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COAL YARD AND COAL YARD RUNOFF POND CLOSURE, CONSTRUCTION OF A PROCESS WATER BASIN AND DEVELOPMENT OF A BORROW SITE ON TVA-OWNED PROPERTY ON OR NEAR THE JOHNSONVILLE FOSSIL PLANT
ENVIRONMENTAL ASSESSMENT
Humphreys County, Tennessee

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Table of Contents

List of Appendices

List of Tables

List of Figures

Symbols, Acronyms, and Abbreviations

AADT	Average Annual Daily Traffic
ACS	American Community Survey
APE	Area of Potential Effect
BMP	Best Management Practices
CCR	Coal Combustion Residuals
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CT	Combustion Turbine
CUF	Cumberland Fossil Plant
CWA	Clean Water Act
dB	Decibel
dBA	A-scale weighting decibels
EA	Environmental Assessment
EJ	Environmental Justice
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973
FHWA	Federal Highway Administration
FPPA	Farmland Protection Policy Act
GHG	Greenhouse Gases
gpm	Gallons Per Minute
HRSG	Heat Recovery Steam Generator
HUD	U.S. Department of Housing and Urban Development
JCT	Johnsonville Combustion Turbine Facility
JOF	Johnsonville Fossil Plant
Ldn	Day-Night Sound Level
LOS	Level of Service
MATS	Mercury and Air Toxics Standards
mg/L	Milligrams Per Liter
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLCD	National Land Cover Dataset
NMSZ	New Madrid Seismic Zone
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
OSHA	Occupational Safety and Health Administration
Pb	Lead
PM	Particulate Matter
$PM_{2.5}$	PM with particle sizes less than or equal to 2.5 micrometers
PM_{10}	PM with particle sizes less than or equal to 10 micrometers
RCRA	Resource Conservation and Recovery Act
RFAI	Reservoir Fish Assemblage Index
SHPO	State Historic Preservation Officer
SO_2	Sulfur Dioxide
SWPPP	Storm Water Pollution Prevention Plan
TDEC	Tennessee Department of Environment and Conservation
TMSP	Tennessee Stormwater Multi-Sector General Permit

TRM	Tennessee River Mile
TVA	Tennessee Valley Authority
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WWC	Wet Weather Conveyances
yd^3	Cubic Yard(s)

CHAPTER 1 – PURPOSE AND NEED FOR ACTION

1.1 Introduction and Background

Tennessee Valley Authority's (TVA) Johnsonville Fossil Plant (JOF) is the oldest fossil plant in the TVA system and is located on approximately 700 acres of land along the east bank of the Tennessee River (Kentucky Reservoir) in New Johnsonville, Tennessee, approximately 75 miles west of Nashville (Figure 1-1). Construction of JOF began in 1949 and was completed in 1952.

In April 2011, TVA entered into two agreements to resolve litigation over Clean Air Act New Source Review requirements at TVA's coal-fired power plants. The first agreement is a Federal Facilities Compliance Agreement with the U.S. Environmental Protection Agency (EPA). The second agreement is with Alabama, Kentucky, North Carolina, Tennessee, the Sierra Club, National Parks Conservation Association and Our Children's Earth Foundation. Under the terms of these agreements (collectively the "EPA Clean Air Agreements"), TVA agreed to retire all ten coal-fired units at JOF. Units 5 through 10 were retired in December 2015, and the remaining units were retired in December 2017. TVA continues to operate 20 combustion turbine (CT) units at the Johnsonville Combustion Turbine Facility (JCT) located within the JOF property boundary. CTs use natural gas as a fuel and are operated to meet peak power demands primarily during the winter and summer. In addition, TVA built a heat recovery steam generator (HRSG) on one of the existing CT units to continue to provide steam to a customer (The Chemours Company) located adjacent to the plant following retirement of the coal-fired units. The EPA Agreements do not affect the operation of the CT units at JOF.

With the closure of the coal-fired generating units, the coal yard and coal yard runoff pond can be closed. In addition, TVA needs to manage storm water and non-coal combustion residual process water from the JCT. Therefore, TVA is evaluating the three possible locations for construction of a process water basin. Two potential sites are located within the current footprint of the coal yard project area and one is located within the area known as the north rail loop. TVA is also considering developing a borrow site on nearby property owned by TVA to provide fill material to support the closure of the coal yard and coal yard runoff pond and other possible future projects at JOF including decommissioning of the coal plant. Figure 1-1 depicts the project areas that are the subject of this environmental assessment (EA).

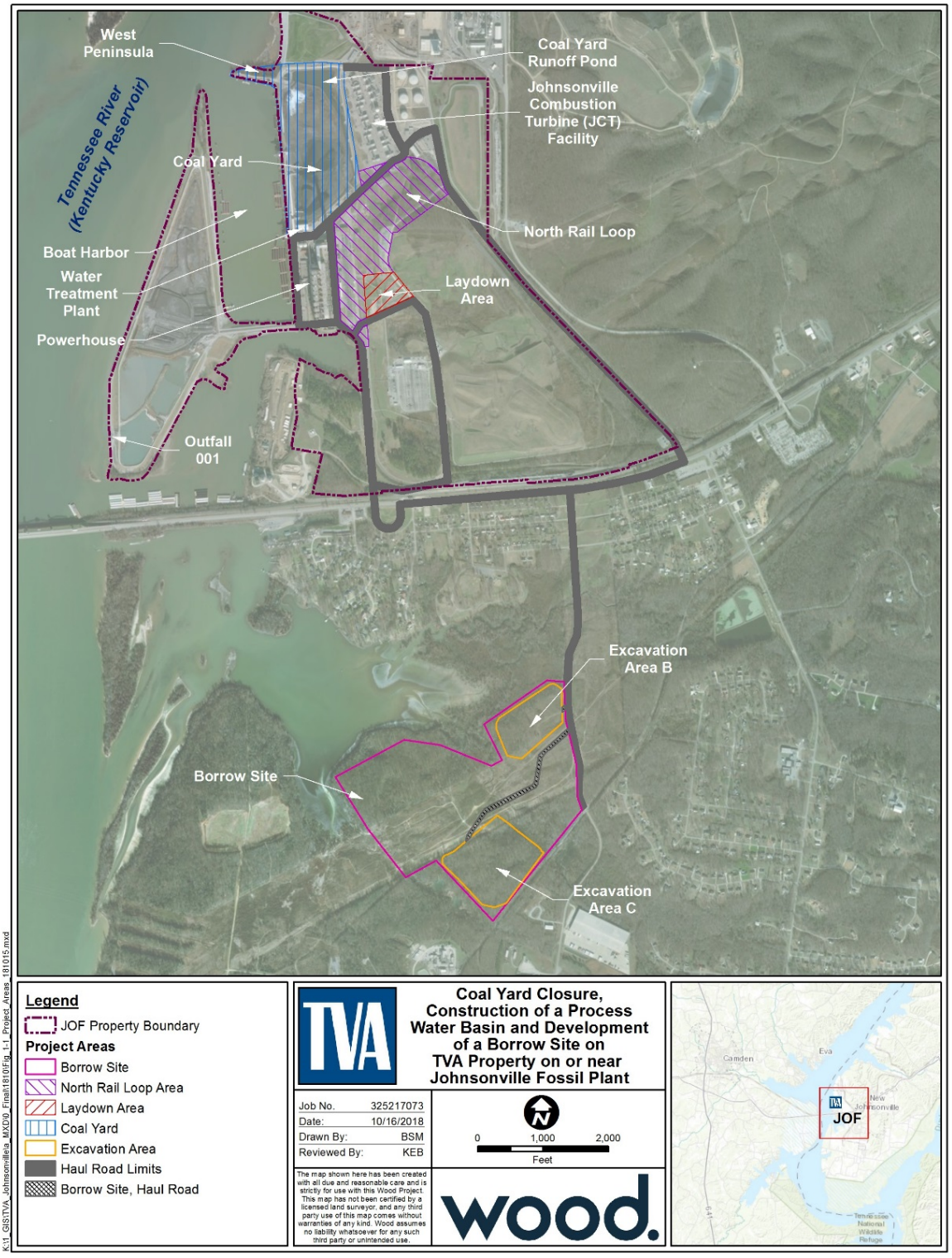

Figure 1-1. Proposed Project Elements

The coal yard, the coal yard runoff pond and west peninsula are contained within an approximately 64-acre project area (Figure 1-1). During the first few years of plant operation, coal ash was sluiced into the north end of the coal yard to raise the grade to match the south end of the coal yard. Current estimates indicate that approximately 600,000 cubic yards (yd^3) of coal ash, known as coal combustion residuals (CCR), are located under the northern half of the coal yard. Additionally, in the early 1990s, fill consisting of bottom ash and spent-bed material (bottom ash mixed with lime) was placed in the southern half of the coal yard to construct a stabilized surface to support heavy equipment operation and coal piles as part of a coal yard resurfacing project. A July 2017 sampling report indicated the presence of extractable petroleum hydrocarbons in stockpiled soil located at the coal yard. A remediation project was completed in the summer of 2017 to remove and dispose of the affected soils (Stantec 2017).

The coal yard runoff pond is located along the north side of the coal yard. The coal yard runoff pond was constructed in 1979 to replace a drainage channel along the north end of the coal yard. The coal yard runoff pond currently collects low volume process waste streams from the plant and storm water runoff from the coal yard, the JCT and north rail loop. Discharge from the coal yard runoff pond is pumped to Ash Pond 2 for treatment prior to discharging through National Pollutant Discharge Elimination System (NPDES) permitted outfall 001.

The north rail loop project area (Figure 1-1) is an approximately 46-acre site located southeast of the coal yard. This area was originally designed and permitted for an ash disposal area, however it was never constructed (Bickel and Sanchez 2011).

TVA proposes to develop a borrow site on TVA-owned property located approximately 1.8 miles south of JOF. The borrow site limits of disturbance would encompass approximately 44 acres of the 165-acre site (See Figure 2-5). Currently this site is undeveloped and is bisected by an overhead TVA electric transmission line and associated undeveloped service roads that run the full width of the transmission line right-of-way.

Assessed separately in the 2018 *Johnsonville Fossil Plant Decontamination and Deconstruction Environmental Assessment* available at http://www.tva.gov/nepa, retirement of the coal-fired generating units has also prompted TVA to evaluate the decommissioning and deconstruction of the powerhouse and powerhouse equipment and associated coal-fired power generation units on JOF. Alternatives include securing and maintaining the plant, deconstructing/demolishing the powerhouse and powerhouse equipment, or leaving the plant as is and taking no action. Additionally, TVA will also evaluate the closure of the active ash impoundment at the site in a separate environmental review.

1.2 Purpose and Need

TVA has retired all coal-fired units at JOF. As there is no longer a need for coal at JOF, TVA proposes to close the coal yard and coal yard runoff pond. However, TVA continues to operate 20 CT units at the JCT to meet peak power demands primarily during the winter and summer. TVA also operates a HRSG to supply steam to a customer.

TVA proposes to construct and operate a process water basin at the JCT to capture and treat the storm water and process water flows from the CT plant site. The borrow site is needed to secure material to facilitate closure of the coal yard and coal yard runoff pond, as well as to support other proposed projects, including closure and decommissioning JOF, currently being evaluated under separate reviews.

1.3 Decision to be Made

This EA has been prepared to inform TVA decision makers and the public about the environmental consequences of the proposed action. TVA must decide whether to close the coal yard and coal yard runoff pond, construct a process water basin for the management of process flows from the CT site, and develop a borrow area to support immediate and future foreseeable projects at JOF.

TVA will use this EA to support the decision-making process and to determine whether an Environmental Impact Statement should be prepared or whether a Finding of No Significant Impact may be issued.

Because of the historic presence of CCR in the coal yard project area, closure of the coal yard is subject to the August 2015 Administrative Order entered by the Tennessee Department of Environment and Conservation (TDEC) (OGC15-0177) which requires that TVA evaluate and remediate, if necessary, any unacceptable risks associated with CCR at its plants in Tennessee. Environmental assessments performed under the administrative order, as well as other environmental regulatory programs, may drive future decisions on additional closure activities as well as potential corrective measures.

1.4 Related Environmental Reviews and Consultation Requirements

Several environmental reviews have been prepared for actions related to the operation of JOF as well as process water basin projects at other TVA sites. The contents of these documents help describe the JOF project area and the method for process water basin construction and are incorporated by reference.

Johnsonville Cogeneration Plant Environmental Assessment (TVA 2015c). This EA assessed the environmental impacts of constructing and operating a HRSG integrated into an existing CT unit at JOF. The project was needed to allow TVA to continue to provide steam to an adjacent steam customer following retirement of the coal-fired units at JOF.

TVA's Integrated Resource Plan (TVA 2015a). The Integrated Resource Plan describes how TVA will meet the long-term energy needs of the Tennessee Valley Region. This document and the associated Supplemental Environmental Impact Statement evaluate scenarios that could unfold over the next 20 years. It discusses ways that TVA can meet future power demand economically while supporting TVA's equally important mandates for environmental stewardship and economic development across the Tennessee Valley. The plan indicated that a diverse portfolio is the best way to deliver low-cost, reliable electricity including the retirement of the coal-fired units at JOF and the operation of the JCT. TVA released the accompanying Final Supplemental Environmental Impact Statement for TVA's Integrated Resource Plan in July 2015 (TVA 2015b).

The description of the affected environment and the assessment of impacts contained in the documents listed above were used in support of this analysis, and are incorporated, as appropriate, into analyses for each environmental resource in Chapter 3.

1.5 Scope of the Environmental Assessment

This EA evaluates the potential environmental, cultural, and socioeconomic impacts of closure of the coal yard and coal yard runoff pond, construction of a process water basin to address process water flows from the JCT, and development of a borrow site at JOF to provide fill material to support closure of the coal yard and coal yard runoff pond as well as for immediate and future projects at JOF.

TVA prepared this EA to comply with the National Environmental Policy Act (NEPA) and 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 potential effects to the environmental resources listed below were relevant to the decision to be made, and assessed the potential impacts on these resources in detail in this EA.

- Air Quality and Climate Change
- Geology and Soils
- Groundwater
- Surface Water
- Floodplains
- Vegetation
- Prime Farmland
- Wildlife
- Aquatic Ecology
- Threatened and Endangered Species
- Wetlands
- Visual Resources
- Land Use
- Solid and Hazardous Waste
- Cultural and Historic Resources
- Natural Areas, Parks, and Recreation
- Transportation
- Environmental Justice
- Noise

TVA also considered potential effects related to: socioeconomics and demographics and public health and safety. These resources, described further below, were considered but eliminated from detailed consideration.

Socioeconomics: Demographic characteristics are not expected to change due to implementation of the proposed actions due to the temporary nature of the proposed construction activities and minor temporary increase in workforce needed to support the proposed activities. Additionally, workers could be drawn from the labor force that currently resides in the study area. Consequently, there would be no discernable impact to the surrounding workforce and regional economy.

Public Health and Safety: TVA's Standard Programs and Processes related to safety would be strictly adhered to during implementation of 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. They also establish responsibilities for implementing Section 19 of the Occupational Safety and Health Act of 1970. Therefore, impacts to public health and safety are not anticipated.

TVA's action would satisfy the requirements of Executive Order (EO) 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), EO 12898 (Environmental Justice), EO 13112 as amended by 13751 (Invasive Species) and applicable laws including the National Historic Preservation Act, Endangered Species Act (ESA), and Clean Water Act (CWA).

1.6 Public and Agency Involvement

TVA's public and agency involvement includes a public notice and a 30-day public review of the Draft EA. The availability of the Draft EA was announced in newspapers that serve the

Humphreys County area, and the Draft EA was posted on TVA's website. TVA's agency involvement included notification of the availability of the Draft EA to local, state, and federal agencies, and federally recognized tribes as part of the review. Chapter 5 provides a list of agencies, tribes, and organizations notified of the availability of the Draft EA. Comments on the Draft EA were accepted from December 19, 2018 through January 21, 2019 via TVA's website, mail, and e-mail.

TVA received one comment submission from TDEC. TVA carefully reviewed all of the comment statements in the submission and edited the text of the final EA as appropriate. Appendix A contains the comments on the Draft EA and TVA's responses to those comments.

1.7 Necessary Permits or Licenses

TVA would obtain all necessary permits, licenses, and approvals required for the alternative selected. TVA anticipates the following would be required for implementing the proposed alternatives.

- A General Permit for Storm Water Discharges Associated with Construction Activities may be required for the proposed project, and a Storm Water Pollution Prevention Plan (SWPPP) would be required to detail sediment and erosion control best management practices (BMPs).
- TVA would comply with all requirements in its NPDES permit.
- TVA would be required to obtain a Tennessee Storm Water Multi-Sector General Permit (TMSP) for Industrial Activities.
- Actions involving wetlands and/or stream crossings and/or alterations would be subject to federal CWA Section 404 permit requirements.
- A TDEC Aquatic Resources Alteration Permit/Section 401 water quality certification may be required for any alterations to streams and wetlands on the affected area.
- TVA would adhere to all appropriate federal, state and county regulatory requirements, including obtaining a burn permit if required, if burning of landscape waste is conducted.
- Clean Air Act Title V permit modification may be necessary for changes in plant operations, added processes such as coal processing, material conveyance, crushing, grinding and screening.

Any other necessary permits would be evaluated based on site-specific conditions.

CHAPTER 2 – ALTERNATIVES

2.1 Description of Alternatives

Alternatives evaluated in this EA include:

- Alternative A – No Action
- Alternative B – Coal Yard Material Consolidation and Cap Closure
- Alternative C – Coal Yard Full Cap Closure
- Alternative D – Coal Yard Remove Material and Close

2.1.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not proceed with closure of the coal yard and coal yard runoff pond, construction of a process water basin, or development of a borrow site on TVA-owned property. There would be no change to the environmental conditions of these respective sites. TVA would continue to secure and maintain the coal yard and coal yard runoff pond to ensure they do not degrade over time. The No Action Alternative is not reasonable as it would not meet the project purpose and need, which is to close the coal yard and coal yard runoff pond because they are no longer needed. In addition, implementation of the No Action Alternative would not provide a means for TVA to manage storm water and process water or provide borrow material to support planned and future projects at JOF and the JCT. However, the No Action Alternative sets a baseline for comparison of Alternatives B, C and D.

2.1.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

Under this Alternative, TVA would close the coal yard and coal yard runoff pond, construct a process water basin and develop a borrow site. Closure of the coal yard and coal yard runoff pond would all occur within the approximately 64-acre coal yard project area identified on Figure 1-1 that includes the coal yard, coal yard runoff pond and west peninsula. Three options for the construction of the process water basin are being considered. Two potential locations would be within the coal yard project area as previously described and the other would be in the north rail loop project area, which is also shown on Figure 1-1. Each of these actions is described below.

TVA has identified an approximately 7.7-acre area southeast of the north rail loop on JOF property that would be used for staging of vehicles, equipment, and materials during construction (Figure 1-1). The laydown area is a previously disturbed undeveloped site. Upon completion of construction activities, it is anticipated that this area would be restored to its previous state.

2.1.2.1 Coal Yard

Closure of the coal yard includes the removal of approximately 24,000 yd^3 of unburned coal and 40,000 yd^3 of sediment from the coal yard runoff pond that is stockpiled on the coal yard. Because the quantity of unburned coal remaining in the coal yard has been estimated, TVA conservatively assumes this quantity could vary up to an additional 15 percent. The quantity of sediment from the coal yard runoff pond was established during dredging and placement of that material onto the coal yard and is, therefore, not expected to change. This material would be transported to the nearest landfill that can accept this material and has the capacity to do so, which TVA has determined at this time is the West Camden

Sanitary Landfill (Figure 2-1). The unburned coal would be transported to the landfill by over-the-road dump trucks primarily utilizing existing roadways along the approximately 12-mile (24-mile round trip) haul route identified on Figure 2-1. Based on the estimated volume of material to be removed and the use of over-the-road dump trucks (capacity of 15 yd^3), transporting all of the unburned coal and sediment excavated from the coal yard runoff pond that is stockpiled on the coal yard to the landfill would entail the use of approximately 90 roundtrip truckloads (180 truck trips) per day operating approximately 5 days per week for a period of approximately 2.3 months.

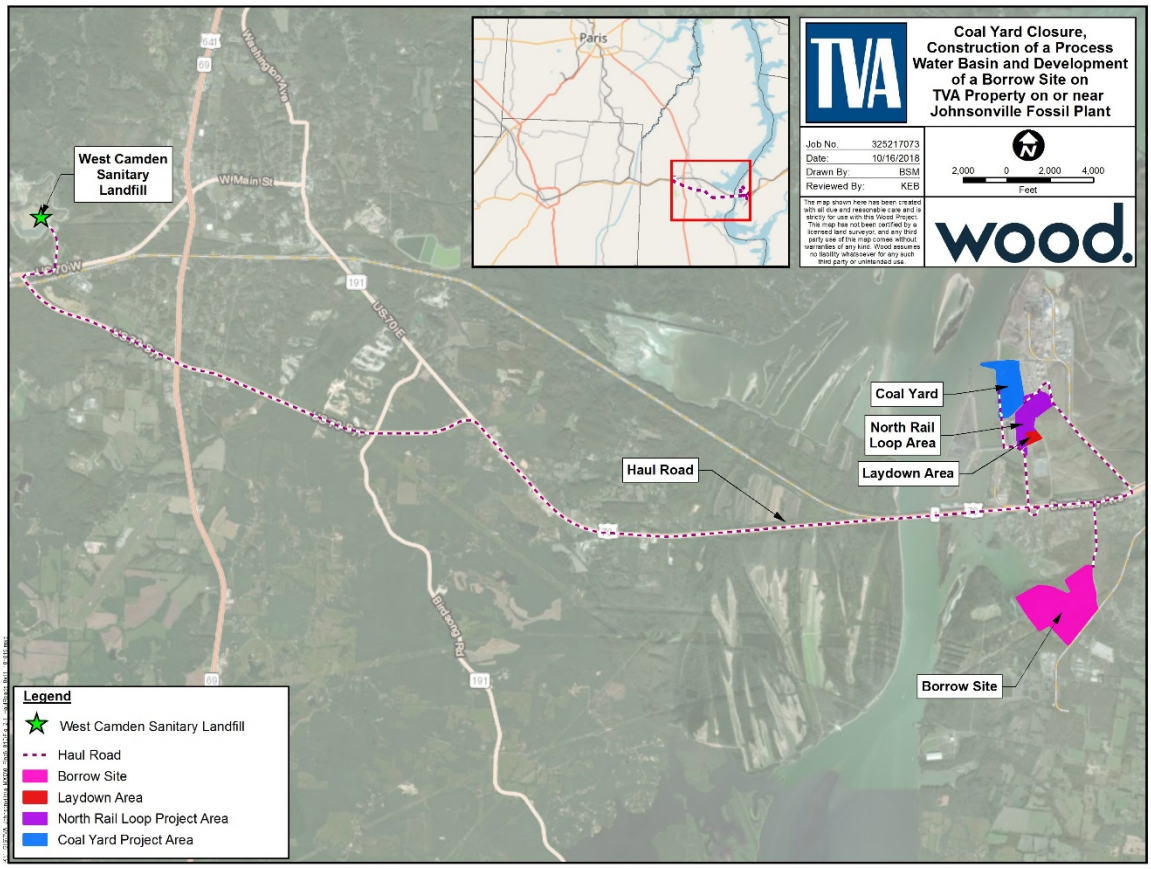

Figure 2-1. Haul Route from the Coal Yard to the West Camden Sanitary Landfill

Alternatively, TVA could also elect to consider implementing a reclamation process to recover the maximum amount of reusable fuel remaining in the coal stockpile. TVA estimates that this process would allow the reuse of approximately 70 to 90 percent of available material. The reclamation process could trigger added permitting requirements and modification to the site Title V Air Permit. The reclamation process is a five-step process which includes:

1. *Collection* – The raw material would be compiled using heavy equipment such as bulldozers, excavators, and trucks.

2. *Screening/Sizing* – Mobile screening equipment (powered by one 250-kilowatt diesel generator) would be used to sort the raw material into useable fuel and waste material.
3. *Separation* – Material ¼ inch to 2 inches in size would be separated into useable fuel or aggregate material. The separation process uses approximately 600 to 800 gallons per minute (gpm) of water cycling in a closed system. One or two 6-inch diesel pumps would pump water from the coal yard runoff pond into the closed system for the separation process. The water would later be returned to the coal yard runoff pond at a similar rate.
4. *Loading* – The useable coal would be loaded onto trucks for delivery to another TVA facility. The waste material and leftover aggregate material would be hauled to an offsite, permitted landfill for disposal.
5. *Grading* – The coal yard would be graded to ensure proper drainage.

As noted in Step 4 above, the useable fuel obtained by this process would be delivered to another TVA facility for use. For the purposes of the analysis in this EA, the useable coal (estimated to be 70-90 percent of the existing stockpile or 47,320 yd^3 to 60,840 yd^3) would be transported to the nearest TVA facility, currently the Cumberland Fossil Plant (CUF). Useable coal would be transported by over-the-road dump trucks to CUF primarily using existing roadways along the 39-mile (78-mile round trip) haul route identified on Figure 2-2. The remaining material (estimated to range from 10 to 30 percent of the existing material in the stockpile or 6,760 yd^3 to 20,280 yd^3) would be transported by over-the-road dump trucks to the West Camden Sanitary Landfill along the haul route shown on Figure 2-1.

Given the distance between JOF and CUF and the use of 15 trucks per day, TVA would transport up to 45 truckloads of usable coal to CUF per day. Based on the estimated range of volume of material that can be reclaimed and the use of over-the-road dump trucks (capacity of 15 yd^3), the transport of usable coal to CUF would occur for a period of up to 4.5 months. Remaining material would be transported by over-the-road dump trucks to the West Camden Sanitary Landfill as described above. Removal of this material would take up to 15 days.

Following removal of the coal stockpile, coal yard remnants approximately 5 feet thick, CCR including bottom ash and spent-bed material fill that was used for surface stabilization in the early 1990s, and soil from the south side of the coal yard would be excavated and consolidated into the north side of the coal yard as shown in Figure 2-3. The north/consolidated side of the coal yard would then be closed using a cover system that meets applicable state and federal requirements. Although the coal yard is not regulated by the federal CCR Rule, TVA would design and construct the cover system to meet the criteria identified in 40 C.F.R. § 257.102(d)(3):

a) The permeability of the final cover system must be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} cm/sec, whichever is less.

b) The infiltration of liquids through the closed CCR unit must be minimized by the use of an infiltration layer that contains a minimum of 18 inches of earthen material.

c) The erosion of the final cover system must be minimized by the use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.

d) The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence.

TVA may select an alternative final cover system design, provided the alternative final cover system is designed and constructed to meet the aforementioned design criteria. The final cover system must include an infiltration layer that achieves equivalent reduction in infiltration, an erosion layer that provides equivalent protection from wind or water erosion and must accommodate settling and subsidence as specified above.

The system would incorporate a geomembrane liner and cover consisting of either protective/vegetative soil or a turf system which consists of an engineered turf and sand fill. The remainder of the coal yard would be graded for proper drainage. Vegetation would be established on areas of bare soil on the south side of the former coal yard. Storm water would be routed to a new outfall to the Tennessee River (Kentucky Reservoir), subject to completion of TMSP permitting. Preliminary conceptual closure plans are shown in Appendix B.

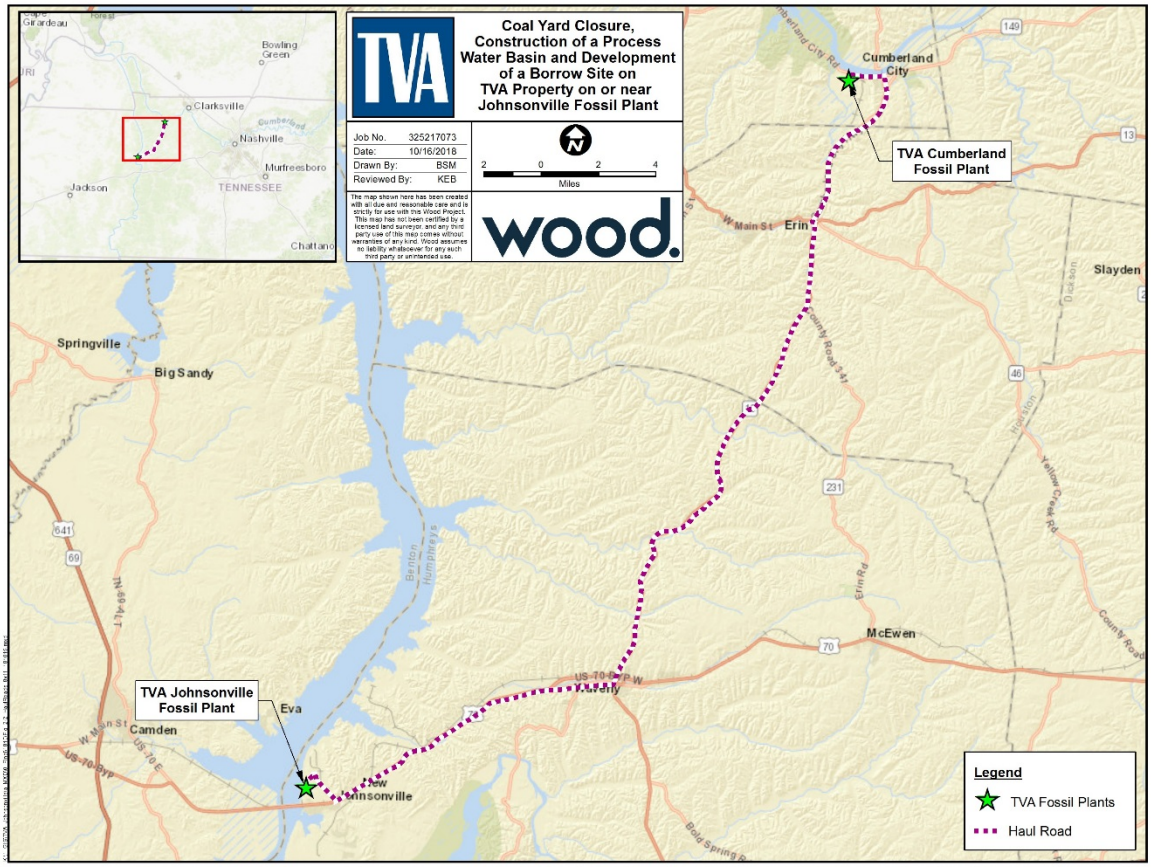

Figure 2-2. Haul Route to the Cumberland Fossil Plant from JOF

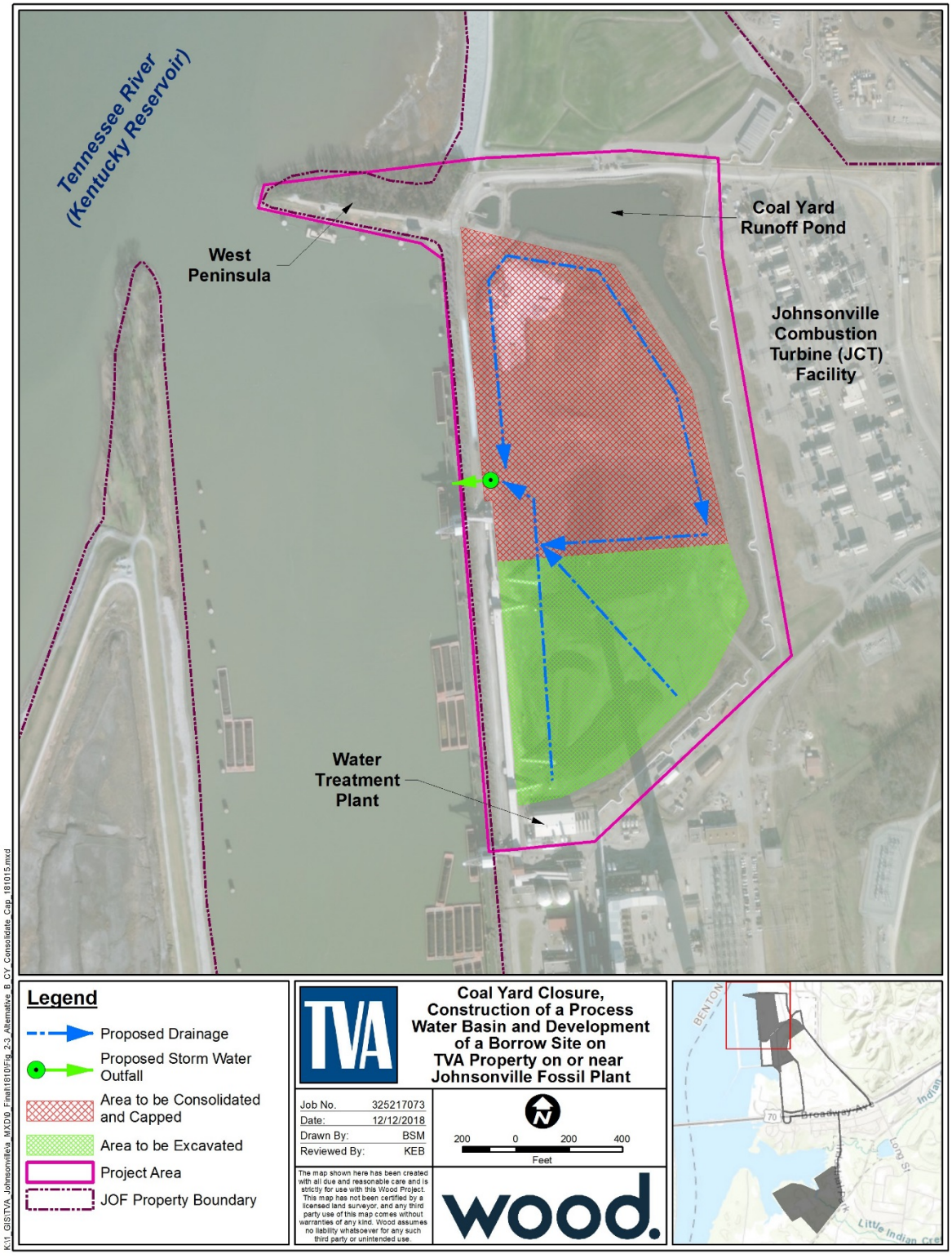

Figure 2-3. Coal Yard Closure Alternative B

2.1.2.2 Coal Yard Runoff Pond Closure

Closure of the coal yard runoff pond would include the following:

- Dewatering of the coal yard runoff pond and perimeter ditch
- Removal of pumps, pipes, platforms, and mechanical equipment
- Excavation of sediment from the bottom of the pond and the perimeter ditch and stockpiling the sediments in the coal yard to be transported to the offsite landfill as described above
- Construction of a storm water outfall structure and discharge pipe to the Tennessee River (Kentucky Reservoir) (Figure 2-4), per the new NPDES permit.
- Placement of a minimum of 6 inches of cover soil and establishing vegetation on areas of bare soil within the coal yard runoff pond

Conceptual closure plans are shown in Appendix B.

