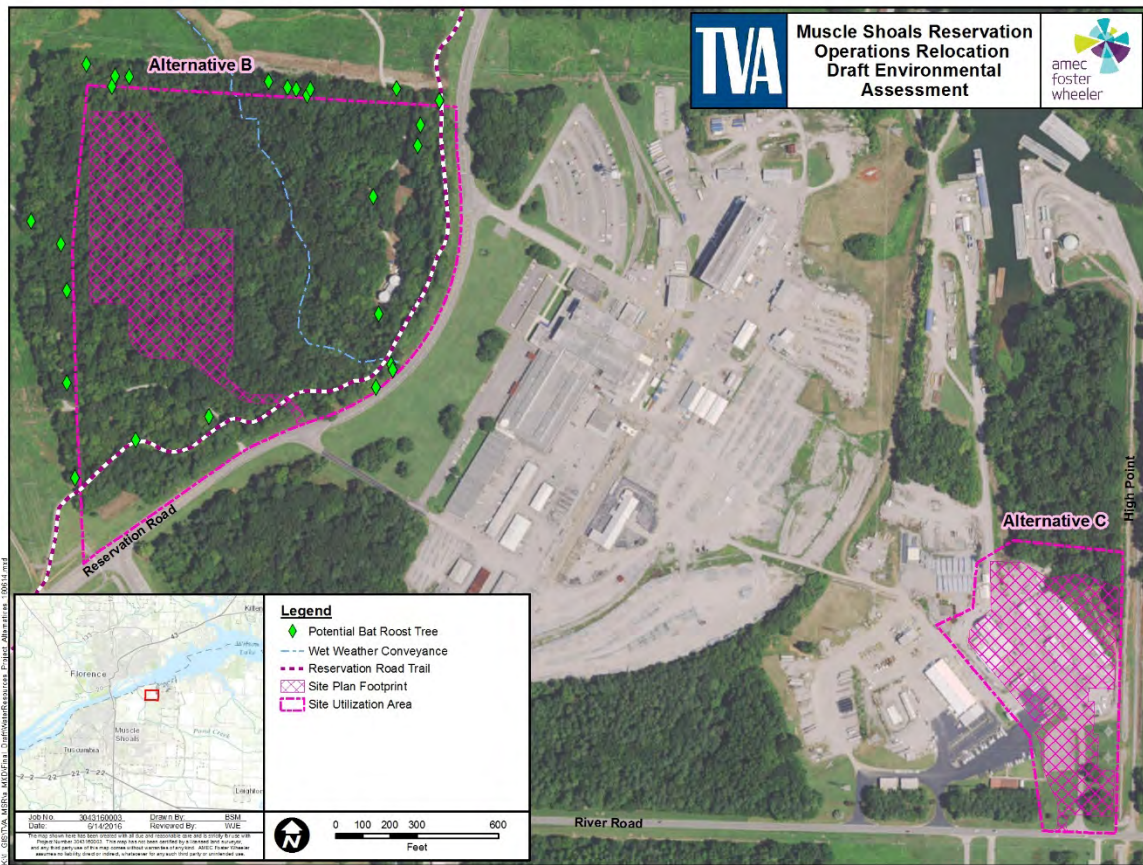


Figure 3-1. Selected Natural Resources within the Proposed Development Sites

Previously, TVA owned and operated a 2.0 million gallons per day (MGD) potable water treatment plant on the Reservation that was situated near and drew water from the Tennessee River and distributed the water throughout the Reservation. This TVA facility was retired in 2011-2012. The two intake structures, previously utilized by the water treatment plant known as the PDW intake pumping station and the Fleet Harbor intake pumping station, located on the Tennessee River, have been contracted out to Occidental Chemical Corporation. The PDW pumping station is located downstream of Wilson Dam, and the Fleet Hollow pumping station is situated upstream of the Wilson Dam. Both stations incorporate multiple pumps with screening capability. Each station is capable of pumping 29 MGD. Occidental Chemical Corporation has all the required operating and environmental permits from the State of Alabama and USEPA to operate the two intakes and associated distribution piping system for both facilities. The Reservation now receives potable water from Sheffield Utilities (TVA 2013). There would be no change in overall water use associated with implementation of either of the alternatives as operations would be the same as current conditions.

The discharge of water pollutants from the TVA Power Services Complex, including the Alternative C River Road site, is regulated by NPDES Permit ALG140643. This permit sets limits on the quantities of discharged pollutants at identified outfalls and requires regular sampling, monitoring, and reporting of discharges.

3.5.2 Environmental Consequences

3.5.2.1 Alternative A – No Action

There would be no change in surface water resources under the No Action Alternative.

3.5.2.2 Alternative B – Construct a New Facility on Reservation Road

Construction and relocation of the operations to the Alternative B site would convert at least 11 acres of existing undeveloped land with sloping topography to impervious surfaces of rooftop and parking. The level and intensity of impacts to surface water quality would depend on the final site development plan. During land clearing and construction of the new facility (i.e., initial excavation and building construction), there is a potential for increased rates of erosion. TVA would submit a notice of intent to ADEM for coverage under the General NPDES Permit for construction stormwater discharges. As part of this permitting process, TVA would develop and implement a Construction Best Management Practice Plan specifying the BMPs used to minimize sediment runoff. If necessary, TVA would also apply for a modification of NPDES Permit ALG140643 to address water pollution discharges resulting from changes to the site.

Implementation of this alternative may result in the fill of the wet weather conveyance. Should the wet weather conveyance be filled, drainage from south of Reservation Road would presumably be conveyed within a buried pipe.

The development of the site would increase impervious surfaces and would therefore increase the potential for surface water runoff. Impervious surfaces also tend to generate increased pollutant loadings to receiving streams from wash-off of materials deposited on the impervious surface. Mitigation of both runoff rates and pollutant loading will be provided by stormwater BMPs, including both structural and non-structural practices, during both the construction and the post-construction phases. These practices include minimizing impervious surfaces and providing retention/detention systems that reduce runoff volume, peak rates, and pollutant discharges. Additionally, the planning, design, and construction of Alternative B would take into consideration Leadership in Energy and Environmental Design standards and goals (i.e., <http://www.usgbc.org/leed>) to minimize the impact of the development on surface runoff, including nutrients, to the Tennessee River. Therefore, implementation of these BMPs and proper design of the facility would minimize the potential runoff and result in insignificant impacts to surface water resources.

Based on the results of the field visit conducted in February 2016, the wet weather conveyance on Site B is not jurisdictional. Therefore, impacts to the stream would not require a permit from the USACE, provided that USACE concurs with TVA's non-jurisdictional determination. If the USACE determines the wet weather conveyance is jurisdictional, TVA would acquire the appropriate permits and mitigate for impacts through avoidance and minimization measures and/or the purchase of credits within a stream bank or other methods as determined in the permits.

3.5.2.3 Alternative C – Modify the River Road Complex

Relocation of the activities to Site C would not result in surface water resource alteration or notable changes in the existing developed and impervious land cover at the already developed location. Planning, design, and construction of the facility would incorporate stormwater BMPs that are expected to reduce existing increases in surface runoff rates and pollutants at this location.

3.6 Vegetation

3.6.1 Affected Environment

The Reservation is located within the Eastern Highland Rim Level IV ecoregion, a transitional area between the western oak-hickory forest type and the Appalachian mesophytic forests to the east (Griffith et al. 2001). Flat areas along the Tennessee River have well-drained soils that are farmed intensively. No forested areas within the project area have characteristics of old growth forests (TVA 2015a).

Land use/land cover based on National Land Cover Database within the each of the project alternative sites and within the 5-mi radius of these sites is summarized in Table 3-1. Land use within a 5-mi radius consists of agricultural, residential, rural and commercial activity (Figure 3-2). Notably, deciduous forest (37.3 acres) comprises 90 percent of Alternative B and low intensity developed (9.6 acres) comprises 88.5 percent of the area considered in Alternative C (Figure 3-3).

Vegetation adjacent to both alternative sites is primarily deciduous forest with species that can occur in a range of hydric conditions (TVA 2015a). A field reconnaissance of the alternative sites was conducted in February 2016 to evaluate the current environmental conditions. Site B consists primarily of a mixed oak-hardwood forest characterized by hackberry, tulip poplar and oak species. A dense understory was present that is dominated by Chinese privet, an invasive species. Most of the area within Site C is already developed for light industrial use; therefore only a small fraction of natural vegetation (deciduous forest) remains and is concentrated on the northeastern corner of the site.

EO 13112 (Invasive Species) defines an invasive species as one that is not native to the local ecosystem and whose introduction does or is likely to cause economic or environmental harm or harm to human health. Invasive plants can include trees, shrubs, vines, grasses, ferns and forbs. Invasive plants common in and near the project area include tree-of-heaven, Chinese privet, Japanese honeysuckle, sacred bamboo and princess tree (TVA 2015a). Chinese privet was the primary invasive species observed during the February 2016 field survey. All of these species have the potential to affect the native plant communities adversely because of their ability to spread rapidly and displace native vegetation.

Muscle Shoals Reservation Operations Relocation

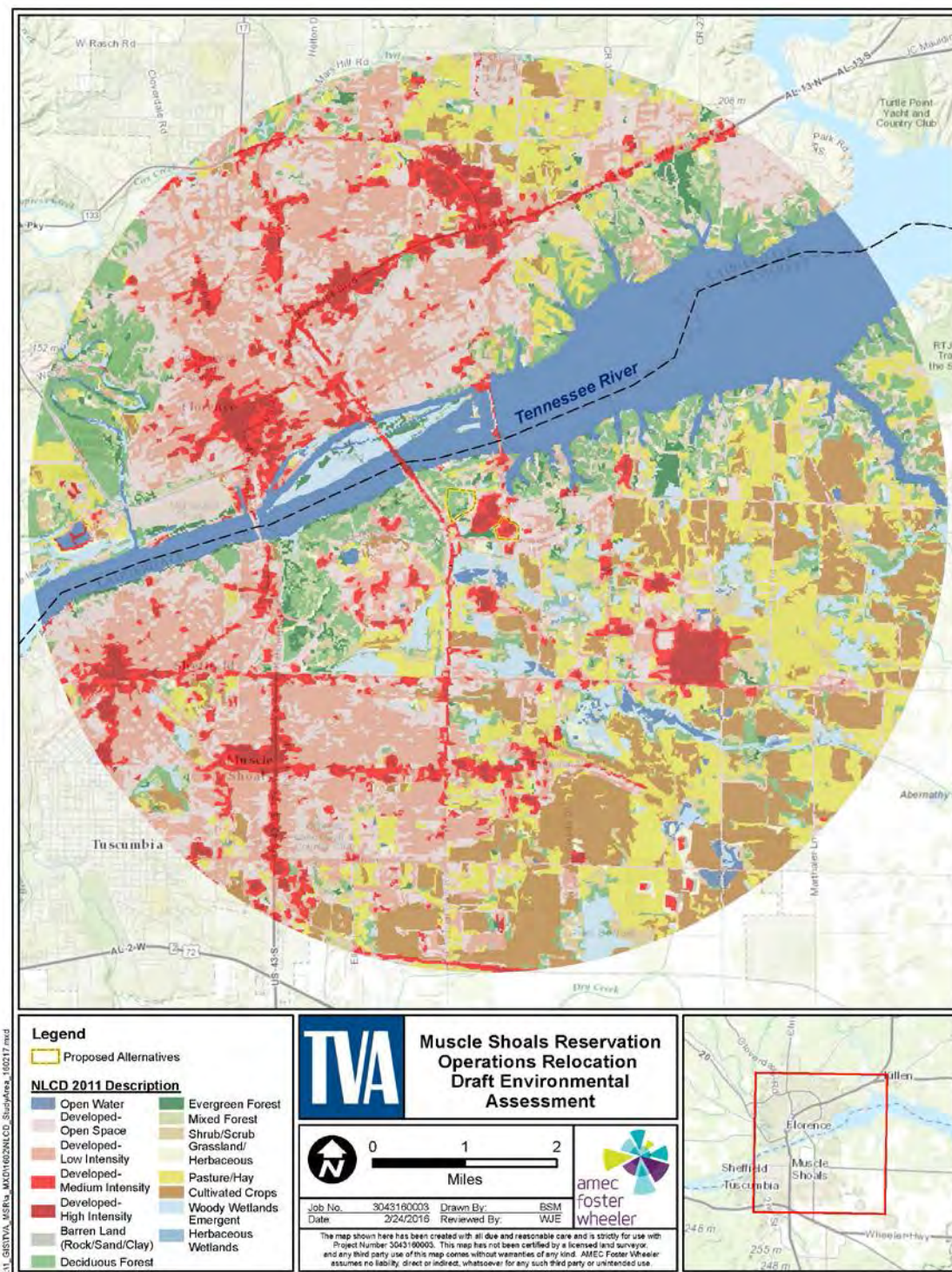


Figure 3-2. Land Cover within 5 Miles of the Proposed Development Sites

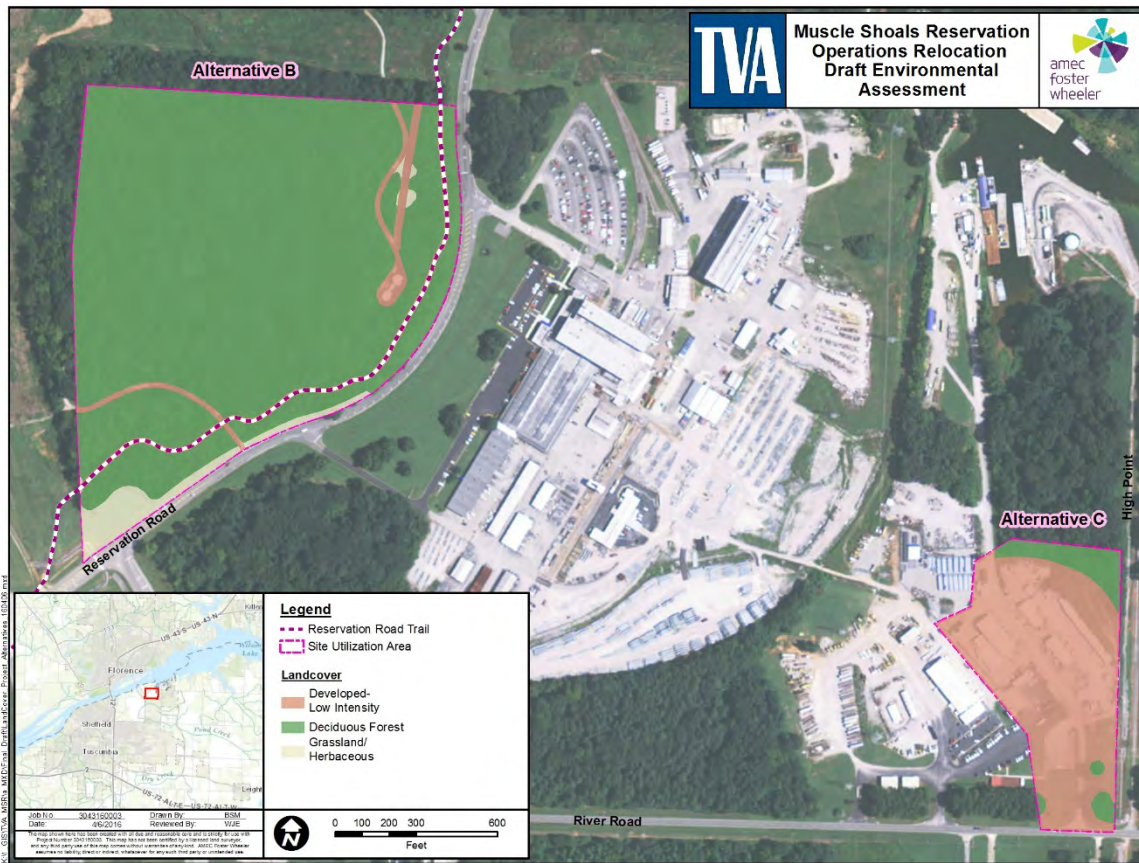


Figure 3-3. Land Cover within Proposed Development Sites

3.6.2 Environmental Consequences

3.6.2.1 *Alternative A – No Action*

Under Alternative A, TVA operations would remain in their present locations and no new buildings would be constructed. Vegetation would not be impacted under this alternative.

3.6.2.2 *Alternative B – Construct a New Facility on Reservation Road*

Permanent impacts to at least 11 acres of deciduous forest vegetation, but likely less than the 37.3 acres present on Site B would result from the construction of the new facility. Within 5-mi of the project area, there is 4,443 acres of deciduous forest similar to the type within the project area. Losses to forested resources would be somewhat reduced through landscaping at the site, including the planting of approximately 21 understory trees, 18 overstory trees, and numerous shrubs around the finished buildings. Because there are no known special plant communities and the existing deciduous forest is highly impacted by invasive plants, potential direct impacts are minor relative to the abundance of similar cover types within the vicinity.

3.6.2.3 *Alternative C – Modify the River Road Complex*

Alternative C would result in only minimal impacts to vegetation if trees need to be removed for the construction of the new facility or, if needed, to modify the entrance road. Approximately 24 understory trees, 24 overstory trees, and numerous shrubs will be

planted as part of the landscaping around the finished buildings. Because this site is largely previously disturbed and would only result in small amounts of clearing of vegetation, impacts are expected to be minimal in comparison to the vegetation resources in the vicinity

3.7 Wildlife

3.7.1 Affected Environment

The proposed project area within the Reservation is located south of the Tennessee River. Overall landscape features within the Reservation include deciduous forest habitat, stream crossings, rock outcroppings, early successional habitat (i.e., maintained right-of-way corridor and herbaceous fields) and lands developed for TVA operations.