2.1.2.3 Process Water Basin Construction

TVA would construct a process water basin to manage non-CCR process water and storm water from the CT plant site and makeup water from the existing wastewater treatment plant. TVA is considering three possible locations for the proposed process water basin as shown on Figure 2-4. Location 1 is within the footprint of the coal yard runoff pond and could be constructed prior to closing both the coal yard runoff pond and the coal yard. Location 2 is on the south side of the coal yard in the area that would be excavated for consolidation. Consequently, if constructed in this location, the process water basin would be constructed after the coal yard is closed, but the coal yard runoff pond could remain in operation during construction of the process water basin. Both potential locations would be contained within the limits of the coal yard project area, and therefore, the environmental impacts would be expected to be similar for both locations.

Location 3 is southeast of the coal yard in the north rail loop project area. The north rail loop project area is previously disturbed. In order to construct the process water basin at this location, TVA would need to remove approximately 10,000 cubic yards of concrete construction debris to an onsite or offsite location to be determined at a later date.

In any location, the process water basin would consist of two basins that would be lined with an approved liner system. The basins will operate both in series and in parallel as needed to support operations. Effluent would reach the process water basin either by gravity drain or pumps and ultimately be discharged through a newly constructed and permitted NPDES outfall to the Tennessee River (Kentucky Reservoir) as shown on Figure 2-4.

Preliminary conceptual plans for each location are included in Appendix B.

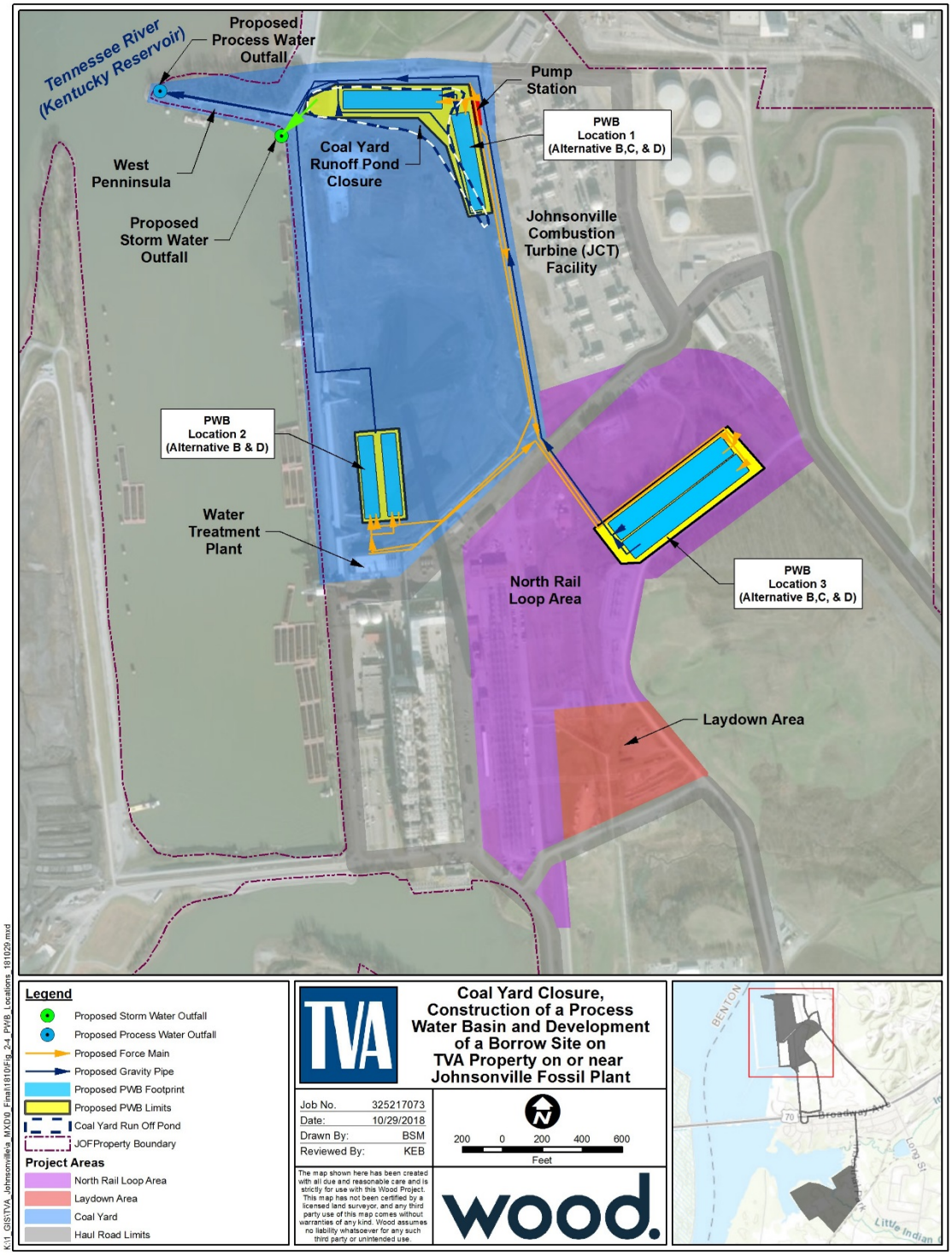

Figure 2-4. Coal Yard Runoff Plan Closure and Construction of the Process Water Basin

2.1.2.4 Borrow Site Development

TVA conducted a study to identify potential borrow sites to support closure activities at JOF (Stantec 2016). This study evaluated potential new borrow sites as well as existing commercial sites. In addition, TVA investigated obtaining borrow material from a commercial landfill located 10 miles from JOF as part of this study.

Eight parcels of land that met the initial size requirements estimated to be needed to provide borrow material to support activities at JOF were identified within a 3-mile radius of JOF. Initially, three sites were identified as most favorable for borrow site development as they were closest to JOF, had sufficient borrow capacity to meet plant needs, and contained TVA transmission line right-of-way that would minimize tree clearing. Additional evaluation indicated that two of these sites were in private ownership and had adverse site conditions including topography and onsite drainage features; hence, they were unsuitable and were dropped from further consideration.

Two offsite commercial properties were also considered by TVA. One of the sites was not available at the time of the study, and the other site did not have sufficient volume of borrow material available. Viability of the use of borrow material from a commercial landfill project was also considered and dismissed due to distance from JOF and uncertainty regarding availability of soil. Therefore, a reliable supply of suitable soil may not be available when needed at JOF.

TVA considered these factors and determined that the development of a borrow area on TVA property was the most viable option. Although this option would result in impacts to the environment as a result of development of the borrow site as identified in the EA, these impacts would be minor. This option would minimize transport distance and use of public roadways, thus decreasing the impacts associated with air emissions, increased traffic and associated safety risks, and disruptions to the public that would be associated with transport of borrow from sources further from JOF. In addition, the use of borrow from TVA-owned property optimizes the use of TVA resources and minimizes cost.

In consideration of the above factors, TVA has identified as the preferred location an approximately 165-acre borrow site on TVA-owned property approximately 1.8 miles south of JOF at the location shown in Figure 1-1. Within the borrow site limits, two sub-areas (Areas B and C) totaling approximately 44 acres would be disturbed (Figure 2-5) and TVA would construct a gravel access road at grade to reach these areas. Preliminary estimates indicate that a sufficient quantity of suitable soil could be obtained from the excavation areas within the borrow site; accordingly, these 44 acres would be analyzed in this EA. TVA has also identified a third excavation area within the limits of the 165-acre borrow site that may be developed for future use. However, development of this third area in the future would be analyzed under a separate NEPA Review.

Soil excavation would involve the use of heavy equipment, including bulldozers, backhoes, excavators, and over-the-road dump trucks. TVA would remove vegetation, including approximately 35 acres of forested lands within the proposed excavation areas. Any marketable timber would be salvaged where feasible; otherwise, woody debris and other vegetation may be disposed onsite through open burning, mulching or sent offsite to an approved solid waste facility for disposal. TVA would adhere to all appropriate state and county regulatory requirements if burning of landscape waste is conducted.

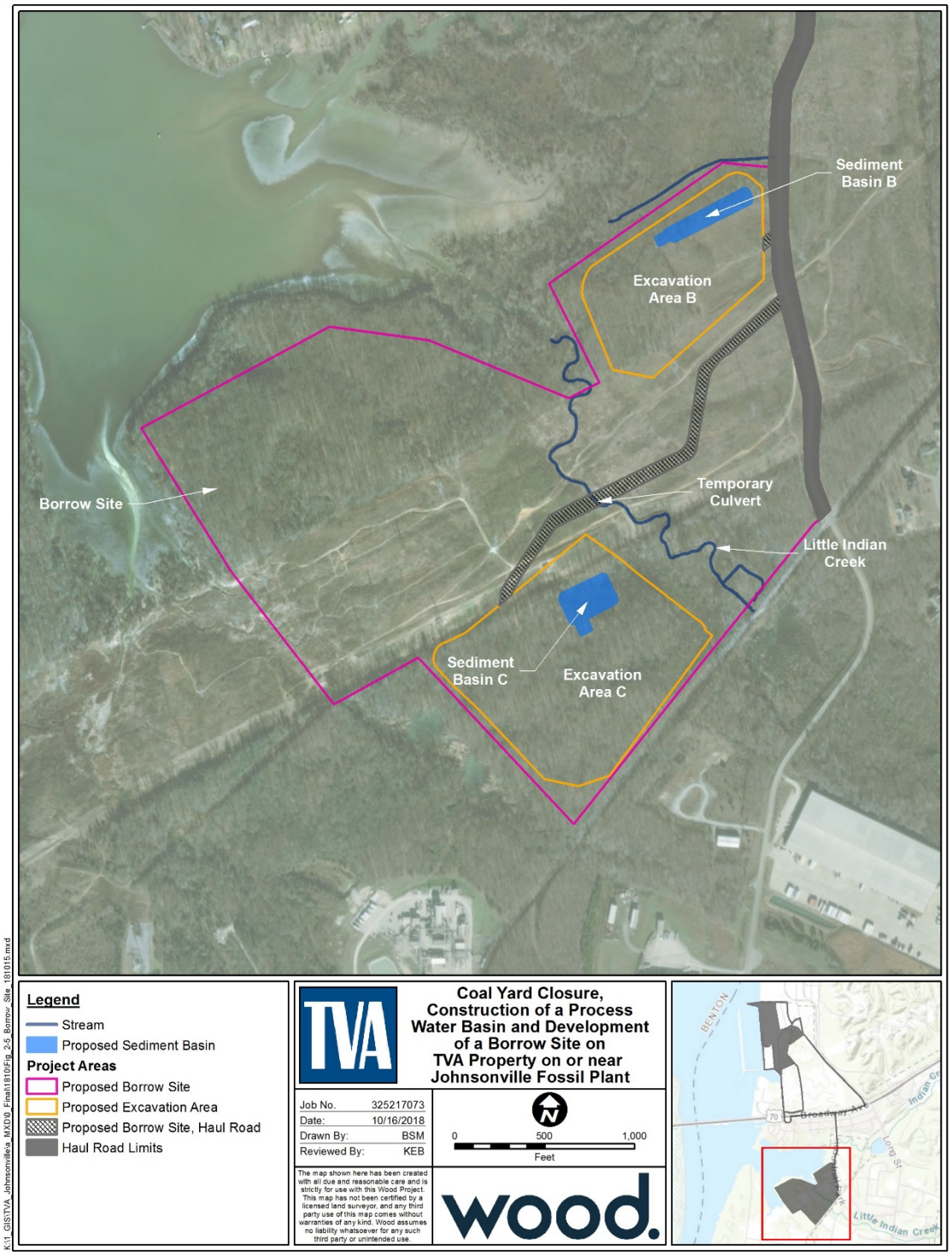

Figure 2-5. Proposed Borrow Site

Borrow material would be excavated and loaded onto dump trucks for transport and placement as needed to support closure activities at JOF. TVA would transport the excavated soil from the borrow site to JOF along existing paved roads (see Figure 1-1). TVA estimates that up to 150 truckloads of borrow per day could be transported to JOF when needed to support closure activities.

Preliminary conceptual grading plans for the borrow site are included in Appendix B. TVA would construct gravel haul roads within the borrow site project limits. One of the haul roads would cross a stream (Little Indian Creek). TVA would place a temporary culverted crossing in Little Indian Creek to convey stream discharge to the Tennessee River while the borrow site is in use. The temporary culvert would be removed, and the stream channel would be restored to its previous condition when borrow material is no longer needed.

Existing storm water flow patterns would be routed around the borrow sites during excavation. Sediment basins would be constructed in each of the excavation areas to prevent sediment deposition into adjacent waterways. Upon cessation of excavation, the borrow site would be graded for proper drainage and vegetated with native, non-invasive plant species. All elements of the borrow excavation would be performed in accordance with established TVA policies and other applicable federal, state, and local guidelines for earthwork activities.

Preliminary conceptual grading plans for the borrow site are included in Appendix B.

2.1.3 Alternative C – Coal Yard Full Cap Closure

Under Alternative C, closure of the coal yard runoff pond, construction of the process water basin, and borrow site development would be the same as described under Alternative B. As with Alternative B, TVA would transport the unburned coal and sediment excavated from the coal yard runoff pond that is stockpiled on the coal yard to the West Camden Sanitary Landfill for disposal. Alternatively, TVA could again elect to implement the turn-key reclamation process to recover the maximum amount of reusable fuel inside the coal yard. However, under Alternative C, TVA proposes to cap the coal yard in its current footprint with a protective/vegetative soil layer or a turf system which consists of an engineered turf and sand fill. The area would be graded for proper drainage. Storm water would be routed to a new outfall to the Tennessee River (Kentucky Reservoir), subject to completion of TMSP permitting. The closure system would meet all applicable state and federal requirements. Although the coal yard is not regulated by the federal CCR Rule, TVA would design and construct the cover system to meet the criteria identified in 40 CFR § 257.102(d)(3) as described above. Figure 2-6 shows the site drainage routing, cap limits, and the proposed storm water outfall proposed for Alternative C.

Because the full extent of the coal yard would be capped under this alternative, TVA determined that the process water basin would be constructed in Location 1 (within the footprint of the coal yard runoff pond) or Location 3 (north rail loop project area).

A preliminary conceptual closure plan is included in Appendix B.

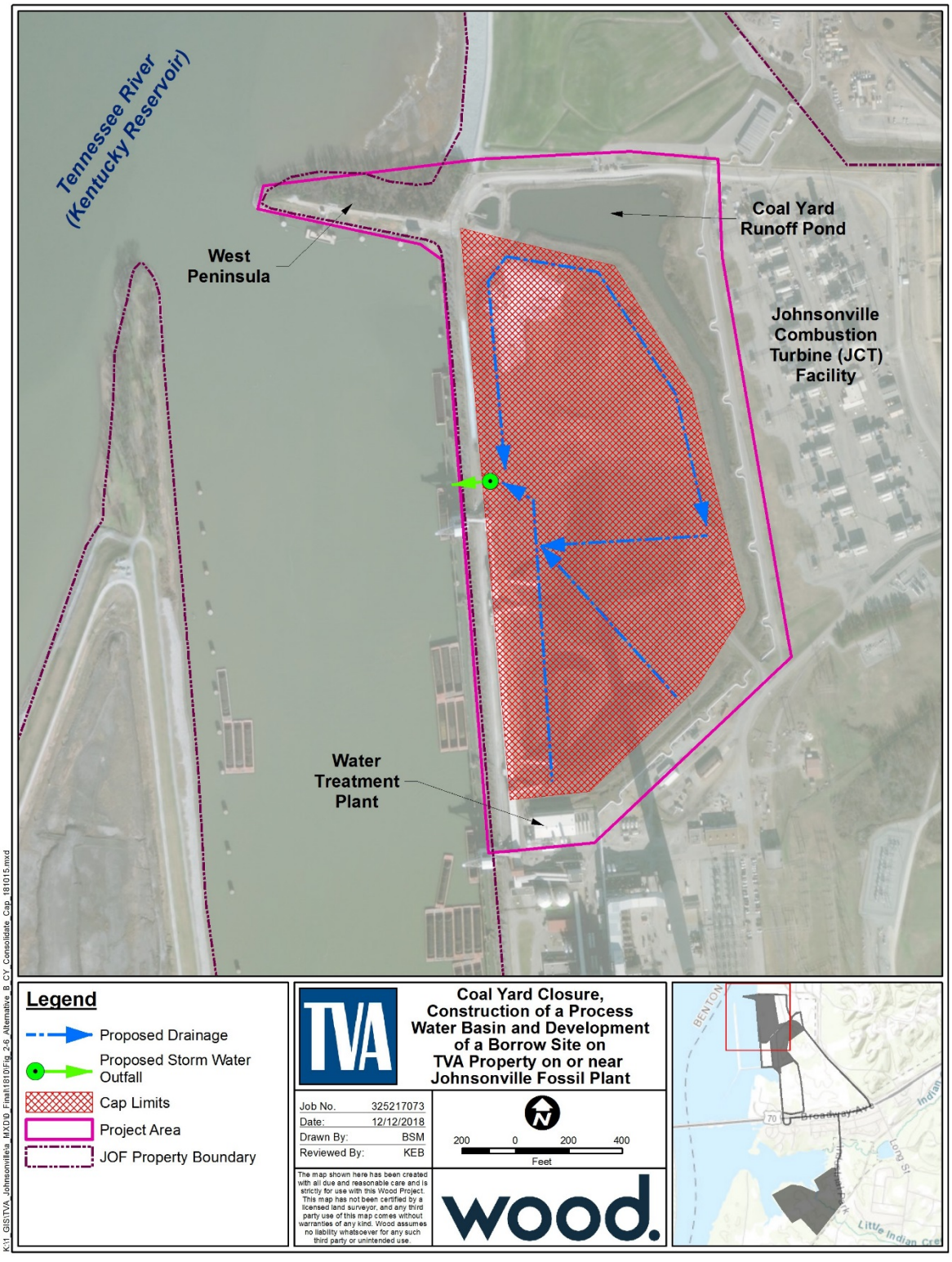

Figure 2-6. Coal Yard Closure – Alternative C

2.1.4 Alternative D – Coal Yard Remove Material and Close

Under Alternative D, removal of the unburned coal and sediment excavated from the coal yard runoff pond that is stockpiled on the coal yard, closure of the coal yard runoff pond, and borrow site activities would be the same as described under Alternatives B and C. Similar to Alternative B, under this alternative the process water basin could be constructed in Location 1 or 2 (within the footprint of the coal yard runoff pond or the footprint of the coal yard) or in Location 3 (the north rail loop).

Under this alternative, however, closure of the coal yard would include the excavation of all coal remnants and underlying CCR including bottom ash/spent-bed material fill within the extent of the current footprint (Figure 2-7). Upon removal of the coal yard material, the site would be graded for proper drainage and reseeded with native non-invasive plant species on areas of bare soil. Storm water would be routed to a new outfall to the Tennessee River (Kentucky Reservoir). Figure 2-7 shows the area to be excavated and reclaimed, the proposed drainage routes and proposed storm water outfall.

TVA estimates that in addition to the removal of the stockpile of unburned coal and sediment excavated from the coal yard runoff pond as described above, under Alternative D approximately 600,000 yd^3 of material from the coal yard would be excavated and transported to the West Camden Sanitary Landfill using over-the-road dump trucks (capacity of 15 yd^3). TVA conservatively estimates this quantity could vary by as much as an additional 15 percent. Based on the estimate of the volume of coal remnants and underlying CCR including bottom ash/spent-bed material fill that would be excavated from the coal yard, closure would require approximately 90 roundtrip truckloads (180 truck trips) per day, five days a week, for a period of roughly 23 months (2 years).

A preliminary conceptual closure plan is included in Appendix B.

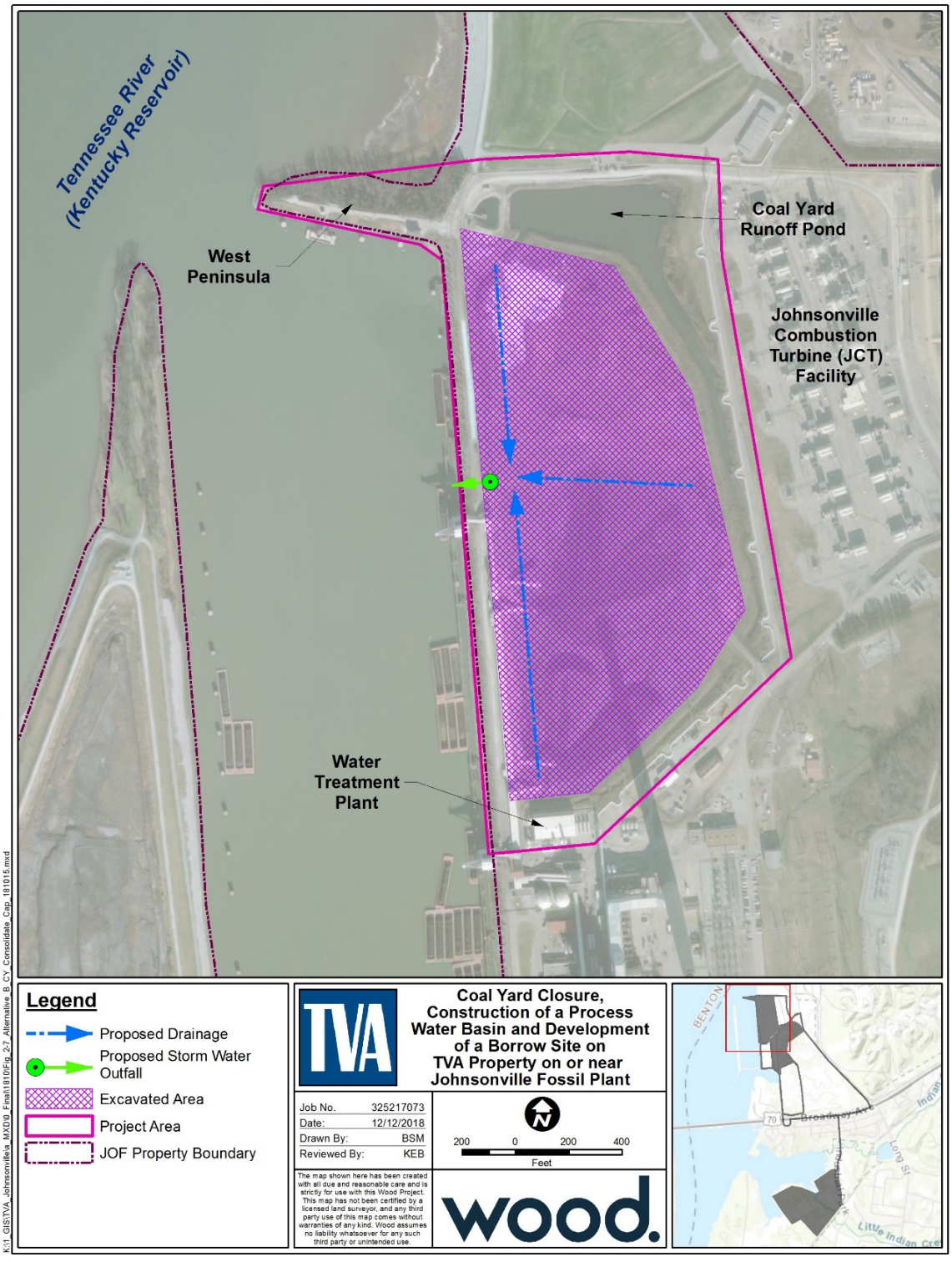

Figure 2-7. Coal Yard Closure – Alternative D

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

Table 2-1. Primary Characteristics of the Proposed Actions

Project Feature	Characteristic	Value
Coal Yard Project Area	Project Area for the coal yard, coal yard runoff pond and west peninsula	63.9 acres
North Rail Loop Project Area	Project Area	47.8 acres
Borrow Site Area	Project Area	164.6 acres
	Limit of Disturbance – Excavation Area B	16.0 acres
	Limit of Disturbance – Excavation Area C	27.8 acres
Laydown Area	Project Area	7.7 acres
Little Indian Creek crossing	Crossing Type	Temporary culvert
Construction equipment	Bulldozers, excavators, over-the-road dump trucks (diesel engines), tub grinders, pickup trucks (gasoline engines), skid loaders, forklifts, compactor, rollers	
Use of existing roads to transport borrow to the plant	Over-the-road dump trucks transporting up to 150 truckloads per day.	Up to 300 truck trips per day when borrow is needed.
Use of existing roads to transport unburned coal and sediment excavated from the coal yard runoff pond that is stockpiled on the coal yard to the West Camden Sanitary Landfill	Over-the-road dump trucks transporting up to 90 truckloads per day.	180 truck trips per day for approximately 2.3 months
Use of existing roads to transport reusable fuel obtained from the reclamation process to CUF and remaining material to the West Camden Sanitary Landfill	Over-the-road dump trucks transporting up to 45 truckloads per day to CUF and 90 truckloads per day to the permitted landfill.	90 truck trips per day to CUF for up to 4.5 months 180 truck trips per day to the landfill for up to 15 days
Transport of CCR under the coal yard (Alternative D) to the West Camden Sanitary Landfill	Over-the-road dump trucks transporting up to 90 truckloads per day.	180 truck trips per day for approximately 2 years

2.2 Comparison of Alternatives

The environmental impacts of each of the alternatives under consideration 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

Resource	Alternative A No Action	Alternative B Coal Yard Material Consolidation and Cap Closure	Alternative C Coal Yard Full Cap Closure	Alternative D Coal Yard Remove Material and Close
Air Quality	No impact.	Temporary minor impacts from fugitive dust and emissions from equipment and vehicles during construction and reclamation activities and transport of borrow material and coal stockpiled on the coal yard on public roadways. The reclamation process could result in fugitive dust emissions that could trigger added permitting requirements and modification to the site's Title V Air Permit.	Similar to Alternative B.	Minor impact yet incrementally greater than Alternatives B and C due to increased emissions associated with transport of material excavated from the coal yard to the landfill.
Climate Change and Greenhouse Gases	No impact.	Increased CO_2 emissions associated with construction and trucking operations and loss of sequestered carbon related to loss of forested land would not increase regional greenhouse gas levels and therefore would not contribute to regional climate change.	Same as Alternative B.	Similar to Alternatives B and C, but magnitude of impact would be incrementally greater due to increased CO_2 emissions associated with transport of material excavated from the coal yard to the landfill. However, no impact to regional climate change.
Geology and Soils	No impact.	Minor temporary increase in soil erosion, minimized with BMPs. Impacts to soil resources associated proposed borrow site excavation would be localized and not noticeable within the context of the project vicinity and are therefore expected to be minor.	Same as Alternative B.	Same as Alternative B.
Groundwater	No impact.	Minor temporary impacts during construction. Long-term beneficial impacts associated with closure of the coal	Same as Alternative B.	Similar to Alternative B, however long-term beneficial impact greater due to removal of all CCR including bottom ash/spent bed material from the coal yard.

Resource	Alternative A No Action	Alternative B Coal Yard Material Consolidation and Cap Closure	Alternative C Coal Yard Full Cap Closure	Alternative D Coal Yard Remove Material and Close
		yard due to reduced risk of migration of constituents to groundwater in comparison to the No Action Alternative.		
Surface Water	No impact.	Minor beneficial impacts associated with closure of the coal yard and coal yard runoff pond due to reduced loadings discharged to the Tennessee River (Kentucky Reservoir). Minor adverse impact due to storm water runoff from development and operation of the borrow site.	Same as Alternative B.	Similar to Alternative B, however long-term beneficial impact greater due to removal of material from the coal yard which minimizes impacts from groundwater to surface water discharges.
Floodplains	No impact.	Negligible impact due to borrow area construction activities. Impact minimized with the use of mitigation measures to minimize the amount of fill within the floodplain.	Same as Alternative B.	Same as Alternative B and C.
Vegetation	No impact.	Minor and adverse impact in the short-term for the coal yard project area and laydown yard, but minor, long-term benefits to the land cover of JOF. Long term, minor adverse impacts due to loss of forested land cover of borrow site and north rail loop.	Same as Alternative B.	Same as Alternatives B and C. Increased naturalized habitat within the coal yard would offer improved long-term benefits to the land cover of JOF compared to Alternatives B and C.
Wildlife	No impact.	Minor impact related to removal of wildlife habitat on the borrow site and north rail loop.	Same as Alternative B.	Similar to Alternatives B and C, however naturalized habitat within the coal yard would offer improved quality as compared to Alternatives B and C.

Resource	Alternative A No Action	Alternative B Coal Yard Material Consolidation and Cap Closure	Alternative C Coal Yard Full Cap Closure	Alternative D Coal Yard Remove Material and Close
Aquatic Ecology	No impact.	Minor temporary impacts during construction activities at the borrow site.	Same as Alternative B.	Same as Alternatives B and C.
Threatened and Endangered Species	No effect on threatened or endangered species.	Minor impact due to the loss of potentially suitable summer roosting bat habitat within borrow site and rail loop areas.	Same as Alternative B.	Same as Alternatives B and C.
Wetlands	No impact.	Minor impact from loss of 0.48 acre of wetlands in the north rail loop area if determined to be jurisdictional under Section 404 of the Clean Water Act. Minor indirect impacts to wetlands located in the borrow site and west peninsula.	Same as Alternative B.	Same as Alternatives B and C.
Land Use	No impact.	Minor impact resulting from the temporary conversion of approximately 44 acres of undeveloped land in the borrow site to industrial use.	Same as Alternative B.	Same as Alternatives B and C.
Prime Farmland	No impact.	Minor impact related to loss of prime farmland soils mapped in the project areas relative to the amount of land designated as prime farmland in the vicinity.	Same as Alternative B.	Same as Alternatives B and C.
Visual Resources	No impact.	Minor impact associated with alteration of local viewshed of the borrow site.	Same as Alternative B.	Same as Alternatives B and C.
Cultural and Historic Resources	No impact.	No impact.	No impact.	No impact.
Natural Areas	No impact.	Temporary minor indirect impact to natural areas located along the route to CUF and the West	Same as Alternative B.	Similar to Alternative B, but the impact would be incrementally greater due to the increased

Resource	Alternative A No Action	Alternative B Coal Yard Material Consolidation and Cap Closure	Alternative C Coal Yard Full Cap Closure	Alternative D Coal Yard Remove Material and Close
		Camden Sanitary Landfill due to transport of unburned coal and sediment excavated from the coal yard runoff pond stockpiled on the coal yard.		duration of transport of coal and bottom ash/spent bed material excavated from the coal yard.
Parks and Recreation	No impact.	Temporary minor indirect impact to parks and recreation areas along the transport route to CUF and the West Camden Sanitary Landfill due to transport of unburned coal and sediment excavated from the coal yard runoff pond stockpiled on the coal yard.	Same as Alternative B	Similar to Alternative B, but the impact would be incrementally greater due to the increased duration of transport of material excavated from the coal yard.
Transportation	No impact.	No impact to levels of service on public roads related to transport of borrow material and offsite transport of the unburned coal and sediment excavated from the coal yard runoff pond stockpiled on the coal yard. Minor impacts on public roads related to increased traffic and potential increase in crash rates associated with transport of material stockpiled on the coal yard and transport of borrow material to JOF.	Same as Alternative B	Similar to Alternative B. However, due to the increased duration of transport associated with closure of the coal yard impacts to traffic operations would be minor, yet incrementally greater than Alternatives B and C. The potential for truck-related crashes associated additional vehicle miles travelled to transport excavated coal yard material to the landfill would be temporary and minor, yet incrementally greater than Alternatives B and C.
Noise	No impact.	Minor impact related to construction and operation of the borrow site. No impact associated with closure of the coal yard, coal yard runoff pond or construction and operation of the process water	Same as Alternative B.	Same as Alternatives B and C.

Resource	Alternative A No Action	Alternative B Coal Yard Material Consolidation and Cap Closure	Alternative C Coal Yard Full Cap Closure	Alternative D Coal Yard Remove Material and Close
		basin as there are no sensitive noise receptors present.		
Solid and Hazardous Waste	No impact.	Minor impact related to generation of waste during construction activities. Negligible effect on the loss in capacity of the West Camden Sanitary Landfill.	Same as Alternative B.	Similar to Alternatives B and C. However, impact on the capacity of the West Camden Sanitary Landfill would be incrementally greater.
Environmental Justice	No impact.	No impact.	No impact.	No impact.
Cumulative Effects	No impact.	Minor impact to terrestrial ecosystems.	Same as Alternative B.	Same as Alternatives B and C.

2.3 TVA's Preferred Alternative

TVA has identified Alternative B – Coal Yard Consolidation and Cap Closure as the preferred alternative. Under this alternative TVA would close the coal yard and coal yard runoff pond, construct a process water basin, and develop a borrow site on TVA-owned property located 1.8 miles south of JOF. TVA has also identified the north rail loop (Location 3) as the preferred location for the construction of the process water basin. Prior to closure of the coal yard under any alternative, TVA would remove the unburned coal and sediment from the coal yard runoff pond that is stockpiled on the coal yard. This material would be transported to the nearest landfill that can accept this material and has the capacity to do so, which TVA has determined at this time is the West Camden Sanitary Landfill. TVA could also decide to implement a turn-key reclamation process to recover the maximum amount of reusable fuel remaining in the coal stockpile. Under this reclamation option, the useable fuel obtained by this process (estimated to be 70-90 percent of the stockpiled coal) would be delivered to TVA's CUF for use. The remaining material would be transported to the West Camden Sanitary Landfill. Under either scenario, TVA estimates that removal of the unburned coal and sediment stockpiled on the coal yard would be completed within approximately 3 months. Following removal of the coal stockpile, approximately 5 feet of coal yard remnants, CCR including bottom ash and spent-bed material fill, and soil from the south side of the coal yard would be excavated and consolidated into the north side of the coal yard. The north/consolidated side of the coal yard would then be closed using a cover system that meets the criteria identified in 40 CFR § 257.102(d)(3) and incorporates a geomembrane liner and cover consisting of either protective/vegetative soil or a turf system which consists of an engineered turf and sand fill. The closure system would comply with applicable TDEC regulations. The remainder of the coal yard would be graded for proper drainage. Vegetation would be established on areas of bare soil on the south side of the former coal yard. Storm water would be routed to a new outfall to the Tennessee River (Kentucky Reservoir), subject to completion of the TMSP permitting.

Implementation of any of the alternatives would result in minimal impacts to the environment. However, Alternative B is preferred because it would achieve the purpose and need of the project and avoids the additional offsite transport of CCR and spent bed materials excavated from the coal yard along public roads which is part of Alternative D. This eliminates the additional impacts associated with air emissions, increased traffic with its associated long-term safety risks and disruptions to the public that would be associated with such offsite transport. In addition, closure of the coal yard under Alternative B could be accomplished sooner, at a lower cost, and offers greater flexibility for future use of a portion of the coal yard than Alternative C.

2.4 Summary of Mitigation Measures and BMPs

TVA has identified the following BMPs that would be used to minimize impacts and restore areas disturbed during construction:

- TVA would use applicable BMPs as described in the project-specific SWPPP.
- Fugitive dust emissions from site preparation and construction would be controlled by wet suppression and BMPs (Clean Air Act Title V operating permit incorporates fugitive dust management conditions).

- Consistent with EO 13112, as amended by EO 13751, disturbed areas would be revegetated with native or nonnative, non-invasive plant species to avoid the introduction or spread of invasive species.

Mitigation measures designed to avoid, minimize, or compensate for adverse impacts associated with the proposed activities include:

- TVA would comply with the terms and conditions of any applicable TDEC Aquatic Resources Alteration Permit and U.S. Army Corps of Engineers (USACE) 404 permits, including any compensatory mitigation credits, if required, prior to the start of clearing and construction.
- Unavoidable impacts to potential suitable summer roosting habitat for the northern long-eared bat and Indiana bat would be addressed using TVA's programmatic biological assessment on routine actions and federally listed bats in accordance with the Endangered Species Act Section 7(a)(2) (TVA 2017). Specific conservation measures would be implemented to minimize effects, including tree removal of potentially suitable summer roosting habitat in winter months (between November 15 and March 31) where feasible. However, if tree removal must occur between April 1 and November 14, a bat habitat assessment would be performed. TVA would track and document removal of potentially suitable summer roost trees and include in annual reporting in accordance with Section 7(a)(2) consultation. For those activities with potential to affect bats, TVA would commit to implementing specific conservation measures to ensure that direct and indirect impacts to federally-listed bat species would be minor.
- Osprey nests are present on lighting structures around the coal yard project area. Birds nesting around the coal yard project area are acclimated to frequent, loud disturbances caused by the operation of JOF and the JCT. No activities would occur that may cause additional disturbance beyond what these ospreys are accustomed to while the nests are occupied and active (typically March-July).
- The temporary culvert in Little Indian Creek would be designed in accordance with BMPs and design requirements appropriate for the site, Little Indian Creek, and construction access roads.
- The minimum amount of fill or riprap necessary to stabilize the outfall structures would be used.
- The temporary culvert in Little Indian Creek would be removed once borrow site use is complete and the stream channel would be restored to its previous condition.
- Upon cessation of excavation, the borrow site would be graded for proper drainage and vegetated with native, non-invasive plant species.

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CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Air Quality

3.1.1 Affected Environment

3.1.1.1 Regulatory Framework for Air Quality

Through passage of the Clean Air Act, Congress mandated the protection and enhancement of our nation's air quality resources and requires the EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment (EPA 2018b). The following criteria pollutants have been set to protect the public health and welfare:

- Sulfur dioxide (SO_2)
- Ozone
- Nitrogen dioxide (NO_2)
- Particulate matter (PM) with particle sizes less than or equal to 10 micrometers (PM_{10})
- Particulate matter with particle sizes less than or equal to 2.5 micrometers ($PM_{2.5}$)
- Carbon monoxide (CO)
- Lead (Pb)

The primary NAAQS were promulgated to protect public health, and the secondary NAAQS were promulgated to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air (EPA 2018b).

In accordance with the Clean Air Act Amendments of 1990, all counties are designated with respect to compliance, or degree of noncompliance, with the NAAQS. These designations are either attainment, nonattainment, or unclassifiable. An area with air quality better than the NAAQS is designated as "attainment;" whereas an area with air quality worse than the NAAQS is designated as "non-attainment." Non-attainment areas are further classified as extreme, severe, serious, moderate, or marginal. An area may be designated as unclassifiable when there is a lack of data to form a basis of attainment status. New or expanded emissions sources located in areas designated as nonattainment for a pollutant are subject to more stringent air permitting requirements (EPA 2018b).

Humphreys County is in attainment with applicable NAAQS (EPA 2018c) and Tennessee ambient air quality standards referenced in the Tennessee Air Pollution Control Regulations Chapter 1200-3-3.

The proposed construction activities would be subject to both federal and state (Tennessee Division of Air Pollution Control) regulations. These regulations impose permitting requirements and specific standards for expected air emissions.

3.1.2 Environmental Consequences

3.1.2.1 Alternative A – No Action Alternative

Under this alternative, the closure of the coal yard and coal yard runoff pond, construction of the process water basin, and the development of the borrow site would not occur. There would be no change in current conditions, and therefore no impact.

3.1.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

3.1.2.2.1 Construction Impacts

Construction activities associated with closure of the coal yard (which includes reclamation of usable fuel stockpiled on the coal yard), closure of the coal yard runoff pond, construction of the process water basin and development of the borrow site all require the use of earthmoving and compacting equipment as well as trucks for hauling materials. Construction-related air quality impacts would be related primarily to generation of fugitive dust and emissions from handling of the coal stockpile and use of fossil-fueled powered vehicles and construction equipment.

Fugitive dust produced from construction activities would be temporary and controlled by BMPs (e.g., wet suppression) as stated in the TVA's fugitive dust control plans required under existing Clean Air Act Title V operating permits.

Combustion of gasoline and diesel fuels by internal combustion engines (vehicles, generators, construction equipment, etc.) would generate local emissions of CO, CO_2, ozone, nitrogen oxides (NO_x), PM, SO_2, and volatile organic compounds during construction activities. However, new emission control technologies and fuel mixtures have significantly reduced vehicle and equipment emissions. Additionally, it is expected that all vehicles and equipment would be properly maintained, which also would reduce emissions. Types of construction equipment expected to be required for the proposed activities are provided in Table 2-1. Emissions from internal combustion engines during construction and operation would result in minor short-term local effects on air quality due to the relatively low number of vehicles, adherence to equipment maintenance requirements, and continued improvement of emission control measures and fuel blends.

The transport of approximately 24,000 yd^3 of unburned coal and 40,000 yd^3 of sediment stockpiled on the coal yard to the landfill would entail the use of approximately 90 roundtrip truckloads of material (180 truck trips) per day. The stockpiled material would be transported approximately 12 miles (24 miles round trip for each vehicle) to the landfill along existing roadways shown on Figure 2-1, for a period of approximately 2.3 months. The total amount of air emissions associated with this vehicular traffic would be minor in comparison to traffic in the region and would not adversely affect local air quality.

Alternatively, TVA could implement the reclamation process described in Chapter 2 to recover the maximum amount of reusable fuel remaining in the coal stockpile. The reclamation process could result in fugitive dust emissions that could trigger added permitting requirements and modification to the site's Title V Air Permit. TVA would adhere to all terms and conditions of the permit including implementation of BMPs, such as dust suppression. Therefore, impacts to air quality during the reclamation process would be minor and temporary. The transport of usable fuel to CUF would entail the use of 45 roundtrip truckloads per day (90 truck trips), depending on the amount of material that would be reclaimed (estimated to be 70 to 90 percent of the stockpiled material). The usable coal would be transported 39 miles (78 miles round trip for each vehicle) to CUF

along existing roadways shown on Figure 2-2, for a period of up to 4.5 months. The remaining material (estimated to range from 10 to 30 percent of the stockpiled material) would be transported approximately 24 miles round trip to the West Camden Sanitary Landfill along the haul route shown on Figure 2-1, for a period of up to 15 days. Although the additional miles travelled under this option would be higher than the option to transport all the stockpiled coal to the landfill for disposal, it would also be minor in comparison to traffic in the region and would not adversely affect local air quality.

Air quality impacts would be dependent upon both man-made factors (e.g., intensity of activity, control measures, vehicle maintenance) and natural factors (e.g., wind speed, wind direction, soil moisture). However, even under unusually adverse conditions, these emissions would have, at most, a minor transient impact on onsite and offsite air quality and would be well below the applicable ambient air quality standard. Consequently, construction-related air emissions would result in minor, short-term, local effects on air quality due to the temporary nature of the reclamation process, relatively low number of vehicles that would be used, adherence to equipment maintenance requirements and use of applicable emission control measures (such as dust suppression).

3.1.2.2.2 Operational Impacts

Once construction is completed, there would be no air emissions associated with the closed coal yard or coal yard runoff pond as they would cease active operations. Operation of the process water basin is expected to generate only insignificant and intermittent amounts of fugitive dust and vehicle emissions that would occur during routine operations and maintenance.

Operation of the borrow site and hauling of material to support JOF construction activities would generate fugitive dust and emissions from vehicle and earthmoving equipment. Fugitive dust from the transport of borrow material to JOF on paved public roads would be minimized as needed. Equipment movement on unpaved portions of the access road within the borrow site would produce fugitive dust that could affect particulate levels. Emissions from equipment that use diesel or gas as fuel may include particulates, CO, CO_2, NO_x, ozone, SO_2 and VOCs. All TVA power plants have fugitive dust control plans as required under existing Title V permits. In addition, all vehicles would be properly maintained which would also reduce emissions. The operation of the borrow site is estimated to last up to five years, and the generation of dust and exhaust emissions from the site would only occur when borrow material is needed at JOF.

Therefore, the generation of dust and exhaust emissions during operation of the borrow site would result in minor, temporary, intermittent, and localized effects on air quality that would be well below the applicable ambient air quality standard.

3.1.2.3 Alternative C – Coal Yard Full Cap Closure

Impacts to air quality under Alternative C would be similar to those identified for Alternative B. TVA estimates that less borrow may be needed for full cap closure which would translate into fewer truck trips to and from the borrow site. However, there would be a greater number of trucks used for grading to support the full cap closure. Therefore, overall the impact to air quality would be similar.

3.1.2.4 Alternative D – Remove Coal Yard Material and Close

Impacts to air quality associated with removal of the coal and sediment stockpiled on the coal yard, closure of the coal yard runoff pond, construction and operation of the process

water basin and borrow site would be the same as Alternatives B and C, except coal yard closure under Alternative D would include the excavation and transport of coal yard remnants and bottom ash/spent-bed material fill from the coal yard to the West Camden Sanitary Landfill for disposal. Over-the-road dump trucks would be used to haul this material between the coal yard and the landfill along the haul route identified on Figure 2-1.

Transport of ash material excavated from the coal yard would require 90 roundtrip truckloads (180 truck trips) per day. Transport would occur daily (during a typical five-day work week) over a period of approximately 2 years. This would be in addition to emissions from truck transport of material stockpiled on the coal yard as described for Alternatives B and C. It is anticipated that all trucks used would be maintained in good working condition with current emission control technologies to minimize air quality impacts. The increase in vehicular traffic under this alternative would be incrementally greater than under Alternatives B and C which would only transport the material stockpiled on the coal yard. However, local and regional impacts on air quality associated with this increase in vehicular traffic would be minor in comparison to existing traffic in the region.

Impacts to air quality for operations under Alternative D would be the same as identified for Alternative B.

3.2 Climate Change and Greenhouse Gases

"Climate change" refers to any substantive change in long-term (decades or longer) measures of climate, such as temperature, precipitation, or wind patterns (EPA 2016). 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 gases (GHG) (e.g., CO_2, methane). By the end of this century, the 2014 National Climate Assessment concluded a 3°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).

Although there are many GHGs that contribute to climate change, CO_2 is the primary GHG emitted through human activities. Activities associated with the proposed action that produce CO_2 are primarily related to emissions from fossil-fuel-powered equipment (e.g., bulldozers, loaders, haulers, trucks, generators) used during the proposed activities, as plant emission have ceased and would not resume under any alternatives.

Forested areas that absorb and store CO_2 from the atmosphere through a process known as carbon sequestration help to reduce levels of CO_2 in the atmosphere. Approximately 35 acres of forested land are present within the proposed borrow site excavation areas; approximately 6.6 acres of forested land are located within the north rail loop project area. Although approximately 1.6 acres of forested land are present in the portion of the coal yard project area known as the west peninsula, those trees would not be disturbed by construction of the pipe to the proposed outfall. There is no forested land within the laydown area.

3.2.1 Environmental Consequences

3.2.1.1 Alternative A – No Action Alternative

Under this alternative, closure activities and construction of the process water basin and borrow site would not occur. There would be no change in existing conditions and therefore no impact to regional GHG levels or climate change.

3.2.1.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

GHG emissions, primarily CO_2, would occur from exhaust emission of fossil-fueled vehicles and construction equipment and the transport of the stockpile of unburned coal and sediment excavated from the coal yard runoff pond that is stockpiled on the coal yard to the West Camden Sanitary Landfill or under the turn-key reclamation process to CUF and the landfill. Due to the short-term duration of the construction activities, and the number of vehicles and construction equipment involved, it is anticipated that only a minor, temporary increase in CO_2 emissions would result from these activities. Such emission levels are de minimis in comparison to the regional and world-wide volumes of CO_2. Therefore, local and regional GHG levels would not be adversely impacted by emissions from these construction activities.

The EPA (2018a) has developed conversion factors to estimate the carbon sequestration that may be lost from the conversion of forested land. Assuming that a total of approximately 42 acres of forested areas (the land cover with the greatest potential carbon sink) are completely cleared from the borrow site and the north rail loop project areas and forest composition and age is typical for the region (Tennessee), the conversion of these forested lands would result in the loss of carbon stock equivalent to 44.1 metric tons of carbon sequestered (or stored) in one year. The loss of carbon sequestered is very small relative to the local and regional carbon sequestered in forested areas. Overall, forest carbon sequestration in the region has increased due to net increases in forest areas (e.g., conversion of farmland to forested areas), improved forest management, as well as higher vegetation growth productivity rates and longer growing seasons. Within a 5-mile radius of JOF, it is estimated that existing forested lands sequester approximately 30,366 metric tons of carbon per year. Therefore, no impact on climate change is anticipated.

3.2.1.2.1 Operation Impacts

Operation of the process water basin in any of the proposed locations is expected to only generate insignificant and intermitted amounts of vehicle emissions that would occur during routine operations.

Operation of the borrow site and hauling of material to support JOF construction activities would result in emissions of GHGs. However, due to the short transport distance (3.6 miles round trip) and intermittent nature of borrow transport, operation of the borrow site would produce a minor, short-term increase in CO_2 emissions, but would not increase regional GHG levels or impact climate change.

3.2.1.3 Alternative C – Coal Yard Full Cap Closure

GHG impacts from emissions related to closure activities and the operation of the process water basin and borrow site are expected to the same as Alternative B. Therefore, no impact on climate change is anticipated under this alternative.

3.2.1.4 Alternative D - Remove Coal Yard Material and Close

3.2.1.4.1 Construction Impacts

Climate change impacts under Alternative D are expected to be similar to Alternatives B and C. However, in contrast to Alternatives B and C, in addition to the removal of unburned coal and sediment from the coal yard runoff pond that is stockpiled on the coal yard, coal remnants and CCR, including bottom ash/spent-bed material fill within the extent of the current footprint of the coal yard, would be excavated and removed to an offsite landfill. After all material has been removed, the site would be graded and revegetated.

As discussed in the Section 3.1, over-the-road dump trucks would be used to haul the material excavated from the coal yard to the landfill along the route shown on Figure 2-1. It is estimated that 90 truckloads would be needed to transport this material to the landfill daily and would result in a traffic count of 180 trips per day to cover both the delivery and return trips.

Given the additional trucks needed to transport material excavated from the coal yard, the CO_2 emissions would be greater under Alternative D than those described under Alternatives B and C. However, overall, CO_2 emissions associated with Alternative D still would be minor and are not anticipated to result in increases in regional GHG levels or impact climate change.

3.3 Geology and Soils

3.3.1 Affected Environment

3.3.1.1 Site Geology

JOF is located along the eastern bank of the Tennessee River within the Western Valley physiographic province (Hardeman et al. 1966). The site is underlain by alluvium and terrace deposits varying in thickness from less than 20 feet along the tributary stream banks to more than 100 feet within the floodplain of the Tennessee River. These deposits consist of sand, silt, clay and gravel. Underlying bedrock consists of the Lower Mississippian age Fort Payne Formation and Devonian age Chattanooga Shale and Camden Formations. The Fort Payne Formation in this area consists of bedded chert with calcareous and dolomitic silicastone. The Chattanooga Shale in this area consists of black calcareous shale with a thickness averaging 20 feet. The Camden Formation is the principal aquifer in the region and consists of light gray cherty clay and siliceous limestone (Hardeman 1966).

3.3.1.2 Geologic Hazards

3.3.1.2.1 Karst Topography

“Karst” refers to a type of topography that is formed when rocks with a high carbonate content, such as limestone and dolomite, are dissolved by groundwater to form sink holes, caves, springs and underground drainage systems. Karst topography forms in areas where limestone and dolomite are near the surface. Karst features are typical in carbonate rock, and sinkhole activity is a potential concern at the JOF. However, karst features are not mapped within the footprint of the proposed project areas (U.S. Geological Survey [USGS] 1987), and no karst features were noted within the proposed project areas during onsite surveys. In addition, no karst features were indicated in any of the borings within the proposed borrow site (Stantec 2016).

3.3.1.2.2 Seismic Events

The USGS information and geologic studies carried out by TVA indicate that the proposed site and surrounding area may be subject to minor seismic events. Seismic events affecting western Tennessee, and thus the JOF site, are associated with the New Madrid Seismic Zone of the central Mississippi Valley. Although most of the events emanating from these zones are too small to be felt at the surface, the New Madrid Seismic Zone produced a series of four earthquakes between December 1811 and early February 1812 each exhibiting estimated magnitudes on the order of 7.0 to 8.0 (Stantec 2009).

The USGS National Seismic Hazard Maps display earthquake ground motions for various probability levels across the United States and according to these maps, JOF is in an area where the expected Peak Ground Acceleration is 0.2 to 0.3 g (fraction of standard gravity) and is identified as being within the influence of the New Madrid Seismic Zone (TVA 2016). For sites that lie within zones that exceed 0.1 g, or for which adjusted values based on site conditions exceed 0.1 g, additional analysis is required to demonstrate that all structural components are designed to withstand seismic events.

3.3.1.2.3 Faults and Liquefaction Potential

There are two general categories of earthquake hazards: primary and secondary. Primary hazards include fault ground rupture and strong ground shaking. If an earthquake is larger than about magnitude 5.5, ground rupture may occur on the fault. The amount of displacement generally increases with the magnitude of the earthquake. Structures, including structural foundations and pipelines, located near or on the fault, can be displaced or damaged by fault ground rupture. The best mitigation for potential fault ground rupture to structures is to accurately locate the fault and construct structures a safe distance from the fault. Where structures and other facilities cannot be located to avoid faults, there are several geotechnical and structural design measures that can be implemented to mitigate the potential for fault ground rupture. No faults have been mapped at or near the site (TVA 2015c) that are believed to be sources of higher magnitude earthquakes during the most recent geologic period (Quaternary) (Stantec 2009).

Secondary hazards include liquefaction/lateral spreading, landsliding, and ground settlement. Liquefaction is essentially loss of strength in generally granular, saturated materials, including alluvial and fluvial deposits subjected to ground shaking. Liquefaction can result in ground settlement, particularly in areas having an abrupt vertical grade change (road cuts, exposed river banks, etc.). Liquefaction can damage foundations, pavement, and pipelines and underground utilities. Earthquake-induced landsliding can occur where landslides are present or where colluvial deposits or unstable materials are present on slopes. Ground settlement can occur in soft, weak materials, including non-engineered fill. Such potential impacts can be mitigated by various geotechnical and structural design measures, including location of proposed structures to avoid vulnerable areas, ground improvements to increase soil and substrate stability, and appropriate foundation design.

3.3.1.3 Soils

According to the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) web soil survey (NRCS 2018), most of the mapped native soils in the proposed project areas are silt loams with a smaller portion being silty clay loams. The extent of soils mapped within the proposed project areas are shown in Table 3-1.

Table 3-1. Mapped Soils of Proposed Project Areas (Acres)

Soil Map Unit (Symbol) Name	Coal Yard Area	North Rail Loop	Borrow Site	Borrow Site Excavation Areas B and C	Laydown Area
Bodine cherty silt loam (Bc)			3.1		
Humphreys silt loam (Hm)			14.4	6.6	
Lindside silt loam (LI)			2.7		
Melvin silt clay loam (Mc)	12.56				
Melvin silt loam (MI)			10.8	0.25	
Paden silt loam (Ps)	0.21	30.4	25.0	16.8	7.1
Paden silt loam, eroded (Psr)	44.96	17.4	26.5	5.3	0.6
Paden silt loam, slope (Psx)			82.1	20.8	
Wolftever silty clay loam, compact (Wcc)	4.08				
Water	2.05				
Total	**63.9**	**47.8**	**164.6**	**43.8**	**7.7**

Source: NRCS 2018

Most of the soils within the JOF property boundary have been disturbed or replaced by anthropogenic fill to support development or operations of the plant facilities. As such, the coal yard and coal yard runoff pond do not contain native soil material. Native soils remaining in the north rail loop and most of the soils in the borrow area are mapped as Paden silt loam. Paden silt loam is described as Loess or silty alluvium over loamy alluvium derived from interbedded sedimentary rock (Stantec 2016). TVA collected soil boring data within the borrow area. The data indicated, the borrow area is overlain by topsoil having an average thickness about 6 inches. A layer of clay soils was found in most of the boring locations to a depth of 5 feet below ground surface and were underlain by clayey sands, silts, and gravels. Poorly to well graded gravel with varying amounts of clay, silt, and sand typically underlie the clayey sands and gravels to a depth of 15 feet which was the bottom of the borings (Stantec 2016).

3.3.2 Environmental Consequences

3.3.2.1 Alternative A – No Action

Under Alternative A, no excavations or construction would occur. There would be change in existing conditions and, therefore, no impact.

3.3.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

Activities associated with closure of the coal yard and coal yard runoff pond and construction of the process water basin at Site 1 or 2 would occur within an area that is extensively disturbed and comprised of fill material. Construction activities associated with these actions would not require deep excavations and as such would not disrupt bedrock geology. Therefore, there would be no impacts to the geological or native soil resources.

Construction of the process water basin in the north rail loop would include clearing, grubbing, grading and excavation. Removal of vegetation, grading and construction activities have the potential to disturb soil stability and increase erosion. Despite these proposed actions, impacts to soil resources associated with surface disturbances related to the proposed construction activities are expected to be minor, as BMPs outlined in the project-specific SWPPP would be implemented to minimize erosion during land clearing

and site preparation. Development of the process water basin in this area would not require deep excavations and as such would not disrupt bedrock geology. Therefore, impacts would be minor and temporary.

Construction of the new NPDES outfall for the process water basin would require excavation along an approximately 1,050 linear foot corridor on the west peninsula for the excavation of a trench for the discharge pipe. This would involve temporary disturbance that would be limited to the surficial soil horizons and, therefore, impacts to geology and soils would be negligible.

Development of the borrow site would involve ground disturbing activities including excavation, grading, tree-clearing, and grubbing which would have a direct impact on the soils within the impacted areas of the proposed borrow site. Grading and construction activities have the potential to disturb soil stability and increase erosion. Impacts to soil resources associated with surface disturbances related to the proposed construction activities would be localized and not noticeable within the context of the project vicinity and are therefore, expected to be minor. BMPs outlined in the project specific SWPPP would be implemented to minimize erosion during development of the borrow site.

3.3.2.2.1 Operational Impacts

Operational impacts to geology are associated with the potential effect of earthquakes on the proposed process water basin, borrow site and the cap systems proposed for the coal yard. However, TVA considers and prepares for earthquake loads (and the secondary effects of strong ground shaking) in the design of the cap system, process water basin and associated piping. These design considerations are expected to mitigate the potential seismic risk of impact to the proposed structures. In addition, because no faults have been mapped at or near the site (TVA 2015c) that are believed to be sources of higher magnitude earthquakes, the potential for surface fault rupture as well as secondary hazards related to liquefaction is considered to be low. Accordingly, seismic impacts at the proposed borrow site are expected to be negligible.

Two subareas (totaling approximately 43.8 acres) within the borrow site project area have been identified for excavation (see Figure 2-4). Large volumes of surface soil and subsoil would be removed from these areas to support the proposed projects as well as future projects at JOF. Soil functions in these areas would be adversely impacted until restoration is completed. Until stabilization can be achieved, soils not removed from these areas would be subject to more erosion and transport than under present conditions.

Development of the borrow site includes the construction of two sediment basins which would limit the amount of soil transported from the borrow site to surface water drainage ways via storm water by detaining the runoff and trapping sediment. When the need for borrow ceases, the excavated areas would be graded for proper drainage and revegetated with native, non-invasive plant species to help promote soil stability, native soil biota, and re-establishment of soil functions. Borrow site excavation is expected to terminate at the soil bedrock interface. Therefore, impacts to bedrock material are not anticipated during borrow site development.

Because no earth-moving or clearing is anticipated within the laydown area, soil disturbance within this area is expected to be temporary and minor.

3.3.2.3 Alternative C – Coal Yard Full Cap Closure
Impacts to geological and soil resources under Alternative C would be the same as identified for Alternative B. Therefore, impacts would be temporary and minor.

3.3.2.4 Alternative D – Remove Coal Yard Material and Close
Impacts to geological and soil resources under Alternative D would be the same as identified for Alternative B. Therefore, impacts would be temporary and minor.

3.4 Groundwater
The federal regulatory framework established to protect groundwater includes the Safe Drinking Water Act of 1974, Wellhead Protection Program, and CCR Rule. The Safe Drinking Water Act of 1974 established the sole source aquifer protection program which regulates certain activities in areas where the aquifer (water-bearing geologic formations) provides at least half of the drinking water consumed in the overlying area.

3.4.1 Affected Environment

3.4.1.1 Regional Aquifers
The Camden Formation is the principal aquifer in the region and consists of thin beds of cherty limestone interbedded with softer clay layers. Local groundwater movement at the site is generally from east to west toward the Kentucky Reservoir. Recharge occurs by local infiltration of precipitation at the surface and laterally from upland areas east of the site. Groundwater passing beneath the site ultimately discharges to the Tennessee River (Kentucky Reservoir). Depth to water typically ranges from 10 to 30 feet below ground surface beneath JOF.

3.4.1.2 Groundwater Use
No public wells or spring water supplies exist within 2 miles of JOF (TVA 2015c). Therefore, there are no local users of groundwater within the vicinity of proposed project areas.

3.4.2 Environmental Consequences

3.4.2.1 Alternative A – No Action Alternative
Under the No Action Alternative, TVA would not proceed with closure of the coal yard or the coal yard runoff pond, construction and operation of a process water basin, or development of a borrow site. TVA would continue to secure and maintain the coal yard and coal yard runoff pond sites to ensure they do not degrade over time. There would be no change to the environmental conditions of these respective sites. Therefore, there would be no project-related impacts to groundwater.

3.4.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure
Following removal of the coal stockpile as described in Section 2.1.2.1, closure of the coal yard under Alternative B would include the excavation of approximately 5 feet of coal yard remnants and underlying CCR including bottom ash fill/spent bed material from the south side of the coal yard and the consolidation of this material in the north side of the coal yard. The north/consolidated side of the coal yard would then be closed with a protective/vegetative soil or turf system. The closure cover system would reduce surface water infiltration and would facilitate management of storm water thereby reducing contact with the underlying material and subsequent leaching to groundwater and receiving surface waters which would have a beneficial impact. TVA is planning to install monitoring wells near the project site and would take any corrective measures needed should ground water effects be noted.

BMPs, as described in the project-specific SWPPP, would be used to control sediment infiltration from storm water runoff during construction phases of the project. Specifically, these BMPs would be implemented during dewatering and excavation of sediment from the coal yard runoff pond ditch and, if dewatering is needed during excavation the coal yard remnants and bottom ash fill, from the south side of the coal yard. With the use of BMPs, impacts to groundwater would be minor and temporary.

Construction of the process water basin in any of the three proposed locations would require placement of a geosynthetic liner to construct an impermeable barrier that would effectively contain collected water from multiple site processes. This impermeable barrier would also prevent leaching of this managed water to groundwater, mitigating the potential for groundwater quality impacts. Therefore, impacts would be negligible.

Under Alternative B, a borrow site would be established 1.8 mile south of JOF. Development of the borrow area would include clearing and grubbing of existing trees in the excavation areas A and B and improvement of the existing access road. During the borrow area evaluation phase, eight soil borings were advanced to a depth of 15 feet below ground surface. Neither bedrock nor groundwater were encountered in any of the borings. Since proposed excavation is expected to terminate at a depth of 10 feet below ground surface and would not encounter groundwater, no impacts to groundwater in the borrow area are expected.

3.4.2.3 Alternative C – Coal Yard Full Cap Closure

Impacts associated with closure of the coal yard and coal yard runoff pond, construction and operation of the process water basin and borrow site development would be the same as described under Alternative B. The closure cover system would reduce surface water infiltration and would facilitate management of storm water thereby reducing contact with the underlying material and subsequent leaching to groundwater and receiving surface waters which would have a beneficial impact. As with Alternative B, TVA would install monitoring wells in the vicinity of the project site and would take any corrective measures needed should ground water effects be noted.

3.4.2.4 Alternative D – Remove Coal Yard Material and Close

Impacts associated with closure of the coal yard runoff pond, construction of a process water basin and development of the borrow site would be the same under Alternative D as described under Alternatives B and C.

However, under Alternative D, the coal yard would be excavated to remove coal remnants and CCR including bottom ash/spent-bed material fill within the extent of the current footprint of the coal yard. All excavated material would be dewatered and disposed in an existing, permitted off-site landfill. The site would be graded for proper drainage and vegetation would be established by backfill of the site using suitable borrow material. Because all coal yard material would be removed, and the site would be restored, no leaching to groundwater would occur. Therefore, potential impacts to groundwater under this alternative are positive and more beneficial relative to Alternatives B and C.