The area associated with Alternative B consists primarily of a mixed oak-hardwood forest with a dense understory heavily impacted by invasive plants, particularly Chinese privet. This type of forested habitat is found throughout the Reservation and is used by a variety of common wildlife species. Numerous species of migratory songbirds migrate through the area during spring and fall and reside on the Reservation during summer months. Common species include northern cardinal, brown-headed cowbird, eastern towhee, blue jay, Carolina chickadee, tufted titmouse, American redstart, yellow-rumped warbler and magnolia warbler. Mammals such as raccoon, opossum, nine-banded armadillo, white-tailed deer, eastern cottontail, eastern gray squirrel and gray fox are common in these areas. Bat surveys were conducted in the forested tracts southeast of the project area in 2007 and captured common species including eastern pipistrelle bats, red bats and big brown bats (TVA 2011). Records from the eBirds database show over 113 species of birds have been identified along the TVA nature trails within the Reservation (eBirds 2016).

The area associated with Alternative C consists largely of a developed and urbanized landscape. The remaining natural areas are limited to small areas of mowed lawn with scattered trees and a small fraction of deciduous forest. Landscaped environments are home to a large number of common species. American robin, Carolina chickadee, blue jay, European starling, house sparrow, mourning dove, northern cardinal and northern mockingbird are birds commonly found in areas developed for human use. Mammals found in this community type include eastern gray squirrel, nine-banded armadillo, northern raccoon and Virginia opossum. Road-side ditches provide potential habitat for amphibians including American toad, upland chorus frog and spring peeper. Reptiles potentially present include black rat snake and eastern garter snake. All of these species have been observed within the Reservation (TVA 2011).

A search of the TVA Regional Natural Heritage database in March 2016 indicated that five caves are located within 5-mi of the project area. However, none are located within the areas associated with either action alternative. Additionally, a colonial nesting bird colony is reported on Jackson Island 1 mi to the north of the alternative sites and just downstream of Wilson Dam in the Tennessee River. Ospreys nest a few miles west of the Reservation and forage along the river.

No unique or important terrestrial habitats were identified within the areas associated with either alternative.

3.7.2 Environmental Consequences

3.7.2.1 *Alternative A – No Action*

Under Alternative A, TVA operations would remain in their present locations and no new buildings would be constructed. Therefore, there would be no impacts to wildlife under this alternative.

3.7.2.2 *Alternative B – Construct a New Facility on Reservation Road*

As discussed in Section 2.1, permanent impacts of up to 37.3 acres of deciduous forest vegetation would result from the construction of the new facility. However, this impact could be much smaller (11 acres) depending on the final site development plan. The proposed action would permanently remove forested wildlife habitat and result in the displacement of any wildlife (primarily common native or naturalized species) currently using the area. Direct mortality to some individuals would occur if those individuals are immobile during the vegetation clearing phase. Individuals would also be impacted if vegetation clearing occurred during their breeding/nesting seasons.

Habitat loss would likely disperse mobile wildlife into surrounding areas in an attempt to find new food and shelter sources and to reestablish territories, potentially resulting in added stress or energy use. In the event that the surrounding areas are already at their carrying capacity, further stress to wildlife populations could occur to those individuals presently utilizing these areas as well as those attempting to relocate. Habitat fragmentation would impact wildlife that utilizes forest interiors more so than those that use forest edges. Considering the amount of habitat of similar or higher quality in the surrounding area, it is unlikely that individuals would be unable to relocate successfully. Although the development of the facility would result in a long-term reduction in the local populations of several wildlife species, the affected species are common in the area and the effects on their area populations would be insignificant. The known caves, colonial wading bird colony, and osprey nest site are outside of the project area and would not be impacted under this alternative.

3.7.2.3 *Alternative C – Modify the River Road Complex*

Most of the area associated with Alternative C is mostly comprised of buildings, parking areas, roads, and maintained lawns. The small forested area has been previously disturbed, and the site provides generally low quality habitat for wildlife species. Modifications to the existing industrial complex or entrance road would result in minor impacts to adjacent forested habitat if tree removal is required. Although some trees would be replanted at the entrance and parking areas as part of site landscaping, these trees would not provide high quality wildlife habitat and impacts to wildlife as a result of the loss of forested habitat would be similar to that described in Alternative B.

3.8 Threatened and Endangered Species

3.8.1 Affected Environment

The ESA provides broad protection for species of fish, wildlife and plants that are listed as threatened or endangered in the United States. The ESA outlines procedures for federal agencies to follow when taking actions that may affect federally listed species or their designated critical habitat.

The state of Alabama does not have a state law equivalent to the ESA. Some species do, however, receive regulatory protection through Game, Fish, Furbearers and Other Wildlife

Regulations published annually and administered by the Alabama Department of Conservation and Natural Resources.

3.8.1.1 Animals

A review of the TVA Regional Natural Heritage database in March 2016 indicated that of those species listed by USFWS and the Alabama Natural Heritage Program (ALNHP), 61 animal species are currently known or have been known to occur within a 5-mile radius of the proposed development sites (Table 3-3). Seventeen additional federally listed animal species are known to occur within Colbert County (USFWS 2016, ALNHP 2016).

All of the aquatic snails, mussels, and fish listed in Table 3-3, as well as the alligator snapping turtle, require perennial streams and/or other permanent water bodies (NatureServe 2015) which do not occur on the alternative sites (Section 3.5.1). Therefore, none of these listed aquatic species occur on either Site B or Site C.

Table 3-3. Species of Conservation Concern within Colbert County

	Common Name	Scientific Name	Status	
			Federal ¹	State ² (Rank ³)
Aquatic Snails	Anthony's River Snail*	<i>Athearnia anthonyi</i>	LE	PROT (S1)
	Armored Rocksnail*	<i>Lithasia armigera</i>	--	TRKD (S1)
	Corpulent Hornsnail*	<i>Pleurocera corpulenta</i>	--	TRKD (S1)
	Muddy Rocksnail*	<i>Lithasia salebrosa</i>	--	TRKD (S1)
	Ornate Rocksnail*	<i>Lithasia geniculata</i>	--	TRKD (S1)
	Rugged Hornsnail*	<i>Pleurocera alveare</i>	--	TRKD (S2)
	Shortspire Hornsnail*	<i>Pleurocera curta</i>	--	TRKD (S1S2)
	Slowwater Elimia*	<i>Elimia interveniens</i>	--	TRKD (S2)
	Telescope Hornsnail*	<i>Pleurocera walkeri</i>	--	TRKD (S3)
	Varicose Rocksnail*	<i>Lithasia verrucosa</i>	--	TRKD (S3)
Birds	Warty Rocksnail*	<i>Lithasia lima</i>	--	TRKD (SH,S1)
	Bald Eagle*	<i>Haliaeetus leucocephalus</i>	DM	PROT (S3)
	Red-cockaded Woodpecker	<i>Picoides borealis</i>	LE	PROT (S2)
Fish	Warbling Vireo*	<i>Vireo gilvus</i>	--	TRKD (S1)
	Crown Darter*	<i>Etheostoma corona</i>	--	TRKD (S2)
	Spotfin Chub	<i>Erimonax monachus</i>	LT	PROT (SX)
Mammals	Snail Darter	<i>Percina tanasi</i>	LT	PROT (S1)
	Gray Bat*	<i>Myotis grisescens</i>	LE	PROT (S2)
	Indiana Bat	<i>Myotis sodalis</i>	LE	PROT (S2)
Mussels	Northern Long-Eared Bat	<i>Myotis septentrionalis</i>	LT	TRKD (S2)
	Acornshell*	<i>Epioblasma haysiana</i>	--	EXTI (SH)
	Alabama Lampmussel*	<i>Lampsilis virescens</i>	LE	PROT (S1)
	Angled Riffleshell*	<i>Epioblasma biemarginata</i>	--	EXTI (SX)
	Birdwing Pearlymussel*	<i>Lemiox rimosus</i>	LE	PROT (SXS1)
	Black Sandshell*	<i>Ligumia recta</i>	--	TRKD (S2)
	Butterfly*	<i>Ellipsaria lineolata</i>	--	TRKD (S3)
	Catspaw	<i>Epioblasma obliquata</i>	LE	PROT (SX)
	Clubshell	<i>Pleurobema clava</i>	LE	PROT (SX)
	Cracking Pearlymussel	<i>Hemistena lata</i>	LE	PROT (SX)
	Cumberland Bean	<i>Villosa trabalis</i>	LE	PROT (SX)
	Cumberland Moccasinshell*	<i>Medionidus conradicus</i>	--	PROT (S1)
	Cumberland Monkeyface*	<i>Quadrula intermedia</i>	LE	PROT (S1)
	Cumberlandian Combshell*	<i>Epioblasma brevidens</i>	LE	PROT (S1)
	Deertoe*	<i>Truncilla truncata</i>	--	TRKD (S1)
	Dromedary Pearlymussel*	<i>Dromus dromas</i>	LE	PROT (S1)
	Duck River Dartersnapper	<i>Epioblasma ahlstedti</i>	LE	PROT (S1)
	Fanshell	<i>Cyprogenia stegaria</i>	LE	PROT (S1)
	Fine-rayed Pigtoe*	<i>Fusconaia cuneolus</i>	LE	PROT (S1)
	Fluted Kidneyshell*	<i>Ptychobranchus subtentum</i>	LE	PROT (SX)

Chapter 3 – Affected Environment and Environmental Consequences

	Common Name	Scientific Name	Status	
			Federal ¹	State ² (Rank ³)
	Kidneyshell*	<i>Ptychobranhus fasciolaris</i>	--	TRKD (S1)
	Knob Mudalia*	<i>Leptoxis minor</i>	--	EXTI (S?)
	Long-solid*	<i>Fusconaia subrotunda</i>	--	TRKD (S1)
	Monkeyface*	<i>Quadrula metanevra</i>	--	TRKD (S3)
	Ohio Pigtoe*	<i>Pleurobema cordatum</i>	--	TRKD (S2)
	Orange-foot Pimpleback	<i>Plethobasus cooperianus</i>	LE	PROT (SH)
	Oyster Mussel	<i>Epioblasma capsaeformis</i>	LE	PROT (SX)
	Painted Creekshell*	<i>Villosa taeniata</i>	--	TRKD (S3)
	Pheasantshell*	<i>Actinonaias pectorosa</i>	--	TRKD (S1)
	Pink Mucket*	<i>Lampsilis abrupta</i>	LE	PROT (S1)
	Pocketbook*	<i>Lampsilis ovata</i>	--	TRKD (S2)
	Purple Catspaw*	<i>Epioblasma obliquata</i>	LE	PROT (SX)
	Purple Lilliput*	<i>Toxolasma lividus</i>	--	TRKD (S2)
	Rabbitsfoot	<i>Quadrula cylindrica</i>	PT	PROT (S1)
	Rayed Bean*	<i>Villosa fabalis</i>	LE	PROT (SX)
	Ring Pink*	<i>Obovaria retusa</i>	LE	PROT (S1)
	Rough Pigtoe*	<i>Pleurobema plenum</i>	LE	PROT (S1)
Mussels (cont.)	Round Combshell*	<i>Epioblasma personata</i>	--	EXTI (SX)
	Scaleshell*	<i>Leptodea leptodon</i>	LE	PROT (SX)
	Sheepnose*	<i>Plethobasus cyphus</i>	LE	PROT (S1)
	Shiny Pigtoe Pearlymussel*	<i>Fusconaia cor</i>	LE	PROT (S1)
	Slabside Pearlymussel	<i>Pleuronaia dolabelloides</i>	PE	PROT (S1)
	Smooth Rabbitsfoot*	<i>Quadrula cylindrica</i>	LT	PROT (S1)
	Snuffbox*	<i>Epioblasma triquetra</i>	LE	TRKD (S1)
	Spectaclecase*	<i>Cumberlandia monodonta</i>	LE	PROT (S1)
	Spike*	<i>Elliptio dilatata</i>	--	TRKD (S1)
	Sugarspoon*	<i>Epioblasma arcaeformis</i>	--	EXTI (SX)
	Tennessee Pigtoe*	<i>Fusconaia barnesiana</i>	--	TRKD (S1)
	Tubercled Blossom	<i>Epioblasma torulosa</i>		
	Pearlymussel*		LE	PROT (SX)
	Turgid Blossom	<i>Epioblasma turgidula</i>		
	Pearlymussel*		LE	EXTI (SX)
	Wavy-rayed Lampmussel*	<i>Lampsilis fasciola</i>	--	TRKD (S1S2)
	Yellow-blossom			
	Pearlymussel*	<i>Epioblasma florentina</i>	LE	PROT (SX)
	Alligator Snapping Turtle*	<i>Macrochelys temminckii</i>	--	PROT (S3)
Plants	Leafy Prairie-clover	<i>Dalea foliosa</i>	LE	SLNS (S1)
	Blue-eyed Mary*	<i>Collinsia verna</i>	--	SLNS (S1)
	Dutchman's Breeches*	<i>Dicentra cucullaria</i>	--	SLNS (S2)
	False Rue-anemone*	<i>Enemion bitematum</i>	--	SLNS (S2)
	Lyrate Bladderpod	<i>Lesquerella lyrata</i>	LT	TRKD (S1)
	White fringeless Orchid	<i>Platanthera integrilabia</i>	PT	SLNS (S2)

Source: Alabama Natural Heritage Program 2016, USFWS 2016 and TVA Regional Natural Heritage Database, accessed March 2016

*Species known to occur within 5-mi of the project area

¹ Federal Status Codes:

DM = Delisted, Recovered and Being Monitored
 LT = Listed Threatened;
 PT = Proposed Threatened

LE = Listed Endangered
 PE = Proposed Endangered

² State Status Codes:

PROT = Protected
 EXTI = Extirpated

TRKD = Tracked
 SLNS = State Listed, No Status Assigned

³ State Rank:

S1 = Extremely rare and critically imperiled
 S3 = Vulnerable
 S5 = Secure SX = Presumed Extirpated

S2 = Very rare and imperiled
 S4 = Apparently secure, but with cause for long-term concern

SH = Historic in Alabama; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)

The bald eagle is protected under the Bald and Golden Eagle Protection Act of 1940 and the Migratory Bird Treaty Act (USFWS 2015a). They are associated with large mature trees capable of supporting their massive nests. These nests are usually found near larger waterways where the eagles forage. One bald eagle nest is known to occur 1 mi east of the Reservation, although bald eagle nests are not known within Sites B or C.

The red-cockaded woodpecker forages and nests in large old pines located in mature pine forest with an open canopy. Any remaining fragments of this habitat are critical to the recovery of this species (USFWS 2003). The mixed hardwood deciduous forest within Sites B and C is not suitable habitat for the red-cockaded woodpecker because it lacks suitable large pine trees, and has a closed canopy and a dense shrub understory. Additionally, this species is not known to occur within 5 mi of the Reservation and the only records within Colbert County are historic (ALNHP 2016).

The warbling vireo is typically found in open, deciduous woodlands, thickets, riparian forests, and parks (NatureServe 2015). Due to the relatively closed canopy of forest and lack of riparian forest on Sites B and C, it is unlikely that the warbling vireo regularly occurs on either site.

A review of the TVA Regional Natural Database indicates that the gray bat is known to occur within 1.5 mi of Sites B and C. Gray bats were captured on the Reservation in 2007. They roost in caves throughout the year and forage over bodies of water including streams and reservoirs where they consume night-flying aquatic insects near the water surface. Unlike other bat species, gray bats are restricted year-round to only cave and cave-like habitats for both hibernation and roosting (Tuttle 1976). There are five potential roosting caves located within 5 mi of Sites B and C, however, none are located within the boundaries of Sites B and C. The closest documented cave is approximately 1.3 mile from the two sites.

The Indiana bat overwinters in large numbers in caves and forms small colonies under the loose bark of trees and snags in summer months. It favors mature forests interspersed with openings and often near sources of water (Pruitt and TeWinkel 2007, Kurta et al. 2002). Snags with sufficient peeling (exfoliating) bark represent suitable summer roosting habitat. Use of living trees with suitable roost characteristics in close proximity to suitable snags has also been documented. The availability of trees of a suitable bark condition, size and sun exposure is an important limiting factor for area populations (Humphrey et al. 1977, Garner and Gardner 1992, NatureServe 2015). The Indiana bat has been documented in Colbert County but only at a stop-over site during migration. One individual Indiana bat was radio-tracked a location on the Reservation approximately 900 feet from Site C in April 2016 by Copperhead Environmental Consulting, Inc.; however the location of the roost tree could not be determined because the transmitter used the track the bat fell off the bat before the roost tree was located. Acoustic detectors subsequently operated by TVA staff near the presumed roosting area for several days did not record any Indiana bat (or northern long-eared bat) calls. These observations support the idea that any use of the Reservation by Indiana bats is temporary and likely only to occur during spring and fall migration. Mist netting performed on the Reservation in the summer of 2007 captured no Indiana bats (TVA 2011).

The northern long-eared bat is not known to occur within 5 mi of the Reservation and but is known to occur within Colbert County. Its range encompasses much of the eastern and central U.S. Suitable winter habitat (hibernacula) includes caves and cave-like structures

(e.g., abandoned or active mines, railroad tunnels). These hibernacula typically have large passages with significant cracks and crevices for roosting, relatively constant cool temperatures (32 to 48°F), high humidity and minimal air currents. During summer this species roosts singly or in colonies in cavities, underneath bark, crevices, or hollows of both live and dead trees (typical diameter ≥ 3 inches). Males and non-reproductive females may also roost in cooler places, like caves and mines. Northern long-eared bats forage for insects in upland and lowland woodlots, tree-lined corridors and over water surfaces. In general, habitat used by northern-long eared bats is thought to be similar to that of Indiana bats, although northern long-eared bats appear to be more opportunistic in selection of summer habitat (USFWS 2014, USFWS 2015b). No northern long-eared bats were captured during mist-netting on the Reservation in the summer of 2007 (TVA 2011).