3.5 Surface Water

3.5.1 Affected Environment

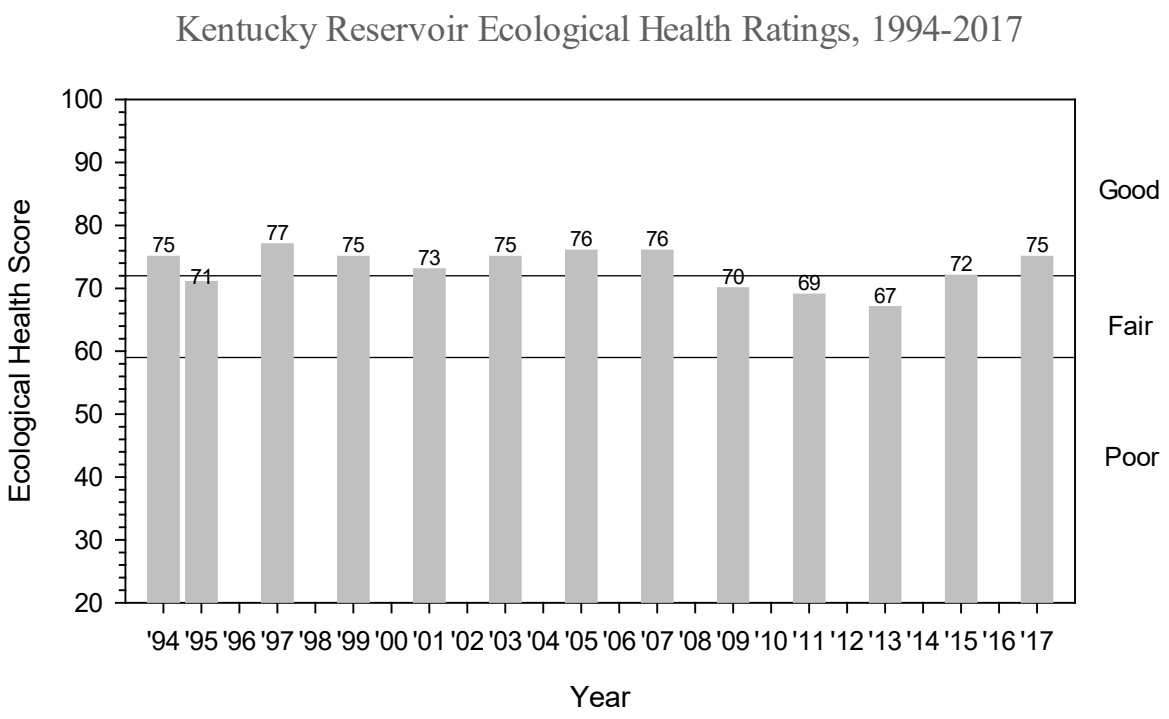
TVA's JOF is situated on the east bank of the Tennessee River, just south (upstream) of the confluence of the Tennessee River Mile (TRM) 99.4, and Trace Creek. This reach of the

lower Tennessee River is part of the Kentucky Reservoir, the largest reservoir in the eastern U.S. This reservoir extends for 184 miles and drains the entire Tennessee Valley watershed. The segment of the Tennessee River adjacent to proposed project area is classified for the uses of domestic water supply, industrial water supply, fish and aquatic life, recreation, livestock watering and wildlife, irrigation and navigation (TDEC 2013).

When JOF was active it withdrew water from the Tennessee River (Kentucky Reservoir) from a bay located on the south side of the plant. The coal-fired units at JOF were officially retired in December 2017, but the cooling water intake structure remain in place so as to be available for future use. Under current operations, select site storm water, runoff from the coal pile, and remaining plant flows are conveyed via pipeline to Ash Pond 2 and discharged from the NPDES permitted Outfall 001.

TVA conducted Reservoir Ecological Health assessments on the Kentucky Reservoir annually from 1991 through 2017 (TVA 2018a). Values of Good, Fair, or Poor are assigned to each metric monitored by TVA. The overall ecological health condition for Kentucky Reservoir rated “good” in 2017. Ecological health scores for Kentucky Reservoir have fluctuated between “good” and the upper end of the “fair” range and have generally followed reservoir flow conditions. The indicators most responsive to flow are dissolved oxygen and chlorophyll, which typically receive lower ratings during dry, low flow years.

The ecological health of Kentucky Reservoir has been monitored using the same methodology since 1994 (Figure 3-1). Ecological health evaluations focus on five indicators: dissolved oxygen, chlorophyll, sediment quality, benthic macroinvertebrate community (bottom life), and the fish assemblage. TVA monitors four locations on Kentucky Reservoir—the deep, still water near the dam, called the forebay (Tennessee River Mile 23.0); the middle part of the reservoir (Tennessee River Mile 85.0); the river-like area at the extreme upper end of the reservoir in the Tennessee River (miles 200 to 206), called the inflow; and the Big Sandy embayment (Big Sandy River Mile 7.4)—usually on a two-year cycle. Only bottom life and the fish assemblage are assessed at the inflow monitoring location.



(Reservoir Ecological Health Scoring Ranges: <59=Poor, 59-72=Fair, >72=Good)

Figure 3-1. Kentucky Reservoir Overall Yearly Health Ratings

As shown on Table 3-2, dissolved oxygen rated “fair” at the forebay, “good” at the mid-reservoir, and “poor” at Big Sandy embayment monitoring location. This indicator has rated “good” at the mid-reservoir all years monitored except 2011, when it rated “fair”. Dissolved oxygen ratings have varied between “good” and “fair” at the forebay and “good”, “fair” and “poor” at the embayment location. Additional detail regarding benthic and fish community monitoring are presented in Chapter 3.9.

Table 3-2. Kentucky Reservoir 2017 Health Ratings by Location

Monitoring location	Dissolved oxygen	Chlorophyll	Fish	Bottom life	Sediment
Forebay	Fair	Fair	Good	Good	Good
Mid-reservoir	Good	Good	Good	Good	Good
Big Sandy embayment	Poor	Poor	Good	Poor	Good
Inflow	--	--	Good	Good	--

Prevailing weather patterns and the related changes in reservoir flows are major factors in differing dissolved oxygen conditions from year to year. Poorer dissolved oxygen conditions typically occur because of reduced flows through the reservoir during dry conditions. Low dissolved oxygen concentrations often develop in a portion of the lower water column during summer at the forebay and embayment locations. However, the low dissolved oxygen exists only for a short time at the forebay, while the more quiescent flows in the embayment reduce water exchange and mixing within the water column, resulting in extended periods with low dissolved oxygen.

Consistent with dissolved oxygen, chlorophyll rated “fair” at the forebay, “good” at the mid-reservoir, and “poor” at the Big Sandy embayment monitoring location. Elevated chlorophyll concentrations are common on Kentucky Reservoir, typically rating “poor” or at the low end of the “fair” range at the forebay and embayment locations. By contrast, chlorophyll typically rates “good” at the mid-reservoir because the reservoir is narrower in this reach and flows (i.e. velocity) generally are sufficient to produce mixing within the water column, which tends to limit light exposure for phytoplankton/algae.

The fish assemblage rated “good” at the four locations monitored. Historically, the fish assemblage has rated “good” at the transition and in the “good” to “high-fair” range at the other monitoring locations. In 2017, the diversity and abundance of fish observed at each location were consistent with long-term averages, and fish health was assessed a “good” rating with low incidences of disease and parasites. A total of 56 different species were observed reservoir wide. Some of the more interesting species observed included American eel, rainbow darter, river darter and silver chub. The invasive species silver carp was observed at the forebay, mid-reservoir and embayment locations.

Monitoring results for bottom life were generally similar to previous years. Bottom life rated “good” at the forebay, mid-reservoir, and inflow locations and “poor” at the Big Sandy embayment location. Samples from the embayment contained fewer individuals and less variety of organisms than those from the other monitoring locations; the organisms consisted mostly of midges, worms, and small mollusks known as fingernail clams. “Low-fair” to “poor” ratings are common for Big Sandy and are likely a factor of the low dissolved oxygen conditions that develop in the lower water column each year.

Sediment quality rated “good” at the three locations this indicator is monitored: the forebay, mid-reservoir, and Big Sandy embayment. No pesticides were detected, and concentrations of metals were within expected background levels. Sediment quality commonly rates “good” at the forebay and mid-reservoir locations and “good” or “fair” at the Big Sandy location due to elevated levels of arsenic. Arsenic occurs naturally in soils and the concentrations in

sediments deposited in the embayment are generally near, slightly above, or below, suggested background concentrations.

The Clean Water Act requires all states to identify all waters where required pollution controls are not sufficient to attain or maintain applicable water quality standards, and to establish priorities for the development of limits based on the severity of the pollution and the sensitivity of the established uses of those waters. States are required to submit reports to the USEPA. The term “303(d) list” refers to the list of impaired and threatened streams and water bodies identified by the state. The lower Tennessee River is not listed on the Final 2018 TDEC 303(d) List (TDEC 2018b); therefore, it is not considered impaired and is assumed to fully meet its designated uses.

3.5.1.1 Existing Wastewaters and Drainage Areas

There are several existing wastewater streams at JOF permitted to be discharged through NPDES Outfall 001 (Permit Number TN0005444) (TDEC 2011). Additionally, storm water discharges are authorized by the Tennessee Storm Water Multi-Sector General Permit No. TNR053188. The majority of the process flows will eventually cease now that the fossil site is no longer generating; however, process flows will continue from the JCT. Currently the remaining plant processing waters are discharged to the eastern side of the Ash Pond 2 near the causeway; whereas the JCT process flows and runoff from the coal pile and northern portion of the site are discharged to the western portion of Ash Pond 2. Ultimately, the water is discharged from NPDES Outfall 001 at the southernmost stilling pond of Ash Pond 2 through six 30-inch diameter pipes into the Tennessee River (Kentucky Reservoir). Water discharges at the spillway outlet are monitored according to NPDES Permit requirements. The NPDES permit requires monitoring of flow, total aluminum, total antimony, total arsenic, total cadmium, total copper, total iron, total lead, total mercury, total nickel, total selenium, total silver, total thallium, total zinc, total cyanide, asbestos, acute toxicity. The NPDES permit also has established limitations on: pH (range from 6 to 9 standard units); total suspended solids (average monthly concentration 30.0 milligrams per liter (mg/L), and daily max 86.6 mg/L); and Oil and Grease (average monthly concentration 14.0 mg/L, and daily max 19.0 mg/L).

Prior to the retirement of the fossil units, the flow being discharged from the Coal Yard Runoff Pond was estimated to be 0.34 MGD (TDEC 2011). TVA has added a HRSG and associated components onto Unit 20 at JCT. With the introduction of this generator, several low volume flows were added to the NPDES permit and are listed in Table 3-3.

Table 3-3. Additional Flow to Active Ash Area 2 with Addition of HRSG

Waste Water	Average Flow (gpm)	Maximum Flow (gpm)
Misc. Demineralized Water Usage	6	6
Misc. Raw Water Usage	2	2
Sample Panel Cooling Water	126	126
HRSG Thermal Quench Water	7	10
HRSG Blowdown	13	19
Aux. Boiler Thermal Quench Water	30	30
Auxiliary Boiler Blowdown	58	58

The coal yard and coal yard runoff pond are both included within the coal yard project area and are disturbed areas bordered to the west by the Tennessee River (Kentucky Reservoir). The north rail loop, which is a potential location for the process water basin, is located within the JOF boundary south of the JCT. The proposed borrow site would be located on TVA-owned property located approximately 1.8 miles south of JOF (Figure 3-2).

Jurisdictional streams and wetlands within the coal yard and borrow site project areas were delineated in November 2017 and within the north rail loop in August 2018. The surface water features for the proposed project sites are shown on Figure 3-2. Desktop review identified one mapped USGS National Hydrology Database stream resource (STR-01) inside the proposed borrow site, which was confirmed during the field survey. This stream, Little Indian Creek, intersects the southern boundary of the borrow site and flows northward to intersect the northern boundary, near WET-03 where it becomes integrated into the wetland. Based on field survey assessment, the morphology and hydrology of the stream's channels were deemed to be slightly to moderately altered. Within the borrow site project area, the stream runs for approximately 2,368 linear feet. Three wet weather conveyances (WWC) were also delineated in the borrow area. The approximate length of the wet-weather conveyances for WWC-01, WWC-02, and WWC-03 are 208, 195, and 238 respectively (Amec Foster Wheeler 2018). No streams were identified within the north rail loop. Wetlands are described in Section 3.11.

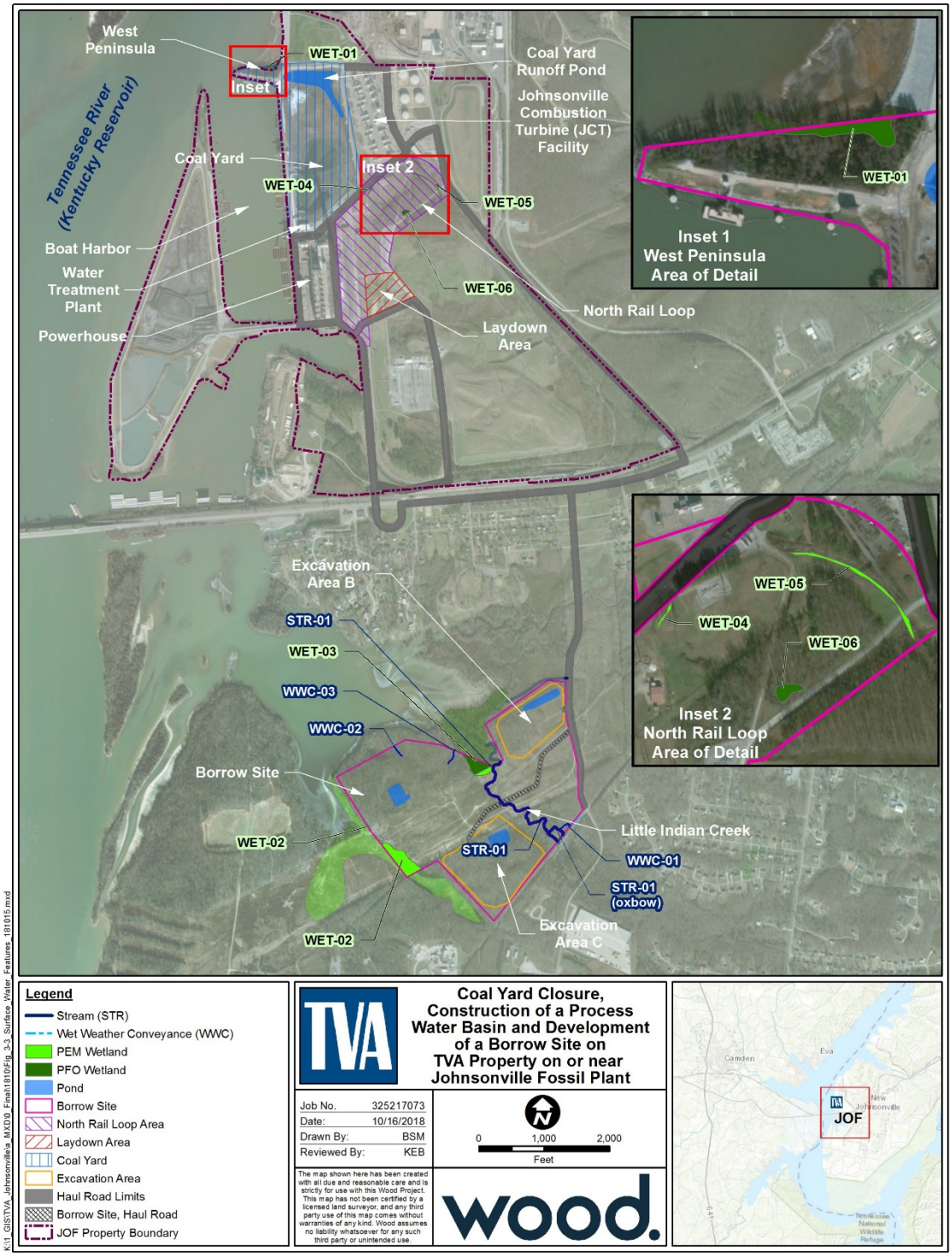


Figure 3-2. Water Resources Identified Within the Proposed Project Areas

3.5.2 Environmental Consequences

3.5.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not close the coal yard or coal yard runoff pond, construct and operate a process water basin or develop a borrow site and no impact to surface water resources would be expected.

3.5.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

The primary flows that would potentially be impacted by this proposed project would be the discharge from Outfall 001, the coal yard runoff pond discharges, storm water discharged from the current coal yard project area and the proposed borrow areas. Construction storm water flows would be released to the Tennessee River (Kentucky Reservoir) directly through storm water outfalls or via permitted process water outfalls, such as Outfall 001. A new NPDES permitted process outfall would be constructed that would include select discharges listed above and the discharges from the existing JCT. This new NPDES permitted process water outfall would be located at TRM 99 (see Figure 2-4). Additionally, various storm water outfalls are proposed as part of this project (see Figures 2-3, 2-4, 2-6 and 2-7 for details).

3.5.2.2.1 Construction Impacts

Impacts of construction of the proposed projects include construction storm water runoff, dewatering of work areas, domestic sewage, non-detergent equipment washings, dust control water, and hydrostatic test discharges.

Construction and activities associated with the closure of the coal yard, coal yard runoff pond, construction of the process water basin and development of the borrow site would involve ground disturbance resulting in the potential for increased sediment release and erosion, which has the potential to temporarily affect surface water via storm water runoff. TVA would comply with all appropriate state and federal permit requirements. Appropriate BMPs would be followed and all proposed project activities would be conducted in a manner to ensure that waste materials are contained, and the introduction of pollutants to the receiving waters would be minimized. A General Permit for Storm Water Discharges Associated with Construction Activities (TDEC 2016) would be required for this project and this permit would require development of a project-specific SWPPP. The Tennessee Erosion and Sediment Control Handbook would be referenced to ensure BMPs are appropriate (TDEC 2012).

All process water and some storm water would be sent to either Ash Pond 2, or for work in the north rail loop, storm water would be conveyed to an existing storm water outfall during the construction phase of this project. This includes any free water that is removed from the coal yard runoff pond. No discernable change in the discharge from Outfall 001 is expected from this proposed construction.

Portable toilets would be provided for the construction workforce as needed. These toilets would be pumped out regularly, and the sewage would be transported by tanker truck to a publicly-owned wastewater treatment works that accepts pump out.

Equipment washing and dust control discharges would be handled in accordance with BMPs described in the SWPPP for water-only cleaning, and/or NPDES Permit TN 0005444.

Discharges from hydrostatic testing would be handled in accordance with NPDES Permit TN0005444 or the TDEC General NPDES Permit for Discharges of Hydrostatic Test Water (TN670000).

Approximately 100 feet of Little Indian Creek would be directly impacted by installing a temporary culvert to maintain the stream flow while the borrow site is in use. The culvert would be removed once borrow site use is complete and the stream channel would be restored to its previous condition. A state 401 water quality certification, either an individual or general Aquatic Resources Alteration permit, and federal USACE 404 permits, would be obtained for any stream alteration. The terms and conditions of necessary permits would likely require mitigation from proposed activities that would cause impacts to water resources. Indirect impacts to Little Indian Creek would be minimized through the use of protective buffers.

With the implementation of appropriate BMPs, only temporary minor impacts to surface waters would be expected from the proposed construction activities.

3.5.2.2.2 Operational Impacts

The coal yard has served as storage for coal unloaded from barges. Storm water runoff generally drains from the coal yard to the perimeter ditches running along the east and west sides of the coal yard which flow north to the coal yard runoff pond. The coal yard perimeter ditch running along the east side of the coal yard also receives storm water draining from the JCT and the north rail loop area.

TVA would remove or reclaim the unburned coal and sediment stockpiled on the coal yard as described in Section 2.1.2.1. This reclamation process would be expected to temporarily increase the total suspended solids and potentially other constituents in the coal yard runoff pond, however would not be expected to discernably change the discharge concentrations of Outfall 001. Therefore, the impacts would be temporary and minor.

Alternative B proposes to excavate 5 feet of coal yard remnants, CCR including bottom ash and spent-bed material fill and soil from the south side of the coal yard and consolidate this material to the north side of the coal yard. The north/consolidated side of the coal yard would then be graded using borrow material and be closed with a cover system consisting of a geomembrane coupled with either a protective/vegetative soil or a turf system. The remainder of the coal yard would be graded for proper drainage and vegetated.

The consolidation and capping of a portion of the coal yard should reduce the quantity of solids and the potential for total and dissolved metals discharges from this site and ultimately from Outfall 001. Additionally, the proposed area where the geomembrane cap system would be installed would have reduced infiltration from precipitation.

The coal yard runoff pond currently discharges through a sluice gate on the west end of the pond into the pump basin which is a small riprap-lined pond built within the footprint of the original coal yard runoff pond. The pump basin contains a set of pumps which maintain a normal pool elevation of 375.0 feet. The pumps discharge through an 18-inch pipe running west beneath the west peninsula, under the Tennessee River (Kentucky Reservoir) and into Active Ash Area 2 and ultimately discharges from Outfall 001.

The coal yard runoff pond receives effluent from numerous sources across the JOF property boundary. Flows discharging into the coal yard runoff pond, as listed in the JOF

NPDES Permit, include the JCT oil/water separator, overflow from the Water Treatment Plant waste, as well as sump flows pumped from the Hopper Building, the Coal Crusher Building, the Fuel Oil Transfer Line, the Crane Unloading Stations, and the F17 and F18 plant sumps.

Closure of the coal yard runoff pond would occur once plant flows to the pond have been eliminated or rerouted to the proposed process water basin and the coal yard has been closed. The coal yard runoff pond would be graded for proper drainage and vegetated.

Final drainage from the coal yard and coal yard runoff pond would be routed to existing or new discharge points in compliance with the current NPDES permit, covered under the Tennessee Storm Water Multi-Sector General Permit or under the new NPDES permit for the JCT, to ensure compliance with regulatory requirements. All runoff would comply with applicable regulations and permits and should result in only temporary, minor surface water impacts. Additionally, consolidating and capping of the existing coal yard and closure of the coal yard runoff pond would reduce runoff from the coal yard to the Tennessee River (Kentucky Reservoir), providing minor beneficial impacts.

The process water basin will consist of two basins operating either in series or in parallel as needed. Flows would reach the process water basin either by gravity drain or pumps and ultimately be discharged by gravity through the newly constructed and permitted NPDES outfall.

The flows that would be routed to this proposed process water basin are the water treatment plant, JCT oil/water separator and storm water flows. The overall discharge flow rate from the proposed process outfall, once the process water basin is constructed, is estimated to be 1.62 MGD, which would include the flows listed below in addition to other flows from JCT oil/water separator, future water treatment waste waters, sump flows and precipitation and runoff flows. TVA would conduct a characterization of the discharges from this basin to confirm that there would be no significant impacts to the Tennessee River (Kentucky Reservoir). Mitigation measures would be identified, as needed, to ensure the discharges meet permit limits. All work would be done in compliance with applicable regulations, permits and BMPs so potential impacts to surface water from this alternative would be negligible.

Primary flows from the proposed borrow site during the operation would be storm water related. With the implementation of appropriate BMPs, as would be described in the project-specific SWPPP, only temporary minor impacts to surrounding surface waters would be expected from operational activities associated with the use of the borrow area.

3.5.2.3 Alternative C – Coal Yard Full Cap Closure

Impacts to surface water would be the same as described for Alternative B. Therefore, implementation of Alternative C would have a minor beneficial impact associated with closure of the coal yard and coal yard runoff pond due to reduced loadings to the Tennessee River (Kentucky Reservoir).

3.5.2.4 Alternative D – Remove Coal Yard Material and Close

Impacts to surface water associated with disposal or reclamation of the unburned coal and sediment from the coal yard runoff pond that is stockpiled on the coal yard, closure of the coal yard runoff pond, construction and operation of the process water basin and development of the borrow site would be the same as described for Alternative B.

However, under Alternative D, the coal yard would be excavated to remove bottom ash/spent-bed material fill within the extent of the current footprint, thereby minimizing the potential for constituents to be discharged from the groundwater to surface water Therefore, implementation of this alternative would have a marginally greater beneficial impact to surface water than Alternatives B and C.

3.6 Floodplains

3.6.1 Affected Environment

A floodplain is the relatively level land area along a stream or river that is subject to periodic flooding. The area subject to a 1 percent chance of flooding in any given year is normally called the 100-year floodplain. The area subject to a 0.2 percent chance of flooding in any given year is normally called the 500-year floodplain.

The proposed project areas would be located between TRMs 99.0 and 101.7 on Kentucky Reservoir, left descending bank. The proposed borrow site project area also includes portions of Fowlkes Branch, Little Indian Creek, and Indian Creek 100-year floodplains. In this reach of Kentucky Reservoir, the 100-year flood elevation and 500-year flood elevation would both be 375.0 feet mean sea level. Floodplains are shown on Figure 3-3.

3.6.2 Environmental Consequences

TVA adheres to the requirements of EO 11988, Floodplain Management. The objective of EO 11988 is “to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative” (EO 11988, Floodplain Management). The EO is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances (U.S. Water Resources Council 1978). The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative.

3.6.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, there would be no change to the existing conditions found within the local floodplains because TVA would not close the coal yard or the coal yard runoff pond, construct a process water basin, or construct a borrow site.

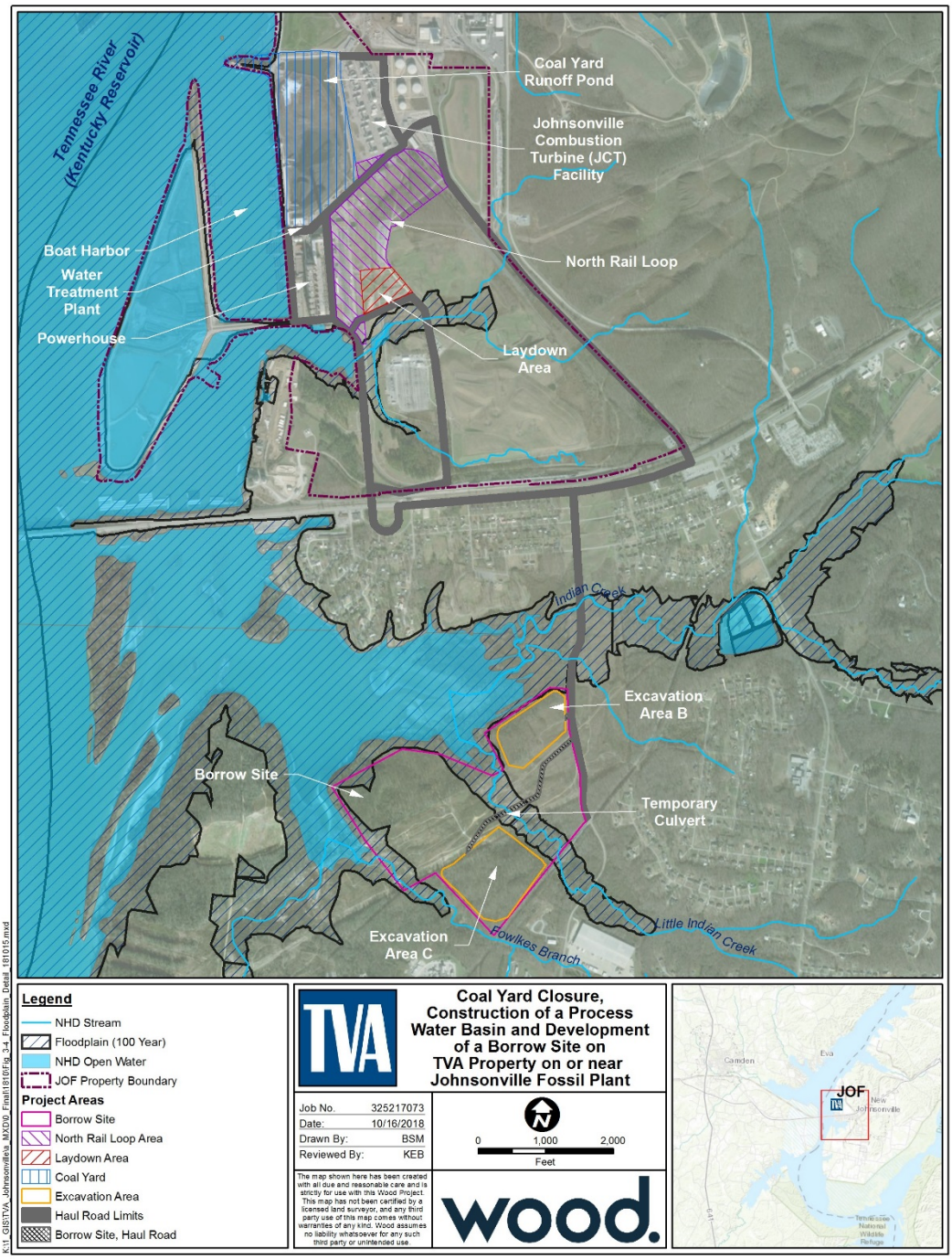


Figure 3-3. Floodplains Near the Proposed Project Areas

3.6.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

The coal yard project area is situated behind a berm with a crest elevation of about 380 feet mean sea level and is, therefore, outside the 100-year floodplain. Thus, closure of the coal yard, coal yard runoff pond, and construction of the process water basin would be located outside the 100-year floodplain, which would be consistent with EO 11988. Storm water outfalls from the proposed facilities would be located within the 100-year floodplain. Outfalls are considered repetitive actions in the floodplain that should result in minor impacts. To minimize adverse impacts, the minimum amount of fill or riprap necessary to stabilize the outfall structures would be used. The temporary laydown area would be located outside the limits of the floodplain and, therefore, there would be no impact to floodplains associated with the use of this area.

The proposed borrow site crosses portions of the floodplains of Fowlkes Branch and Little Indian Creek (see Figure 3-3). Activities located within these floodplains consist of a minor amount of excavation, installation of a temporary culvert in Little Indian Creek and two storm water outfalls from the borrow area sediment basins.

Consistent with EO 11988, culverts associated with roads and outfalls are considered repetitive actions in the 100-year floodplain that should result in minor impacts. TVA would implement the following mitigation measures to minimize adverse impacts.

- The temporary culvert in Little Indian Creek would be designed in accordance with BMPs and design standards appropriate for the site, Little Indian Creek, and construction access roads.
- The minimum amount of fill or riprap necessary to stabilize the outfall structures would be used.

Therefore, implementation of Alternative B would have no significant impacts on floodplains and their natural and beneficial values.

3.6.2.3 Alternative C – Coal Yard Full Cap Closure

Impacts to floodplains would be the same as described for Alternative B. Therefore, there would be no significant impacts on floodplains and their natural and beneficial values.

3.6.2.4 Alternative D – Remove Coal Yard Material and Close

Under Alternative D, impacts to floodplains would be the same as described in Alternative B and C. Therefore, there would be no significant impacts on floodplains and their natural and beneficial values.

3.7 Vegetation

3.7.1 Affected Environment

The project area is located within the Western Highland Rim, a sub-ecoregion of the Interior Plateau. The ecoregion consists of dissected and rolling terrain of open hills. Historically, this area was dominated by oak-hickory forests that were mostly removed in the 1800s in association with iron-ore mining. Currently, portions of this ecoregion are once again heavily forested with some agriculture occurring along the stream and river valleys (Griffith et al. 2001).

The vegetation within a 5-mile radius surrounding JOF and within the project areas for the proposed activities was evaluated with land use/land cover information obtained from the National Land Cover Dataset (NLCD) (Homer et al. 2015). Analysis of the NLCD indicates that land cover within a 5-mile radius of JOF is primarily forested land (25,281 acres) and open water (roughly 10,000 acres) (Table 3-4). Land cover within a 5 mile-radius is shown on Figure 3-4.

Table 3-4. Land Use/Land Cover in the Proposed Project Areas and Within the Vicinity of JOF

Land Cover Type	Coal Yard Project Area (acres)[2]	North Rail Loop (acres)[2]	Borrow Site Project Area2 (acres)[2]	Borrow Site-Excavation Areas (acres)[2]	Laydown Area (acres)[2]	5-Mile Radius (acres)[1]
Barren Land	--		--	--	--	147
Cultivated Crops	--		--	--	--	3,215
Deciduous Forest	1.6	6.6	88.1	35.1	--	23,354
Developed, High Intensity	--		--	--	--	302
Developed, Medium Intensity	--		--	--	--	445
Developed, Low Intensity	58.1	29.9	--	--	7.7	523
Developed, Open Space	--		--	--	--	2,011
Emergent Herbaceous Wetlands	--		2.8	--	--	519
Evergreen Forest	--		--	--	--	1,927
Hay/Pasture	--		--	--	--	3,107
Herbaceous	--	11.3	71.9	8.7	--	1,051
Open Water	3.9		--	--	--	9,999
Shrub/Scrub	--		--	--	--	299
Woody Wetlands	0.2		1.8	--	--	3,366
Total	**63.9**	**47.8**	**164.6**	**43.8**	**9.4**	**50,265**

Source: [1]Homer et al. 2015
[2]Derived from Homer et al. supplemented by field surveys and aerial photography

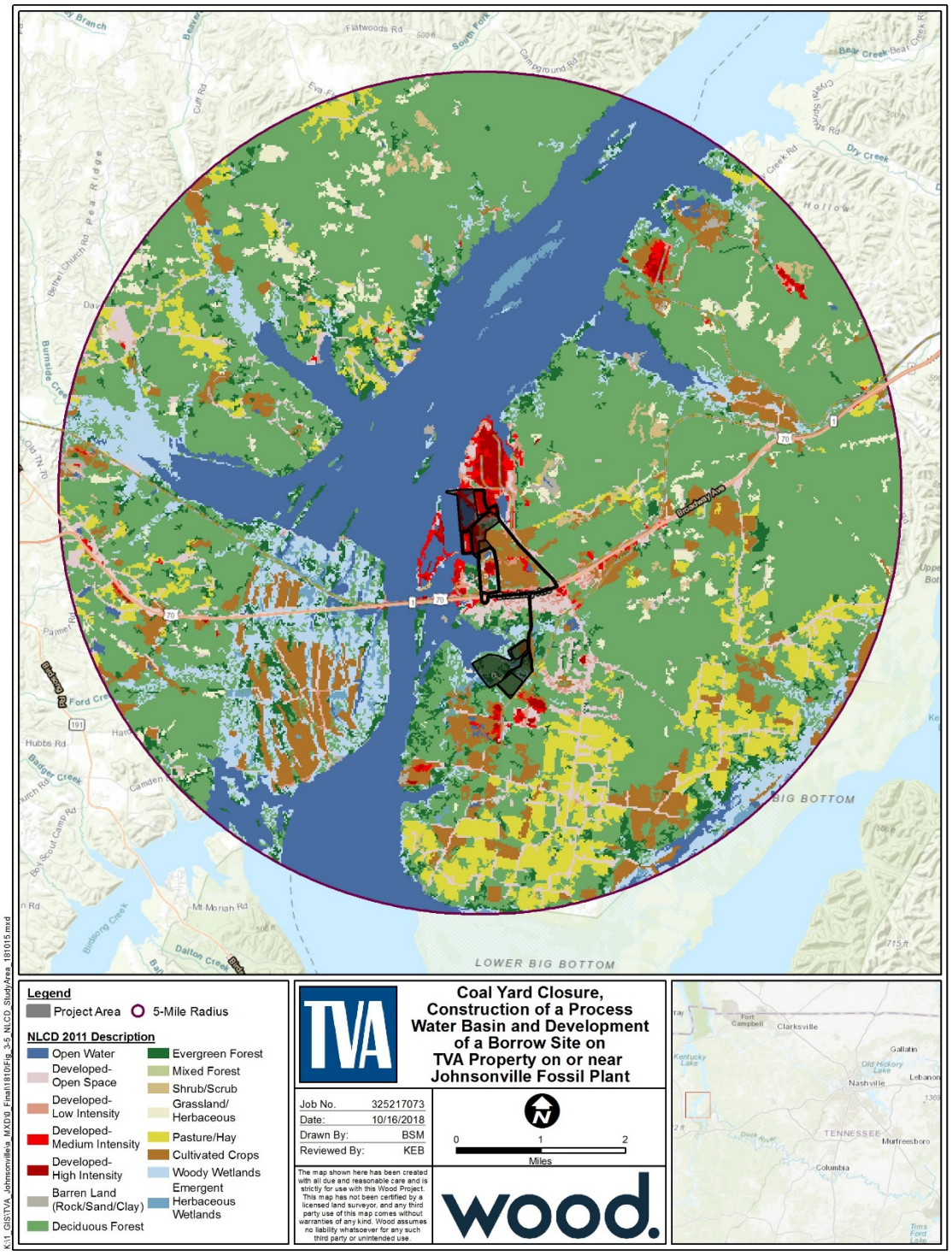


Figure 3-4. Land Use/Land Cover Within a 5-Mile Radius of JOF

The NLCD is based on aerial/satellite observations of large areas based on a spatial resolution of 30-meter pixels and therefore, is useful for gaining a general understanding of land cover in a region. Land cover within the project areas was developed based upon field observations and aerial photography. Field surveys of plant communities were conducted for the project areas in November 2017 and August 2018 (Table 3-5, Figure 3-5). Much of the land cover in the coal yard and laydown area is developed land (approximately 66 acres). Deciduous forest (88.1 acres) and grassland (herbaceous) (71.9 acres) are dominant throughout the borrow site project area. The north rail loop is predominantly developed land, but also contains 6.6 acres of deciduous forest and 11.3 acres of grassland (herbaceous).

Table 3-5. Representative Common Plant Species Observed in the JOF Project Areas

		Areas Surveyed			
Common name	**Scientific Name**	**Coal Yard**	**Borrow Site**	**Laydown Area**	**North Rail Loop**
Trees, Shrubs, and Lianas					
Black cherry	*Prunus serotina*	X	X		X
Black locust	*Robinia pseudoacacia*	X			X
Black willow	*Salix nigra*	X			X
Chinese privet	*Ligustrum sinense*	X	X		X
Common persimmon	*Diospyros virginiana*		X		X
Coralberry	*Symphoricarpos orbiculatus*		X		X
Eastern red cedar	*Juniperus virginiana*	X	X		X
Green ash	*Fraxinus pennsylvanica*		X		X
Heartleaf peppervine	*Ampelopsis cordata*	X			X
Loblolly	*Pinus taeda*				X
Poison ivy	*Toxicodendron radicans*	X			X
Sawtooth blackberry	*Rubus argutus*	X	X		X
Sericea	*Lespedeza cuneata*	X	X	X	X
Smooth sumac	*Rhus glabra*	X			X
Southern red oak	*Quercus falcata*		X		X
Sweetgum	*Liquidambar styraciflua*		X		X
Trumpet creeper	*Campsis radicans*	X		X	X
Winged elm	*Ulmus alata*	X	X		X
Herbaceous Plants					
Broomsedge bluestem	*Andropogon virginicus*	X	X	X	
Dallisgrass	*Paspalum dilatatum*				X
Frost aster	*Symphyotrichum pilosum*	X	X	X	X
Horseweed	*Conyza canadensis*			X	X
Japanese honeysuckle	*Lonicera japonica*	X	X	X	X
Johnsongrass	*Sorghum halepense*	X		X	X
Korean bushclover	*Kummerowia stipulacea*				X

		Areas Surveyed			
Common name	**Scientific Name**	**Coal Yard**	**Borrow Site**	**Laydown Area**	**North Rail Loop**
Narrowleaf plantain	*Plantago lanceolata*			X	X
Prairie threeawn	*Aristida oligantha*	X	X	X	
Ragweed	*Ambrosia artemisiifolia*			X	X
Scutch	*Cynodon dactylon*				X
Sericea lespedeza	*Lespedeza cuneata*	X	X	X	X
Sweetclover	*Melilotus* sp.	X			X
Tall fescue	*Schedonorus arundinaceus*	X		X	X
Tall goldenrod	*Solidago altissima*	X	X	X	X

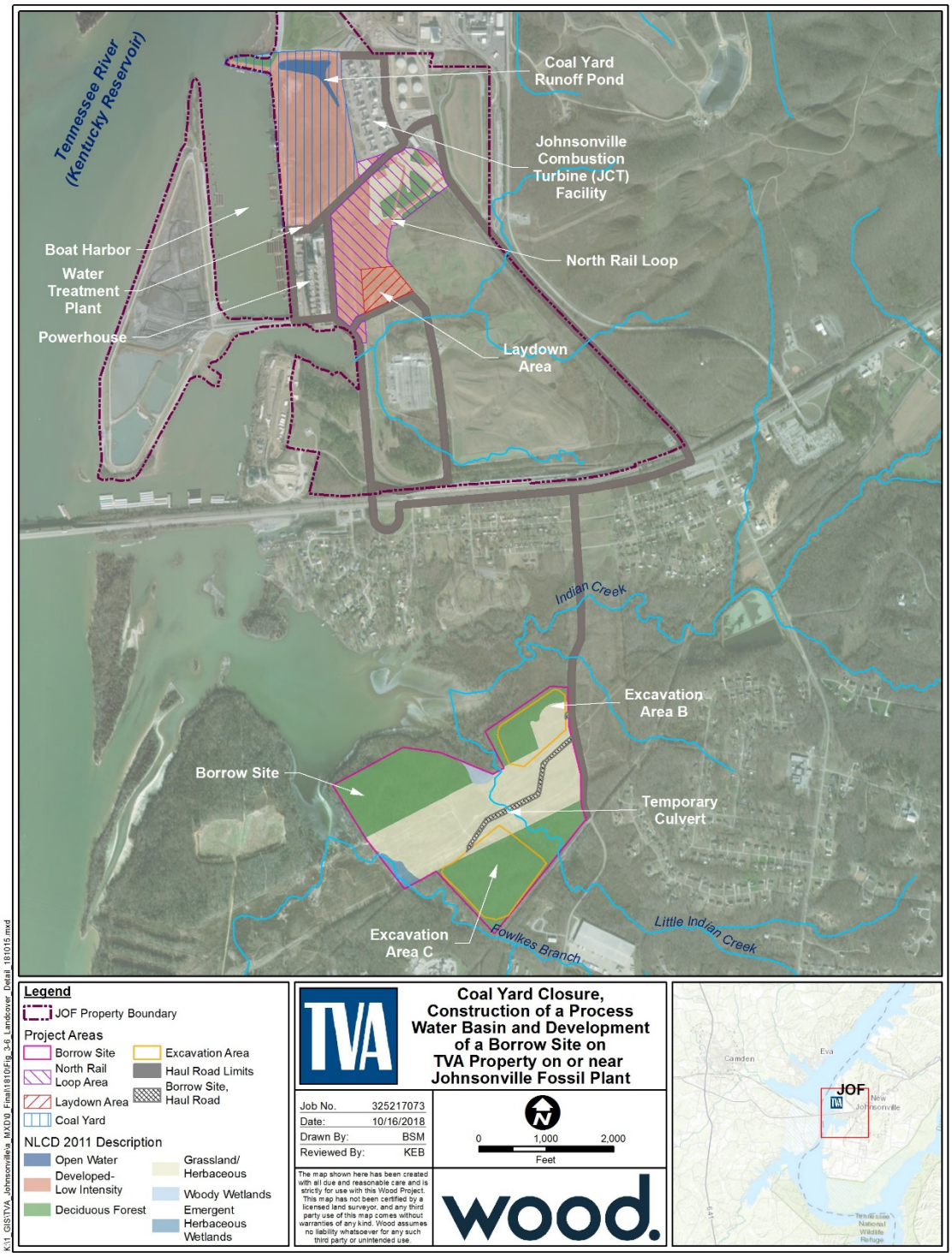


Figure 3-5. Land Use/Land Cover Within the Proposed Project Areas at JOF

No sensitive plant communities were identified during the field surveys, and there are no known rare plant communities in the vicinity of JOF. Plants observed are shown in Table 3-5.

The coal yard is highly disturbed and generally devoid of native vegetation. However, in the northern end of the coal yard project area, early successional herbaceous and shrub vegetation that includes invasive plant species occurs along the perimeter of the coal yard runoff pond at the northwest corner of the property.

Mowed and maintained early successional herbaceous communities are dominated by dallisgrass, little bluestem, beardgrass, sericea lespedeza, tall goldenrod, tall fescue, Johnsongrass, yellow foxtail, narrowleaf plantain, sawtooth blackberry smooth sumac and eastern red cedar.

The west peninsula has a small area of mature moderate quality bottomland deciduous forest dominated by black willow, bald cypress, silver maple, and tree of heaven.

Forested areas are common within the proposed borrow site and in a portion of the rail loop area south of the JCT. Dominant species within bottomland forest areas include American elm, American hornbeam, common persimmon, possumhaw, red maple, sycamore, and silver maple. By comparison, upland forested areas are dominated by white oak, tulip poplar, shagbark hickory, mockernut hickory, black oak, black locust, southern red oak, loblolly, sweet gum, winged elm, Japanese honeysuckle, and trumpet vine.

Certain non-native species are considered invasive and pose a significant threat to the natural environment. EO 13112 of February 3, 1999 directed TVA and other federal agencies to prevent the introduction of invasive species (both plants and animals), control their populations, restore invaded ecosystems and take other related actions. EO 13751 issued on December 8, 2016 amends EO 13112 and directs actions to continue coordinated federal prevention and control efforts related to invasive species. Invasive plants are common in and near the project areas. Some of the invasive plant species observed within the study areas include, Japanese honeysuckle, foxtail grasses, lacegrass, Johnsongrass, tall fescue and sericea lespedeza. Chinese privet, Japanese honeysuckle, Callery pear, common reed, Japanese stiltgrass, small carpetgrass, scutch, crabgrasses, foxtail grasses, dallisgrass, lacegrass, Johnsongrass, tall fescue and sericea lespedeza.

3.7.2 Environmental Consequences

3.7.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not close the coal yard, or the coal yard runoff pond, construct process water basins, nor develop the borrow site. Therefore, no impacts with respect to vegetation would occur under this alternative.

3.7.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

Impacts to vegetation would generally result from earthmoving and vegetation clearing activities associated with the construction of the proposed projects and borrow site excavation. Additionally, operation of the proposed borrow site would result in the potential introduction and/or spread of invasive plant species from borrow material. Lastly, vegetation impacts would occur in the laydown area due to vehicle and equipment parking and material storage.

As shown on Table 3-4, landcover in the laydown area is classified as Developed Low Density which describes areas with a mixture of constructed areas and vegetation. Accordingly, the laydown area consists of a gravel parking lot with some herbaceous land cover, primarily consisting of turfgrass and vegetation associated with disturbed areas found at the edge of a gravel parking lot. The laydown area would be impacted mostly by storage of equipment and materials during construction. Post-construction, this area would revert to its original use; therefore, the impact to any vegetation present in the laydown area would be short-term and minor.

Under this alternative, the north/consolidated side of the coal yard would be closed with a geomembrane cap system consisting of either protective vegetative soil or turf system. The cover system could include 6 inches of topsoil that could sustain herbaceous native plant growth or sod. In the short term, impacts to vegetation resulting from closure of the coal yard and construction of the process water basin in location 1 or 2 would be minor as vegetation in these areas consist of early successional herbaceous and shrub vegetation that includes invasive plant species occurs along the perimeter of the coal yard runoff pond at the northwest corner of the property. In the long term, there would be a beneficial impact because of installation of a cover system over a portion of coal yard that could support herbaceous vegetation. In the event an artificial turf system is used, the cover would not support herbaceous vegetation, and the long-term minor benefits to vegetation would not occur.

Plant communities within the north rail loop include maintained early successional herbaceous land cover types and some deciduous forest. Construction of the process water basin in this location would result in the permeant loss of 6.6 acres of deciduous forest resulting in long-term adverse impacts. However, none of the vegetation in the north rail loop is of notable conservation value.

Unburned coal and sediment from the coal yard runoff pond that is stockpiled on the coal yard would be disposed in the West Camden Sanitary Landfill or taken to TVA's CUF. This material would be transported on existing roadways; therefore, no additional impacts to vegetation resources due to the transportation of material is anticipated. Indirect impacts associated with the offsite hauling of this material would potentially result in minor increases in fugitive dust and exhaust emissions that could indirectly impact vegetation resources along the route. However, BMPs such as covered loads and equipment maintenance would be implemented as appropriate to minimize impacts. Therefore, no notable indirect impacts to vegetation are expected to occur.

It is likely that project-related construction would result in localized increases of invasive plants, but the plants most likely to colonize the area are distributed widely throughout the region; therefore, implementation of the proposed project would not likely increase the proportion of invasive plants in the area. Impacts would be further reduced with the vegetative cap versus the turf cover because the site would be revegetated using native or non-invasive species.

Potential indirect impacts on vegetation adjacent to the haul road to transport borrow material to JOF would include deposition of fugitive dust during transportation. BMPs such as covered loads and equipment maintenance would be implemented as appropriate to minimize impacts. Therefore, no notable indirect impacts to vegetation are expected to occur.

This alternative is expected to result in minor impacts due to loss of vegetation in the coal yard project area, north rail loop and laydown area. Closure of the coal yard with a cover system that could sustain herbaceous native plant growth or sod could result in the potential long-term establishment of natural herbaceous plant communities. Hence, impacts of this alternative are minor and adverse in the short-term, but could provide minor, long-term benefits to the land cover of the JOF should the vegetative closure cap be selected.

Proposed soil excavation activities associated with borrow site development would remove approximately 44 acres of vegetation including 35 acres of hardwood forest and 9 acres of common herbaceous vegetation. There is abundant deciduous forest habitat (23,354 acres) of similar quality within a 5-mile radius of JOF, and the vegetation in the borrow area is common and representative of the region. Therefore, no direct or indirect impacts to unique or important terrestrial plant communities are anticipated. Based on the low area of impacted forest in comparison to the abundance of similar habitats within the 5-mile vicinity, overall impacts to forest resources would be minor.

3.7.2.3 Alternative C – Coal Yard Full Cap Closure

Vegetation impacts are anticipated to be the same as Alternative B. Therefore, impacts would be minor.

3.7.2.4 Alternative D – Remove Coal Yard Material and Close

Impacts associated with removal of the unburned coal and sediment from the coal yard runoff pond that is stockpiled on the coal yard, construction of the process water basin and development of the borrow site would be the same as Alternatives B and C. However, under Alternative D, once the coal yard material is removed, the site would be graded for proper drainage and reseeded with vegetation on areas of bare soil and naturalized plant communities would reestablish within the limits of the former coal yard. The offsite transport of material excavated from the coal yard would not result in additional impacts to offsite vegetation communities because the materials would be disposed at a licensed and permitted facility. Therefore, impacts would be minor. However, a minor amount of increased naturalized habitat would offer improved long-term benefits to the land cover of JOF compared to Alternatives B and C.

3.8 Wildlife

3.8.1 Affected Environment

Wildlife likely to occur in the project area are expected to be those species common to the available habitats. As described in Section 3.7 (Vegetation), plant communities are

classified as primarily developed and/or very early successional habitats in and around the coal yard project area (includes the coal yard and coal yard runoff pond), most of the north rail loop project area, as well as the laydown area. The north rail loop also has fragments of deciduous forest remaining between roads and early successional habitats. The borrow site is dominated by both herbaceous grassland and old field areas within the existing transmission line easement clearing areas, and deciduous forests in the main borrow area. The coal yard and laydown areas have very limited wildlife habitat, whereas the herbaceous and deciduous forest areas associated with the borrow site contain more suitable habitat to support a more diverse wildlife community.

Deciduous forests within the borrow site project area and north rail loop provide habitat for common reptiles including eastern fence lizard, ground skink, five-lined skink, eastern box turtle, common garter snake, eastern worm snake, black racer, and ring-necked snake. Numerous bird species also nest in deciduous forests including wild turkey, ruby-throated hummingbird, red-eyed vireo, wood thrush, gray catbird, black-and-white warbler, ovenbird, hooded warbler, and scarlet tanager. Mammals that inhabit deciduous forests in this region include white-tailed deer, eastern gray squirrel, gray fox, eastern chipmunk, and eastern mole. Mature trees and trees with cavities and exfoliating bark found in these forests can also provide summer-roosting habitat for common bats including big brown bats, evening bats, and red bats. The bottomland forest habitat that occurs within the northwest portion of the borrow site project area may provide habitat for birds, including Acadian flycatcher, prothonotary warbler, red-winged blackbird, song sparrow, swamp sparrow, and white-throated sparrow. Midwestern worm snake, ringneck snake, rough green snake, eastern garter snake and black rat snake, are common reptiles often present within this habitat type. Amphibians likely found in bottomland forested areas include salamanders, eastern narrowmouth toad, eastern spadefoot toad, Fowler's toad, gray treefrog, and southern leopard frog.

Herbaceous vegetation, dominated by early successional habitats within the cleared transmission line easement portions of the proposed borrow site, and to a lesser extent in the coal yard, north rail loop and laydown area, provide habitat for common bird species, such as Canada goose, eastern meadowlark, European starling, killdeer, field sparrow, song sparrow, indigo bunting, wild turkey, red-winged blackbird, Carolina wren, and mourning dove. White-tailed deer, eastern cottontail, striped skunk, and rodents such as the white-footed mouse are also frequently associated with early successional habitats. Reptiles generally found in these habitats include southern black racer, gray rat snake, and eastern garter snake.

Review of the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation database (https://ecos.fws.gov/ipac/) resulted in identification of 12 migratory birds of conservation concern that have the potential to occur within the project area: blue-winged warbler, cerulean warbler, eastern whip-poor-will, golden eagle, Kentucky warbler, Le Conte's sparrow, lesser yellow legs, prairie warbler, red-headed woodpecker, rusty blackbird, semipalmated sandpiper, and wood thrush. The forested and herbaceous habitats within the project areas offer a small amount of habitat for several of these species. Although the shorebird species in the USFWS list may use the coal yard runoff pond and other habitats in the project area intermittently, these areas do not provide suitable habitat due to the highly disturbed, low quality habitats that occur in this industrial setting. Two records of colonial wading bird colonies exist within 3 miles of JOF. The nearest viable record is approximately 1.0 mile from the JOF project areas. One record of osprey exists approximately 2.4 miles from the project areas. No aggregations of birds or colonial wading

bird colonies were documented within any of the project areas during field reviews on February 14 and 15, 2018. Field reviews in July 2018 observed seven additional active osprey nests on lighting structures around the coal yard project area.

Review of the TVA Regional Natural Heritage database on January 19, 2018, resulted in no records of caves within 3 miles of any of the project areas. No new caves were found during field reviews on February 14 and 15, 2018. No other unique terrestrial habitat is known from within 3 miles of the project areas.

3.8.2 Environmental Consequences

3.8.2.1 Alternative A – No Action Alternative

Under this alternative, there would be no environmental impacts to the habitats of terrestrial wildlife species.

3.8.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

Closure of the coal yard (including removal of the coal stockpile), closure of the coal yard runoff pond and process water basin construction (at Location 1 or 2) would occur within a highly disturbed and fragmented industrial landscape that offers minimal habitat for wildlife. Resident wildlife found in the coal yard project area would opportunistically use available habitats within the surrounding area and no tree clearing would occur in conjunction with these activities. Therefore, no direct impacts would occur to tree roosting/nesting bird or mammal species. However, direct effects to species that use disturbed, fragmented industrial areas could occur to immobile individuals (eggs, juveniles) should they occur in the coal yard project area at the time of construction. The process water basin may provide a small amount of marginal habitat intermittently used by waterfowl. Due to the previously disturbed nature of the coal yard project area, impacts to wildlife are considered minor.

The temporary laydown area is located on land previously disturbed, fragmented, and of poor quality for use by wildlife. Wildlife habituated to the area are expected to move to other suitable environments offsite which are plentiful; however, as described above, immobile species may be impacted should they be present in the laydown area at the time of use. Post construction, these areas would return to their previous state. Overall, impacts to wildlife utilizing these areas would be minor and temporary.

Construction of the process water basin in the north rail loop area (Location 3) would require removal of approximately 6.6 acres of fragmented deciduous forest. Some early successional habitat would also be removed. These forest fragments range from 0.2-3.06 acres in size and are divided by roads and early successional habitats. Due to the small size of these forest fragments and the heavy disturbance that consistently occurs in the north rail loop, common, habituated, opportunistic species are likely the only wildlife to utilize these areas. Direct effects could occur to immobile individuals (eggs, juveniles) should they occur in action areas at the time of construction. Mobile individuals disturbed by habitat removal would likely relocate in nearby forests and early successional habitats. Therefore, populations of common wildlife are not likely to be impacted by proposed actions in the north rail loop.

Development of the borrow area would include removal of approximately 35 acres of forested lands 9 acres of common herbaceous vegetation. Any wildlife (primarily common species) found in the impacted areas would be permanently displaced when vegetation is removed. Direct effects to common wildlife may occur to some individuals that may be immobile during the time of project activities (i.e. juveniles or eggs). This could be the case

if project activities took place during breeding/nesting seasons. However, the actions are not likely to affect populations of species common to the area since the impacts are relatively isolated across the landscape and similar habitat is available immediately adjacent to the project where mobile individuals can move in case of disturbance.

Based on the small amount of fragmented habitat and the significant amount of disturbance in the areas immediately adjacent to all project areas, populations of migratory birds of conservation concern are not likely to inhabit the proposed project areas. Migratory bird populations are not likely to be impacted by any of the proposed actions.

One record of an osprey nest was previously recorded approximately 2.7 miles from the coal yard project area. Field reviews in July 2018 observed seven additional active osprey nests on lighting structures around the coal yard project area. No nests would be removed in association with the proposed actions. Birds nesting around the coal yard project area are acclimated to frequent, loud disturbances caused by the functioning of JOF and the JCT. A commitment has been made that no activities would occur that may cause additional disturbance beyond what these ospreys are accustomed to while the nests are occupied and active (typically March-July). Because of this commitment, no direct or adverse effects to nesting osprey would occur as a result of the proposed actions.

While the proposed actions would result in alteration of habitats and displacement of resident wildlife species, impacts to wildlife are not expected to result in notable large-scale habitat alteration or destabilization of any wildlife species. Therefore, impacts to wildlife resulting from the implementation of Alternative B would be minor.

3.8.2.3 Alternative C – Coal Yard Full Cap Closure

Alternative C would result in similar impacts to wildlife and habitats as described under Alternative B. Therefore, impacts would be minor.

3.8.2.4 Alternative D – Remove Coal Yard Material and Close

Alternative D would result in similar impacts to wildlife and habitats as described under Alternative B and C. However, closure of the coal yard under this alternative would include excavation of the coal remnants and bottom ash/spent-bed material fill within the extent of the current footprint of the coal yard. Once the coal yard material is removed, the site would be graded for proper drainage and reseeded with vegetation on areas of bare soil. Because there would be no maintained cover system in the former coal yard, following construction these lands may be expected to undergo succession to naturalized habitats after they are re-seeded and that may offer somewhat improved habitat quality as compared to Alternatives B and C. Therefore, impacts would be minor; however, naturalized habitat would offer improved quality as compared to Alternatives B and C.

The excavated material would be transported to and existing permitted landfill and as such would not result in in additional impacts to offsite wildlife and habitats.

3.9 Aquatic Ecology

3.9.1 Affected Environment

JOF is in Humphreys County, Tennessee, in the Western Highland Rim subregion of the Interior Plateau ecoregion. The proposed project area is located along the eastern bank of the Tennessee River (Kentucky Reservoir) and lies within the Tennessee River 10-digit Hydrologic Unit Code watershed 0604000504 (TVA 2015c).

The Western Highland Rim of the Interior Plateau is characterized by dissected, rolling terrain of open hills, with elevations of 400 to 1,000 feet. Soils in this region tend to be acidic, cherty, and moderate in fertility. Streams in this region are relatively clear with moderate gradients, with substrates consisting primarily of course chert gravel and sand with some bedrock. Much of the region is heavily forested, with some agriculture in the stream and river valleys. The project areas are located on the east bank of the Tennessee River (Kentucky Reservoir) between TRMs 99.0 and 101.7. The reach of the Tennessee River adjacent to JOF has been altered from its former free-flowing character by the presence of Kentucky Dam, located approximately 76 river miles downstream of JOF, and Pickwick Dam, located approximately 107 river miles upstream (TVA 2015c). The portion of the Kentucky Reservoir near JOF is characterized as wide, shallow, contains a high density of aquatic vegetation with numerous small islands that separate the left and right banks (TVA 2012). As noted in Chapter 3.5, TVA began a program to monitor the ecological conditions of its reservoirs systematically in 1990. Reservoir (and stream) monitoring programs were combined with TVA's fish tissue and bacteriological studies to form an integrated Vital Signs Monitoring Program. The Program activities focus on physical/chemical characteristics of waters and sediments, benthic macroinvertebrate community sampling, and fish assemblage sampling (TVA 2015c).

Benthic macroinvertebrates are included in the monitoring program because of their importance to the aquatic food chain and because they have limited capability of movement, thereby preventing them from avoiding undesirable conditions. Benthic macroinvertebrate sampling and data analysis from TVA's reservoir monitoring program is based on seven parameters that include:

1. species diversity,
2. presence of selected taxa that are indicative of good water quality,
3. occurrence of long-lived organisms,
4. total abundance of all organisms except those indicative of poor water quality,
5. proportion of total abundance comprised by pollution-tolerant oligochaetes,
6. proportion of total abundance comprised by the two most abundant taxa, and
7. proportion of samples with no organisms present.

The closest benthic monitoring locations near JOF are approximately at TRM 85, 94, 98, 104, and 106. The monitoring location at TRM 85, the site closest to JOF, has been sampled numerous times since 1994 scoring "excellent" since 1997. Monitoring locations at TRM 94, 98, 104, and 106 were only sampled in 2011. All four of these locations scored "excellent" as well (TVA 2012). Oligochaetes, chironomids, and Asiatic clams were the dominant taxa encountered near the JOF during these sampling efforts (TVA 2012).

TVA initiated a study in 2001 to evaluate fish communities in areas immediately upstream and downstream of JOF using Reservoir Fish Assemblage Index (RFAI) multi-metric evaluation techniques. Fish are included in aquatic monitoring programs because they are important to the aquatic food chain and because they have a relatively long life cycle which allows them to reflect conditions over time. Fish are also important to the public for

aesthetic, recreational, and commercial reasons. Electrofishing and gill netting was conducted as part of the RFAI. Monitoring locations closest to JOF were at TRM 85, 97, and 105. Monitoring results for each sampling station were analyzed to arrive at a RFAI rating which is based primarily on fish community structure and function. Also considered in the rating is the percentage of the sample represented by omnivores and insectivores, overall number of fish collected, and the occurrence of fish with anomalies such as diseases, lesions, parasites, or deformities. The fish community monitoring results are identified in Table 3-6. Overall results indicate that the Kentucky Reservoir fish assemblage near the JOF has been consistently "Good" since 2001 (TVA 2015c). Commonly encountered fish species included bluegill, longear sunfish, redear sunfish, gizzard shad, largemouth bass, spotted bass, white crappie, black crappie, channel catfish, flathead catfish, common carp, Mississippi silverside, logperch, emerald shiner, golden shiner and mimic shiner (TVA 2012).

Table 3-6. Reservoir Fish Assemblage Index Scores Near the Johnsonville Fossil Plant From 2001 to 2011

Station	TRM 105	TRM 97	TRM 85
2001	Good	Good	Good
2003	Good	Good	Good
2005	Good	Good	Good
2007	Good	Good	Good
2009	-	-	Good
2010	Good	Good	-
2011	Good	Good	Good

Source: TVA 2015c

Given the "excellent" scores for the benthic community and "good" scores for the fish community in the monitoring locations nearest the JOF, these results indicate a healthy benthic and fish community (TVA 2015c).

Little Indian Creek, a tributary to the Kentucky Reservoir, lies within the proposed project area. Due to its relatively small size, the fish and benthic invertebrate communities in the creek are expected to have a more simple species composition similar to that of other small tributary streams that drain to the Kentucky Reservoir. The coal yard runoff pond does contain free-standing water but does not provide habitat for aquatic biota since it is considered a treatment system. Discharge from the coal yard runoff pond is currently pumped and discharged through the NPDES permitted outfall.

3.9.2 Environmental Consequences

3.9.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not implement the proposed projects; consequently, no impacts to aquatic ecology would occur.

3.9.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

Since there are no aquatic habitats within the coal yard or the coal yard runoff pond, or north rail loop, direct impacts to aquatic biota associated with the closure of these facilities or construction of the process water basins are not anticipated. Indirect impacts to adjacent

water bodies from storm water runoff due to temporary construction activities associated with site preparation and closure activities could occur, but construction activities would adhere to SWPPP and construction storm water permit limit requirements, including the use of BMPs to minimize indirect effects on aquatic resources during the construction phase. Following construction, care and maintenance of the approved closure systems and site-wide management of storm water using appropriate BMPs and a new permitted storm water outfall would minimize indirect impacts to the aquatic community in the receiving waters.

Construction of the NPDES process water outfall on the shoreline of the Tennessee River (Kentucky Reservoir) may have some temporary direct impacts on aquatic biota. Impacts would be minor for mobile aquatic resources, such as fish, that would likely avoid sections of the river during construction of the outfall and quickly repopulate reservoir sections shortly after construction activities. Less mobile aquatic organisms (aquatic macroinvertebrates) may be directly impacted by placement of rock at the outfall during construction. However, the area of impact would be very small, and many macroinvertebrate species would repopulate quickly. The discharges from this outfall during its operation would meet permit limits, and sampling would be performed at the outfall structure in accordance with the NPDES permit requirements.

The transport of unburned coal and sediment from the coal yard runoff pond that is stockpiled on the coal yard to the West Camden Sanitary Landfill or to both the landfill and CUF as part of the coal reclamation process would utilize existing roadways; therefore, no additional impacts to aquatic resources due to the transportation of material is anticipated.

A borrow site would be established at the location shown in Figure 1-1. Access to the borrow site would be provided by an existing road which crosses Indian Creek on an existing bridge. No work is planned or expected for this bridge; thus, impacts to Indian Creek are not anticipated. Within the borrow site, Little Indian Creek would be crossed by installing a temporary culvert. The temporary culvert crossing of the stream would be used to maintain the flows while the borrow site is in use but would be removed once borrow site use is complete and the stream channel would be restored to its previous condition.

Direct impacts to aquatic habitat of the creek would be limited to stream alteration from the culvert installation. This activity would be done in compliance with applicable TDEC ARAP/401 and USACE 404 permits obtained for the proposed action. The direct impacts would be minor for mobile aquatic resources (fish) of Little Indian Creek that would likely avoid sections of the stream during culvert construction and quickly repopulate altered stream reaches following construction completion. Less mobile aquatic resources (aquatic macroinvertebrates) would be directly impacted during culvert construction. However, many macroinvertebrate species would repopulate quickly through their mobile adult phase of life. Indirect impacts to aquatic resources of Little Indian Creek may be associated with storm water runoff due to temporary construction activities associated with borrow site use and development. Borrow site activities would adhere to permit limit requirements and would utilize sedimentation and erosion BMPs (i.e., silt fencing, wattles, seeding) to minimize indirect effects on aquatic resources during the construction and stream channel restoration phase.

Based on the analysis summarized above, impacts associated to aquatic resources would be minor and temporary.

3.9.2.3 Alternative C – Coal Yard Full Cap Closure

Impacts to aquatic ecology for this alternative would be the same as described for Alternative B. Therefore, impacts would be minor and temporary.

3.9.2.4 Alternative D – Remove Coal Yard Material and Close

Impacts to aquatic resources under Alternative D would be the same as those described for Alternatives B and C. Therefore, impacts would be minor and temporary.

3.10 Threatened and Endangered Species

3.10.1 Affected Environment

The Endangered Species Act, 16 United States Code [USC] §§ 1531-1543, was passed to conserve the ecosystems upon which endangered and threatened species depend, and to conserve and recover those species. An endangered species is defined by the ESA as any species in danger of extinction throughout all or a significant portion of its range. A threatened species is defined as one likely to become endangered within the foreseeable future throughout all or a significant part of its range. Critical habitats, essential to the conservation of listed species, also can be designated under the ESA. The ESA establishes programs to conserve and recover endangered and threatened species and makes their conservation a priority for Federal agencies. Section 7 of the ESA requires federal agencies to consult with the USFWS when their proposed actions may affect endangered or threatened species and their critical habitats.