A survey was conducted in February 2016 to determine bat habitat suitability on Sites B and C. No caves or culverts of suitable size were observed on Site B, however 16 potential roost trees were discovered adjacent to Site B and nine potential bat roost trees were identified within the site (see Figure 3-1). Areas with suitable roost trees were dominated by hackberry, red oak, white oak, tulip poplar and water oak in the canopy. The understory was a dense thicket of Chinese privet. Most suitable trees identified (>60 percent) were live with holes or crevices. Roughly one-half of these holes/crevices appeared to be within the midstory or understory of the forest such that exposure to sunlight would be minimal. Only two trees were large snags with exfoliating bark generally preferred by maternity roosting females. Site C consists primarily of developed land with a small forested area in the northeast corner. No suitable caves, culverts, or bat trees for the Indiana bat or northern long-eared bat were observed on this site. The dense understory of the forested area of both Sites B and C would impair movement of bats in the understory. While Site B may offer some low to moderate quality roosting habitat for migrating bats, it does not provide high quality roosting habitat for summer roosting Indiana bats or northern long-eared bats.

3.8.1.2 Plants

Three state-listed plants of conservation concern are known to occur within 5 mi of the Sites B and C (TVA 2016). An additional three federally listed plant species are known to occur in Colbert County. Habitat requirements for each of these species are presented in Table 3-4. Based on their preferred habitat, blue-eyed Mary, Dutchman's breeches and false rue-anemone can be found in woodland habitat similar to the forested area in the proposed project areas. However, the February 2016 field survey indicated that these areas have a dense understory of shrubs which would over shade the potential habitat for these herbaceous wildflowers. Additionally, there are no known populations of these plant species within the project area, and none were observed during the recent site visits. Therefore, it is unlikely that these plants would occur on either site.

Table 3-4. Habitat Requirements for Plant Species of Conservation Concern within the Vicinity of the Reservation

Common Name	Habitat Requirements	Habitat within Project Area
Leafy Prairie-clover ¹	Remnant prairies near cedar glades	No
Blue-eyed Mary ²	Damp open woods	Yes
Dutchman's Breeches ³	Deciduous woods and clearings	Yes
False Rue-anemone ³	Moist deciduous woods	Yes
Lyrate Bladderpod ⁴	Cedar glades and disturbed habitat in calcareous areas	No
White Fringeless Orchid ¹	Wet, boggy areas	No

Sources: ¹ USFWS 2016
² Lady Bird Johnson Wildflower Center 2016
³ Flora of North America 2010
⁴ NatureServe 2015

3.8.1.3 Alternative B – Construct a New Facility on Reservation Road

As discussed in Section 3.6, permanent impacts of up to 37.3 acres of deciduous forest vegetation would result from the construction of the new facility. However, plan this impact could be much smaller (11 acres) depending on the final site development plan. The area of impact subject to project activities under this alternative is primarily comprised of land that is generally unsuitable for the listed species in Table 3-3.

Suitable habitat for federally listed aquatic species does not occur within the project area. Therefore, direct impacts to state or federally listed threatened and endangered aquatic species are not anticipated to occur with implementation of Alternative B.

The terrestrial habitat on-site consists of woodland habitat with a dense, non-native understory that is generally unsuitable habitat for the listed plant species identified within the vicinity of the Reservation. Therefore, impacts to threatened or endangered plants are not anticipated.

Suitable habitat for red-cockaded woodpecker does not occur within or near the project area. No bald eagles or bald eagle nests are known within 660 feet of the two sites or were observed during field reviews. Presence of warbling vireo is unlikely in the project area due to lack of quality habitat. The red-cockaded woodpecker, bald vireo and warbling vireo would not be affected by the proposed actions.

Five cave sites are known to occur within 5 mi of Site B, which have the potential to provide roosting habitat for gray bat, Indiana bat and northern long-eared bat. However, the closest of these caves is greater than 1 mi from the site and would not be impacted by the proposed action. No other winter roosting habitat occurs within the project area. Only one ephemeral body of water exists within the project footprint for Site B. Due to lack of roosting sites and the lack of high quality foraging habitat, gray bats would not be impacted by the proposed actions.

Foraging habitat for the Indiana bat and northern long-eared bat exists at Site B over and within the canopy of forested areas. The forested area on Site B includes nine potential

roost trees suitable for use by the Indiana bat and the northern long-eared bat (Figure 3-1). Proposed actions at Site B may remove some or all of this low to moderate quality roosting habitat for Indiana bat or northern long-eared bat. Removal of forested habitat at Site B would occur between October 15 and March 15 in order to avoid any potential direct impacts to Indiana or northern long-eared bats. Consultation with the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act is underway regarding impacts to Indiana bat and northern long-eared bat and TVA would implement any mitigation measures, in addition to the seasonal restrictions on removal of forested habitat, specified by USFWS during the consultation. Therefore, impacts to threatened and endangered species are expected to be minor under this alternative.

3.8.1.4 Alternative C – Modify the River Road Complex

Alternative C would result in minimal tree removal for the construction of the new facility and in support of the alteration of the entrance road. There is no aquatic habitat impacted within the project area and no bat roost trees were identified in the small forested area. Because this site is largely previously disturbed, it does not provide suitable habitat for the listed species in Table 3-3. Therefore, no impacts to threatened or endangered species are expected to occur with this alternative.

3.9 Solid/Hazardous Waste Affected Environment

Solid waste consists of a broad range of materials that include refuse, sanitary wastes, contaminated material, scrap metals, nonhazardous wastewater treatment plant sludge, nonhazardous air pollution control wastes, various nonhazardous industrial waste and other materials (solid, liquid, or contained gaseous substances).

Hazardous materials and management of these materials are regulated under a variety of federal laws including the Occupational Safety and Health Administration (OSHA) standards, Emergency Planning and Community Right to Know Act, RCRA, the Comprehensive Environmental Response, Compensation and Liability Act and the Toxic Substances Control Act. The Hazardous and Solid Waste Amendments of 1984 expanded RCRA by requiring corrective action for the release of hazardous wastes and constituents from a treatment, storage and disposal facility. The goal of the corrective action process is to ensure that hazardous waste and hazardous constituent releases associated with treatment, storage and disposal facilities are remediated, regardless of when the waste was produced. In the mid-1980s, TVA received a hazardous waste management (AHWMMMA) permit from ADEM to maintain a drum storage facility at the Power Service Center and to perform research on hazardous waste streams (TVA 2011). The drum storage facility was closed in 2015 and the current AHWMMMA Permit is being modified to note this closure.

The current AHWMMMA Permit covers the portion of the reservation which includes the Alternative B and Alternative C facility sites. This permit, AHWMMMA Permit USEPA ID # 640 090 005, requires notification to and approval by ADEM of any planned physical alteration or additions to the permitted facility and any solid waste management units or areas identified in the permit. Solid Waste Management Unit (SWMU) 55, one of numerous SWMUs addressed in this permit, is located near the eastern edge of the Alternative B site, a short distance north of the two water tanks. An identified Area of Environmental Concern is present on the Alternative C site. This indicates the presence of the probable release of a hazardous substance(s) with the potential to threaten human health or the environment that is not associated with a SWMU. ADEM currently monitors and oversees all activities performed under the permit and has indicated that no land can be sold or transferred within

the existing permit area unless it is either remediated to unrestricted use levels or regulated with the appropriate environmental covenants.

A variety of hazardous materials are used as part of daily operations at the Reservation. A byproduct of the use of hazardous materials is the generation of hazardous wastes. The quantities of asbestos and other hazardous materials in the buildings on the Alternative C site are not known.

3.9.2 Environmental Consequences

3.9.2.1 *Alternative A – No Action*

Under the No Action Alternative, TVA would continue to generate solid and hazardous wastes from its current operations. These wastes would be managed in accordance with current TVA procedures and state and federal regulations, and no impacts to solid waste and hazardous waste generation are anticipated

3.9.2.2 *Alternative B – Construct a New Facility on Reservation Road*

3.9.2.2.1 Construction Impacts

Solid Waste Management Unit (SWMU) 55 occurs near the eastern edge of the Alternative B site. It would likely not be affected by the construction of the proposed facility. If it is likely to be affected, TVA would request approval and modification of the associated RCRA AHWMMMA Permit from ADEM. Should any new SWMUs or Areas of Concern be identified during construction, TVA would notify ADEM and investigate and/or remediate them according to permit requirements.

Construction of the complex would generate solid and hazardous wastes. The primary waste streams resulting from construction would be solid nonhazardous waste. However, some nonhazardous liquid waste would also be generated. The primary nonhazardous solid waste generated during construction are expected to include:

- Construction debris consisting primarily of miscellaneous construction rubble, wastes from packing materials and empty nonhazardous chemical containers during project construction.
- Land clearing wastes would result from vegetation clearing and grubbing and grading operations.
- Soils would result from land clearing, grading and excavation. Excess topsoil would be utilized in berms/landscaping or hauled from the site.

In addition to these larger nonhazardous waste streams, limited quantities of nonhazardous solvents, paints and adhesives, spill absorbent, oil and solvent contaminated rags and empty containers would be generated.

Various hazardous wastes, such as fuels, lubricating oils, solvents, paints, adhesives, and compressed gases could also be produced during construction. Oily wastes generated during servicing of heavy equipment would be managed by off-site vendors who service on-site equipment using appropriate self-contained used oil reservoirs. Appropriate spill prevention, containment and disposal requirements for hazardous wastes would be implemented to protect construction and plant workers, the public and the environment.

TVA would manage all solid waste and hazardous wastes generated from construction activities in accordance with standard spill prevention and cleanup and waste management

protocols developed in accordance with pertinent federal, state and local requirements. General municipal solid waste and scrap metal could be incorporated into the existing recycling program.

Disposal of non-recyclable materials generated by this action would be disposed in either the Republic Services Morris Farm Landfill located approximately 32 mi to the east in Hillsboro AL or the Colbert County Landfill located less than 10 mi to the south in Tuscumbia AL. Overall, sufficient landfill capacity is expected to accommodate the additional solid waste generated as a result of the proposed construction activities. Generation of construction wastes would be short-term and temporary; therefore, with implementation of standard TVA procedures including recycling, direct or indirect effects associated with construction wastes would be minimal.

3.9.2.2.2 Operational Impacts

Given the nature of the relocated operations generation of large-scale waste streams or significant amounts of solid and hazardous are not anticipated. The TSC has approximately 20 service vehicles (pickup trucks and automobiles) as well as three 18-wheel trucks and one bulldozer that are used for service and maintenance activities. Small quantities of used oil and other hazardous wastes would be temporarily stored onsite and properly disposed of in accordance with standard procedures for spill prevention and cleanup and waste management protocols in accordance with pertinent federal, state and local requirements.

Fuel for the backup generator would be stored onsite in a double wall above ground storage tank onsite. The current Spill Prevention, Control and Countermeasures Plan (SPCC) would be updated to incorporate procedures to be implemented related to this storage tank.

The limited amount of hazardous waste generated during operation would be similar to what is currently generated as no new waste streams are anticipated. Therefore, no direct or indirect effects related to solid or hazardous wastes are anticipated from operation of the new facility at this site.

3.9.2.3 *Alternative C – Modify the River Road Complex*

3.9.2.3.1 Construction Impacts

As with Alternative B, construction activities under Alternative C would generate construction-related nonhazardous solid waste and hazardous waste. However, the quantity of these wastes would be larger as development of Site C would require the demolition of up to 10 structures. The quantity of waste generated through land clearing activities would be low compared to Alternative B. The majority of waste generated would be considered nonhazardous wastes and would be recycled in compliance with state waste regulations or properly disposed of at approved solid waste facilities.

Non-recyclable demolition debris would be loaded in roll-off containers or trucks and transported to one of the two landfills identified under Alternative B. Sufficient landfill capacity exists in the landfills identified in Section 3.9.2.2.1 to accommodate any construction and demolition wastes that are not recycled. In addition to these larger nonhazardous waste streams, limited quantities of nonhazardous solvents, paints and adhesives, spill absorbent, oil and solvent contaminated rags and empty containers would be generated.

The buildings to be demolished could contain hazardous materials such as asbestos. Prior to the initiation of any demolition work, a complete inventory of hazardous materials associated with the buildings would be completed and processes for the removal, transport, disposal, and/or storage of the hazardous materials would be addressed in the SPCC/Incident Prevention Plan (IPP) plans. Hazardous materials associated with the identified Area of Concern would similarly be inventoried and treated in accordance with the SPCC/IPP plans.

Various hazardous wastes, such as waste paints, coating and adhesive wastes and spent solvents, could be produced during construction. These wastes would be temporarily stored in properly managed hazardous waste storage areas on site. Appropriate spill prevention, containment and disposal requirements for hazardous wastes would be implemented to protect construction and plant workers, the public and the environment. A permitted hazardous waste disposal facility would be used for ultimate disposal of the wastes.

Wastes generated during construction would be managed by implementation of routine TVA procedures for proper handling, recycling, and disposal of such wastes. Appropriate management of construction debris, including recycling and reuse when possible, would limit any potential adverse impacts. Overall, sufficient landfill capacity exists to accommodate the additional solid waste generated as a result of the proposed construction activities. Generation of construction wastes would be short-term and temporary; therefore, impacts would be minimal. With implementation of standard TVA procedures and recycling, effects associated with construction wastes would be minimal.

3.9.2.3.2 Operational Impacts

Operations would be the same as described under Alternative B. Therefore, no direct or indirect effects related to solid or hazardous wastes are anticipated from operation of the new facility at this site.

3.10 Socioeconomics

3.10.1 Affected Environment

The Reservation is located in Colbert County in northwestern Alabama and is surrounded by the cities of Sheffield, Muscle Shoals, Tuscumbia and Florence. Given the nature of the proposed action, the potentially affected population for this analysis is defined as the community within a 5-mi radius buffer around the proposed project sites. This community includes both Colbert and Lauderdale counties and therefore both counties and the State of Alabama are included as appropriate secondary geographic areas of reference. Comparison at multiple scales provides a more effective definition for socioeconomic factors

3.10.1.1 Demographics

Demographic characteristics of the surrounding community which is defined as the 5 mi radius around the proposed development sites as well as the surrounding counties and State of Alabama are summarized in Table 3-5. The community surrounding sites B and C incorporates portions of the surrounding cities which are reflected in the resident population of 73,707. However, Colbert County (54,543 residents) and Lauderdale County (93,096 residents) only represent 1 to 2 percent of the total population of Alabama (4,849,377). Since 2000, the population within the surrounding community has increased by 1.4 percent. During this same period, the populations of Colbert and Lauderdale counties and the state of Alabama increased by less than 1 percent.

Table 3-5. Demographic Characteristics

	Surrounding Community³	Colbert County	Lauderdale County	State of Alabama
Population				
Population, 2014 estimate	73,707	54,543	93,096	4,849,377
Population, 2010	72,691	54,428	92,709	4,780,127
Percent Change 2010-2014	1.4%	0.2%	0.4%	0.01%
Persons under 18 years, 2014	20.6%	21.7	20.5	22.8
Persons 65 years and over, 2014	17.7%	18.5%	18.2%	15.3%
Racial Characteristics				
White, 2013 ¹	76.1%	80.8%	86.7%	69.7%
Black or African American, 2014 ¹	19.5%	16.3%	10.4%	26.7%
American Indian and Alaska Native, 2014 ¹	0.5%	0.6%	0.5%	0.7%
Asian, 2014 ¹	0.8%	0.5%	0.9%	1.3%
Native Hawaiian and Other Pacific Islander, 2013 ¹	0.01%	0.1	0.1%	0.1%
Two or More Races, 2014	2.1%	1.7%	1.5%	1.5%
Hispanic or Latino, 2014 ²	1.2%	2.6%	2.4%	4.1%
Income and Poverty				
Housing Units	36,160	26,192	44,353	2,207,912
Median household income, 2010-2014	\$36,220	\$39,914	\$42,703	\$43,511
Persons below poverty level, 2010-2014	22.9%	16.7%	18.7%	19.3%

¹Includes persons reporting only one race.

²Hispanics may be of any race, so also are included in applicable race categories.

³5 mi radius around the proposed alternative development sites.

Source: U.S. Census Bureau (USCB) 2016a

Approximately 76 percent of the study area population is white. Minority populations in the study area are smaller and include: black or African American (19.5 percent), Hispanic or Latinos (1.2 percent) and persons who identified as two or more races. Black or African American populations within the study area, however, are slightly higher than that of the surrounding counties (19.5 percent) and lower than that of the state (26.7 percent). Hispanic and Latino ethnic groups are present in the study area, but are below comparative rates for the surrounding counties and Alabama.

3.10.1.2 Economic Conditions

Employment characteristics are summarized in Table 3-6. The total employed civilian population within the surrounding community is 30,222. Approximately 9 percent of the civilian labor force in the surrounding community is unemployed, which is comparable to the unemployment rate in Colbert and Lauderdale counties (approximately 10 and 8 percent respectively) and the state as a whole (approximately 10 percent). Median household income for the surrounding community was \$36,220, which is lower than those reported for Colbert and Lauderdale counties and the state of Alabama (see Table 3-5).

A total of 9.1 percent of the civilian labor force in the surrounding community is unemployed. This rate is lower than civilian unemployment rate reported for Colbert County and Alabama (10 percent), but higher than the unemployment rate for Lauderdale County (7.9 percent) (see Table 3-6).

Table 3-6. Employment Characteristics

	Surrounding Community¹	Colbert County	Lauderdale County	State of Alabama
Population Over 16 years	73,492	44,184	75,673	3,828,799
Civilian Labor Force	33,241	23,627	43,491	2,239,169
Employed	30,222	21,271	40,047	2,010,453
Unemployed	3,019	2,356	3,444	228,716
Percent of Civilian Labor Force	9.1%	10.0%	7.9%	10.2%

Source: USCB 2016a and 2016b

¹ 5-mi radius around the proposed alternative development sites.

The largest percentage of civilian employees in Colbert County are employed in the educational services, health care and social services industries (19.5 percent), followed by manufacturing (18.3 percent) and wholesale trade (12.9 percent). This is similar to Lauderdale County where the business sector providing the greatest employment is education services, health care and social services (22.3 percent). However the second largest percentage of Lauderdale County residents are employed in the retail trade sector (15.3 percent) followed by manufacturing (13.1 percent) (USCB 2015a). Based on current commuting patterns, the labor market area is defined to include all adjacent counties (USCB 2015a).