The State of Tennessee provides protection for species considered threatened, endangered or deemed in need of management within the state other than those already federally listed under the ESA. Plant species are protected in Tennessee through the Rare Plant Protection and Conservation Act of 1985. The listing of species is managed by TDEC. Additionally, TVA also maintains databases of aquatic and terrestrial animal and plant species that are considered threatened, endangered, or of special concern, or are otherwise tracked in Tennessee because the species is rare and/or vulnerable within the state.

A review of the USFWS Information for Planning and Consultation tool, the TDEC rare species list, and the TVA Regional Natural Heritage database for species of conservation concern potentially present within the project area was conducted (Table 3-7). In addition, two separate field surveys within the project areas were conducted (November 2017 and February 2018) to assess the potential for the presence of threatened and endangered species.

Table 3-7. Species of Conservation Concern Within Humphreys County and Within the Vicinity of the JOF

Common Name	Scientific Name	Status		Suitable Habitat Present on the Project Sites[7]
		Federal[4]	State Rank[5] (Status[6])	
Birds[1]				
Bald eagle	*Haliaeetus leucocephalus*	DM	S3 (D)	P
Bewick's wren	*Thryomanes bewickii*	--	S1 (E)	P
Little blue heron	*Egretta caerulea*	--	S2B, S3N (D)	P
Piping plover	*Charadrius melodus*	LT	--	P
Mammals[1]				
Gray bat	*Myotis grisescens*	LE	S2 (E)	P
Indiana bat	*Myotis sodalis*	LE	S1 (E)	P
Little brown bat	*Myotis lucifugus*	--	S3	P
Northern long-eared bat	*Myotis septentrionalis*	LT	S1S2	P
Reptiles[1]				
Alligator snapping turtle	*Macrochelys temminckii*	--	S2S3 (D)	N
Northern pine snake	*Pituophis melanoleucus*	--	S3 (T)	P
Western pygmy rattlesnake	*Sistrurus miliarius streckeri*	--	S2S3 (T)	P
Fish[2]				
Blotchside logperch	*Percina burtoni*	--	S2 (D)	N
Blue sucker	*Cycleptus elongatus*	--	S2 (T)	N
Coppercheek darter	*Etheostoma aquali*	--	S2S3	N
Golden darter	*Etheostoma denoncourti*	--	S2	N
Highfin carpsucker	*Carpiodes velifer*	--	S2S3	N
Pygmy madtom	*Noturus stanauli*	LE	S1 (E)	N
Saddled madtom	*Noturus fasciatus*	--	S2 (T)	N
Slenderhead darter	*Percina phoxocephala*	--	S3 (D)	N
Mollusks[2]				
Clubshell	*Pleurobema clava*	LE	SH (E)	N
Helmet rocksnail	*Lithasia duttoniana*	--	S2 (Rare)	N
Orange-foot pimpleback	*Plethobasus cooperianus*	LE	S1 (E)	N
Ornate rocksnail	*Lithasia geniculate*	--	S2	N
Painted creekshell	*Villosa taeniata*	--	--	N
Pink mucket	*Lampsilis abrupta*	LE	S2 (E)	N
Pistolgrip	*Tritogonia verrucose*	--	S4	N
Purple Lilliput	*Toxolasma lividus*	--	S1S2	N
Ring pink	*Obovaria retusa*	LE	S1 (E)	N
Rough pigtoe	*Pleurobema plenum*	LE	S1 (E)	N
Salamander mussel	*Simpsonaias ambiqua*	--	S1 (Rare)	N
Slabside pearlymussel	*Pleuonaia dolabelloides*	LE	S2	N
Smooth rabbitsfoot	*Quadrula cylindrica*	LT	S3 (Rare)	N
Spectaclecase	*Cumberlandia monodonta*	LE	S2S3	N
Plants[3]				
American ginseng	*Panax quinquefolius*	--	S3S4 (S-CE)	N
Bearded rattlesnake-root	*Prenanthes barbata*	--	S2 (S)	N
Blue mud-plantain	*Heteranthera limosa*	--	S1S2	N
Fen orchid	*Liparis loeselii*	--	S1 (T)	N

Common Name	Scientific Name	Status		Suitable Habitat Present on the Project Sites[7]
		Federal[4]	State Rank[5] (Status[6])	
Fraser loosestrife	*Lysimachia fraseri*	--	S2 (E)	P (limited)
Hairy umbrella-sedge	*Fuirena squarrosa*	--	S1 (S)	N
Heller's catfoot	*Pseudognaphalium helleri*	--	S2 (S)	N
Lamance iris	*Iris brevicaulia*	--	S1 (E)	P (limited)
Pubescent sedge	*Carex hiritfolia*	--	S1S2 (S)	P (limited)
Reniform sedge	*Carex reniformis*	--	S1 (S)	P (limited)
River bulrush	*Bolboschoenus fluviatilis*	--	S1 (S)	P (limited)
Short's rock-cress	*Boechera shortii*	--	S1S2 (S)	P (limited)
Short-beaked arrowhead	*Sagittaria brevirostra*	--	S1 (T)	P (limited)
Smaller mud-plantain	*Heteranthera limosa*	--	S1S2 (T)	N
Sweet-scented Indian-plantain	*Hasteola suaveolens*	--	S2 (S)	N
Sweetscent Ladies'-tresses	*Spiranthes odorata*	--	S1 (E)	P (limited)
Virginia rose	*Rosa virginiana*	--	--	N
Walter's barnyard grass	*Echinochloa walteri*	--	S1 (S)	P (limited)

Sources: USFWS IPaC 2018, TDEC 2018a, TVA Natural Heritage Database 2018, The Tennessee Bat Working Group species occurrence maps (http://www.tnbwg.org/index.html), accessed 3/5/2018

[1] Federally-listed species documented in Humphreys County, Tennessee and state-listed species within 3 miles, of the project areas.

[2] Documented in Humphreys County, Tennessee, and/or within 10 miles of the project areas

[3] Documented in Humphreys County, Tennessee, and/or within 5 miles of the project areas

[4] Federal Status Codes:

LE = Listed Endangered
-- = Not Listed by USFWS
LT = Listed Threatened; First Five Years
DM = Delisted Taxon, Recovered, Being Monitored

[5] State Status Codes:

E = Listed Endangered
S = Species of special concern
T = Listed Threatened
Rare = Rare, but not state listed
CE = Commercially Exploited

[6] State Rank:

S1 = Critically Imperiled
S2 = Imperiled
S3 = Vulnerable
S4 = Apparently Secure
S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)
S#B = Breeds in Tennessee
S#N = Occurs in Tennessee in a non-breeding status

[7] Habitat Codes:

Y = Yes, species has been documented in existing habitats in study area and suitable habitat is present
N = No, no records of species within study area and no suitable habitat is present
P = Potentially suitable habitat is present, but no records of species in study area
P (limited) = Only limited areas in the proposed site are consistent with species recorded habitat preferences, no records of species in study area. Not likely to occur as habitat is fragmented and marginal.

3.10.1.1 Terrestrial Animals

A review of the TVA Regional Heritage database on January 2018 resulted in records for five state-listed species (alligator snapping turtle, Bewick's wren, little blue heron, northern pine snake, and western pygmy rattlesnake) and one record of a federally listed species (piping plover). Additionally, a federally protected species (bald eagle) is known to be found in Humphreys County, Tennessee. Records exist for gray bat in Humphreys County, Tennessee, though the exact location is unknown. Also, though no known records exist, the

USFWS has determined the federally listed Indiana bat and northern long-eared bat have the potential to occur in Humphreys County, Tennessee (see Table 3-7).

3.10.1.1.1 Birds

Bald eagles are protected under the Bald and Golden Eagle Protection Act (USFWS 2013). This species is associated with larger mature trees capable of supporting its massive nests. These nests are usually found near larger waterways where the eagles forage (Turcotte and Watts 1999). The nearest bald eagle nesting record is approximately 3.1 miles from the JOF project areas. No bald eagles or their nests were observed in or within 660 feet of any of the project areas during field reviews performed on February 14 and 15, 2018. Bald eagle foraging habitat exists adjacent to the borrow site and coal yard in the Tennessee River.

Bewick's wren utilizes brushy areas, thickets in open country, and open woodlands. This species often builds nests within cavities of trees, as well as on ledges that are within 30 feet of the ground. Common nest sites include rock crevices, brush piles, outbuildings, and abandoned woodpecker nest cavities (Cornell Lab of Ornithology 2018). The closest record of Bewick's wren is approximately 1.3 miles from the JOF project areas. Habitat for Bewick's wren exists in the thickets and scrubby field edges in the borrow site project area. Possible nesting habitat exists within buildings adjacent to the coal yard project area and laydown area.

Little blue heron is a rare nesting species in Tennessee though migrants can sometimes be found throughout the state during summer months. They are sometimes found in colonies with other herons in West Tennessee. Little blue herons are slow, methodical feeders in freshwater ponds, lakes, marshes, and coastal wetlands (National Geographic 2002). They feed on small fish, amphibians, and aquatic invertebrates. The closest record of a little blue heron is approximately 1.8 miles away from the JOF project areas. Great egret utilizes similar habitat and forage habits as little blue herons. During a field review on February 14 and 15, 2018, suitable foraging and nesting habitat was found along shorelines within the coal yard and borrow site project areas, but no little blue herons or great egrets were seen within any of the project areas.

Piping plover forages in exposed sand flats, mudflats, sandy beaches, stream shorelines, and ephemeral ponds (USFWS 2003). The populations of piping plover that can be found in the Tennessee Valley Region are rare fall and spring migrants (Robinson 1990, Henry 2012). The closest record of piping plover occurs approximately 0.4 miles from the JOF project areas. Suitable habitat for piping plover occurs along shorelines around streams and wetlands in the borrow site project area and along shorelines around the coal yard runoff pond within the coal yard project area. Suitable habitat also occurs along shorelines along the Tennessee River (Kentucky Reservoir) adjacent to the borrow site and coal yard project areas.

3.10.1.1.2 Mammals

Little brown bat uses a wide range of habitats and often use human-made structures, caves, and hollow trees for resting and maternity sites. Foraging occurs over water, along the margins of lakes and streams, or in woodlands near water. Little brown bats hibernate in caves and mines (Campbell 2015). Maternity colonies commonly occur in warm sites in buildings and other structures and also infrequently in hollow trees. Microclimate conditions suitable for raising young are relatively narrow, and availability of suitable maternity sites may limit the species' abundance and distribution. The closest record of little brown bat is

approximately 3.0 miles from the JOF project areas. During a field review on February 14 and 15, 2018 and July 2018, it was determined foraging habitat for little brown bat exists in wooded areas along streams within the borrow site project area and wooded areas of the north rail loop. Possible roosting habitat may exist in buildings adjacent to the coal yard project area and laydown area.

Gray bat inhabits caves throughout the year, migrating among different caves across seasons (Brady et al. 1982, Tuttle 1976). During summer, bats disperse from colonies at dusk to forage for insects over streams, rivers and reservoirs (Harvey 1992). The closest record of a gray bat is approximately 6.2 miles from the JOF project areas. No known cave records exist within 3 miles of any of the project areas. No caves or other winter roosting habitat were observed in the JOF project areas during field reviews on February 14 and 15, 2018. Drinking water and foraging habitat for gray bat exists over small streams and wetlands within the borrow site project area and the coal yard runoff pond, as well as in the Tennessee River (Kentucky Reservoir) adjacent to the borrow site and coal yard project areas.

Indiana bat hibernates in caves during winter and inhabit forest areas around these caves for swarming (mating) in the fall and staging in the spring, prior to migration to summer habitat. During summer, Indiana bats roost under exfoliating bark, and within cracks and crevices of trees in mature forests with an open understory often near sources of water. Indiana bats are known to change roost trees frequently throughout the season, yet still maintain site fidelity, returning to the same summer roosting areas in subsequent years (Pruitt and TeWinkel 2007, Kurta et al. 2002, USFWS 2017). The closest known record of Indiana bat is in Benton County, Tennessee, approximately 21 miles from any of the project areas. No known cave records exist within 3 miles of any of the project areas. No other suitable winter roosting habitat is known from any of the JOF project areas, and none was found during field reviews. Drinking water for Indiana bat exists over small streams and wetlands within the borrow site project area and the coal yard runoff pond, as well as in the Tennessee River (Kentucky Reservoir) adjacent to the borrow site and coal yard project areas. Foraging habitat for Indiana bat also exists above tree canopies and along forested edges within the borrow site, coal yard, and north rail loop project areas.

The northern long-eared bat overwinters predominantly in large hibernacula such as caves, abandoned mines, and cave-like structures. During the fall and spring, they utilize entrances of caves and the surrounding forested areas for swarming and staging. In the summer, northern long-eared bats roost individually or in colonies beneath exfoliating bark or in crevices of both live and dead trees. Roost selection by northern long-eared bat is similar to Indiana bat; however, it is thought that northern long-eared bats are more opportunistic in roost site selection. This species is also known to roost in abandoned buildings and under bridges. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (Harvey et al. 2011; USFWS 2014; USFWS 2017). The closest known record of northern long-eared bat is in Perry County, Tennessee, approximately 17 miles from any of the JOF project areas. No known cave records exist within 3 miles of any of the project areas. No other suitable winter roosting habitat is known from any of the project areas and none was found during field reviews. Drinking water for northern long-eared bat exists over small streams and wetlands within the borrow site project area and the coal yard runoff pond, as well as in the Tennessee River (Kentucky Reservoir) adjacent to the borrow site and coal yard project areas. Foraging habitat for northern long-eared bat also exists under forested canopies within the borrow site, coal yard, and north rail loop project areas.

Habitat assessment surveys for Indiana bat and northern long-eared bat were performed on February 14 and 15 2018, and July 2018 using the USFWS 2017 Range-wide Indiana bat Summer Survey Guidelines. Approximately 41.7 acres were identified as potential suitable summer roosting habitat for Indiana bat and northern long-eared bat in the borrow site and north rail loop project areas.

3.10.1.1.3 Reptiles

Alligator snapping turtles are an almost entirely aquatic turtle. Only nesting females are known to leave the water (Behler and King 1979). Alligator snapping turtles use large, deep bodies of water such as lakes, rivers, and deep sloughs. They are often found among submerged logs and root snags in areas with muddy substrate. The closest record of alligator snapping turtle is approximately 1.5 miles away from the JOF project areas. Suitable habitat for alligator snapping turtle does not occur in any of the project areas. Habitat for alligator snapping turtle does exist adjacent to the coal yard and borrow site project areas in the Tennessee River (Kentucky Reservoir).

Northern pine snake is found in flat, sandy, pine barrens, sandhills, and dry mountain ridges, most often in or near pine woods (Conant and Collins 1998). They can also use scrub habitat and agricultural fields. Northern pine snakes are considered secretive because of the amount of time they spend underground in burrows. The closest record of a pine snake is approximately 2.3 miles from the JOF project areas. During a field review on February 14 and 15, 2018, suitable habitat for northern pine snake was found in the forested and early successional areas within all of the JOF project areas.

Western pygmy rattlesnake occurs in a variety of habitats, but it is generally found where water is nearby such as in river floodplains, swamps, marshes, and wet prairies (Conant and Collins 1998). The species is less common in rocky upland type habitats in pine forests. Diet consists of amphibians, reptiles, and small mammals. The closest record is approximately 2.3 miles from the JOF project areas. During a field review on February 14 and 15, 2018, suitable habitat for western pygmy rattlesnake was found in forested habitats near a stream in the borrow site project area as well as along forested areas adjacent to the Tennessee River (Kentucky Reservoir) within the borrow site and coal yard project areas.

3.10.1.2 Aquatic Animals

Listed aquatic animal species documented on the TVA Regional Heritage Database as occurring within the Tennessee River 10-digit HUC watershed (HUC 0604000504) and within a 10-mile radius of the proposed JOF project area in Humphreys County, Tennessee include eight federally listed species (see Table 3-7). Four of these are either historical or extirpated records and no longer considered extant in this portion of the Tennessee River. Additionally, one federally listed endangered fish species, the pygmy madtom, is reported to occur in the Tennessee River watershed. The pygmy madtom is an extremely rare fish which only occurs in limited reaches of the lower Duck River in this portion of the Tennessee River system and does not occur in the mainstem of the Tennessee River (Kentucky Reservoir) adjacent to JOF (Etnier and Starnes 1993). No federally designated critical habitat for these species is present within Humphreys County, Tennessee.

A November 2017 field visit identified one stream within the borrow site project area, but the stream does not provide adequate habitat for any federal and state listed species and no threatened and endangered aquatic species were found throughout the stream. There were no streams observed within the north rail loop project area during the August 2018 field visit. Therefore, no potential suitable habitat exists in the project area for aquatic species.

3.10.1.3 Plants

A review of the TVA Regional Natural Heritage database indicated that no state-listed or federally listed plant species or associated designated critical habitat are known to occur on or within 5 miles of JOF. No federally listed plant species have been previously reported in Humphreys County, Tennessee. However, 17 species of plants listed by TDEC as threatened, endangered, or species in need of management in Tennessee are known to occur within Humphrey and Benton counties (see Table 3-7). Preferred habitat for each species and the possibility of habitat within the project areas are addressed in Table 3-8.

Of the 17 state-listed species known to occur within the counties surrounding JOF, nine species may have generalized habitat requirements that potentially overlap with the habitats in the proposed JOF project areas. However, for several of these species the generalized habitat preferences (e.g., wetlands, marshes, etc.) are poorly established at JOF and are highly fragmented and degraded and as such, the habitat within the project areas range from unsuitable to very low quality for state listed threatened and endangered plant species. Therefore, because the coal yard project area, north rail loop, laydown area, and a portion of the borrow site project areas consist of previously disturbed vegetation, the potential for occurrence within the proposed project areas is considered to be low. Notably, none of these species has been observed within 5 miles of the JOF site and no threatened and endangered species were identified during the November 2017 and August 2018 field surveys.

Table 3-8. Habitat Requirements for Plant Species of Conservation Concern Within 5 Miles of the Project Area

Common Name	Scientific Name	Habitat Requirements	Habitat within Project Area
American ginseng	*Panax quinquefolius*	Rich woods[1]	N
Bearded rattlesnake-root	*Prenanthes barbata*	Barrens and dry woodlands[1]	N
Blue mud-plantain	*Heteranthera limosa*	Mud flats[1]	N
Fen orchid	*Liparia loeselii*	Calcareous seeps[1]	N
Fraser loosestrife	*Lysimachia fraseri*	Alluvial meadows, stream banks, moist pastures, roadside ditches[2]	P (limited)
Hairy umbrella-sedge	*Fuirena squarrosa*	Shores of rivers, lakes, ponds[3]	N
Heller's catfoot	*Pseudognaphalium helleri*	Dry sandy woods[1]	N
Lamance iris	*Iris brevicaulis*	Bottomlands[1]	P (limited)
Pubescent sedge	*Carex hirtifolia*	Lowland forests[1]	P (limited)
Reniform sedge	*Carex reniformis*	Rich bottomland woods[1]	P (limited)
River bulrush	*Bolboschoenus fluviatilis*	Marshes[1]	P (limited)
Short's rock-cress	*Boechera shortii*	Wooded bluffs and floodplains[1]	P (limited)
Short-beaked arrowhead	*Sagittaria brevirostra*	Swamps and floodplains[1]	P (limited)
Smaller mud-plantain	*Heteranthera limosa*	Mud flats, vernal pools of rock outcrops, shallow quiet water[4]	N
Sweet-scented Indian-plantain	*Hasteola suaveolens*	Alluvial woods, moist slopes, fens[1,4]	N
Sweetscent Ladies'-tresses	*Spiranthes odorata*	Swamps, pond margins, sand prairies, gravelly seeps, bluffs, ditches, abandoned fields[1,5]	P (limited)
Virginia rose	Rosa virginiana	Meadows and fields, dry and sometimes saline habitats[3]	N
Walter's barnyard grass	Echinochloa walteri	Bottomlands and marshes[1]	P (limited)

Source: NatureServe 2018, Minnesota Wildflowers 2018
[1] TDEC 2018a
[2] Nature Serve 2018
[3] New England Wildflower Society
[4]Minnesota Wildflowers
[5]Illinois Wildflowers
*Habitat Codes:

Y = Yes, species has been documented in existing habitats in study area and suitable habitat is present
N = No, no records of species within study area and no suitable habitat is present
P = Potentially suitable habitat is present, but no records of species in study area
P (limited) = Only limited areas in the proposed site are consistent with species recorded habitat preferences, no records of species in study area. Not likely to occur as habitat is fragmented and marginal.

3.10.2 Environmental Consequences

3.10.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not close the coal yard and coal yard pond, construct and operate a process water basin or develop a borrow site. Therefore, no impacts to threatened or endangered species, or species of conservation concern or any suitable habitat would occur under this alternative.

3.10.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

Under Alternative B, potential impacts to threatened and endangered species would be associated with earthmoving activities and disturbance related to the closure of the coal yard and coal yard runoff pond, installation of the cap system, construction of the process water basin, and usage of the laydown yard area. Additionally, potential impacts to threatened and endangered species would occur within approximately 35 acres of bottomland hardwood forest that would be removed in the borrow site project area and 6.6 acres of deciduous forest would be removed in the north rail loop Area if that location is chosen for the process water basin. However, since no known records of any of the listed species occur within the JOF project areas, it is unlikely that populations of any of the listed species would be impacted by the project.

No suitable habitat for alligator snapping turtle exists within the project areas. However, implementation of BMPs would protect alligator snapping turtle habitat within the Tennessee River (Kentucky Reservoir) that is adjacent the borrow site and coal yard project areas. With the implementation of BMPs, all proposed activities would not have any measurable effects on alligator snapping turtle.

Habitat for Bewick's wren exists in the thickets and scrubby field edges in the borrow site and coal yard. Possible nesting habitat exists within buildings adjacent to the coal yard and laydown area. Direct effects to Bewick's wren may occur to some individuals that may be immobile during the time of project activities (i.e. juveniles or eggs). This could be the case if project activities took place during breeding/nesting seasons. However, similar suitable habitat exists in the vicinity of the project areas that would provide alternative nesting sites. Therefore, all proposed project activities would not adversely affect populations of Bewick's wren.

Foraging and nesting habitat for little blue heron and piping plover exists along the shorelines of streams and wetlands within the borrow site and coal yard project areas, as well as along shorelines of the Tennessee River (Kentucky Reservoir) adjacent to the borrow site and coal yard project areas. A small amount of possible foraging habitat also exists on the shoreline of the coal yard runoff pond that would be removed during closure and construction of the process water basin. Bald eagle foraging habitat also exists adjacent to the borrow site and coal yard project areas in the Tennessee River (Kentucky Reservoir). No records of these species occur within the JOF project areas. During field reviews on February 14 and 15, 2018, no bald eagles, little blue herons, or piping plovers were observed within any of the project areas. Also, no heronries or eagle nests were seen within 660 feet of any of the project areas. Implementation of BMPs would minimize impacts to bald eagle, little blue heron, and piping plover foraging habitat. With the implementation of BMPs, project activities would have no measurable effect on bald eagle, little blue heron, and piping plover.

Habitat for northern pine snake and western pygmy rattlesnake exists within the proposed project areas. Both of species have the potential to be directly affected by clearing and

excavation activities (i.e. crushing) in all project areas. Northern pine snake eggs also have the potential to be directly affected if nests are disturbed during excavation activities at the borrow site and coal yard. However, similar suitable habitat exists in the vicinity of all the project areas. Proposed project activities would not affect populations of northern pine snake and western pygmy rattlesnake.

Several activities (vegetation removal, grubbing, grading) associated with this alternative have potential to affect the federally listed gray bat, Indiana bat, northern long-eared bat, and state-listed little brown bat. Exposure of Indiana bat, northern long-eared bat, and little brown bat to noise has potential to occur when machinery or heavy equipment is in use and is taking place near a roost occupied by a bat during the day. Noise may occur during vegetation removal, grubbing, and grading. Noise from these activities is expected to be short-term, transient, and not significantly different from urban interface or natural events that bats are frequently exposed to when present on the landscape; bats thus are unlikely to be disturbed.

Exposure of Indiana bat, northern long-eared bat, and little brown bat to the effects of tree removal has the potential to occur when bats are roosting in trees during time of removal, or when bats return to a previously occupied tree to find that the tree is no longer present. Bats may respond to the stress of roost tree removal by flushing during tree removal, falling out of the tree during tree removal, being crushed during tree removal, or selecting a different tree if a previously used tree is no longer present. Habitat assessment surveys for Indiana bat and northern long-eared bat were performed on February 14 and 15, 2018 and July 2018 using the USFWS 2017 Range-wide Indiana bat Summer Survey Guidelines. Approximately 35 acres of forest in the borrow site and 6.6 acres of forest in the north rail loop were identified as potential suitable summer roosting habitat for Indiana bat and northern long-eared bat. No records of these species have been recorded within the proposed project areas. If possible, and to avoid or minimize impacts to bats, removal of potentially suitable summer roosting habitat would occur in winter months (i.e., between November 15 and March 30).

All four bat species rely on water sources for drinking water and prey availability. Several potential water sources (i.e., some areas of existing wetlands, the coal yard runoff pond) are present within the project areas. Inputs of sediment or other pollutants into water sources resulting from vegetation removal, grubbing and grading has potential to alter water quality, which may in turn degrade drinking water and available prey sources. Bats may be exposed to the adverse impacts of sedimentation and pollutants when activities with ground disturbance or use of chemicals (or fuels) are conducted near or adjacent to water sources that these bats use for foraging and drinking. Bats may respond to these stressors by experiencing reduced health, reduced feeding success, death, or by seeking alternate sources for drinking, foraging and roosting, which may result in increased energy expenditures. Operations involving chemical or fuel storage or resupply and vehicle servicing would be handled outside of riparian zones and away from aquatic features (e.g., wetlands) and in such a manner as to prevent these items from reaching a watercourse. Effective means would be installed to protect stream channels from direct surface runoff. Servicing would be done with care to avoid leakage, spillage, and subsequent stream, wetland, or ground water contamination. Oil waste, filters, and other litter would be collected and disposed of properly. Therefore, when compared to existing conditions, the proposed project is not likely to impact bat drinking water sources.

All activities discussed above (vegetation removal, grubbing and grading) are covered in TVA's programmatic ESA Section 7 consultation on federally listed bats and routine actions carried out or permitted by TVA (TVA 2017). As determined by this programmatic consultation, none of these activities is likely to adversely affect the gray bat. Grubbing and grading are not likely to adversely affect Indiana bat or northern long-eared bat. Vegetation removal (i.e., removal of suitable summer roost trees) may directly and adversely affect these two species if removal occurs when bats are present on the landscape. Removal of potentially suitable summer roosting habitat would occur if possible in winter months (between November 15 and March 31) and, regardless of season of removal, would be tracked, documented and reported to the USFWS. As part of TVA's ESA programmatic consultation, removal of potentially suitable summer roosting habitat during time of potential occupancy has been quantified and minimized programmatically. If removal of suitable summer roosting habitat needs to occur when bats are present on the landscape, the project would be required to make a monetary contribution to a TVA-managed conservation fund (based on amount of habitat removed) dedicated to future conservation and recovery efforts for federally listed bats. The project could also opt to conduct seasonal bat presence/absence survey (e.g., mist netting or emergence counts). If no bats are detected, trees could be cut at any time of year without penalty. An added benefit of this approach is the opportunity to gain increased knowledge of bat presence on the landscape while continuing to carry out TVA's broad mission and responsibilities. Given the relatively small amount of suitable habitat (approximately 41.7 acres) proposed for removal, and the abundance of available habitat within the TVA region (TVA 2017) implementation of this alternative is anticipated to have a negligible impact on available bat habitat within the region.

A number of activities associated with the proposed action, including tree clearing, were addressed in TVA's programmatic biological assessment on routine actions and federally listed bats in accordance with ESA Section 7(a)(2) (TVA 2017). For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. Therefore, direct and indirect impacts to federally listed bat species are expected to be minor. These activities and associated conservation measures are identified in TVA's Bat Strategy Project Screening Form (Appendix C).

For the federal and state-listed aquatic species, 22 aquatic species are known to occur within the counties surrounding JOF. There is one perennial stream, Little Indian Creek, identified within the proposed borrow site project area that discharges into the Tennessee River (Kentucky Reservoir. All of the federal and state listed aquatic species occur in larger river systems such as the Tennessee, Cumberland, and Duck Rivers and none of the fish and mollusk species listed to occur within the vicinity of JOF have habitat requirements that overlap with the habitats of the proposed project areas. Impacts to federally and state-listed species would result in no effect because their habitat requirements are not consistent with the site conditions.

No federally listed plant species is known from the county and no habitat suitable for federally listed plant species was observed during field surveys. Consequently, the proposed project would have no effect on federally listed plant species.

Of the 17 state-listed plant species known to occur within the counties surrounding JOF, nine species have generalized habitat preferences that overlap with the observed habitats within the proposed project areas. However, for several of these species the generalized habitat preferences (e.g., wetlands, marshes, etc.) are poorly established at JOF and are

highly fragmented and degraded. Therefore, the habitat within the project areas range from unsuitable to very low quality for state listed threatened and endangered plant species. No listed species are known to occur within the project areas as there have been no records to date and no species were found during the field surveys in November 2017. Therefore, impacts to state-listed plant species are not anticipated.

The project is not expected to result in long-term impacts to listed species. There are no records of any listed species within the proposed JOF project areas. Although the project would impact potential suitable habitats for several of the species, these species were not found during field surveys, and there is an abundance of suitable habitat in the surrounding areas. Use of BMPs and timing of tree removal to occur during winter months would help to ensure that any potential direct impacts to individuals using those habitats would be minimized or avoided.

3.10.2.3 Alternative C – Coal Yard Full Cap Closure

Under Alternative C, impacts to threatened and endangered species are anticipated to be the same as Alternative B.

3.10.2.4 Alternative D – Remove Coal Yard Material and Close

Impacts to threatened and endangered species are anticipated to be the same as Alternatives B and C.

3.11 Wetlands

3.11.1 Affected Environment

The USACE regulates the discharge of fill material into waters of the United States including wetlands, pursuant to Section 404 of the CWA (33 USC 1344). Additionally, EO 11990 (Protection of Wetlands) requires federal agencies to avoid, to the extent possible, adverse impacts to wetlands and to preserve and enhance their natural and beneficial values.

As defined in Section 404 of the CWA, wetlands are those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands and wetland fringe areas also can be found along the edges of many watercourses and impounded waters (both natural and man-made). Wetland habitat provides valuable public benefits including flood storage, erosion control, water quality improvement, wildlife habitat, and recreation opportunities.

Wetlands were identified on National Wetland Inventory maps within proposed project areas and fieldwork was conducted to confirm mapped resources, identify additional resources, and provide for more accurate mapping of those resources. A field survey team performed wetland and stream delineations within the proposed borrow site, coal yard and laydown areas in November 2017 (Amec Foster Wheeler 2018) and in the north rail loop in August 2018 (Wood 2018). The survey team consisted of two biologists with training and expertise in waters of the U.S. delineations and specific knowledge and expertise in local flora, fauna, and soils. Potential jurisdictional wetlands were evaluated in accordance with the Regional Supplement to the USACE Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0).

As summarized in Table 3-9, the field delineations identified approximately 5.2 acres of wetland features within the project areas. These areas are shown on Figure 3-2. Final determinations regarding jurisdiction and mitigation measures, if needed, would be identified during the Section 404 permitting process.

Table 3-9. Summary of Wetland Features Identified Within the Project Area

Feature Type	Coal Yard Project Area (acres)	North Rail Loop (acres)	Laydown Area (acres)	Borrow Site (acres)	Total
Emergent Wetlands	0.25	0.23		3.2	3.7
Forested Wetlands		0.13		1.4	1.5
Total	**0.25**	**0.36**	**0**	**4.6**	**5.2**

Sources: Amec Foster Wheeler 2018 and Wood 2018

Land use/land cover data within a 5-mile radius of the project areas shows that wetlands comprise approximately 7.7 percent (3,885 acres) of emergent herbaceous and woody wetlands) of the surrounding lands (see Table 3-4) Therefore, the emergent and forested wetlands within the proposed project areas comprise approximately 0.1 percent of the wetlands within a 5-mile radius. Further, the project areas are in the Interior Plateau Level III ecoregion and as reported by TVA, there are approximately 35,904 acres of emergent wetland and 313,600 acres of forested wetland within the boundaries of this ecoregion contained within the 82,000 square mile TVA power service area (TVA 2018b).

3.11.2 Environmental Consequences

3.11.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not undertake any proposed construction activities. As a result, there would be no impacts to wetland resources with this alternative.

3.11.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

One forested wetland was delineated in the west peninsula (WET-01) within the proposed coal yard project area. As part of the proposed construction of the process water basin, a NPDES permitted outfall would be built to discharge into the Tennessee River (Kentucky Reservoir). The pipeline would be installed on top of the peninsula and would avoid direct impact to the WET-01. Appropriate BMPs would be followed and site-specific erosion control plans would be implemented to minimize potential indirect impacts, including erosion and sedimentation during trenching and installation of the pipeline. Therefore, indirect impacts to wetland areas due to construction activities would be short-term and minor. Accordingly, no impacts to wetlands associated with closure of the coal yard, coal yard runoff pond or construction of the process water basin in Location 1 or 2 would occur.

A total of 0.36 acres of wetlands (WET-04, WET-05 and WET-06) were identified in the north rail loop (Figure 3-2 and Table 3-9). WET-04 and WET-06 have no direct connection to streams or other wetlands and may be considered isolated. WET-05 is separated by a paved road; however, it appears to be connected to a larger wetland area during high flow periods. The proposed process water basin would avoid direct impacts to WET-04 and WET-05. However, construction and operation of the process water basin in the north rail loop (Location 3) would result in a direct loss of 0.13 acre of forested wetland (WET-06). Impacts to this wetland were minimized to the extent practicable, but engineering constraints associated with the siting of the process water basin did not allow avoidance. There was no practicable alternative to avoiding impacts to the wetland. Unavoidable direct impacts to wetlands would be mitigated as required by both state and federal agencies in accordance with the Tennessee Water Quality Control Act and Section 404 of the CWA. Therefore, implementation of Alternative B would be consistent with EO 11990.

The transport of unburned coal and sediment from the coal yard runoff pond that is stockpiled on the coal yard to the West Camden Sanitary Landfill and/or to CUF would utilize existing roadways; therefore, no additional impacts to wetland resources due to the transportation of material is anticipated. Indirect impacts associated with the offsite hauling include increased potential fugitive dust from the transport vehicles during closure activities. Due to the use of BMPs designed to minimize fugitive dust, impacts to wetland vegetation along the haul route would be temporary and minor.

The proposed borrow site would be developed on land that is currently undeveloped and partially forested. A total of 4.6 acres of wetlands (WET-02 and WET-03) were identified within the borrow site project area. Through careful project planning, the proposed excavation areas would avoid direct impacts to all delineated wetland resources.

Potential indirect impacts resulting from the development and operation of the borrow site and construction of the process water basin in the north rail loop (Location 3) could include erosion and sedimentation from storm water runoff into nearby jurisdictional and non-jurisdictional wetlands. BMPs and site-specific erosion control plans would be implemented to minimize this potential. Indirect impacts to wetland areas due to construction activities would be short-term and minor.

3.11.2.3 Alternative C – Coal Yard Full Cap Closure

Impacts to wetland resources under Alternative C would be the same as those described for Alternative B. Therefore, there would be no direct impacts to wetlands. Potential indirect impacts would be minor and temporary and minimized with the use of BMPs.

3.11.2.4 Alternative D – Remove Coal Yard Material and Close

Impacts to wetland resources under Alternative D would be the same as those described for Alternative B and C. Therefore, there would be no direct impacts to wetlands. Potential indirect impacts would be minor and temporary and minimized with the use of BMPs.

3.12 Land Use

3.12.1 Affected Environment

JOF is in Humphreys County, Tennessee, along the eastern bank of the Tennessee River (Kentucky Reservoir) near New Johnsonville, Tennessee. The plant property occupies approximately 720 acres of land that supports industrial development for the facility itself and supporting infrastructure (see Figure 1-1). JOF is an industrial site with typical industrial

uses. Industrial developed lands are located to the northeast and south of the coal yard project area, the north rail loop and the laydown area. The Tennessee River (Kentucky Reservoir) is located to the west.

The proposed borrow site project area is located on TVA-owned land south of the JOF. The site is undeveloped and consists of forested land that is bisected by an overhead transmission line easement. Surrounding land uses include the city of New Johnsonville to the north and east, light industrial development to the south and undeveloped land and the Tennessee River (Kentucky Reservoir) to the west.

As summarized in Table 3-4 and shown in Figure 3-5, land use within the vicinity (i.e., 5-mile radius around JOF or 50,265 acres) is dominated by undeveloped lands with various vegetative cover types including deciduous forest (23,354 acres or approximately 46 percent of the total), woody wetlands (3,366 acres or approximately 6.7 percent) and cultivated crops (3,215 acres or approximately 6.4 percent). Developed lands in the vicinity include both industrial (JOF and surrounding industrial uses) and non-industrial (primarily residential) land uses.

3.12.2 Environmental Consequences

3.12.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not implement the proposed projects and as such there would be no change in the land uses in the project areas.

3.12.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

The coal yard project area is already used for heavy industrial use and most of the north rail loop supports industrial development. Accordingly, no changes in land use would occur with this alternative. Short-term impacts from the temporary conversion of a vacant space on JOF property to a construction laydown area would be minor because it would be restored to its previous state upon completion of construction activities. There would be no impact to land use associated with the transport of unburned coal and sediment from the coal yard runoff pond that is stockpiled on the coal yard as the haul route to the West Camden Sanitary Landfill and/or to CUF would use existing roads.

The proposed borrow site is undeveloped and contains herbaceous and forest land cover (see Table 3-4). The site is bisected by a transmission line easement. Clearing, grubbing, grading, and excavation activities would result in the temporary conversion of approximately 44 acres of undeveloped land for industrial use. The disturbance of undeveloped lands would be minor when compared to the abundance of undeveloped land within a 5-mile radius of the site (see Table 3-4). Upon completion of excavation activities, the borrow site would revert to non-industrial undeveloped land and be regraded and seeded or sodded to re-establish herbaceous vegetation. Therefore, overall impacts to land use from the construction of the borrow site would be minor.

3.12.2.3 Alternative C – Coal Yard Full Cap Closure

Impacts to land use would be the same as under Alternative B. Therefore, impacts would be minor.

3.12.2.4 Alternative D – Remove Coal Yard Material and Close

Impacts to land use would be the same as under Alternatives B and C. Therefore, impacts would be minor.

3.13 Prime Farmland

3.13.1 Affected Environment

The 1981 Farmland Protection Policy Act (FPPA) (7 Code of Federal Regulations [CFR] Part 658) requires all federal agencies to evaluate impacts to prime, state or locally important, and unique farmland prior to permanently converting the land to uses incompatible with agriculture. Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops. These characteristics allow prime farmland soils to produce the highest yields with minimal expenditure of energy and economic resources. In general, prime farmland soils have an adequate and dependable water supply, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. Prime farmland soils are permeable to water and air, not excessively erodible or saturated for extended period, and are protected from frequent flooding.

Prime farmland soils mapped within the proposed project areas and within a 5-mile radius of the project areas are summarized in Table 3-10 and illustrated in Figures 3-6 and 3-7.

Table 3-10. Acres of Prime Farmland Soils Mapped Within the Proposed Project Areas (areas)

Farmland Class	Coal Yard Project Area	Borrow Site	Borrow Site Excavation Area	North Rail Loop	Laydown Area	Five-Mile Radius
All prime farmland soils	4.3	39.4	17.4	30.4	7.1	7,204
Not prime farmland	59.6	122.5	26.4	17.4	0.6	38,948
Prime farmland if drained		2.7				4,113
Totals	**63.9**	**164.6**	**43.8**	**47.8**	**7.7**	**50,265**

Source: NRCS 2018

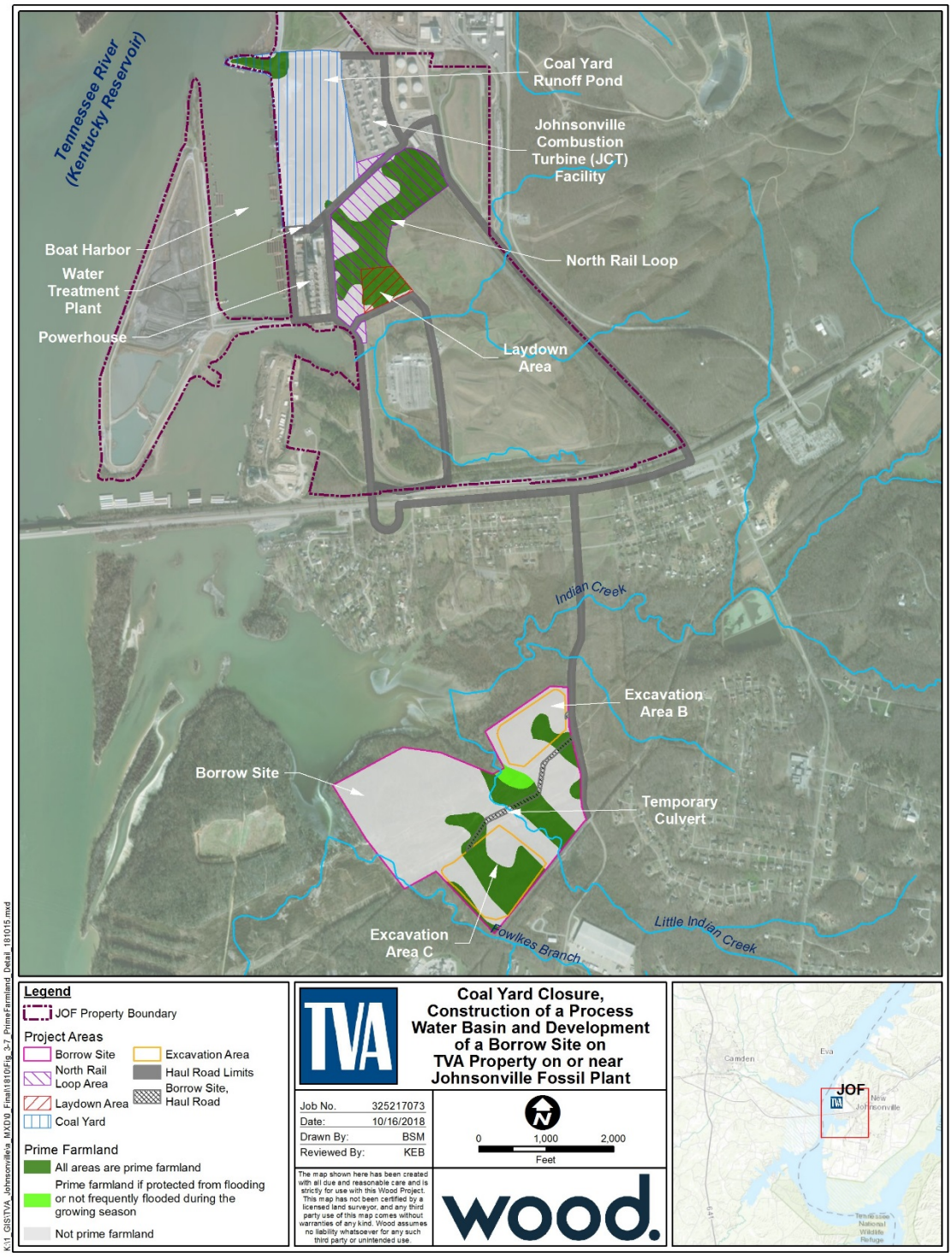


Figure 3-6. Prime Farmland Soils Within the Proposed Project Areas

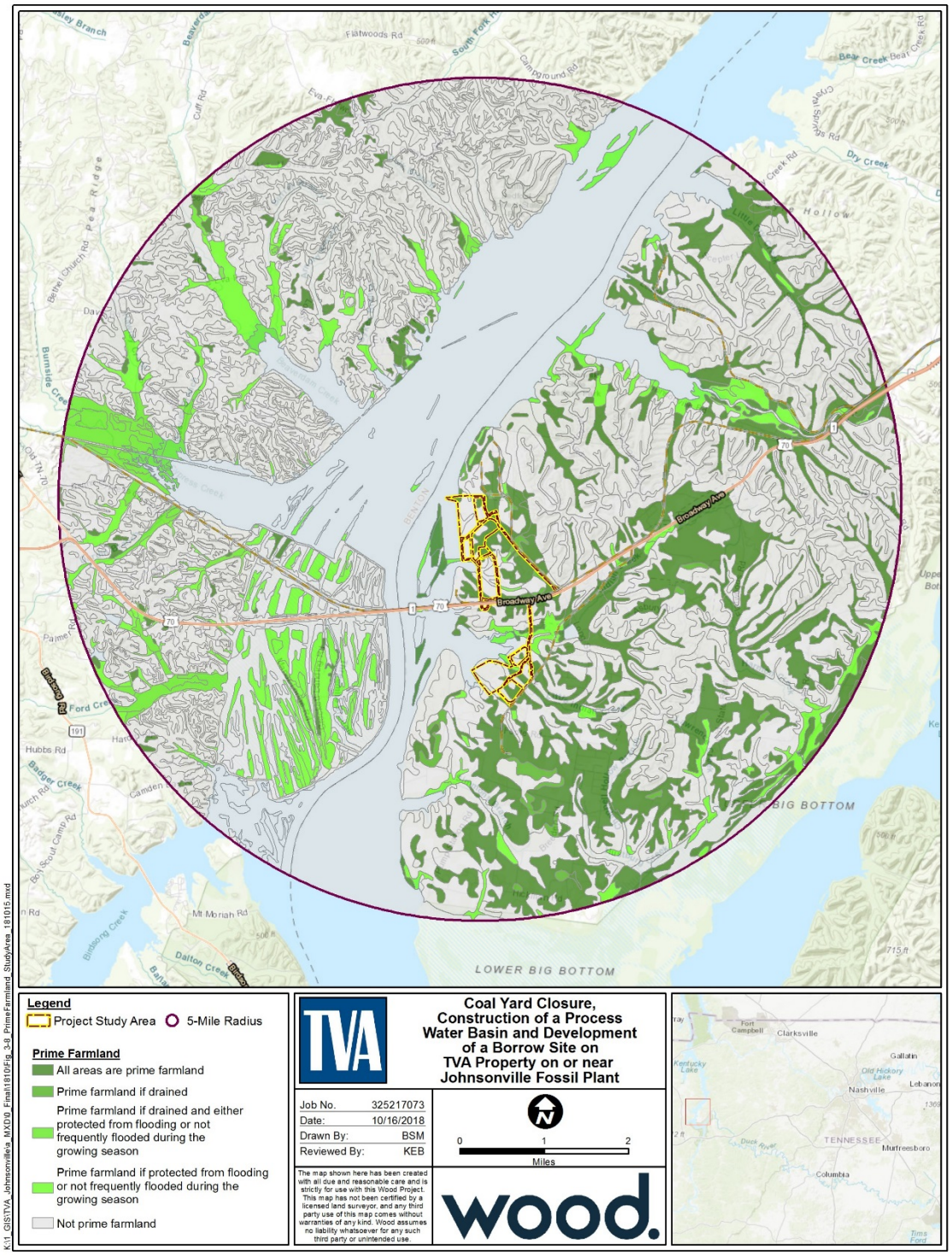


Figure 3-7. Prime Farmland Soils Within the Vicinity of the Proposed Project Areas

Within the coal yard project area, north rail loop and laydown project areas, approximately 4.3 acres (7 percent of the area), 30.4 acres (63 percent of the area) and 7.1 acres (92 percent of the area), respectively, are mapped as prime farmland soils. It should be noted, however, that these lands mapped as having prime farmland soils are previously disturbed and partly developed, and therefore, do not retain their original prime farmland characteristics. In addition, these areas are dedicated to industrial uses and are, therefore, exempt from regulation under the FPPA (7 CFR Part 658).

Approximately 39.4 acres of the 164.6 acre borrow site is mapped as prime farmland soils and 17.4 acres of prime farmland soils are mapped within the proposed excavation areas. Prime farmland soil within the proposed borrow site excavation areas are mapped as Humphreys and Paden silt loams.

3.13.2 Environmental Consequences

3.13.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not proceed with closure of the coal yard or coal yard runoff pond, construction of the process water basin or development of the borrow site; therefore, there would be no impacts to prime farmland soils.

3.13.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

Actions associated with closure of the coal yard, coal yard runoff pond, construction of the process water basin and use of the laydown area would occur in areas that are previously disturbed, and the soils are not expected to exhibit prime farmland soil characteristics.

Approximately 17 acres of soils mapped as prime farmland within Excavation Areas B and C would be impacted with development of the borrow site. The loss of lands mapped as prime farmland and its potential productivity would be lost with the development of the borrow site. However, loss of these lands is minor (0.2 percent) when compared to the amount of land designated as prime farmland within the surrounding region. Therefore, the impact to prime farmland is minor.

TVA initiated coordination with the U.S. Department of Agriculture Natural Resources Conservation Service (USDA NRCS) through submittal of the AD 1006 Farmland Conversion Impact Rating Form on July 31, 2018.

3.13.2.3 Alternative C – Coal Yard Full Cap Closure

Impacts associated with implementation of this alternative are anticipated to be the same as Alternative B. Therefore, the impact would be minor.

3.13.2.4 Alternative D – Remove Coal Yard Material and Close

Impacts associated with implementation of this alternative are anticipated to be the same as Alternatives B and C. Therefore, the impact would be minor.

3.14 Visual Resources

3.14.1 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 U.S. Forest Service (USFS) and integrated with planning methods used

by TVA (USFS 1995). Potential visual impacts to cultural and historic resources are not included in this analysis as they are assessed separately in Section 3.15.

The visual landscape of an area is formed by physical, biological and man-made features that combine to influence both landscape identifiability and uniqueness. Scenic resources within a landscape are evaluated based on several 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. It can be scored into three categories: distinctive, common, or minimal. Scenic integrity is a measure of scenic importance based on the degree of visual unity and wholeness of the natural landscape character. The scenic integrity of a site can be scored as high, moderate, low, or very low. 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.

Views of the landscape are described in terms of what is seen in the foreground, middleground, and background distances. In the foreground, an area within 0.5 mile of the observer, details of objects are easily distinguished. In the middleground, from 0.5 mile to 4 miles from the observer, objects may be distinguishable, but their details are weak and 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 miles from the observer. Visual and aesthetic impacts associated with an action may occur because of the introduction of a feature that is not consistent with the existing viewshed. Consequently, the visual character of an existing site is an important factor in evaluating potential visual impacts.

The surrounding topography ranges from relatively flat near the banks of the Tennessee River (Kentucky Reservoir) to moderately sloping at Johnsonville State Historic Park to the north. Industrial activities to the north are visible from the coal yard and north rail loop project areas. Forested areas within Johnsonville State Historic Park are visible to the east and northeast. Low-density residential areas exist to the west of the project area, across the Tennessee River (Kentucky Reservoir).

The affected environment includes the excavation areas within the proposed borrow site, the coal yard, north rail loop site and the haul roads that encompasses both permanent and temporary impact areas, as well as the physical and natural features of the landscape. The proposed borrow site is located south of JOF and consists of lands that are currently undeveloped. Existing roads would connect the borrow site with the laydown area, north rail loop and coal yard. Except for the JCT and other industrial uses to the north, the surrounding region is largely undeveloped with residential and commercial development in the vicinity of New Johnsonville.

Components of the existing power plant are dominant elements in the landscape and include the powerhouse and the 600-foot high emissions stack. Other major visual components of the industrial site include the JCT, transmission lines, and a coal pile. Most of the project area within JOF is devoid of any vegetation, although there are some small patches of grassed areas and trees along the peninsula. The viewscape of the coal yard and north rail loop project areas includes broadly horizontal buildings and industrial

equipment and the existing emissions stack. Therefore, scenic attractiveness of these areas are minimal and scenic integrity ranges from low to very low.

The borrow site is largely undeveloped with forested cover, which is bisected by an existing overhead transmission line corridor that is maintained in an herbaceous state. There is light residential development east of the borrow site, and the nearest residence is located approximately 0.2 mile from Excavation Area C. The transmission line easement, composition of vegetation and the patterns of vegetation are the prominent features and consist of a variety of deciduous trees, wetlands, ephemeral stream channels, and grassland within the utility corridor. Scenic attractiveness of the area is considered common, and scenic integrity is considered moderate due to human alteration in the surrounding area.

The ratings for scenic attractiveness assigned to the project sites is due to the ordinary or common visual quality. The forms, colors and textures in the affected environment are normally seen through the characteristic landscape and are not considered to have distinctive quality. In the foreground and middleground, the scenic integrity has been lowered by slight human alteration such as residential and industrial development. However, in the background these alterations are not substantive enough to dominate the view of the landscape. The scenic value class of a landscape is determined by combining the levels of scenic attractiveness, scenic integrity and visibility and can be excellent, good, fair, or poor. Based on the criteria used for this analysis, the overall scenic value class for the affected environment ranges from poor within the plant facility to good at the borrow site.

3.14.2 Environmental Consequences

3.14.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, the project would not be undertaken. As a result, the existing aesthetics of the project areas would not change.

3.14.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

The coal yard project area, north rail loop and laydown area are located within industrial areas of JOF. The proposed borrow site is located south of the plant in an area with some residential and light industrial development.

During the closure of the coal yard, coal yard runoff pond and construction of the process water basin, there would be slight visual discord from the existing conditions due to an increase in personnel and equipment in the area. There would also be an increase in vehicular traffic along Industrial Park Road and U.S. Route 70 Avenue during the hauling of material from the borrow site, which would be noticeable to residents along those streets. Impacts from additional vehicular traffic are expected to be minor as the roads within the plant are already predominately used by employees and for industrial activity. This small increase in visual discord would be temporary and intermittent and only last until construction activities have been completed.

The 0.5-mile area around the defined affected environment includes undeveloped forested lands, residences, the JCT and other industrial uses. There are no sensitive visual receptors within the foreground of the proposed actions. In the foreground viewing distance, individual details of specific objects are important and easily distinguished, and details are the most significant within the immediate foreground up to 300 feet. In the middleground viewing distance, details are weak as they tend to merge into larger patterns. Visibility of

the proposed actions is expected to be limited to receptors within this viewing distance due to the screening effect of surrounding topography and vegetation. At the background distance, the proposed actions are not expected to be discernible due to the screening effects of terrain and overall distance, nor would they contrast with the overall landscape.

The closed coal yard and process water basin would be mainly seen by employees and facility operators. Although the coal stockpile would be removed, and the coal yard would be covered with a grass or turf system the closed coal yard and process water basin would be visually similar to other industrial elements present in the current landscape. Therefore, the coal yard and process water basin would generally be absorbed by surrounding industrial components and would become visually subordinate to the overall landscape character associated with the plant site.

Construction of the proposed NPDES permitted outfall to the Tennessee River (Kentucky Reservoir) would be installed on the west peninsula to manage flows from the proposed process water basin. During construction this area may be visible to boaters on the river, once construction is complete, the outfall would be visually similar to other industrial elements present in the current landscape.

The haul route used to transport unburned coal and sediment from the coal yard runoff pond that is stockpiled on the coal yard to the West Camden Sanitary Landfill and to CUF would utilize existing roadways which currently support truck traffic. Therefore, any small increase in visual discord as a result of additional trucks would not alter the overall landscape. Therefore, impacts to visual resources along the haul road to the West Camden Sanitary Landfill and to CUF are not anticipated.

The proposed borrow site would primarily be seen by motorists on the adjacent roadway, Industrial Park Road. The development of the proposed borrow site would contrast with the color of the landscape during some phases of operation. The current landscape at the proposed site is predominantly green and brown due to the existing vegetation on the site. While the excavation areas are being actively used, the increase in personnel and equipment would contrast with the natural landscape color. The dominant shapes in the landscape include the vertical lines of existing transmission structures and forested areas. The color and shape contrast would be greatest in the foreground to passing motorists, although the contrasts would be less noticeable in the middleground and background.

The development of the borrow site would contribute to a change in visual integrity of the landscape due to construction and excavation activities which impact the local viewshed. Scenic attractiveness would be reduced to minimal in the foreground during site clearing and excavation but would remain common in the middleground and background. Similarly, scenic integrity would be reduced to low in the foreground during clearing and excavation as deviations to the landscape character due to increased activity would dominate the landscape being viewed during the use of the borrow area. During this period, impacts to scenic integrity are anticipated to be greatest in the foreground for passing motorists along Industrial Park Road. However, existing vegetation would buffer the view of the borrow site from residents in the foreground. After borrow materials are exhausted from each excavation area, the area would be graded and seeded or sodded to support the establishment of native vegetation. In the middleground and background, impacts are not considered to be reduced as they are not expected to alter the overall landscape, therefore, scenic integrity would remain moderate.

Based on the USFS scenic management system criteria used for this analysis, the scenic value class for the affected environment is considered to remain poor to good. Therefore, it is not expected that the existing scenic class would be reduced by two or more levels, which is the threshold of significance of impact to the visual environment.

3.14.2.3 Alternative C – Coal Yard Full Cap Closure

Impacts associated with implementation of this alternative are anticipated to be the same as Alternative B. Therefore, the impact would be minor.

3.14.2.4 Alternative D – Remove Coal Yard Material and Close

Impacts associated with implementation of this alternative are anticipated to be the same as Alternative B and C. Therefore, the impact would be minor.

3.15 Cultural and Historic Resources

3.15.1 Affected Environment

3.15.1.1 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 the National Historic Preservation Act (NHPA) (54 USC 300101 et seq.) 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 affect 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 NHPA 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 (54 USC 300101 et seq.), 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 Tennessee 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 tribes) 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 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.

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.

3.15.1.2 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.

TVA determined that the APE for archaeological sites includes the coal yard, the coal yard runoff pond, and the proposed process water basin site 3 (i.e., the north rail loop). TVA does not consider the continued use of an existing construction laydown, or the use of existing paved/gravel roads as haul roads, to have potential to result in effects on historic properties. Therefore, the proposed construction laydown and haul roads are not included in the APE. No buildings or other above-ground structures would be removed as part of the project. Given the nature of the proposed undertaking, which does not include construction of any standing structures, TVA considers the undertaking not to be of a type with potential for indirect effects on aboveground properties that are included or eligible for inclusion in the NRHP.

One historic cemetery is shown on the 1937 land acquisition map within the Coal Yard. TVA's technical report on JOF (TVA 1958:207-208) states that the cemetery was "within an area which was to be excavated to a depth of more than 8 feet, making removal necessary." Based on this documentation, the APE does not contain any historic cemeteries.

Part of the area affected by the a previous JOF Decontamination and Deconstruction project extends into the coal yard and was discussed in a January 25, 2018 letter to the SHPO documenting TVA's no effect finding for that undertaking. In evaluating the potential for intact Holocene deposits in the coal yard and coal yard runoff pond areas, TVA Cultural Compliance staff examined TVA's 1937 land acquisition map for Kentucky Reservoir, TVA's original plant grading plan from 1949, current satellite imagery, and previous archaeological investigations (Cable 1999, Ezell 2000, Kerr 1996, McKee 2001). Prior to construction of JOF, these areas consisted of two branches of a small creek and its terraces. As documented in TVA's technical report on JOF (TVA 1958) and by the 1949 grading plan, TVA construction crews excavated and graded soil to depths ranging from approximately

3 feet to nearly 20 feet throughout the coal yard and surrounding area during plant construction. Based on these historical documents, TVA finds that the coal yard and coal yard runoff pond areas have no potential to contain intact archaeological sites due to these past land disturbing activities. The SHPO agreed with this finding by letter dated April 5, 2018 (Appendix D). None of the consulted Indian tribes objected to the undertaking or identified resources of concern in the APE.

The proposed borrow site straddles an existing transmission line corridor. TVA performed a Phase I archaeological survey of the portion of the proposed borrow site that lies in the transmission line corridor in 2016 and consulted with SHPO and federally recognized Indian tribes on the findings (by letter dated March 2, 2017). The 2016 survey identified no archaeological sites and TVA found that no historic properties would be affected. SHPO agreed to this determination by letter dated March 20, 2017, and no tribe objected or raised concerns (Appendix D).

To identify archaeological sites in the remaining portion of the proposed borrow site, which encompasses approximately 100 acres, TVA conducted an additional Phase I archaeological survey of that area in 2018. The 2018 survey included the excavation of 470 shovel test pits in the APE. One isolated find, consisting of three flakes, was identified. The 2018 survey identified no archaeological sites. The 2018 survey findings indicate that the majority of the APE has been affected by severe soil erosion. Based on this 2018 survey, TVA finds that the proposed undertaking would have no effect on historic properties. TVA consulted with the SHPO and federally recognized Indian tribes. SHPO agreed by letter dated April 5, 2018 with TVA's no effect finding and no tribe objected or raised concerns (Appendix D).

To identify archaeological sites in the process water basin site 3 (i.e., the north rail loop), TVA conducted an additional Phase I archaeological survey of that area in October 2018. This area encompasses approximately 21 acres. The survey consisted of a pedestrian survey and systematic shovel testing. One isolated find, consisting of two flakes in a single shovel test, was identified. The survey identified no archaeological sites and documented that most of the north rail loop has been disturbed by past activities associated with JOF operation and maintenance. Based on this investigation TVA found that the isolated find is ineligible for inclusion in the NRHP and that no additional archaeological investigations are required prior to implementation of the undertaking. On November 29, 2018, the SHPO concurred with TVA's no effect finding for the north rail loop area (Appendix D).

3.15.2 Environmental Consequences

As there are no archaeological sites located in the APE, no structures would be physically affected by the undertaking, and the undertaking is not a type with potential to result in indirect effects on historic structures. TVA finds that the proposed undertaking would not affect any historic properties under any of the project alternatives (No Action Alternative, and Alternatives B, C, and D). TVA consulted with the SHPO and the following federally recognized Indian tribes under 36 CFR § 800.4(d)(1) and § 800.3(f)(2) regarding TVA's finding of no effect on historic properties: Absentee Shawnee Tribe of Oklahoma, Cherokee Nation, Chickasaw Nation, Coushatta Tribe of Louisiana, Eastern Band of Cherokee Indians, Eastern Shawnee Tribe of Oklahoma, Kialegee Tribal Town, Muscogee (Creek) Nation, Shawnee Tribe, Thlopthlocco Tribal Town, and the United Keetoowah Band of Cherokee Indians in Oklahoma. SHPO agreed by letters dated April 5, 2018 and November 28, 2018 (Appendix C), and no tribe objected or raised concerns.

3.16 Natural Areas

3.16.1 Affected Environment

Natural areas include 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, National Park Service, USFS, state or county) to protect and maintain certain ecological and/or recreational features. Ecologically significant sites are tracts of privately-owned land that are recognized by resource biologists as having significant environmental resources or identified tracts on TVA lands that are ecologically significant, but not specifically managed by TVA's Natural Areas Program. The National Rivers Inventory is a listing of more than 3,400 free-flowing river segments in the United States that are believed to possess one or more outstandingly remarkable natural or cultural values judged to be of more than local or regional significance.

This section addresses natural and managed areas that are on, immediately adjacent to (within 0.5 mile), or within the vicinity of the project areas (5-mile radius) (Figure 3-8). A review of the TVA Natural Heritage database indicates that no natural areas are present within the proposed project sites.

There are eight natural areas located within the vicinity of project sites, which include:

Johnsonville State Historic Park – This site is 0.85-mile northeast of the coal yard project area. Serving as a day-use park named for former President Andrew Johnson, this 1,075-acre park is located in Humphreys County. It commemorates the site of the Johnsonville Depot, the Battle of Johnsonville, and the historic town site of Johnsonville that existed from 1864-1944 prior to the formation of Kentucky Reservoir (TN State Parks 2018a).

Camden State Wildlife Management Area – This site is located 0.98 mile southwest of the coal yard project area. It provides hunting opportunities (big/small game, turkey, and waterfowl). Cropland and bottomland hardwood forests are intertwined within the 3,692 acres of Camden. Some grassy fields are present and likely good for sparrows. River front access with boat ramps provides views of expanses of water (TWRA 2017).

Ashworth Property – This site is located 1.1 mile east of the coal yard project area and is private property under a conservation easement by the Land Trust for Tennessee.

Nathan Bedford Forrest State Park – This site is located 2.9 miles north of the coal yard project area. Fishing is prominent in this park and is a popular destination for smallmouth, largemouth and striped bass, sauger, crappie, bream and catfish. Commercial marinas and public boat docks are located nearby and three boating accesses are available in the park at no cost. More than 20 miles of hiking trails offer short jaunts or longer treks (TN State Parks 2018b).

Tribble Woods TVA Habitat Protection Area – This site is located 2.1 miles south of the proposed borrow site and is managed as a Habitat Protection Area targeting the protection of a population of short-stemmed iris (*Iris brevicaulis*), a stated listed plant species. The iris population on this parcel occurs in the forested floodplain and requires little, if any, active management.

Tennessee National Wildlife Refuge – This site is located 2.2 miles south of the proposed borrow site. Thanks to an abundance of habitat types, the refuge harbors 51 mammals, 89 reptiles and amphibians, and 144 species of fish. An abundance of white-tailed deer can be found throughout the area, along with smaller animals such as raccoons, foxes, squirrels, beaver, rabbits and wild turkey. The refuge also offers many recreational opportunities such as hunting, fishing, hiking, wildlife viewing, and photography.

Designated Critical Habitat (Slabside Pearlymussel) – This site is located 4.6 miles east of the project footprint in the Duck River. This area of habitat is deemed by the USFWS to be essential to the slabside pearlymussel's conservation.

Designated Critical Habitat (Fluted Kidneyshell) – This site is located 4.6 miles east of the project footprint in the Duck River. This area of habitat is deemed by the USFWS to be essential to the fluted kidneyshell's conservation.