3.10.1.3 Community Facilities

Community facilities and services are public or publicly funded facilities such as police protection, fire protection, schools, hospitals and other health care facilities, libraries, day-care centers, churches and community centers. Services available to the communities surrounding the reservation include hospitals, fire and emergency services, law enforcement, churches, schools and two airports (Figure 3-4). The Mount Olive Missionary Baptist Church and the Muscle Shoals Baptist Church are located approximately 0.7 mi southwest and 0.8 mi east, respectively, of the proposed alternative development sites. All other community facilities are located greater than 1 mi from the alternative development sites.

3.10.1.4 Environmental Justice

On February 11, 1994, President Clinton signed EO 12898 Federal Actions to Address Environmental Justice in Minority and Low Income Populations. This EO mandates some federal-executive agencies to consider environmental justice (EJ) when identifying and addressing human health or environmental effects of its programs, policies and activities that have a disproportionate on minority and low-income populations. While TVA is not subject to this EO, TVA applies it as a matter of policy.

The analysis of the impacts of the proposed activities on EJ issues follows guidance issued by CEQ under NEPA (CEQ 1997). The analysis of EJ impacts has three parts:

1. Identification of the geographic distribution of low-income and minority populations in the affected area;
2. An assessment of whether the impacts of the proposed activities would produce impacts that are high and adverse; and
3. If impacts are high and adverse, a determination is made as to whether these impacts disproportionately affect minority and low-income populations.

The potential for disproportionate impacts is determined by comparing the proximity of any high and adverse impacts to the locations of low-income and minority populations. If the analysis determines that health and environmental impacts are not significant, there can be no disproportionate impacts on minority and low-income populations. Demographic data from all of the census block groups included in the potentially affected community (i.e. those within a 5-mi radius) were compared to data for Colbert and Lauderdale counties to determine potential impacts to EJ communities.

The CEQ defines minority as any race and ethnicity, as classified by the USCB as: Black or African American; American Indian or Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; some other race (not mentioned above); two or more races; or a race whose ethnicity is Hispanic or Latino (CEQ 1997).

Identification of minority populations requires analysis of individual race and ethnicity classifications as well as comparisons of all minority populations in the region. Minority populations exist if either of the following conditions is met:

- The minority population of the impacted area exceeds 50 percent of the total population.
- The ratio of minority population is meaningfully greater (i.e., greater than or equal to 20 percent) than the minority population percentage in the general population or other appropriate unit of geographic analysis (CEQ 1997).

Total minority populations (i.e., all non-white racial groups combined and Hispanic or Latino) comprise 22.0 percent of the population of the block groups within the potentially affected community. The minority populations within this group are less than the rate for Colbert County (30 percent minority) but greater than for Lauderdale County (14 percent minority).

However, the total minority population exceeded 50 percent of the total population in eight of the block groups included within the potentially affected community. Therefore, persons in these block groups should be considered as a minority population subject to EJ considerations. One of these block groups includes all of the Reservation. The other block groups are located within the city of Muscle Shoals and across the Tennessee River within the city of Florence.

Low-income populations are those with incomes that are less than the poverty level (CEQ 1997). The 2015 Health and Human Services Poverty Guidelines states that an annual household income of \$24,250 for a family of four is the poverty threshold. For an individual, an annual income of \$11,770 or less is below the poverty threshold. A low-income population is identified if either of the following two conditions are met:

- The low income population of the impacted area exceeds 50 percent of the total population.
- The ratio of low income population significantly exceeds (i.e., greater than or equal to 20 percent) the appropriate geographic area of analysis.

Approximately 23 percent of persons within the potentially affected community are living below the poverty threshold. The low income populations within these block groups did not significantly exceed corresponding rates for Colbert County (16.7 percent) or Lauderdale County (18.7 percent minority).

However, the total low income population exceeded 50 percent of the total population in two of the block groups included within the potentially affected community. Therefore, persons in these block groups should be considered as a low-income population subject to EJ considerations. These block groups are both located within the city of Muscle Shoals.

3.10.2 Environmental Consequences

3.10.2.1 Alternative A – No Action

There would be no change in local demographics, economic conditions, or community services under the No Action Alternative; therefore, no short-term positive or negative economic impacts associated with construction activities would occur.

3.10.2.2 Alternative B – Construct a New Facility on Reservation Road

3.10.2.2.1 Demographic and Employment Impacts

The on-site construction workforce is estimated to be 20 to 50 workers during the construction period (estimated to be 11 to 18 months). These workers could be drawn from the labor force that currently resides in the study area. There would be no change to the number of employees currently assigned to the relocated functions. Consequently, no impacts to local demographics are expected.

3.10.2.2.2 Economic Impacts

Potential economic impacts associated with the proposed project relate to direct and indirect effects of the construction. Construction activities may entail the purchase of materials and supplies and procurement of additional services. Capital costs associated with the proposed action would, therefore, have direct economic benefits to the local area and surrounding community. Given the nature of the construction it is unlikely that the project would increase local employment as most workers would be employed by regional construction companies, however, the project would provide continued employment to local workers. Revenue generated through income tax and sales tax from employed persons would benefit the local economy. Additionally, some beneficial secondary impacts to the economy are also expected in conjunction with the multiplier effects of construction activities. For example, capital expenditures associated with the project are expected to have secondary beneficial effects on suppliers of goods and services associated with the project. There would be no long-term economic impact as there would be no change in existing employment conditions.

3.10.2.2.3 Community Facilities and Services

Direct impacts to community facilities occur when a community facility is displaced or access to the facility is altered. Indirect impacts occur when a proposed action or project results in a population increase that would generate greater demands for services and affect the delivery of such services. There are no direct impacts to community services associated with any of the alternatives and there are no community facilities within 0.5 mi of either of the alternative sites. In addition, the proposed action involves relocating operations and therefore there would be no change to the current demand for services.

3.10.2.2.4 Environmental Justice

A minority population subject to EJ consideration was identified in the block group that contains the proposed alternative development sites. The changes that would occur under Alternative B are minor and would have at most only small impacts on the region's economy, recreation opportunities in the area, scenic values and other resource areas. Therefore, no disproportionate impacts to disadvantaged populations are expected to

occur. The minority populations identified within the potentially affected area are located within the surrounding cities of Muscle Shoals and Florence and would not be impacted by the proposed development and operation of the relocated TSC, Data Center and Weather Monitoring Center complex at Site B.

It should also be noted that opportunities would be provided to residents with some construction phase employment, which would provide potential positive impacts to area low low-income populations.

3.10.2.3 *Alternative C – Modify the River Road Complex*

Because the proposed construction activities under Alternative C are essentially the same as Alternative B and because of the proximity of the two potential alternative sites, impacts to demographic characteristics, the local economy, community services and EJ are the same as described for Alternative B.

3.11 Natural Areas, Parks and Recreation

3.11.1 Affected Environment

Natural areas include TVA and non-TVA managed areas, ecologically significant sites and Nationwide Rivers Inventory streams. Managed areas include lands held in public ownership that are managed by an entity (e.g., TVA, U.S. Forest Service (USFS), State of Alabama, Colbert County) to protect and maintain certain ecological and/or recreational features. Ecologically significant sites either are tracts of privately owned land that are recognized by resource biologists as having important environmental resources or are identified tracts on TVA lands that are ecologically distinct in attributes or character but are not specifically managed by TVA's Natural Areas Program. Nationwide Rivers Inventory streams are free-flowing segments of rivers recognized by the U.S. National Park Service as possessing outstandingly remarkable natural or cultural values. This section addresses natural areas that are on, immediately adjacent to (within 0.5 mi), or within the region (5 mi radius) of Sites B and C.

The TVA Natural Heritage database indicated that 14 natural areas occur within 5 mi of the proposed alternative sites. These areas are shown on Figure 3-4. However, only one of these areas, the Muscle Shoals National Recreational Trail (also known as the Reservation Road Trail), is located on or immediately adjacent to Site B.

The Seven Mile Island State Wildlife Management Area, Old First Quarters TVA Small Wild Area and the Key Cave Aquifer Hazard Area are located within 1.5 to 4.5 mi from the alternative sites. Two unique aquatic habitat areas (Wilson Dam Tail Water Restricted Mussel Harvest Area and Tennessee River/Wilson Dam Nonessential Experimental Population Area) are located approximately 0.6 mi north of the proposed development sites. Other recreation areas within approximately 5 mi of the proposed alternative development sites include Veterans Park, McFarland Park, Cox Creek Park, Wildwood Park and Florence Municipal Park. Cypress Creek from river mile (RM) 5, west of Florence to RM 25 at the Tennessee state line is listed on the Nationwide Rivers Inventory for its scenery and recreational value (National Park Service 2016). Under a 1979 Presidential Directive and related CEQ procedures, all federal agencies must seek to avoid or mitigate actions that would adversely affect one or more Nationwide Rivers Inventory segments. Cypress Creek is located across the Tennessee River, 4.9 mi northeast of the proposed development sites.

44



44

The Reservation Road Trail and the associated trail complex is a 15-mi loop greenway urban trail/bikeway for public use primarily located in Colbert County (TVA 2011). It connects numerous historical sites on the Reservation. The trail is part of the Muscle Shoals Reservation Recreation Complex and is a notable outdoor recreation resource that attracts visitors from within as well as outside the northwest Alabama region. The Wilson Dam Visitor Center, Rockpile Recreation Area, Civilian Conservation Corps Park, the Native Plant Garden Area and the Old Rail Road Bridge are key developed areas within the Complex that provide access to the extensive trail system (TVA 2015a). The Reservation Road trail is primarily located north of Reservation Road. Approximately 2,300 feet (0.44 mile) of the trail traverses the southern boundary of the Site B (see Figure 3-4). While the trail receives a substantial amount of recreational use, there is little evidence of recreational use of the portion of Site B north of the trail. This undeveloped forested area does, however, contribute to the recreational experience of trail users.

3.11.2 Environmental Consequences

3.11.2.1 Alternative A – No Action

Under this alternative, the operations would not be relocated to a new facility and the natural areas, parks recreation facilities and public use patterns in this area would not be affected.

3.11.2.2 Alternative B – Construct a New Facility on Reservation Road

Under Alternative B, TVA would construct the facility in an area that would require one or two access roads which would cross the Reservation Road Trail. The level of impact to the trail would depend on the site-specific plan of development. TVA would mark these crossings with appropriate signage and pavement striping to minimize potential impacts to users of the trail. TVA recognizes the importance of this trail and aesthetic qualities that the forested corridor along it provides to the trail users. Therefore, as an impact minimization measure, TVA would retain at least a 100-foot forested buffer along both sides of the recreational trail.

The trail would remain open during construction of the complex minimizing impacts to users of this facility during this period. To minimize potential safety concerns with trail users, TVA would post a flagman during peak construction periods at the access road trail crossings. During construction the increased noise, construction traffic and fugitive dust may have a negative impact on persons using the trail. These impacts would be temporary (11 to 18 months) and would be minimized through maintenance of the vegetative buffer.

The other parks and natural areas identified in Figure 3-4 are located greater than 0.5 mi away from Site B. Given the distance between the areas and the proposed project site and minimal impacts to surface waters, no direct or indirect impacts to natural areas, aquatic habitat areas, or parklands would occur under Alternative B.

As noted in Section 3.3 (Land Use), Site B is currently zoned for Public Recreation and Open Space and is proposed to be rezoned for TVA Project Operations. The primary current recreational use of Site B is associated with the Reservation Road Trail. A portion of the land within Site B would be converted from undeveloped open space to light industrial use, resulting in a small reduction in land available to meet future needs for recreation and open space within an increasingly urbanized area. While the inclusion of the buffer would help preserve the character of the Reservation Road Trail, the addition of one or two trail/access road crossings would have some negative impact on the continuity of the trail

compared to existing conditions. There would be no indirect impacts to recreation as a result of the development of the new facility at Site B.

There would be no indirect impacts from onsite construction activities given the distance between the natural areas, parks or recreational facilities and the construction site.

3.11.2.3 *Alternative C – Modify the River Road Complex*

Under Alternative C, TVA would construct the project in an area that is an existing industrial use area. There would be no impact to the Reservation Road Trail under this alternative and all other parks and natural areas identified in Figure 3-4 are located greater than 0.5 mile away from the site. Given the distance between the developed recreation areas and the site and taking into account the existing industrial nature of the site, no direct impacts to natural areas or parklands would occur with this alternative.

There would be no indirect impacts from onsite construction activities given the existing industrial setting of the project location and the distance between the natural areas, parks or recreational facilities and the construction site.

3.12 Transportation

3.12.1 Affected Environment

The Reservation is served by highway and railway modes of transportation. The transportation network surrounding the Reservation contains roads, bridges, rail lines and navigable waterways; however, given the nature of the proposed action, rail lines and navigable waterways are inconsequential in the assessment of transportation. The Reservation is served by State Highway 133 (SH 133), a four-lane divided highway, which runs north-south between Muscle Shoals and Florence and carries traffic over the Tennessee River. Access to the Alternative B site is provided off of Reservation Road, which passes under SH 133 to the west of the Alternative B site. Reservation Road is a two-lane road. Access to Alternative C is provided from River Road (also known as County Road 40), a two-lane road east of SH 133. SH 133 and Reservation Road are linked by a short four-lane connector road, which intersects SH 133 at a signalized intersection near the southwest corner of the site (see Figure 1-1).

Alternative B is located on TVA-owned property along the north side of Reservation Road just east of SH 133. This area is undeveloped and does not currently generate any traffic. Alternative C is located on the northwest corner of the intersection of River Road and High Point Avenue. The area is currently developed with a mix of office and warehouse-type development.

The 2014 Annual Average Daily Traffic on the roadways in the immediate vicinity of the reservation is listed in Table 3-7.

Table 3-7. Average Daily Traffic Volume (2014) on Roadways in Proximity to the Reservation

Roadway	Existing Average Daily Vehicle Use (Average Annual Daily Traffic)
SH 133 north of Reservation Road	28,750
SH 133 south of Reservation Road	25,960
Connector between SH 133 and Reservation Road	1,250
River Road east of SH 133	5,770

Source: ALDOT 2014.

3.12.2 Environmental Consequences

For Alternatives B and C, the daily workforce during construction/renovation is expected to range from 20 to 50 workers. Traffic is expected to predominantly consist of a mix of passenger cars and pickup trucks, along with less frequent large material delivery trucks. It is expected to be up to 40 workers would be relocated from other portions of the Reservation to one of the proposed alternate sites. For the purpose of this analysis, the bounding value of the construction workforce (50 workers) is used to assess potential effects on traffic operations.

Traffic is assumed to be distributed during a peak morning period (to the site) and during a peak evening period (away from the site). Therefore, a daily traffic volume of 100 vehicles per day (vpd) is assumed to be generated by Alternatives B or C, which assumes one person per vehicle.

3.12.2.1 Alternative A – No Action

Under this alternative, the potentially affected TVA operations would remain in their present locations in other areas of the Reservation. Once the areas they occupy are sold, TVA would either have to lease the existing occupied space from the new owners or relocate the operations. No construction or demolition activities would be undertaken by TVA as part of this alternative. This alternative would only have a minor effect on transportation in the event of the relocation of existing operations. However, this effect would be limited to relatively minor shifts in traffic patterns associated with the existing workforce.

3.12.2.2 Alternative B – Construct a New Facility on Reservation Road

Under this alternative, it is anticipated that up to 100 vpd would be generated by either the construction phase of the new facility. For the purpose of this analysis, all of this anticipated traffic is assumed to access the traffic signal at SH 133 from Site B, although it will likely be distributed to other roadways (such as coming from and going to the west on Reservation Road) in the network that are not linked to the traffic signal. Under this assumption, traffic would use a short distance of Reservation Road between Site B and the connector road to SH 133.

The daily traffic volume of 100 vpd would have little to no effect on the existing traffic volume on SH 133. It would increase the traffic count on the connector road between SH 133 and Reservation Road from 1,250 vpd to 1,350 vpd, or 5.6 percent. This is a relatively minor increase given that the connector is a four-lane roadway and there is ample capacity to handle this relatively minor increase. Additionally, TVA proposes to add a left-turn lane at each entrance from eastbound Reservation Road to the proposed site, which

will improve traffic flow and safety of workers entering the complex. This road is maintained by TVA and does not require coordination with the city. However, coordination with the state may still be required to ensure that federal and state guidelines are followed in the design of the left-turn lane.

Therefore, the predicted traffic increases resulting from the development of a new facility at Site B are negligible and the impacts are expected to be minor.

3.12.2.3 *Alternative C – Modify the River Road Complex*

Under this alternative, the predicted traffic generated from the construction/renovation of the new facility would be higher than that associated with Alternative B due to the need to haul off construction debris. It is assumed that construction-related traffic will utilize interstate highways or major arterial roadways as much as possible and therefore there would only be a minor increase in traffic on local roads. However, this impact would only occur during building demolition and therefore would be temporary in nature.

Under Alternative C, operational traffic would enter the existing developed complex and no additional turn lanes or access would be required from Reservation Road. Rather, the traffic count on River Road would be expected to increase from 5,770 vpd to 5,870 vpd, or 1.2 percent. The development of Site C would increase the traffic count on the connector road from 1,250 vpd to 1,350 vpd, or 5.6 percent. All roadways potentially affected by traffic increases associated with this alternative have sufficient capacity to accommodate the expected traffic volumes.

Therefore, the predicted traffic increases resulting from the development of a new facility at Site C are negligible and the impacts are expected to be minor.

3.13 Visual Resources

3.13.1 Affected Environment

This assessment provides a review and classification of the visual attributes of existing scenery, along with the anticipated attributes resulting from the proposed action. The classification criteria used in this analysis are adapted from a scenic management system developed by the USFS and integrated with planning methods used by TVA. The classification process is also based on fundamental methodology and descriptions adapted from *Landscape Aesthetics, A Handbook for Scenery Management*, Agriculture Handbook Number 701 (USFS 1995).

Scenic resources within a landscape are evaluated based on a number of factors that include scenic attractiveness, integrity and visibility. Scenic attractiveness is a measure of scenic quality based on human perceptions of intrinsic beauty as expressed in the forms, colors, textures and visual composition of each landscape. Scenic integrity is a measure of scenic importance based on the degree of visual unity and wholeness of the natural landscape character. The varied combinations of natural features and human alterations both shape landscape character and help define their scenic importance. The subjective perceptions of a landscape's aesthetic quality and sense of place is dependent on where and how it is viewed. For this analysis, the affected environment is considered to include the proposed alternative site areas, as well as the physical and natural features of the landscape around them.

Scenic visibility of a landscape may be described in terms of three distance contexts: foreground, middleground and background. In the foreground, an area within 0.5 mile of the observer, individual details of specific objects are important and easily distinguished. In the middleground, from 0.5 to 4 mile from the observer, object characteristics are distinguishable but their details are weak and they tend to merge into larger patterns. In the distant part of the landscape, the background, details and colors of objects are not normally discernible unless they are especially large, standing alone, or have a substantial color contrast. In this assessment the background is measured as 4 to 10 mile from the observer. Visual and aesthetic impacts associated with a particular action may occur as a result of the introduction of a feature that is not consistent with the existing viewshed. Consequently, the character of an existing site is an important factor in evaluating potential visual impacts.

Most of the area encompassed by Site B includes a naturally appearing landscape that shows little evidence of human alteration. The composition of vegetation and the patterns of vegetation are the prominent features and consist of a variety of deciduous trees, shrubs and herbaceous plants. Scenic attractiveness in this area is common, scenic integrity is generally high and scenic visibility is moderate to high. The number of available views of this site are low and limited to passing motorists on Reservation Road and SH 133. However, this site is also viewed by pedestrians and other users of the recreational trails, who place a high value on the attractiveness of the area. The overall scenic value class for this area is good.

Site C is in an area with urban landscape character. Scenic attractiveness is minimal as any remaining vegetation consists of maintained turf and landscape plantings or sparse groupings of emerging woody vegetation. The scenic integrity is generally very low as landforms and vegetation patterns have been heavily altered and the built environment dominates the landscape. The scenic visibility has a low sensitivity, where the number of views are restricted to those driving along River Road to the south and High Point Avenue to the east. This area has an overall poor scenic value class.

3.13.2 Environmental Consequences

3.13.2.1 Alternative A – No Action

Under Alternative A, no new facility would be constructed by TVA, resulting in no changes to the existing visual environment.

3.13.2.2 Alternative B – Construct a New Facility on Reservation Road

Under Alternative B, during the construction phase of the new facility, there would be some visual discord from the existing conditions due to an increase in personnel and equipment in the area. Impacts from additional vehicular traffic are expected to be minor as the roads are already predominantly used for industrial related activity. This increase in visual discord would be temporary and only last until construction is completed.

Industrial development of all or a portion of the site under this alternative would adversely impact existing scenic resources. Removal of existing trees and site grading and surfacing would reduce the scenic integrity of the site as it would alter the naturally appearing landscape character. Under this alternative, there would be a moderate visual change in the landscape at the foreground viewing distance due to the change from a natural landscape to one of light industrial development. The greatest impact would be experienced by users of the Reservation Road Trail as the removal of trees along the trail would decrease the aesthetic quality of this portion of the trail. However, TVA recognizes the importance of this trail and aesthetic qualities that its forested corridor provides to the trail users. Therefore, as

an impact minimization measure, TVA will retain at least a 100-foot forested buffer along both sides of the recreational trail. This buffer would act to visually separate the new development from Reservation Road and the recreational trail as the building would only reveal itself after the access drive crosses the trail.

The proposed road crossings of the trail at up to two locations would disrupt the continuous park-like setting along the trail. However, given the brief and intermittent nature of ingress and egress at these crossings, they would contribute little to no impact on the overall aesthetic quality of the trail.

Permanent impacts would include moderate discernible alterations that would be viewed in the foreground of new facility along either Reservation Road or the recreational trail that passes through the site. These minor visual obtrusions would be minimized with the retention of a forested buffer along either side of the recreational trail. By infilling with supplemental landscaping, the main building would appear situated within a forested areas and truck drives and laydown yards would be screened from view for site visitors. The retention of a vegetative buffer, in combination with limiting new roadway intersections (i.e., curb cuts) would reduce the potential for disturbance and maintain the park-like setting for viewers using recreational trails located within Site B. In more distant views, the buildings would likely merge with the existing surrounding industrial development and any visual intrusions would be buffered by the surrounding vegetation. Overall, the construction, operation and maintenance of the new facility would have minor visual impacts for area residents, motorists, recreational users and TVA employees and visitors.

3.13.2.3 *Alternative C – Modify the River Road Complex*

Alternative C would result in no change to the overall visual appearance at the River Road Complex. Since the scenic attractiveness is already of low quality, any discord resulting from the construction activity is not anticipated to result in a change in the scenic quality. The area included within Site C would continue to be classified as having minimal scenic attractiveness and low to very low scenic integrity. The landscape character of this highly disturbed industrial site would be similar to the existing character. Therefore, visual impacts resulting from implementation of Alternative C would be negligible.

3.14 Cultural and Historic Resources

3.14.1 Affected Environment

3.14.1.1 *Regulatory Framework for Cultural Resources*

Cultural resources or historic properties include prehistoric and historic archaeological sites, districts, buildings, structures and objects as well as locations of important historic events. Federal agencies, including TVA, are required by NHPA (16 USC 470) and by NEPA to consider the possible effects of their undertakings on historic properties. “Undertaking” means any project, activity, or program and any of its elements, which has the potential to have an effect on a historic property and is under the direct or indirect jurisdiction of a federal agency or is licensed or assisted by a federal agency. An agency may fulfill its statutory obligations under NEPA by following the process outlined in the regulations implementing Section 106 of NHPA at 36 CFR Part 800. Additional cultural resource laws that protect historic resources include the Archaeological and Historic Preservation Act (16 USC 469-469c), Archaeological Resources Protection Act (16 USC 470aa-470mm) and the Native American Graves Protection and Repatriation Act (25 USC 3001-3013).

Section 106 of the NHPA requires that federal agencies consider the potential effects of their actions on historic properties and to allow the Advisory Council on Historic Preservation an opportunity to comment on the action. Section 106 involves four steps: (1) initiate the process, (2) identify historic properties, (3) assess adverse effects and (4) resolve adverse effects. This process is carried out in consultation with the State Historic Preservation Officer (SHPO) and other interested consulting parties, including federally recognized Indian tribes.

Cultural resources are considered historic properties if they are listed or eligible for listing in the National Register of Historic Places (NRHP). The NRHP eligibility of a resource is based on the Secretary of the Interior's criteria for evaluation (36 CFR 60.4), which state that significant cultural resources possess integrity of location, design, setting, materials, workmanship, feeling, association and

- a. Are associated with events that have made a significant contribution to the broad patterns of our history; or
- b. Are associated with the lives of persons significant in our past; or
- c. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value; or
- d. Have yielded, or may yield, information (data) important in prehistory or history.

A project may have effects on a historic property that are not adverse, if those effects do not diminish the qualities of the property that identify it as eligible for listing on the NRHP. However, if the agency determines (in consultation with the SHPO and other parties) that the undertaking's effect on a historic property within the area of potential effect (APE) would diminish any of the qualities that make the property eligible for the NRHP (based on the criteria for evaluation at 36 CFR Part 60.4 above), the effect is said to be adverse. Examples of adverse effects would be ground disturbing activity in an archaeological site or erecting structures within the viewshed of a historic building in such a way as to diminish the structure's integrity of feeling or setting.

Federal agencies must resolve the adverse effects of their undertakings on historic properties. Resolution may consist of avoidance (such as choosing a project alternative that does not result in adverse effects), minimization (such as redesign to lessen the effects), or mitigation. Adverse effects to archaeological sites are typically mitigated by means of excavation to recover the important scientific information contained within the site. Mitigation of adverse effects to historic structures sometimes involves thorough documentation of the structure by compiling historic records, studies and photographs. Agencies are required to consult with SHPOs, tribes and others throughout the Section 106 process and to document adverse effects to historic properties resulting from agency undertakings.

3.14.1.2 Area of Potential Effect

The APE is the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist.

For Alternative B, TVA would develop a new facility to house the relocated operations. The archaeological APE is defined as the project footprint and includes the 41.1-acre site within which ground disturbance may occur during construction and operation of the center (see Figure 2-3). The APE for architectural resources consists of the project footprint as well as the line of sight within a half-mile area surrounding the proposed facility.

For Alternative C, TVA would remove existing buildings and build a new facility to house the relocated operations. The archaeological APE is defined as the project footprint and includes approximately 10.8 acres as this is the area within which ground disturbance may occur during construction and operation of the facility (see Figure 2-3). The APE for architectural resources consists of the project footprint as well as the line of sight within a half-mile area surrounding the proposed centers.

3.14.1.3 Previous Studies

TVA has conducted records searches on the Alabama State Archaeological Site File, at the AHC in Montgomery, Alabama as well as the National Register of Historic Places to identify previously recorded archaeological and architectural properties listed on, or eligible for inclusion in the NRHP within the APE.

For archaeological resources, the site file and database research identified no previously recorded archaeological sites located within the APE for either Site B or Site C. Eight recorded archaeological surveys and 24 previously recorded sites were identified within the 1.6- mi buffer around the archaeological APEs. The Phase I survey did not identify any archaeological sites within the APE of Site B or Site C (Bradley, Edge and Prybylski 2016); therefore it was recommended that no additional archaeological work be conducted within the APE.

The record search determined that no archaeological resources listed or eligible for listing on the NRHP were located within the footprint of Site B and Site C. No structures over 50 years of age are located in Site B. Site C has two structures over 50 years of age but the structures have been extensively modified. These two structures are not considered eligible for listing due to lack of architectural distinction and integrity (Bradley, Edge and Prybylski 2016).

The architectural resource APE is located in a relatively urban area that includes the TVA Reservation and Wilson Dam facility, as well as the neighborhoods of Belva, Stinson Hollow, Lakeside and Fleet Hollow. As such, it has been visually impacted by previous large scale modern construction projects, such as those associated with the construction of the Reservation, as well as other industrial/commercial structures. Utilities, religious institutions and infrastructure elements have continually been constructed in the area and include communication towers, expanded road projects, churches and water supply facilities. It should be noted that much of the western side of the viewshed, northwest of the Site B site is primarily undeveloped and has areas with heavy vegetation and steep topography. A recreational trail and two water tanks, however, are located on Site B. Due to the high topographic relief and vegetation in the area, the majority of the buildings that were not directly adjacent to the project area did not have a direct "line-of-sight" and were, thus, excluded from the survey. Site C is located within an area with an urban character with non-historic, industrial buildings to the east, west and south.

One building within the viewshed of Sites B and C, the TVA Power Service Building, had been previously recorded by TRC Environmental Solutions in 2002 and was recommended

eligible as a contributing element of a proposed TVA Muscle Shoals Reservation Historic District. Although this building was recommended eligible, it was determined that there would be no adverse visual impact associated with the project (Bradley, Edge and Prybylski 2016). The setting is already visually compromised by construction activities from 1972 to the present time. Furthermore, the proposed Alternative B facility would not be visible from the Power Service Building due to the presence of intervening dense vegetation. Based on these factors, no further work is recommended.

A total of 12 unrecorded buildings over 50 years of age were identified within the line-of-sight of the viewshed of Sites B and C. These buildings date between 1946 and 1968. None of the resources documented was listed on the NRHP. All 12 buildings were recommended as not eligible due to a lack of physical integrity, a lack of integrity of association and feeling and/or the failure to meet any of the National Register criteria for eligibility (Bradley, Edge and Prybylski 2016). No further work was recommended for those buildings.

3.14.2 Environmental Consequences

3.14.2.1 *Alternative A – No Action*

Under Alternative A – No Action, TVA would keep its CSC, the TSC, the Data Center and the Weather Monitoring Center operations in their present locations. No construction or demolition activities would be undertaken by TVA. Implementing Alternative A would require no new ground disturbance activities or changes to current operations. The area is previously developed. Therefore, no direct or indirect impacts to cultural resources would occur under Alternative A.

3.14.2.2 *Alternative B – Construct a New Facility on Reservation Road*

Under Alternative B, no adverse impacts to cultural resources are anticipated as no archaeological sites were identified within the APE and the NRHP-eligible Power Service Building would not be adversely affected by the view of the new building facility.

The Phase I archaeological survey did not identify any archaeological sites within the APE and on June 15, 2016 the SHPO concurred that the construction of the new facility will not affect archaeological resources (Appendix A). TVA also consulted with federally recognized Indian tribes regarding properties that may have religious and cultural significance to their tribe and may be eligible for the NRHP. As stipulated in the consultations, if an unidentified archaeological site is discovered during construction, TVA will cease all construction activities in the immediate area where archaeological material is discovered.

For architectural resources, the record search and field survey determined that no listed or NRHP-eligible resources were located on Site B. While the proposed new facility would be partially visible to the Power Service Building, which is eligible for listing on the NRHP as part of the Muscle Shoals Reservation Historic District, TVA determined that there will be no adverse visual impact due to the direct association of the new facility with reservation operations. The construction of new facilities in the Reservation compound represents a natural evolution of the site to consolidate functions and better serve its continued missions. The SHPO concurred on June 15, 2016 with this no adverse effect determination (Appendix A).

3.14.2.3 *Alternative C – Modify the River Road Complex*

Similar to Alternative B, Alternative C would have no adverse impacts to cultural resources as no archaeological sites were identified within the APE and the NRHP-eligible Power

Service Building would not be adversely affected by the view of the new facility. The SHPO concurred with the determination on June 15, 2016 (Appendix A).

As with Alternative B, if an unidentified archaeological site is discovered during construction, TVA will cease all construction activities in the immediate area where archaeological material is discovered.

For architectural resources, no listed or NRHP-eligible resources were located within the footprint of Site C. Two structures over 50 years of age are located within the site, but the two structures are not considered eligible for listing due to lack of material and historic integrity.

As with Alternative B, the proposed facility would be partially visible to the NRHP-eligible Power Service Building. TVA determined that there will be no adverse visual impact due to the new facility's direct association with Reservation operations and because it represents a natural evolution of the site to consolidate functions and better serve TVA's continued missions. The SHPO concurred on June 15, 2016 with this no adverse effect determination (Appendix A).

3.15 Noise

3.15.1 Affected Environment

Noise is unwanted or unwelcome sound usually caused by human activity and added to the natural acoustic setting of a locale. It is further defined as sound that disrupts normal activities or diminishes the quality of the environment. Community response to noise is dependent on the intensity of the sound source, its duration, the proximity of noise-sensitive land uses and the time of day the noise occurs (i.e., higher sensitivities would be expected during the quieter overnight periods).

Sound is measured in units of decibels (dB) on a logarithmic scale. Therefore, increasing the noise level by 5 dB results in a noise level perceived by the human ear to be twice as loud as the original source. The "pitch" (high or low) of the sound is a description of frequency, which is measured in Hertz (Hz). Most common environmental sounds are a composite of sound energy at various frequencies. A normal human ear can usually detect sounds that fall within the frequencies from 20 Hz to 20,000 Hz. However, humans are most sensitive to frequencies between 500 Hz to 4,000 Hz.

Given that the human ear cannot perceive all pitches or frequencies in the sound range, sound level measurements are typically weighted to correspond to the limits of human hearing. This adjusted unit of measure is known as the A-weighted decibel (dBA). A noise change of 3 dBA or less are not normally detectable by the average human ear. An increase of 5 dBA is generally not readily noticeable by anyone and a 10 dBA increase is usually felt to be "twice as loud" as before.

To account for sound fluctuations, environmental noise is commonly described in terms of the equivalent sound level, or equivalent sound level (Leq). The Leq value, expressed in dBA, is the energy-averaged, A-weighted sound level for the time period of interest. The day-night sound level (Ldn), is the 24-hr equivalent sound level, which incorporates a 10-dBA correction penalty for the hours between 10 p.m. and 7 a.m., to account for the increased sensitivity of people to sounds that occur at night.

Common indoor and outdoor sound levels are listed in Table 3-8.

Table 3-8. Common Indoor and Outdoor Noise Levels

Common Outdoor Noises	Sound Pressure Levels (dB)	Common Indoor Noises
	110	Rock Band (15 ft)
Jet Fly-over (1000 ft)		
	100	
Gas Lawn Mower (3 ft)		
	90	Food Blender (3 ft)
Diesel Truck (50 ft)		
	80	Garbage Disposal (3 ft)
Gas Lawn Mower (100 ft)	70	Vacuum Cleaner (10 ft)
		Normal Speech (3 ft)
Heavy Traffic (300 ft)	60	
	50	Dishwasher Next Room
Typical Urban Daytime		
	40	
Urban Nighttime		Library
	30	Bedroom at Night
Rural Nighttime	20	Whisper
	10	
	0	Threshold of Hearing

Source: Arizona DOT 2008

3.15.1.1 Noise Regulations

The Noise Control Act of 1972, along with its subsequent amendments (Quiet Communities Act of 1978, USC 42 4901-4918), delegates authority to the states to regulate environmental noise and directs government agencies to comply with local community noise statutes and regulations. Although there are no federal, state, or local regulations for community noise in Colbert or Lauderdale counties, USEPA (1974) guidelines recommend that Ldn not exceed 55 dBA for outdoor residential areas. The USEPA noise guideline recommends an Ldn of 55 dBA, which is sufficient to protect the public from the effect of

broadband environmental noise in typical outdoor and residential areas. These levels are not regulatory goals but are “intentionally conservative to protect the most sensitive portion of the American population” with “an additional margin of safety” (USEPA 1974). The U.S. Department of Housing and Urban Development (HUD) considers an Ldn of 65 dBA or less to be compatible with residential areas (HUD 1985).

3.15.1.2 Background Noise Levels

Noise levels continuously vary with location and time. In general, noise levels are high around major transportation corridors along highways, railways, airports, industrial facilities and construction activities. Sound from a source spreads out as it travels from the source and the sound pressure level diminishes with distance. In addition to distance attenuation, the air absorbs sound energy. Atmospheric effects (wind, temperature, precipitation) and terrain/vegetation effects also influence sound propagation and attenuation over distance from the source. An individual's sound exposure is determined by measurement of the noise that the individual experiences over a specified time interval.

Community noise refers to outdoor noise near a community. A continuous source of noise is rare for long periods and is typically not a characteristic of community noise. Typical background day/night noise levels for rural areas range between 35 and 50 dB whereas higher-density residential and urban areas background noise levels range from 43 dB to 72 dB (USEPA 1974). Background noise levels greater than 65 dBA can interfere with normal conversation, watching television, using a telephone, listening to the radio and sleeping.

3.15.1.3 Sources of Noise

Site B and C are located within the Reservation along the south shore of the Wilson Reservoir. Currently, Site B is primarily forested and bordered by Reservation Road and utility corridors. A TVA operated industrial facility (TVA Power Service Shop) is located across from the site on the south side of Reservation Road.

Site C is a currently developed complex that houses light industrial/office functions. The site is surrounded by some light residential development to the south and east of River Road. Other uses in the vicinity of this site include agricultural and undeveloped land.

The Northwest Alabama Regional Airport at Muscle Shoals is 2.75 mi south of the proposed development sites. The airport can accommodate small to medium size airplanes. The airport hosts approximately eight arrivals and departures on weekdays, two on Saturday and six flights on Sunday (Northwest Alabama Regional Airport 2016). Approaching and departing planes regularly pass over the Reservation and would also be an external source of noise.

Vehicular traffic is the primary noise source at the reservation (TVA 2011). Three primary factors influence highway noise generation: traffic volume, traffic speed and vehicle type. Generally, heavier traffic volumes, higher speeds and greater numbers of trucks increase the loudness of highway traffic noise. Other factors that affect the loudness of traffic noise include a change in engine speed and power such as at traffic lights, hills and intersecting roads and pavement type. Highway traffic noise is not usually a serious problem for people who live more than 500 feet from heavily traveled freeways or more than 100 to 200 feet from lightly traveled roads (Federal Highway Administration 2011). Due to the nature of the decibel scale and the attenuating effects of noise with distance, a doubling of traffic will

result in a three dBA increase in noise levels, which in and of itself would not normally be a perceivable noise increase.

Although current ambient noise levels in the vicinity of the Sites B and C are not available, TVA estimated average background noise levels associated with vehicular traffic at various points around the Reservation in 2011. The result of that evaluation determined that average background noise levels at the Reservation ranged from 50.8 dBA when vehicular traffic was inactive to 76.6 dBA when more vehicles were on the road. The average background noise levels measured at one site just south of the intersection of the Connector Road and River Road ranged from a high of 68.8 dBA (vehicular traffic active) to a low of 53.7 dBA when vehicular traffic was inactive (TVA 2011).

3.15.2 Environmental Consequences

3.15.2.1 Alternative A – No Action

Under the Alternative A – No Action, TVA operations would not be relocated and no construction or demolition activities would occur. Therefore, there would be no changes to the existing noise environment.

3.15.2.2 Alternative B – Construct a New Facility on Reservation Road

3.15.2.2.1 Construction Noise

Other than users of the Reservation Road Trail, the closest sensitive receptor to the boundary of Site B would be the single family home located 0.27 mi south of River Road. In addition, the Rockpile Recreation Area is located approximately 0.25 mi north of the site boundary.

Equipment expected to be used to construct the new facility include bulldozers, cranes, lifts, hand tools, generators, compressors and other miscellaneous equipment. Construction activities would primarily occur during the day on weekdays; however, construction activities could occur at night or on weekends, if necessary. Typical noise levels from construction equipment are listed in Table 3-9 and are expected to be 85 dBA or less.

Based on straightline noise attenuation from the boundary of Site B, it is estimated that construction phase noise levels from equipment having a noise emissions level of 85 dBA would attenuate to 55.9 dBA at the nearest residence and to 56.6 dBA at the recreation area. However, this level would be lower in the field as objects and topography would cause further noise attenuation. Although construction noise would attenuate to meet the HUD guideline of 65 dBA, construction noise could still remain above the USEPA guideline of 55 dBA. In addition, users of the Reservation Road Trail would be subjected to high levels of noise during the some of the construction period. Given the temporary and intermittent nature of construction noise, the impact of noise generated from construction activities is expected to be minor.

Table 3-9. Typical Construction Equipment Noise Levels

Equipment	Noise Level (dBA) at 50 feet
Dump Truck	84
Bulldozer	85
Scraper	85
Grader	85
Excavator	85
Compactor	80
Concrete Truck	85
Boring-Jack Power Unit	80
Backhoe (trench)	80
Flatbed Truck	84
Crane (mobile)	85
Generator	82
Air Compressor	80
Pneumatic Tools	85
Welder/Torch	73
Paver	85

Source: Federal Highway Administration 2015.

3.15.2.2.2 Operational Noise

The primary noise generators under Alternative B would be associated with workforce and related traffic and industrial operations. In addition, TVA has indicated that a diesel generator may be required to provide an alternative power source. Workforce traffic is not expected to have a notable increase in traffic volume and, therefore, would not increase perceptible traffic-related noise levels. The backup generator would be operated infrequently and typically for short periods of time. It is anticipated that typical backup generator operation is 50 hours per year with a maximum expected usage of 200 hours per year and as such would not be a source of noise under typical operating conditions.

Operations at the site would be near an area that supports industrial uses. However, development of this site may have an impact on noise levels at surrounding sensitive receptors especially users of the Reservation Road Trail and nearby recreational areas. This impact would be minimized through maintenance of a vegetated buffer around the development site. Therefore, noise from the proposed facility is expected to be minor.

3.15.2.3 *Alternative C – Modify the River Road Complex*

3.15.2.3.1 Construction Noise

The closest sensitive receptors to the boundary of the Site C is the single family home located 300 feet east of the entrance to the site. As indicated for Alternative B, typical noise levels from construction equipment are expected to be 85 dBA or less. Based on a simplified analysis of straight-line noise attenuation from the boundary of Site C, it is estimated that construction phase noise levels would attenuate to 69.4 dBA at this residence. Construction noise at the residence would exceed the HUD guideline of 65 dBA and the USEPA guideline of 55 dBA. However, the actual noise level would be lower as objects and topography would cause further noise attenuation. Given the temporary and intermittent nature of construction noise, the impact of noise generated from construction activities is expected to be minor.

3.15.2.3.2 Operational Noise

The primary noise generators under Alternative C would be the same as Alternative B. As this is an existing developed site, the change in the existing noise environment is not expected to be perceptible surrounding sensitive receptors. Therefore, noise impacts from the proposed facility are expected to be negligible

3.16 Public Health and Safety

Workplace health and safety regulations are designed to eliminate personal injuries and illnesses from occurring in the workplace. These laws may comprise both federal and state statutes. Occupational Safety and Health Administration (OSHA) is the main statute protecting the health and safety of workers in the workplaces. OSHA regulations are presented in 29 CFR 1919, Occupational Safety and Health Standards. A related statute, 29 CFR 1926, contains health and safety regulations specific to the construction industry. The Alabama Department of Labor has not adopted federal OSHA standards.

TVA's Safety Standard Programs and Processes would be strictly adhered to during the proposed actions. The safety programs and processes are designed to identify actions required for the control of hazards in all activities, operations and programs. It also establishes responsibilities for implementing Section 19 of OSHA.

3.16.1 Affected Environment

The routine operations and maintenance activities at the Reservation reflect a safety-conscious culture and activities are performed consistent with OSHA standards and requirements and specific TVA guidance. Personnel at the Reservation are conscientious about health and safety and address and manage operations to reduce or eliminate occupational hazards through the implementation of safety practices, training and control measures.

The Reservation has safety programs and BMPs in place to minimize the potential of safety incidences. These would include but are not limited to such programs as the following:

- Hazard Analysis
- Management of Change
- Spill and Emergency Response Plan
- Standard Operating Procedures
- Safety Reviews
- Compliance Audits
- Training
- Incident Investigations

It is TVA policy that contractors have a site-specific health and safety plan in-place prior to conducting construction activities at TVA properties. The contractor site-specific health and safety plans address the hazards and controls as well as contractor coordination for various construction tasks. A health and safety plan would also be required for workers responsible for operating the new facility after construction is complete.

The Reservation emergency response plan is discussed with local emergency management agencies. These programs are audited by TVA no less than once every three years and by USEPA periodically.

Health hazards are also associated with emissions and discharges from Reservation facilities. Mitigative measures are used to ensure protection of human health which includes the workplace, public and the environment. Applicable regulations and attending administrative codes that prescribe monitoring requirements may include those associated with emergency management, environmental health, drinking water, water and sewage, pollution discharge, air pollution, hazardous waste management and remedial action.

Additionally, wastes generated by operations at the Reservation can pose a health hazard. Solid wastes, hazardous waste, liquid wastes, discharges and air emissions, are managed in accordance with applicable federal, state and local laws and regulations and all applicable permit requirements. Furthermore, waste reduction practices are employed including recycling and waste minimization.

3.16.2 Environmental Consequences

3.16.2.1 Alternative A – No Action

Activities at the existing CSC, TSC, Data Center and the Weather Monitoring Center will continue within the safety-conscious culture and activities currently performed in accordance with applicable standards or specific TVA guidance. The Reservation will continue to address and manage reduction or elimination of occupational hazards through implementation of safety practices, training and control measures. Alternative A would not have an impact on public health and safety

3.16.2.2 Alternative B – Construct a New Facility on Reservation Road

Under this Alternative, TVA would develop a new facility where it could relocate selected operations. Construction activities in support of the proposed facility would be performed consistent with standards established by OSHA. Construction of the new facility would require the use of earthmoving, compacting and paving equipment as well as trucks for hauling materials.

During construction, customary industrial safety standards as well as the establishment of appropriate BMPs and job site safety plans would describe how job safety will be maintained during the project. These BMPs and site safety plans address the implementation of procedures to ensure that equipment guards, housekeeping and personal protective equipment are in place; the establishment of programs and procedures for lockout, right-to-know, hearing conservation, equipment operations, excavations, grading and other activities; the performance of employee safety orientations and regular safety inspections; and the development of a plan of action for the correction of any identified hazards. Construction debris and wastes would be managed in accordance with federal, state and local requirements. The recreation trail would remain open during construction and TVA would post a flagman during peak construction periods at the access road trail crossing.

Operation of the new facility would adhere to TVA guidance and be consistent with standards established by OSHA. All facility wastes would be managed in accordance with applicable federal, state and local laws and regulations and all applicable permit requirements. The recreation trail and facility access road(s) would be signed and striped

at the access road crossing(s) to enhance the safety of the trail users by reducing the potential for collisions between motorized vehicles and trail users.

3.16.2.3 *Alternative C – Modify the River Road Complex*

Under Alternative C, TVA would construct the TSC, the Data Center and the Weather Monitoring complex as described under Alternative B, but in a different location. In addition, existing buildings would need to be demolished and pavement removed. Construction and demolition activities in support of the project would be performed consistent with standards established by OSHA.

As discussed above with Alternative B, customary industrial safety standards as well as the establishment of appropriate BMPs and job site safety plans would describe how job safety will be maintained during construction and demolition activities. The operation of the complex also would adhere to TVA safety guidance and be consistent with public health and safety standards established by OSHA as discussed in Alternative B. All wastes generated during construction, demolition, or operations would be managed in accordance with applicable federal, state and local laws and regulations and all applicable permit requirements. Therefore, under Alternative C, there would be no impact to public health and safety.

3.17 Unavoidable Adverse Impacts

Unavoidable adverse impacts are the effects of the proposed action on natural and human resources that would remain after mitigation measures or BMPs have been applied. Mitigation measures and BMPs are typically implemented to reduce a potential impact to a level that would be below the threshold of significance as defined by the CEQ and the courts. Impacts associated with construction of the new facility have the potential to cause unavoidable adverse effects to several environmental resources.

Under Alternative B, a primarily undeveloped site that supports recreational use would be developed to support light industrial use. Development would require clearing up to 37.3 acres of deciduous forest and impact 26.5 acres of prime farmland soils. Clearing and grading of the site would result in localized long-term impacts to species composition and wildlife habitat. However, these impacts are relatively minor given the abundance of similar habitat and prime farmland soils in the surrounding area. The development of Site B would conflict with the current zoning of the site and adversely affect the public recreation and open space and values of the site that are recognized by its current zoning. As part of a larger lands planning effort, TVA proposes to rezone the site to accommodate its future development. TVA would design the facility to reduce its adverse effects on public recreation, open space, and related environmental resources and would implement the mitigation measures identified in Section 2.3.

Under Alternatives B and C, unavoidable localized increases in air and noise emissions would occur during construction. Activities associated with the use of construction equipment may result in varying amounts of dust, air emission and noise that may potentially impact both on-site workers and off-site residents near the proposed development sites. Potential noise impacts also include traffic noise associated with the construction workforce traveling to and from the site. Emissions from construction activities and equipment are minimized through implementation of mitigation measures, including proper maintenance of construction equipment and vehicles.

3.18 Relationship of Short-Term Uses and Long-Term Productivity

NEPA requires a discussion of the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. This EA focuses on the analyses of environmental impacts associated with the construction of the new facility to house relocated operations and the relocation of these operations into the newly constructed facility. These activities are considered short-term uses for purposes of this section. The long-term is considered to be initiated with the cessation of these operations at the Reservation. This section includes an evaluation of the extent that the short-term uses preclude any options for future long-term use of either of the proposed project sites.

The principal change in short-term use of Site B would be the loss of vegetation within the proposed 41.1-acre site. Currently, this area is primarily wooded and supports recreational use. The acreage disturbed to support development of the proposed complex may displace some wildlife and alter existing vegetation. Since the surrounding vicinity includes similar vegetation and habitat types including prime farmland, the short-term disturbance to support operations at this site is not expected to significantly alter long-term productivity of wildlife, agriculture or other natural resources. Site B is included in the portion of the reservation that TVA intends to retain for the foreseeable future and it is proposed to be zoned for TVA Project Operations. If the site is sold, the land could be available for other industrial as well as non-industrial uses. The Reservation Road Trail would be crossed to provide access to the new complex. However, overall use of the trail is not expected to change.

Alternative C currently supports TVA operations at the Reservation; therefore the use of the land for the new facility housing the relocated operations is not expected to alter long-term, productivity of wildlife or other natural resources. As with Site B, Site C is included in the portion of the reservation that TVA intends to retain for the foreseeable future. If the site is sold, the land could be available for other industrial as well as non-industrial uses.

3.19 Irreversible and Irretrievable Commitments Effects Issues

This section describes the expected irreversible and irretrievable environmental resource commitments used in the construction and operation of the new facility to house relocated operations. The term irreversible commitments of resources describes environmental resources that are potentially changed by construction or operation and that could not be restored at some later time to the resource's state prior to construction or operation. For example, the construction of a road through a forest would be an irretrievable commitment of the productivity of timber within the road right of way as long as the road remains. Irretrievable commitments of resources are generally materials that are used for the new facility in such a way that they could not, by practical means, be recycled or restored for other uses. For example, mining of ore is an irreversible commitment of a resource; once the ore is removed and used, it cannot be restored.

The land used for the proposed complex at both Sites B and C is not irreversibly committed because once operations at the Reservation cease, the land supporting the facilities could be returned to other developed uses.

Nonrenewable fossil fuels would be irretrievably lost through the use of gasoline and diesel-powered equipment during construction and operations including the use of the backup generator. In addition, the materials used for the construction of the proposed complex would be committed for the life of the facility. Some building materials may be irrevocably committed, however some metal components and structures could be recycled. The limited

use of building materials for use in this project would not adversely affect the future availability of these resources.

3.20 Cumulative Effects

This section supplements analyses in preceding sections that either explicitly or implicitly considered cumulative impacts resulting from the construction and operation of new TVA operations complex. These analyses are based on baseline conditions, which reflect the impacts of past and present actions and how they have shaped the existing environment. The CEQ regulations (40 CFR 1500-1508) implementing the procedural provisions of the NEPA of 1969, as amended (42 USC 4321 et seq.) define cumulative impact as: "...the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7). Therefore, this section will analyze the incremental impact of the proposed action and any cumulative effects when added to other identified past, present and reasonably foreseeable future actions.

3.20.1 Scoping for Cumulative Effects Analysis

3.20.1.1 Identification of the Significant Cumulative Effects Issues

TVA evaluated a full range of environmental resource issues for inclusion in the cumulative effects analysis. Most of the landscape surrounding the areas associated with both alternatives is already subject to environmental stressors associated with industrial operations for TVA and other facilities. Consequently, as has been described in prior subsections of this EA, the existing quality of environmental resources potentially directly or indirectly affected by project activities is generally low to moderate. The proposed action identified under Alternative B would occur on land that is currently in an undeveloped, forested state and zoned for public recreation and open space use. The proposed action identified under Alternative C would occur on land already developed for industrial use.

This analysis is limited only to those resource issues potentially adversely affected by project activities or connected actions. Accordingly, air quality, climate change, prime farmland, groundwater, geology/soils, surface water, floodplain, wetlands/aquatic ecosystems, natural areas, cultural and historic resources, hazardous materials/waste, socioeconomics, environmental justice, transportation, noise and safety are not included in this analysis as these resources are either not adversely affected, or the effects are considered to be beneficial. Primary resource categories specifically considered in this cumulative effects assessment include land use, terrestrial ecosystems, parks and recreation and visual effects.

3.20.1.2 Geographic Area of Analysis

The appropriate geographic area over which past, present and future actions could reasonably contribute to cumulative effects is variable and dependent on the resource evaluated. Based upon the defined list of resources potentially affected by cumulative effects, the lands within the Reservation and the Wilson Reservoir were considered appropriate for consideration in this analysis. For visual effects, the cumulative impacts analysis will be on near off-site areas.

3.20.1.3 Identification of "Other Actions"

Past, present and reasonably foreseeable future actions that are appropriate for consideration in this cumulative analysis are listed in Table 3-10. These actions were

identified within the geographic area of analysis as having the potential to, in the aggregate, result in larger and potentially significant adverse impacts to the resources of concern.

Actions that are listed as having a timing that is “past” or “present” inherently have environmental impacts that are integrated into the base condition for each of the resources analyzed in this chapter. However, these actions are included in this discussion to provide for a more complete description of their characteristics. Actions that are not reasonably foreseeable are those that are based on mere speculation or conjecture, or those that have only been discussed on a conceptual basis.

Table 3-10. Summary of Other Past, Present or Reasonable Foreseeable Future Actions in the Vicinity of the Proposed Project

Actions Description	Description	Timing and Reasonable Foreseeability
Reservation Redevelopment	Sale of approximately 1,000 acres within the Reservation, resulting in the relocation of some operations and future commercial and industrial development west of Sites A and B	Past, Present, Reasonably Foreseeable Future
Recreation Area Improvements	Improvements to three main trail heads within the Reservation Trail System	Reasonably Foreseeable Future
Land Management Plan	Revised land use designations within the Reservation	Reasonably Foreseeable Future

3.20.1.3.1 Muscle Shoals Reservation Redevelopment

The TVA Board of Directors approved the disposal of approximately 1,000 acres of land within the Reservation. After the final EIS was published, TVA worked with the local community to develop a comprehensive Master Plan to guide development of the land. The Master Plan concludes that the property should be marketed to promote a smart and balanced mixed-use development. The preferred use for areas within the property is identified as design guidelines and any development restrictions for each area are identified.

3.20.1.3.2 Muscle Shoals Outdoor Education and Recreation Area Improvements

TVA has approved to complete improvements for three main trail heads along the trail/recreation system located north of Reservation Road on the Reservation. Under the approved plan, recreation opportunities would be enhanced at the Rockpile, CCC Pavilion and Native Plant Garden areas and would further TVA efforts to create a high quality outdoor education and recreation area.

3.20.1.3.3 Wilson Reservoir/ Muscle Shoals Reservation Land Management Plan

TVA has initiated an environmental review to consider an alternative RLMP for Wilson Reservoir and seven other TVA reservoir systems. The RLMP planning process is a systematic method of identifying and evaluating the most suitable use of public lands under TVA's stewardship. By providing a clear vision for how TVA will manage public land, an RLMP minimizes conflicting interests and guides decisions on land-use requests. The

current version of the RLMP proposes to change the land use designation for the area that encompasses Alternative B to from the conservation-oriented Public Recreation and Open Space to the development-oriented Project Operations. This could result in increased industrial development in the vicinity of Site B.

3.20.2 Analysis of Cumulative Effect

To address cumulative impacts, the existing affected environment surrounding the project area was considered in conjunction with the environmental impacts presented in Chapter 3. These combined impacts are defined by the CEQ as “cumulative” in 40 CFR Regulations 1508.7 and may include individually minor, but collectively significant actions taking place over a period of time. The potential for cumulative effects to the identified environmental resources of concern are analyzed below for Alternative B. There would be no impacts to these resources under Alternative C, therefore, potential cumulative effects are not analyzed for this alternative.

The potential for cumulative effects are largely driven by the change in land use and land cover as a result of the light industrial development within the proposed site for Alternative B. As described in Section 3.3 (Land Use), the construction of a light industrial complex would be inconsistent with the current recreational use designation for that area but consistent with the revised RLMP that TVA is currently preparing. In addition to the revised RLMP for Wilson Reservoir, TVA is also updating the land plans for seven other reservoirs and an overarching Comprehensive Valleywide Land Plan (CVLP), which established a target range for each zone based on information from existing land plans. In the proposed revised ranges there would be an increase in the areas zoned as Project Operations (Zone 2), however, developed Recreation (Zone 6) would remain the same. In addition, the planned improvements to the three trail heads within the Reservation trail network would enhance the recreational use opportunities and overall experience for the users within the Reservation. Therefore, the loss of area currently zoned as Public Recreation and Open Space within Alternative B would not significantly impact the overall recreational land use in the TVA Valley.

Issues typically evaluated in the context of cumulative effects to terrestrial ecosystems include the potential for habitat fragmentation/degradation and the potential to enhance dispersal of invasive species. Under Alternative B, the proposed construction activities would permanently remove vegetation within the area proposed for the new facility. However, terrestrial ecosystems within the impacted area are comprised of communities that are common or of relatively low to moderate quality. Additionally, sections of the forested habitat around Alternative B are already fragmented by the presence of utility and transportation corridors. This forest fragment is heavily impacted by invasive exotic plants (Chinese privet) and does not provide unique habitat for common wildlife species. Proposed actions would permanently remove existing impacted forested habitat for common wildlife, however similarly suitable habitat is plentiful in the surrounding area across the Muscle Shoals Reservation.

While the habitat within the site is not suitable for foraging for bat species due to the dense understory, vegetation clearing to accommodate the new facility would result in the removal of up to nine potential bat roost trees. Protected bat species are not known to occur within 5-mi of the project area and due to the minor amount of suitable habitat directly impacted, cumulative impacts to these species are not anticipated. Mitigation for impacts to these species as a result of future actions not identified in this analysis may be required through consultation with the appropriate state and federal agencies.

Much of the native vegetation within and surrounding the Reservation has already been altered by previous land use. The sale of approximately 1,000 acres due to the Reservation redevelopment could potentially impact vegetation within the property depending on the future use. Consistent with TVA's mission of environmental stewardship to protect existing and future natural resources within the property, the Master Plan identifies a "Wildlife Corridor" that would traverse through a portion of the property. The corridor, which contains hardwoods, native vegetation, water, wetlands and floodplain, will serve as a set-aside for the continued movement of various forms of wildlife to access a rich habitat that stems from Pond Creek to the Tennessee River. While redevelopment within areas outside of the Wildlife Corridor may impact terrestrial ecosystems, environmental impact minimization measures such as wildlife habitat protection, woodlands integration/removal minimization and noise and lighting impact prevention would be integrated into the designs. Therefore, cumulative effects to terrestrial ecosystems would be minor.

The retention of the vegetative buffers around the Reservation Road Trail would minimize impacts to recreational users and protect visual resources within the Wilson Reservoir and Reservation. The Master Plan for the Reservation redevelopment identifies the need to maintain aesthetics within the property. A design criteria is that any new development incorporate architectural style and material elements that are consistent with the appearance of other buildings on the Reservation and which complement the historical context. Additionally, the Wildlife Corridor and other environmental impact minimization measures described above would further retain the aesthetic qualities of the natural landscape. Therefore, there would be no cumulative impacts to visual resources as a result of the implementation of Alternative B.

CHAPTER 4 – LITERATURE CITED

- Alabama Department of Environmental Management (ADEM), July 2005. Surface Water Quality Screening, Assessment of the Tennessee River Basin-2003. Part II: Reservoir Tributary Embayments.
- _____. 2014 Alabama §303(d) List. Retrieved from <http://adem.alabama.gov/programs/water/303d.cnt> (accessed June 2016).
- _____. 2016. 2016 Draft Alabama §303(d) List. Retrieved from <http://adem.alabama.gov/programs/water/303d.cnt> (accessed June 2016).
- Alabama Department of Transportation (ALDOT), 2014. Alabama Traffic Data Web site. Retrieved from <http://algis.dot.state.al.us/atd/default.aspx> (accessed March 2016).
- Alabama Natural Heritage Program. 2016. County Level Rare Species Data. Retrieved from http://www.alnhp.org/submit_query.php (accessed March 2016).
- Arizona Department of Transportation. 2008. Common Indoor and Outdoor Noise levels. Retrieved from http://azdot.gov/docs/default-source/planning/noise_common_indoor_and_outdoor_noise_levels.pdf?sfvrsn=4 (accessed September 2015).
- Bradley, D., C. Edge and M. Prybylski. 2016. Phase I Archaeological Survey and Historic Architectural Viewshed Survey for Proposed TVA Service Centers Relocation Project, Muscle Shoals, Colbert County, Alabama. Amec Foster Wheeler Environment and Infrastructure, Inc., Kentucky. 2016.
- Buhlmann, K., T. Tuberville, and W. Gibbons. 2008. Turtles of the Southeast. University of Georgia Press, Athens, Georgia.
- Council on Environmental Quality. 1997. Environmental Justice Guidance Under the National Environmental Policy Act, Executive Office of the President, Washington, DC. Retrieved from http://www.epa.gov/environmentaljustice/resources/policy/ej_guidance_nepa_ceq1297.pdf (accessed March 2016).
- eBird Basic Dataset. 2016. Version: EBD_relMay-2013. Cornell Lab of Ornithology, Ithaca, New York. May 2013. Retrieved from <http://ebird.org/ebird/hotspot/L677384> (accessed March 2016).
- Federal Emergency Management Agency (FEMA). 2016. Retrieved from <https://msc.fema.gov/portal/search?AddressQuery=Muscle%20Shoals%20Alabama> (accessed March 2016).
- Federal Highway Administration. 2011. Highway Traffic Noise: Analysis and Abatement Guidance. FHWA-HEP-10-025, December 2011.

- Federal Highway Administration. 2015. Construction Noise Handbook. Retrieved from http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook_09.cfm (accessed September 2015).
- Flora of North America Editorial Committee, eds. 2010. Flora of North America North of Mexico. 19+ vols. New York and Oxford.
- Garner, J. D., and J. E. Gardner. 1992. Determination of summer distribution and habitat utilization of the Indiana bat (*Myotis sodalis*) in Illinois. Illinois Department of Conservation. Final Report, Project E-3. Springfield, Ill.
- Griffith, G.E., J.M. Omernik, J.A. Comstock, S. Lawrence, G. Martin, A. Goddard, V.J. Hulcher and T. Foster. 2001. Ecoregions of Alabama and Georgia, (color poster with map, descriptive text, summary tables and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,700,000).
- Homer, C.G., J.A. Dewitz, L. Yang, S. Jin, P. Danielson, G. Xian, J. Coulston, N.D. Herold, J.D. Wickham and K. Megown. 2015. Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information. Photogrammetric Engineering and Remote Sensing, v. 81, no. 5, p. 345-354.
- HUD (U.S. Department of Housing and Urban Development). 1985. The Noise Guidebook, HUD-953-CPD Washington, D.C. Superintendent of Documents, U.S. Government Printing Office.
- Humphrey, S. R., A. R. Richter, and J. B. Cope. 1977. Summer Habitat and Ecology of the Endangered Indiana Bat, *Myotis sodalis*. Journal of Mammalogy 58(3):334-346.
- Kurta, A., S. W. Murray, and D. H. Miller. 2002. Roost selection and movements across the summer landscape. Pages 118-129 in A. Kurta and J. Kennedy, editors. The Indiana Bat: Biology and Management of an Endangered Species. Bat Conservation International, Austin, Texas.
- Lady Bird Johnson Wildflower Center. 2016. Blue Eyed Mary Species Information. Retrieved from http://www.wildflower.org/plants/result.php?id_plant=COVE2 (accessed March 2016).
- Le Quéré, C., G. P. Peters, R. J. Andres, R. M. Andrew, T. Boden, P. Ciais, P. Friedlingstein, R. A. Houghton, G. Marland, R. Moriarty, S. Sitch, P. Tans, A. Arneeth, A. Arvanitis, D. C. E. Bakker, L. Bopp, J. G. Canadell, L. P. Chini, S. C. Doney, A. Harper, I. Harris, J. I. House, A. K. Jain, S. D. Jones, E. Kato, R. F. Keeling, K. Klein Goldewijk, A. Körtzinger, C. Koven, N. Lefèvre, A. Omar, T. Ono, G-H Park, B. Pfeil, B. Poulter, M. R. Raupach, P. Regnier, C. Rödenbeck, S. Saito, J. Schwinger, J. Segschneider, B. D. Stocker, B. Tilbrook, S. van Heuven, N. Viovy, R. Wanninkhof, A. Wiltshire, S. Zaehle and C. Yue. 2014. Global Carbon Budget 2013, Earth Syst. Sci. Data 6: 689-760. doi: 10.5194/essd-6-235-2014.
- Melillo, Jerry M., Terese (T. C.) Richmond and G. W. Yohe, Eds. 2014. Climate Change Impacts in the United States: The Third National Climate Assessment. U.S. Global Change Research Program. doi:10.7930/J0Z31WJ2, p iii.

- NatureServe. 2015. NatureServe Web Service. Arlington, VA. U.S.A. Retrieved from <http://services.natureserve.org> (accessed March 2016).
- Northwest Alabama Regional Airport. 2016. Retrieved from <http://www.flytheshoals.com/flights/flight-schedule.php> (accessed March 2016).
- National Park Service (NPS). 2016. Nationwide Rivers Inventory. Retrieved from <https://www.nps.gov/ncrc/programs/rtca/nri/states/al.html> (accessed March 2016).
- Pruitt, L. and L. TeWinkel, editors. 2007. Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. Fort Snelling, Minnesota. Retrieved from http://ecos.fws.gov/docs/recovery_plan/070416.pdf (accessed March 2016).
- Roy, Joseph, April 2014. The Alabama Integrated Water Quality Monitoring and Assessment Report. Alabama Department of Environmental Management. <http://www.adem.state.al.us/programs/water/waterquality.cnt>
- Tennessee Valley Authority (TVA). 1996. Muscle Shoals/Wilson Dam Reservation Land Use Plan – Final Environmental Assessment. Available at https://www.tva.gov/file_source/TVA/Site%20Content/Environment/Environmental%20Stewardship/Land%20Management/Land%20Plans/Wilson%20Dam%20and%20Muscle%20Shoals%20Reservations%20LUP.pdf.
2011. Final Environmental Impact Statement Muscle Shoals Redevelopment, November 2011. Retrieved from <https://www.tva.gov/Environment/Environmental-Stewardship/Environmental-Reviews/Muscle-Shoals-Reservation-Redevelopment>.
- _____. 2012. Ecological Health Indicators at Wilson Reservoir. 2012. <https://www.tva.gov/Environment/Environmental-Stewardship/Water-Quality/Reservoir-Health-Ratings/Wilson-Reservoir>.
- _____. 2013. Solid Waste Management Unit 108- Pond Creek Relocation Environmental Assessment. TVA, Knoxville, Tenn.
- _____. 2015a. Muscle Shoals Outdoor Education and Recreation Area Improvements Environmental Assessment. Available at <https://www.tva.com/Environment/Environmental-Stewardship/Environmental-Reviews/Muscle-Shoals-Outdoor-Education-and-Recreation-Area-Improvements>.
- _____. 2015b. Proposed RLMP Plan: Wilson Reservoir. Retrieved from <https://www.tva.gov/Environment/Environmental-Stewardship/Land-Management/Proposed-RLMP-Plan-Wilson-Reservoir> (accessed March 2016).
- Tuttle, M. D. 1976. Population ecology of the gray bat (*Myotis grisescens*): philopatry, timing, and patterns of movement, weight loss during migration, and seasonal adaptive strategies. Occasional Papers of the Museum of Natural History, University of Kansas, 54: 1-38.
- U.S. Census Bureau (USCB). 2016a. American FactFinder. Retrieved from http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml# (accessed March 2016).

- _____. 2016b. State and County QuickFacts – Tennessee. Retrieved from <http://quickfacts.census.gov/qfd/states/47000.html> (accessed November 2015).
- U.S. Environmental Protection Agency (USEPA). 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, EPA-550/9-74-004, Washington, DC. Retrieved from <http://www.nonoise.org/library/levels74/levels74.htm> (accessed September 2015).
- _____. 2016a. Climate Impacts in the Southeast. Retrieved from <https://www3.epa.gov/climatechange/impacts/southeast.html> (accessed March 2016).
- _____. 2016b. USEPA Green Book. Retrieved from <https://www3.epa.gov/airquality/greenbook/ancl.html> (accessed March 2016).
- U.S. Fish and Wildlife Service (USFWS). 2003. Recovery Plan for the Red-cockaded Woodpecker (*Picoides borealis*): Second Revision. USFWS Southeast Region, Atlanta, GA.
- _____. 2007. National Bald Eagle Management Guidelines. Retrieved from <http://www.fws.gov/northeast/ecologicalservices/pdf/NationalBaldEagleManagementGuidelines.pdf> (accessed July 2016).
- _____. 2014. Northern Long-eared Bat Interim Conference and Planning. Retrieved from <https://www.fws.gov/northeast/virginiafield/pdf/NLEBinterimGuidance6Jan2014.pdf> (accessed June 2016).
- _____. 2015a. Bald & Golden Eagle. Retrieved from <https://www.fws.gov/birds/management/managed-species/bald-and-golden-eagle-information.php> (accessed December 2015).
- _____. 2015b. Northern Long-Eared Bat Fact Sheet. Bloomington, MN. Retrieved from <http://www.fws.gov/Midwest/endangered/mammals/nleb/pdf/NLEBFactSheet01April2015.pdf> (accessed March 2016).
- _____. 2016. Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern Long-Eared Bat. Bloomington, MN. Retrieved from <https://www.gpo.gov/fdsys/pkg/FR-2016-01-14/pdf/2016-00617.pdf> (accessed March 2016).
- U.S. Forest Service (USFS). 1995. Landscape Aesthetics, Agriculture Handbook Number 701. Washington, D.C.

CHAPTER 5 – LIST OF PREPARERS

5.1 NEPA Project Management

Name: **Charles Nicholson (TVA)**
 Education: Ph.D., Ecology and Evolutionary Biology, Wildlife Management; B.S., Wildlife and Fisheries Science
 Project Role: NEPA Compliance
 Experience: 33 years in Zoology, Endangered Species Studies and NEPA Compliance

Name: **Bill Elzinga (Amec Foster Wheeler)**
 Education: M.S. and B.S., Biology
 Project Role: NEPA Review Manager
 Experience: 30 years of experience managing and performing NEPA analyses for electric utility industry and state/federal agencies; ESA compliance; CWA evaluations.

Name: **Dana Vaughn (TVA)**
 Education: M.A., Education and B.A., Biology
 Project Role: PM, Environmental Support
 Experience: 11 years in Natural Resources and Environmental Compliance

Name: **Jon Riley (TVA)**
 Education: Bachelor of Landscape Architecture
 Project Role: Project Lead
 Experience: 12 years in Site Planning, Design and Visual Resource Management, 6 years in Architectural History and Historic Preservation

5.2 Other Contributors

Name: **Liz Hamrick (TVA)**
 Education: M.S., Wildlife and B.S. Biology
 Project Role: Terrestrial Ecology (Animals), Terrestrial Threatened and Endangered Species
 Experience: 17 years conducting field biology, 12 years technical writing, 8 years compliance with NEPA and ESA.

Name: **Tim Nichols**
 Education: B.S. Biology 1998, M.S. Biology 2005
 Project Role: Field Team Lead, wetlands, threatened and endangered species and water resources
 Experience: 10 years of experience conducting natural and water resources studies

Muscle Shoals Reservation Operations Relocation

Name: **Adam Dattilo (TVA)**
Education: M.S., Forestry
Project Role: Vegetation, Threatened and Endangered Plants
Experience: 10 years botany, restoration ecology, threatened and endangered plant monitoring/surveys, invasive species control, as well as NEPA and Endangered Species Act compliance.

Name: **Kim Pilarski-Hall (TVA)**
Education: M.S., Geography, Minor Ecology
Project Role: Wetlands, Natural Areas
Experience: 20 years expertise in wetland assessment, wetland monitoring, watershed assessment, wetland mitigation, restoration as well as NEPA and Clean Water Act compliance.

Name: **Robert Marker (TVA)**
Education: B.S., Outdoor Recreation Resources Management
Project Role: Parks and Recreation
Experience: 40 years in outdoor recreation resources planning and management.

Name: **Craig Phillips (TVA)**
Education: M.S. and B.S. Wildlife and Fisheries Science
Project Role: Aquatic Ecology and Threatened and Endangered Species
Experience: 7 years sampling and hydrologic determination for streams and wet-weather conveyances; 5 years in environmental reviews

Name: **Tom Waddell (TVA)**
Education: B.S., Chemical Engineering
Project Role: Air Quality
Experience: 30 years in air permitting and compliance, regulatory development and air pollution research

Name: **Richard Yarnell (TVA)**
Education: B.S., Environmental Health
Project Role: Cultural and Historic Resources
Experience: 39 years, cultural resource management

Name: **Karen Boulware (Amec Foster Wheeler)**
Education: M.S., Resource Planning and B.S., Geology
Project Role: NEPA Coordinator, Socioeconomics/Environmental Justice/Noise/Solid and Hazardous Waste
Experience: 25 years of professional experience in NEPA.

Name: **Michaelyn Harle (TVA)**
Education: Ph.D., Anthropology
Project Role: Cultural and Historic Resources, Archaeology
Experience: 13 years in archaeology and cultural resource management

Name	Dave Breetzke
Education:	MA History/Historic Archaeology
Project Role:	Cultural Resources
Experience:	20 years, cultural resource management
Name:	Steve Coates, PE (Amec Foster Wheeler)
Education:	B.S., Civil Engineering
Project Role:	Transportation
Experience:	25 years of experience in conceptual design of urban and rural highway projects, environmental compliance and storm water management and civil site design and NEPA compliance.
Name:	Linda Hart (Amec Foster Wheeler)
Education:	B.S. Management/Biology
Project Role:	Technical Editor
Experience:	30 years of experience in production of large environmental documents including formatting, technical editing and assembling.
Name:	Matt Basler (Amec Foster Wheeler)
Education:	M.S., Fisheries Science/Management and B.S., Wildlife and Fisheries
Project Role:	Wildlife
Experience:	12 years of experience in aquatic, marine and terrestrial ecology studies, fisheries
Name	Wayne Ingram P.E. (Amec Foster Wheeler)
Education	B.S., Civil Engineering and B.S., Physics
Project Role	Surface Water
Experience:	30 years of experience in surface water engineering and analysis including drainage, storm water management, water quality assessment, erosion and sedimentation, sediment transport, wetlands hydrology, stream restoration and storm water detention systems
Name:	Marty Marchaterre (Amec Foster Wheeler)
Education:	JD, Law
Project Role:	Cultural Resources, Air and Climate Change
Experience:	25 years of experience in NEPA document preparation.
Name:	Stephanie Miller (Amec Foster Wheeler)
Education:	M.S., Biology and B.S., Marine Biology
Project Role:	Land Use, Prime Farmland, Visual Resources
Experience:	8 years of experience in visual assessment, land use, aquatic and terrestrial ecology.
Name:	Brian Mueller (Amec Foster Wheeler)
Education:	B.S.
Project Role:	Senior GIS Analyst

Muscle Shoals Reservation Operations Relocation

Experience: 25 years in GIS applications for environmental projects.

Name: **Lana Smith (Amec Foster Wheeler)**

Education: M.S., Biology and B.S., Environmental Biology

Project Role: Public Health and Safety

Experience: 21 years in Health and Safety, Hazard Analysis Assessment and Health and Safety Plan development.

Name: **Steve Stumne, PWS (Amec Foster Wheeler)**

Education: B.S., Biology

Project Role: Ecology Lead

Experience: Over 20 years of experience providing natural resource investigations, NEPA analysis and documentation, wetland and stream delineation/permitting/mitigation and endangered species investigations

Name: **Irene Weber (Amec Foster Wheeler)**

Education: M.S., Biology and B.S., Plant Biology

Project Role: Vegetation

Experience: 5 years of experience in ecology and plant biology.

Appendix A – Consultation Correspondence



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

May 16, 2016

Ms. Lee Anne Wofford
Deputy State Historic Preservation Officer
Alabama Historical Commission
468 South Perry Street
Montgomery, Alabama 36130-0900

Dear Ms. Wofford:

TENNESSEE VALLEY AUTHORITY (TVA), MUSCLE SHOALS RESERVATION OPERATIONS
RELOCATION DRAFT ENVIRONMENTAL ASSESSMENT, COLBERT COUNTY, ALABAMA

TVA proposes to construct a new building on the retained portion of TVA Muscle Shoals Reservation in Colbert County, Alabama. TVA is considering two tracts of land: Alternate B, which consists of approximately 38 acre greenfield site located on the north side of Reservation Road and Alternate C, which is an approximately 28 acre parcel that consists of a complex of buildings located on River Road. For Alternate C, the existing buildings would be demolished. TVA determined the area of potential effects (APE) to be the 66.18 acres of land being considered for potential construction. The architectural APE is the .5 mile radius unobstructed line of sight from the proposed facilities.

TVA contracted with Amec Foster Wheeler Environment & Infrastructure Inc (AMEC) to conduct a Phase I cultural resources survey. Please find enclosed the resulting report, titled *Phase I Archaeological and Historic Architectural Viewshed Survey for the Proposed TVA Service Centers Relocation Project, Muscle Shoals, Colbert County, Alabama*.

The archaeological survey failed to identify any archaeological sites within the APE. Two architectural resources (Ct00001, a circa 1950 warehouse and Ct00002, a circa 1945 metal Quonset Hut) are located within the area of direct effect under Alternate C. Both structures have been altered, and they no longer retain historic integrity. Furthermore, the buildings lack architectural significance. TVA finds that Ct00001 and Ct00002 not eligible for the National Register of Historic Places (NRHP). Twelve unrecorded buildings over 50 years of age (Ct00003 through Ct00014) and one previously identified historic property (TVA Power Service Shop) were identified within the line-of-sight of the combined Alternate B and C viewshed APE. The Power Service Shop was previously recommended eligible for the National Register in 2002 by TRC. Although both Alternative B and C would cause a visual effect to the Power Service Shop, TVA finds that the effect would not be adverse. The setting is already visually compromised by modern construction that has occurred periodically from 1972 to present. Furthermore, the proposed construction plan for Alternative B shows the line of site to the Power Service Shop will be obstructed by dense vegetation (Figure 1). In addition, TVA finds

Ms. Lee Anne Wofford
Page Two
May 16, 2016

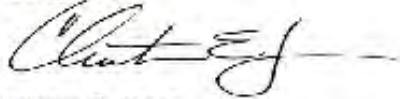
that Ct00003 through Ct00014 are ineligible for the NRHP based on lack of integrity, lack of architectural distinction and/or inability to associate the property with significant historical events or individuals.

TVA has read the enclosed report and agrees with the recommendations of its authors. We are seeking your concurrence with TVA's findings and recommendations that no historic properties would be adversely affected by the proposed undertaking.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and eligible for the NRHP.

Should you have any questions or comments, please contact Michaelyn Harle at mharle@tva.gov or by phone at 865-632-2248.

Sincerely,

A handwritten signature in black ink, appearing to read "Clinton E. Jones", followed by a horizontal line.

Clinton E. Jones
Manager, Biological and Cultural Compliance
Safety, River Management and Environment
WT11C-K

MSH:CSD
Enclosure



STATE OF ALABAMA
ALABAMA HISTORICAL COMMISSION
466 SOUTH PERRY STREET
MONTGOMERY, ALABAMA 36104-0001

June 15, 2016

JSA L. JONES
ATTENDING EXECUTIVE DIRECTOR
STATE HISTORIC PRESERVATION OFFICER

TEL: 204-242-2184
FAX: 204-240-2477

Clinton E. Jones
Manager, Biological and Cultural Compliance
Safety, River Management and Environment
WT11C-K
TVA
400 West Summit Hill Drive
Knoxville, Tennessee 37902

Re: AHC 2016-0876
Muscle Shoals Reservation Operations Relocation
Draft Environmental Assessment
Colbert County

Dear Mr. Jones:

Upon review of the cultural resource assessments conducted for the above referenced project, we have determined that we continue to agree that the structure recorded in 2002 would meet NRHP criteria, but we find no adverse effect. We also agree that the remaining 12 properties are not NRHP eligible.

We appreciate your commitment to helping us preserve Alabama's historic archaeological and architectural resources. Should you have any questions, please contact me. Have the AHC tracking number referenced above available and include it with any future correspondence.

Sincerely,

A handwritten signature in black ink, appearing to read "Lee Anne Wofford".

Lee Anne Wofford
Deputy State Historic Preservation Officer

LAW/LAW/amh

THE STATE HISTORIC PRESERVATION OFFICE
www.alahistory.org



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

May 26, 2016

To Those Listed:

TENNESSEE VALLEY AUTHORITY (TVA), MUSCLE SHOALS RESERVATION OPERATIONS
RELOCATION DRAFT ENVIRONMENTAL ASSESSMENT, COLBERT COUNTY, ALABAMA

TVA proposes to construct a new building on the retained portion of TVA Muscle Shoals Reservation in Colbert County, Alabama (T 3S R 10W S20). TVA is considering two tracts of land: Alternate B, which consists of approximately 38 acre greenfield site located on the north side of Reservation Road and Alternate C, which is an approximately 28 acre parcel that consists of a complex of buildings located on River Road. For Alternate C, the existing buildings would be demolished. TVA determined the area of potential effects (APE) to be the 66.18 acres of land being considered for potential construction. The architectural APE is the .5 mile radius unobstructed line of sight from the proposed facilities.

TVA contracted with Amec Foster Wheeler Environment & Infrastructure Inc. (AMEC) to conduct a Phase I cultural resources survey. Please find enclosed a copy of the report, titled *Phase I Archaeological and Historic Architectural Viewshed Survey for the Proposed TVA Service Centers Relocation Project, Muscle Shoals, Colbert County, Alabama*.

The archaeological survey failed to identify any archaeological sites within the APE. Two architectural resources (Ct00001, a circa 1950 warehouse and Ct00002, a circa 1945 metal Quonset Hut) are located within the area of direct effect under Alternate C. Both structures have been altered, and they no longer retain historic integrity. Furthermore, the buildings lack architectural significance. TVA finds that Ct00001 and Ct00002 are not eligible for the National Register of Historic Places (NRHP). Twelve unrecorded buildings over 50 years of age (Ct00003 through Ct00014) and one previously identified historic property (TVA Power Service Shop) were identified within the line-of-sight of the combined Alternate B and C viewshed APE. The Power Service Shop was previously recommended eligible for the National Register in 2002 by TRC. Although both Alternative B and C would cause a visual effect to the Power Service Shop, TVA finds that the effect would not be adverse. The setting is already visually compromised by modern construction that has occurred periodically from 1972 to present. Furthermore, the proposed construction plan for Alternative B shows the line of site to the Power Service Shop will be obstructed by dense vegetation (Figure 1). In addition, TVA finds that Ct00003 through Ct00014 are ineligible for the NRHP based on lack of integrity, lack of architectural distinction and/or inability to associate the property with significant historical events or individuals.

TVA has read the enclosed report and agrees with the recommendations of its authors. TVA finds that no historic properties would be adversely affected by the proposed undertaking.

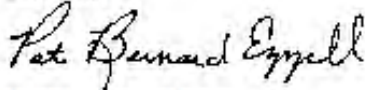
To Those Listed
Page Two
May 26, 2016

Pursuant to 36 C.F.R. Part 800.3(f)(2), TVA is consulting with the following federally recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for the NRHP: Cherokee Nation, Eastern Band of Cherokee Indians, United Keetoowah Band of Cherokee Indians, Chickasaw Nation, Coushatta Tribe of Louisiana, Alabama Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town, Muscogee (Creek) Nation of Oklahoma, Kialegee Tribal Town, Thlopthlocco Tribal Town, Poarch Band of Creek Indians, Absentee Shawnee Tribe of Oklahoma, Eastern Shawnee Tribe of Oklahoma, Shawnee Tribe and the Seminole Nation of Oklahoma.

By this letter, TVA is providing notification of these findings and is seeking your comments regarding any properties that may be of religious and cultural significance and may be eligible for listing in the NRHP pursuant to 36CFR § 800.2 (c)(2)(ii), 800.3 (f)(2), and 800.4 (a)(4)(b).

Please respond by June 25, 2016, if you have any comments on the proposed undertaking. If you have any questions, please contact me at (865)632-6461 or by email at pbezzell@tva.gov.

Sincerely,



Patricia Bernard Ezzell
Senior Program Manager
Tribal Relations and Corporate Historian
Communications
WT 7D-K

MMS:CSD
Enclosure

IDENTICAL LETTER MAILED TO THE FOLLOWING ON MAY 26, 2016:

Ms. Sheila Bird
Cherokee Nation
Post Office Box 948
Tahlequah, Oklahoma 74465

Mr. Ken Blanchard
Tribal Historic Preservation Officer
Absentee Shawnee Tribe of Oklahoma
2025 S. Gordon Cooper
Shawnee, Oklahoma 74801

cc: Mr. Leonard Longhorn
Absentee Shawnee Tribe of Oklahoma
2025 S. Gordon Cooper
Shawnee, Oklahoma 74801

Ms. Karen Brunso
Tribal Historic Preservation Officer
Division of Historic Preservation
Department of Culture & Humanities
The Chickasaw Nation
Post Office Box 1548
Ada, Oklahoma 74821-1548

Ms. RaeLynn Butler
Tribal Historic Preservation Officer
Muscogee (Creek) Nation
P.O. Box 580
Okmulgee, Oklahoma 74447

Mr. Bryant Celestine
Tribal Historic Preservation Officer
Alabama-Coushatta Tribe of Texas
571 State Park Rd. 56
Livingston, Texas 77351

Mr. David Cook
Tribal Administrator
Kialegee Tribal Town
Post Office Box 332
Wetumka, Oklahoma 74883

Ms. Robin Dushane
Tribal Historic Preservation Officer
Eastern Shawnee Tribe of Oklahoma
127 West Oneida
Seneca, Missouri 64865

cc: Ms. Dee Gardner
NAGPRA/Cell Tower Coordinator
Eastern Shawnee Tribe of Oklahoma
127 West Oneida
Seneca, Missouri 64865

Ms. Natalie Harjo
Tribal Historic Preservation Officer
Seminole Nation of Oklahoma
Post Office Box 1498
Wewoka, Oklahoma 74884

Mr. Tyler Howe
Tribal Historic Preservation Specialist
Historic Preservation Specialist
Eastern Band of Cherokee Indians
Post Office Box 455
Cherokee, North Carolina 28719

cc: Mr. Russell Townsend
Tribal Historic Preservation Officer
Eastern Band of Cherokee Indians
Post Office Box 455
Cherokee, North Carolina 28719

Ms. Kim Jumper
Tribal Historic Preservation Officer
Shawnee Tribe
Post Office Box 189
Miami, Oklahoma 74355

Dr. Linda Langley
Tribal Historic Preservation Officer
Coushatta Tribe of Louisiana
P.O. Box 10
Elton, Louisiana 70532

Eric Oosahwee-Voss
Tribal Historic Preservation Officer
United Keetoowah Band of Cherokee Indians in Oklahoma
Post Office Box 1245
Tahlequah, Oklahoma 74465

cc: Karen Pritchett
United Keetoowah Band of Cherokee Indians in Oklahoma
Post Office Box 1245
Tahlequah, Oklahoma 74465

Muscle Shoals Reservation Operations Relocation

Ms. Samantha Robison
Tribal Historic Preservation Officer
Alabama-Quassarte Tribal Town
PO Box 187
101 East Broadway
Wetumka, OK 74883

Mr. Emman Spain
Thlopthlocco Tribal Town
Tribal Historic Preservation Officer
P.O. Box 188
Okemah, Oklahoma 74859

Mr. Robert Thrower
Tribal Historic Preservation Officer
Poarch Band of Creek Indians
5811 Jack Springs Road
Atmore, Alabama 36502