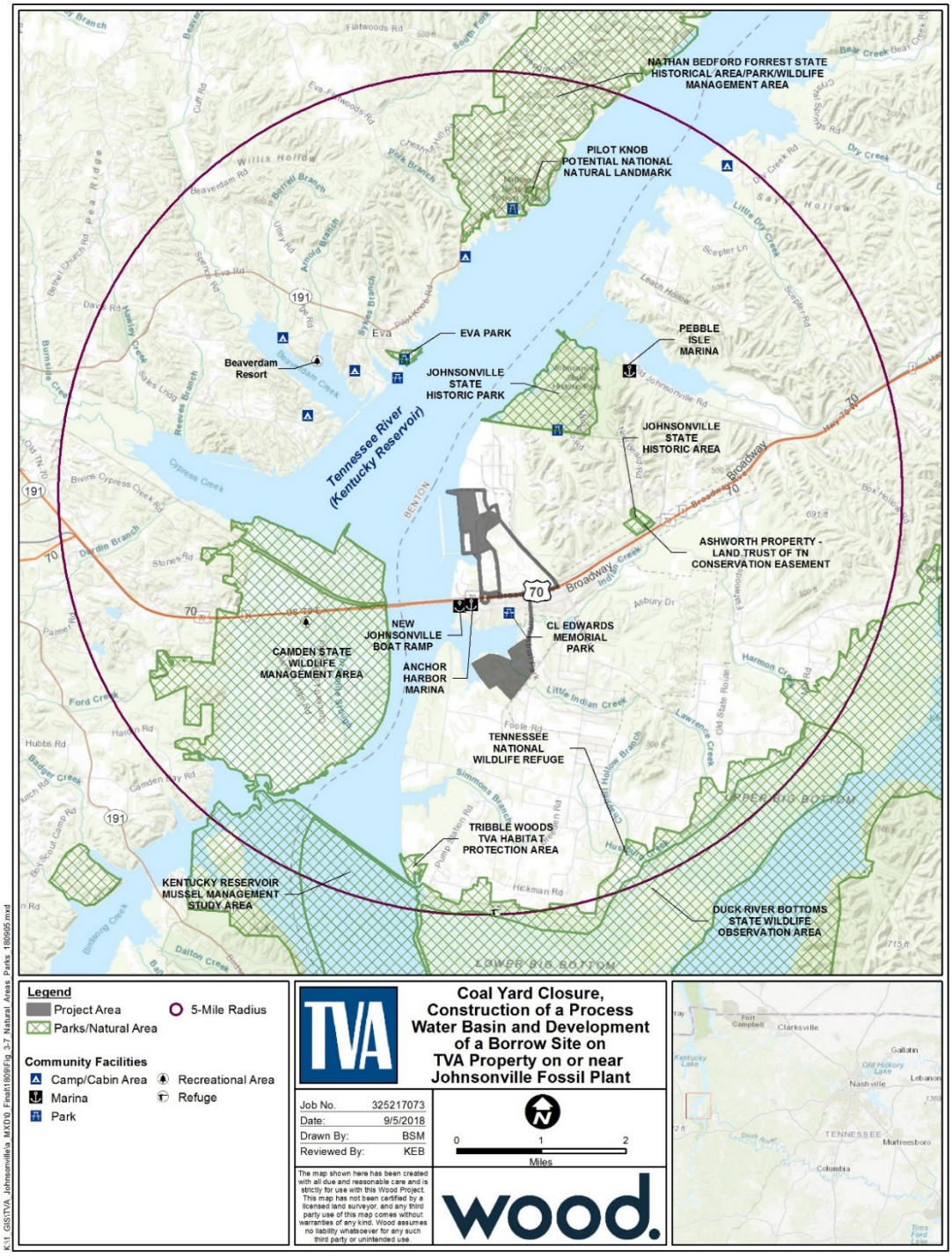


Figure 3-8. Natural Areas and Parks Within a 5-Mile Radius of JOF

3.16.2 Environmental Consequences

3.16.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not proceed with closure of the coal yard or the coal yard runoff pond, construction of a process water basin, or development of a borrow site. As a result, there would be no impact to natural or managed areas.

3.16.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

Under Alternative B, the coal yard, coal yard runoff pond closure and process water basin construction project areas are located within the limits of an industrial area. The proposed borrow site is located on TVA-owned property south of JOF. Surrounding uses include residential, light industrial and recreational land uses. Natural and managed areas identified within the vicinity of the project areas are located greater than 0.5 mile from all of the project areas. Therefore, no impacts to natural or managed areas are anticipated under this alternative.

The transport of unburned coal and sediment from the coal yard runoff pond that is stockpiled on the coal yard would utilize existing roadways, including U.S. Highway 70 West through Camden State Wildlife Management Area towards the West Camden Landfill and U.S. Highway 70 East toward CUF adjacent to the Ashworth Property. Indirect impacts to natural and managed areas along these routes associated with the offsite hauling of stockpiled material include increased traffic, noise, and potential fugitive dust from the transport vehicles. However, roadways used to transport stockpiled material to these facilities currently support truck traffic. This impact would be minor and would not impact the use or enjoyment of these areas given the short-term nature of the transport of the stockpiled material and the preferred use of existing arterial or interstate roadways that currently support truck traffic.

3.16.2.3 Alternative C – Coal Yard Full Cap Closure

Impacts would be the same as described for Alternative B. There would be no direct impact, but there would be a minor, temporary indirect impact to natural areas.

3.16.2.4 Alternative D – Remove Coal Yard Material and Close

As with Alternatives B and C, no natural areas would be directly impacted under this alternative and the impact associated with the transport of material stockpiled on the coal yard to the West Camden Sanitary Landfill or the Cumberland Fossil Plant would be the same as described for Alternative B.

However, under this alternative, the closure of the coal yard also includes removing coal remnants and CCR including bottom ash/spent-bed material fill from the coal yard. All material removed from the coal yard would be transported to the West Camden Sanitary utilizing existing roadways, including U.S. Highway 70 West through Camden State Wildlife Management Area. Indirect impacts associated with the offsite hauling of CCR and coal remnants include increased traffic, noise, and potential fugitive dust from the transport vehicles during closure activities. Due to the temporary nature of closure activities, impacts to natural areas along the haul route would be temporary and minor. However, the indirect impact would be incrementally greater than Alternatives B and C as closure under this option would increase the duration of transportation activities by approximately 23 months (2 years) due to the transport of material excavated from the coal yard.

3.17 Parks and Recreation

3.17.1 Affected Environment

Parks and recreation facilities include open areas, boat ramps, community centers, swimming pools, and other public places. This section addresses parks and recreation facilities that are on, immediately adjacent to (within 0.5 mile), or within the vicinity of the project areas (5-mile radius). Parks and recreation facilities within the vicinity of the project areas are illustrated on Figure 3-8.

Several public and commercial recreation areas are located in the vicinity of the proposed project areas. Eva Park, a small community park which offers swimming and boat access to Kentucky Reservoir is located approximately 1.6 miles northwest of the coal yard project site. C.L. Edwards Memorial Park, a community park which offers ball fields, walking paths, and pavilions is located approximately 0.2 mile north of the borrow site project area.

Commercial recreation areas within 5 miles of the project areas include Anchor Harbor Marina, New Johnsonville Boat Ramp, Pebble Isle Marina, and Beaver Dam Resort. Anchor Harbor Marina and the New Johnsonville Boat Ramp are located within one mile of the project areas and are accessed from U.S. Route 70. Pebble Isle Marina and Beaver Dam Resort are located more than 1 mile from the proposed project areas.

The Tennessee River (Kentucky Reservoir) is a major focal point for outdoor recreation, and most of the recreation areas in the vicinity of the project include water-based or water-oriented recreation services and facilities such as boat launching ramps, boat moorage and fueling, and shoreline camping and picnic facilities. Accordingly, the reservoir is used for water-based recreation activities including general boating, fishing and swimming.

3.17.2 Environmental Consequences

3.17.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not proceed with closure of the coal yard or the coal yard runoff pond, construction of a process water basin, or development of a borrow site. Therefore, there would be impact to outdoor recreational use patterns.

3.17.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

No parks or recreational facilities are located within the boundaries of the proposed project areas. Therefore, no direct impacts to parks or recreational facilities would occur with this alternative. Given the number of parks and recreational facilities in the surrounding area, it is possible that indirect impacts could occur as a result of additional truck traffic, noise and dust from the transport of material stockpiled on the coal yard to either the West Camden Sanitary Landfill or to the landfill and to CUF. However, these impacts would be minor and would not impact the use or enjoyment of these areas given the relatively short-term nature of this action and the preferred use of existing arterial or interstate roadways to transport material to CUF which would minimize the impact to motorists accessing these areas.

There is a potential for indirect impacts associated with the transport of borrow material to JOF. C.L. Edwards Memorial Park is located approximately 0.2 mile north of the borrow site, and the haul route to is located approximately 800 feet east of the park boundaries. However, the haul route does not utilize the roadways within the park or the primary access road to the park, which should minimize impacts to users of this facility from project activities. Considering the intermittent nature of the transport of borrow and the relatively

low number of trucks anticipated to be used to transport borrow material, indirect impacts to parks or recreation areas are anticipated to be temporary and negligible.

3.17.2.3 Alternative C – Coal Yard Full Cap Closure

Impacts associated with implementation of this alternative are anticipated to be the same as Alternative B. There would be no direct impact, but there would be a negligible temporary indirect impact to parks or recreation areas.

3.17.2.4 Alternative D – Remove Coal Yard Material and Close

Similar to Alternatives B and C, no parks or recreation areas would be directly impacted under this alternative, and the impact associated with the transport of material stockpiled on the coal yard to the West Camden Sanitary Landfill or the Cumberland Fossil Plant would be the same as described for Alternative B. Additionally, the impact associated with the transport of borrow material would be the same as Alternative B.

However, under this alternative, closure of the coal yard also includes removing approximately 600,000 yd^3 of coal remnants, CCR including bottom ash/spent-bed material fill from the coal yard. All material excavated from the coal yard would be transported to the West Camden Sanitary Landfill. This would involve an additional 90 roundtrip truckloads (180 truck trips) per day on the roadway for approximately 2 years. Given the number of parks and recreational facilities in the surrounding area, it is possible that indirect impacts could occur as a result of additional truck traffic, noise and dust from the transport of material excavated from the coal yard. However, due to the relatively short-term nature of this action and the preferred use of existing arterial or interstate roadways, the transport of material excavated from the coal yard would not impact the use or enjoyment of these areas. However, as with the analysis presented in Section 3.16, the indirect impact would be incrementally greater than Alternatives B and C as closure under this option would increase the duration of transportation activities by approximately 23 months (2 years) due to the transport of material excavated from the coal yard.

3.18 Transportation

3.18.1 Affected Environment

JOF is served by highway, railway, and waterway modes of transportation. U.S. Route 70/ State Highway 1, also locally known as Broadway Avenue, is the primary arterial roadway serving the JOF site. The road and has four transitions from two lanes to four lanes just west of the Tennessee River (Kentucky Reservoir) before crossing east over the bridge into Humphreys County with an additional center turn lane. Existing traffic conditions generated by JOF is composed of a mix of cars and light duty trucks, as well as medium duty to heavy duty trucks.

There are two points of access into JOF from U.S. Route 70. The main entrance is an at-grade ramp entrance on the south side of U.S. Route 70 that loops around to the north, crosses over the road and the double CSX Railroad tracks, then enters JOF from the south side of the site. Approximately 0.83 mile east of the main entrance is an at-grade intersection at North Street on the north side of U.S. Route 70. North Street crosses the railroad tracks then continues north along the east side of JOF. Figure 1-1 shows the locations of each road that serves JOF.

The 2016 Average Annual Daily Traffic (AADT) counts and existing levels of service (LOS) for key roadways near JOF are presented in Table 3-11. LOS is a quality measure

describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. LOS is described accordingly:

- LOS A: describes free flow traffic conditions;
- LOS B: free flow conditions although presence of other vehicles begins to be noticeable;
- LOS C: increases in traffic density become noticeable but remain tolerable to the motorist;
- LOS D: borders on unstable traffic flow; the ability to maneuver becomes restricted; delays are experienced;
- LOS E: traffic operations are at capacity; travel speeds are reduced; ability to maneuver is not possible; travel delays are expected; and
- LOS F: designates traffic flow breakdown where the traffic demand exceeds the capacity of the roadway; traffic can be at a standstill.

Table 3-11. Average Daily Traffic Volume (2016) on Roadways in Proximity to JOF

Roadway	Existing Average Daily Vehicle Use (AADT)	Number of Lanes	Existing LOS
U.S. Route 70 east of JOF	8,079	4	A
U.S. Route 70 west of JOF	5,658	2	B
State Highway 13 (Waverly, TN)	4,761	2	B
State Highway 927/Long Street	4,349	2	A
Industrial Park Road	4,349	2	A

Source: Tennessee Department of Transportation 2016

3.18.2 Environmental Consequences

3.18.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not proceed with closure of the coal yard or the coal yard runoff pond, construction of a process water basin, or development of a borrow site. As a result, there would be no impact to transportation.

3.18.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

The daily workforce during construction of the proposed activities at JOF is expected to be approximately 60 workers per day. Workforce traffic would mainly consist of a mix of passenger cars and light duty trucks (such as delivery trucks). Traffic is assumed to be distributed during a peak morning period (to the site) and a peak evening period (away from the site). Assuming one person per commuting vehicle, there would be a daily morning inbound traffic volume of 60 vehicles and a daily outbound traffic volume of 60 vehicles for a total of 120 vehicles per day. Construction-related vehicles (dozers, backhoes, graders, loaders, etc.) would be delivered to or removed from the proposed project sites on flatbed

trailers under both the mobilization and demobilization stages of the projects. This traffic volume is expected to disperse into the surrounding road network and have negligible effects on these roads. Overall, the traffic volume generated by the construction workforce and the construction-related vehicles would be relatively minor and temporary.

Closure of the coal yard and coal yard runoff pond includes removing approximately 24,000 yd^3 of unburned coal in addition to 40,000 yd^3 of sediment from the coal yard runoff pond that is stockpiled on the coal yard. This material would be transported via over-the-road dump trucks to the West Camden Sanitary Landfill in Camden, Tennessee. The landfill lies about 12 miles west of JOF via U.S. Route 70. The proposed haul route from JOF to the landfill is shown in Figure 2-1. This section of U.S. Route 70 is a two-lane asphalt highway. Based on the hauling capacity of a tri-axle dump truck, which is approximately 15 yd^3, and the distance between JOF and the landfill it would take roughly 90 roundtrip truckloads (180 truck trips) per eight-hours to transport the material to the landfill. The effects of these truck trips on roads along the haul route are shown in Table 3-12. The truck traffic would cause a 3.2 percent increase in traffic volume on this roadway. The percentage increase is low and would only occur for approximately 2.3 months. The addition of these 180 truck trips would not change the existing LOS of these roadways as there is sufficient capacity remaining on them to handle the increase in traffic.

Table 3-12. Traffic Impacts Associated on Roadways Impacted Under Alternative B

Roadway	Exist. Average Daily Vehicle Use (AADT)	Existing AADT plus Hauling Traffic	Traffic Increase to Landfill (Percent)	Traffic Increase to CUF (Percent)	LOS
U.S. 70 east of JOF	8,079	8,079	0%	1.1%	A
State Highway 13	4,761	4,851	0%	1.9%	B
State Highway 927/Long Street	4,349	4,349	0%	0%	A
Industrial Park Road	4,349	4,649*	6.9%	0%	A
U.S. 70 west of JOF	5,658	5,838	3.2%	0%	B

Source: Tennessee Department of Transportation 2016

*Includes 300 additional trips per day for borrow site development

TVA may elect to implement a reclamation process to recover the maximum amount of reusable fuel from the stockpiled material. This process would recover approximately 70 to 90 percent (estimated at 47,320 yd^3 to 60,840 yd^3) of the total stockpiled material. The reclaimed material would be hauled to CUF using over-the-road trucks from JOF. CUF is located about 39 miles northeast of JOF via US 70 and TN-13. The proposed haul route to the fossil plant is shown in Figure 2-2. This section of US 70 is a four-lane divided highway with periodic at-grade signalized crossings. TN-13 is a two-lane asphalt highway. Due to the distance between JOF and CUF, the number of truckloads TVA could transport to CUF per 8-hour day is estimated to be 45 roundtrips (90 truck trips). Accordingly, the duration of transport under this option would be up to 4.5 months depending on the percentage of usable fuel reclaimed. The effects of the added trips to U.S. Route 70 and TN-13 can be seen in Table 3-12.

The remaining material would be hauled to the offsite landfill for disposal. The estimated amount of remaining material would range from 10 to 30 percent of the existing stockpile, or

6,760 yd^3 to 20,280 yd^3. This material would be transported by over-the-road dump trucks to the West Camden Sanitary Landfill along the haul route shown in Figure 1-2. This would increase traffic on the haul route by 180 trips per day but would only occur for up to 15 days due to the lower volume of material that would be removed. The LOS would remain at a B as there is sufficient capacity along the two-lane road to handle the minor increase in traffic.

The proposed borrow site is located approximately 1.8 miles south of JOF just west of Industrial Park Road. The proposed haul route to JOF would follow Industrial Park Road 0.8 mile north to U.S. 70. From there, trucks can either head west 0.49 mile to the main JOF entrance or travel east 0.34 mile along to North Street and then northwest toward JOF. TVA estimates up to 150 truckloads of borrow per eight-hour day would be transported to JOF when needed. This results in a trip count of 300 trips per day on Industrial Park Road. It is assumed that the AADT on Industrial Park Road is equal to or less than the AADT on State Highway 927 and as such, the truck traffic would cause a 6.9 percent increase in traffic volume on this roadway and a 3.2 percent increase in traffic volume on U.S 70 but would not change the LOS of these roads. The demand for borrow would vary over the course of closure operations and ongoing plant operations; thus, it is expected to be intermittent and dependent upon specific needs at JOF.

Based on this level of use, impacts to traffic operations are expected to be relatively minor. Implementation of this alternative would cause minor disturbances to the roadway network, and localized roadway degradation along the route to the offsite destinations because of increased truck traffic.

In addition, the proposed transport of material stockpiled on the coal yard as well as the transport of borrow to JOF over public roadways would result in an increase in the number of vehicle miles traveled on those roadways. This increase in vehicle miles is a factor in injury and fatal traffic crash rates. Therefore, there would be a minor impact related to increased traffic and driver safety.

3.18.2.3 Alternative C – Coal Yard Full Cap Closure

Although, closure of the coal yard under this alternative would potentially require less borrow material for full cap closure, transportation impacts for Alternative C are expected to be similar to those described under Alternative B. Therefore, there would be a minor impact related to increased traffic and potential increase in crash rates associated with transport of material stockpiled on the coal yard on public roads and transport of borrow to JOF.

3.18.2.4 Alternative D – Remove Coal Yard Material and Close

Impacts related to the construction workforce and the construction-related vehicles, removal of the material stockpiled on the coal yard, and the transport of borrow to JOF would be similar to Alternatives B and C.

Under Alternative D, the closure of the coal yard includes removing the stockpiled material on the coal yard as well as excavating coal remnants and CCR including bottom ash/spent bed material from the coal yard. All material removed from the coal yard would be transported to the West Camden Sanitary Landfill. As described for Alternative B, transport of material from the coal yard would result in an additional 180 truck trips per day between JOF and the landfill. This truck traffic would occur throughout the closure period, which is estimated to be approximately 2 years following the removal of the coal stockpile. The increase in duration would cause minor additional wear and tear on the roadways but would not impact the traffic flow or capacity of haul route.

Therefore, due to the increased duration of transport associated with closure of the coal yard impacts to traffic operations would be minor, yet incrementally greater than Alternatives B and C. Additionally, under this alternative, there would be an increase in the number of vehicle miles traveled and therefore the potential for truck-related crashes associated with the transport of material excavated from the coal yard to the landfill would be greater than Alternatives B and C.

3.19 Noise

3.19.1 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 and 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. For instance, higher sensitivities to noise would be expected during the quieter overnight periods at noise sensitive receptors such as residences. Other noise sensitive receptors might include developed sites where frequent human use occurs such as churches and schools.

Sound is measured in units of decibels (dB) on a logarithmic scale. Because not all noise frequencies are perceptible to the human ear, A-scale weighting decibels (dBA), which filter out sound in frequencies above and below human hearing, are typically used in noise assessments. A noise level change of 3 dBA or less is barely perceptible to average human hearing. However, a 5 dBA change in noise level is clearly noticeable. The noise level associated with a 10 dBA change is perceived as being twice as loud; whereas the noise level associated with a 20 dBA change is considered to be four times as loud and would therefore represent a “dramatic change” in loudness.

The day-night sound level (Ldn), is the 24-hour 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. Typical background day-night noise levels for rural areas is anticipated to range between an Ldn of 35 and 50 dB, whereas higher-density residential and urban areas background noise levels range from 43 dB to 72 dB (EPA 1974). Background noise levels greater than 65 dBA can interfere with normal conversation, watching television, using a telephone, listening to the radio, and sleeping. Common indoor and outdoor noise levels are listed in Table 3-13.

The EPA 1974 guidelines recommend that Ldn not exceed 55 dBA for outdoor residential areas. 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). For traffic-related noise, the Federal Highway Administration (FHWA) has set a threshold of 67 dBA as the sound level at which noise abatement should be considered. The Tennessee Department of Transportation has adopted this same threshold for projects in Tennessee.

Table 3-13. Common Indoor and Outdoor Noise Levels

Common Outdoor Noises	Sound Pressure Levels (dB)	Common Indoor Noises
	110	Rock Band at 5 meters (16.4 feet)
Jet Flyover at 300 meters (984.3 feet)		
	100	Inside Subway Train (New York)
Gas Lawn Mower at 1 meter (3.3 feet)		
	90	Food Blender at 1 meter (3.3 feet)
Diesel Truck at 15 meters (49.2 feet)		Garbage Disposal at 1 meter (3.3 feet)
	80	Shouting at 1 meter (3.3 feet)
Gas Lawn Mower at 30 meters (98.4 feet)	70	Vacuum Cleaner at 3 meters (9.8 feet)
Commercial Area		Normal Speech at 1 meter (3.3 feet)
	60	Large Business Office
	50	Dishwasher Next Room
Quiet Urban Daytime		
	40	Small Theater, Large Conference Room Library
Quiet Urban Nighttime Quiet Suburban Nighttime		
	30	Bedroom at Night
Quiet Rural Nighttime		Concert Hall (Background)
	20	Broadcast and Recording Studio
	10	
		Threshold of Hearing
	0	

Source: Arizona DOT 2008.

3.19.1.1 Sources of Noise

JOF is located along the south bank of the Tennessee River in an industrial area. Noise generating sources in the vicinity of the project site include periodic barge operations on the river, railroad operations, and routine vehicle operations at the project site and the adjacent industrial facility.

Noise sources common to activities evaluated in this EA include noise from industrial activities, transportation noise, and construction noise. Noise from industrial activities would be related to the operation of the borrow site and the process water basin. Transportation noise primarily includes noise from truck traffic. 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 sound level of highway traffic noise. Other factors that affect the sound level 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 (FHWA 2011). Due to the nature of the decibel scale and the attenuating effects of noise with distance, a doubling of traffic would result in a 3 dBA increase in noise levels, which in and of itself would not normally be a perceivable noise increase.

The expected level of construction noise is dependent upon the nature and duration of the project. Construction activities for most large-scale projects would be expected to result in increased noise levels as a result of the operation of construction equipment onsite and the movement of construction-related vehicles (i.e., worker trips, and material and equipment trips) on the surrounding roadways. Noise levels associated with construction activities would increase ambient noise levels adjacent to the construction site and along roadways used by construction-related vehicles. Construction noise is generally temporary and intermittent in nature as it generally only occurs on weekdays during daylight hours which minimizes the impact to sensitive receptors.

3.19.1.2 Sensitive Receptors

Sensitive noise receptors in the vicinity of the proposed project areas include residences and recreational areas. C.L. Edwards Memorial Park is located approximately 0.2-mile north of the borrow site, and Johnsonville State Historic Park is located approximately 0.85-mile northeast of the coal yard project area (see Figure 3-8). Densely forested areas of Johnsonville State Historic Park separate public use areas within the park from the proposed project area. The closest sensitive receptors to the proposed borrow site include residential subdivisions, with homes located approximately 475 feet east of the borrow site and homes located within 250 feet of the borrow haul route.

3.19.2 Environmental Consequences

3.19.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not close the coal yard or the coal yard runoff pond, construct a process water basin, or develop a borrow area; therefore, there would be no change in the existing noise environment under this alternative.

3.19.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

Noise impacts under this alternative would be associated with closure of the coal yard and coal yard runoff pond, construction of the process water basin, construction and operation of the borrow site, construction-related traffic (construction workforce and the shipment of goods and equipment) to and from the project sites, and the transport of coal stockpiled on the coal yard and of borrow material to JOF.

There are no noise receptors within the vicinity of the proposed coal yard project area or the north rail loop. Therefore, there would be no direct noise impacts associated with closure of the coal yard, coal yard runoff pond and process water basin construction. Typical equipment used to construct and operate the borrow site would consist of skidder loaders,

tub grinders, dozers, excavators, and over-the-road dump/haul trucks. Typical noise levels from construction equipment used at the borrow site are expected to be 85 dBA or less at a distance of 50 feet from the site (FHWA 2016). Based on straight line noise attenuation, it is estimated that noise levels from these sources would attenuate to 65.4 dBA at the nearest residence, approximately 476 feet east of the borrow site. Noise from construction and operation of the borrow site at C.L. Edwards Memorial Park, approximately 0.2-miles (approximately 1,200 feet) north of the borrow site, would attenuate to 57.2 dBA. However, actual noise would likely be lower in the field, where tree stands and topography would cause further noise attenuation. While this level is higher than the EPA noise guidance for Ldn of 55 dBA, it meets the HUD guidelines for Ldn of 65 dBA. Given the temporary and intermittent nature of construction and operation noise, the impact of noise generated from construction and operation of the borrow site is expected to be minor.

Noise impacts from construction-related traffic are expected to be minor as construction-related traffic would utilize interstate highways or major arterial roadways as much as possible and likely would not have a noticeable increase on traffic volume and consequently traffic noise near those major roadways.

Transportation of unburned coal and sediment from the coal yard runoff pond that is stockpiled on the coal yard to the West Camden Sanitary Landfill would utilize U.S. Highway 70 West to TN Route 1 East to West Camden Landfill Lane. If TVA choses to reclaim the stockpiled coal usable fuel would be transported to CUF and the waste material would be transported to the West Camden Sanitary landfill. The haul route to CUF would utilize U.S. Highway 70 east to TN Route 13 North to TN Route 149 East. As these routes primarily utilizes arterial roadways, residences or other noise-sensitive receptors are generally set back from the road at distances greater than 500 feet. Further, as identified in Section 3.18 (Transportation), the percentage increases in traffic along the haul route to the landfill and to CUF is negligible. Therefore, the increase in current noise levels is estimated to be less than 3 dBA and as such traffic noise is not anticipated to increase perceptibly.

In addition, there is a potential for noise impacts associated with an increase in traffic related to the transport of borrow material to JOF from the proposed borrow site. Industrial Park Road would be used to haul borrow to JOF, some residences on the west side of Industrial Park Road are located within 500 feet of the road, with the closest residence approximately 250 feet from the road. TVA estimates up to 150 truckloads of borrow per day would be hauled to JOF when needed to support closure activities. This results in a trip count of 300 trips per day on Industrial Park Road. As noted in Section 3.18, the increased traffic along Industrial Park Road is negligible as it would not change the LOS of the road. In addition, the demand for borrow would vary over the course of closure operations and ongoing plant operations; thus, it is expected to be intermittent and dependent upon specific needs at JOF. Therefore, the increase in current noise levels is estimated to be less than 3 dBA and as such traffic noise is not anticipated to increase perceptibly. Additionally, operations would generally only occur during normal workdays and during specific construction periods (when borrow is needed at JOF). Given this, the noise impacts associated with the hauling of borrow from the borrow site to JOF are expected to be negligible.

3.19.2.3 Alternative C – Coal Yard Full Cap Closure

Noise impacts under this alternative would be the same as those discussed for Alternative B. Therefore, there would be no impact.

3.19.2.4 Alternative D – Remove Coal Yard Material and Close

Noise impacts associated with removal of material stockpiled on the coal yard, construction of the process water basin, and operation of the borrow site would be the same as those identified under Alternatives B and C. Additional potential noise impacts associated with this alternative are related to the offsite transport of material excavated from the coal yard to the West Camden Sanitary Landfill. TVA estimates that transport of this material would result in 180 truck trips per day along the haul route for approximately 2 years following removal of the material stockpiled on the coal yard. However, as described above, the increase in traffic associated with the transport along the route is negligible and as such traffic noise is not expected to increase perceptibly during the closure period.

3.20 Solid and Hazardous Waste

3.20.1 Affected Environment

3.20.1.1 Solid Waste

In Tennessee, requirements for management of solid wastes are focused on solid waste processing and disposal under Rule 0400-11-.01. Solid wastes are defined in the rule as garbage, trash, refuse, abandoned material, spent material, byproducts, scrap, ash, sludge and all discarded material including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial and agricultural operations, and from community activities. Subtitle D of Resource Conservation and Recovery Act (RCRA) and its implementing regulations establish minimum federal technical standards and guidelines for nonhazardous solid waste management.

In general, hazardous materials include substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health or the environment when released into the environment. Hazardous materials are regulated under a variety of federal laws including Occupational Safety and Health Administration (OSHA) standards, Emergency Planning and Community Right to Know Act, RCRA, the Comprehensive Environmental Response, Compensation and Liability Act of 1980 and the Toxic Substances Control Act.

Various hazardous wastes are generated at the plant. In 2013, JOF was classified under RCRA as a Conditionally Exempt Small Quantity Generator.

3.20.2 Environmental Consequences

3.20.2.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not close the coal yard or the coal yard runoff pond, construct a process water basin, or develop a borrow area; therefore, there would be no impacts to solid waste and hazardous waste generation under this alternative.

3.20.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

The primary waste streams resulting from the closure of the coal yard and coal yard runoff pond would be solid nonhazardous waste. However, some nonhazardous liquid waste would also be generated. During construction, the primary solid nonhazardous wastes generated would be refuse from the contractor personnel, a small volume of construction debris (liner scraps, piping removed, etc.) and soils as briefly summarized below:

- Construction debris consisting primarily of liner scraps, piping removed, miscellaneous construction rubble, wastes from packing materials and empty nonhazardous chemical containers during project construction.

- Land clearing wastes would result from grading operations.

- Soils would result from land clearing, grading and excavation.

Construction waste and debris would be placed in roll-offs and disposed of at a permitted offsite construction and demolition landfill. TVA would manage all solid wastes generated from construction activities in accordance with applicable state regulations following procedures outlined in TVA's current Environmental Procedures and applicable BMPs. Any soils generated due to grading or excavation would be managed onsite. 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, compressed gases and other hazardous materials could also be produced during construction. Oily wastes generated during servicing of heavy equipment would not be stored on site but 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 procedures for spill prevention and cleanup and waste management protocols in accordance with pertinent federal, state and local requirements.

TVA would relocate unburned coal and sediment excavated from the coal yard runoff pond that is stockpiled on the coal yard to the West Camden Sanitary Landfill or TVA may elect to implement a reclamation process to recover the maximum amount of reusable fuel to CUF and all remaining unusable waste material to the landfill. According to a study completed in 2013, the life of the landfill is estimated to be over 25 years (Northwest Tennessee Development District 2013). Therefore, given the relatively small amount of material stockpiled on the coal yard that would be disposed in the landfill this action would have a negligible effect on the long-term ability to meet disposal needs of the region. Conversely, if TVA implements the reclamation process, the amount of unusable material that would be transported to the West Camden Sanitary Landfill would be lower and therefore would not have a discernable impact the long-term ability to meet disposal needs of the region.

The proposed borrow site is currently undeveloped with some forested land. Portions of the site are maintained as a transmission line easement. Consequently, no solid or hazardous materials or wastes exists in the area. During borrow site development, some debris and waste materials would be generated and removed from the proposed site. It is expected that this material would primarily be vegetative waste associated with preparation of the area for soil excavation. All materials would be salvaged where feasible; otherwise, woody debris and other vegetation may be disposed onsite through open burning or sent offsite to an approved solid waste facility for disposal in compliance with applicable pertinent federal, state and local requirements. TVA would perform material removal using TVA standard BMPs. All other waste materials removed from the site would be properly managed and disposed of at approved solid waste facilities or recycled in compliance with applicable pertinent federal, state and local requirements and best management practices.

Hazardous waste generated during development and operation of the borrow site may include limited quantities of fuels, lubricating oils, and other hazardous materials. Appropriate spill prevention, containment, and disposal requirements for hazardous materials would be implemented to protect construction and plant workers, the public, and the environment. A permitted third-party waste disposal facility would be used for ultimate disposal of the wastes.

Limited quantities of used oils would be generated during operation of the process water basin from pumps, gear boxes, compressors and other machinery. These types of used oil are currently generated by JOF, and the increase in generation rate of these wastes is not expected to be significant. Used oil is recycled in accordance with applicable regulations and TVA’s procedures.

Hazardous waste streams that are likely to be generated during the operation of the process water basin are those associated with routine maintenance activities and include adhesives, paints, paint chips, degreasing solvents, absorbents and oily and solvent contaminated rags. JOF is considered a Conditionally Exempt Small Quantity Generator of hazardous waste which is defined by the EPA as generating no more than 220 pounds of hazardous waste per month. Only a very limited increase in hazardous waste generation is expected to occur from operation of the process water basin, and the status of JOF as a Conditionally Exempt Small Quantity Generator of hazardous waste would not change as a result of the proposed actions.

Solid and hazardous wastes generated at TVA facilities are managed in accordance with established procedures and applicable regulations, and wastes generated by equipment maintenance would be managed under existing programs Therefore, impacts from solid waste and hazardous waste generation are considered to be minor.

3.20.2.3 Alternative C – Coal Yard Full Cap Closure

Impacts under this alternative would be the same as those identified for Alternative B. Therefore, impacts from solid waste and hazardous waste generation are considered minor under this alternative.

3.20.2.4 Alternative D – Remove Coal Yard Material and Close

Impacts associated with the closure of the coal yard, coal yard runoff pond construction of the process water basin and development of the borrow site would be the same as Alternatives B and C.

Under Alternative D, the closure of the coal yard includes excavating 600,000 cubic yards of coal remnants and CCR including bottom ash/spent-bed material from the coal yard and transporting it to the West Camden Sanitary Landfill for disposal. OSHA requirements for workers engaged in excavation activities would be applied. Transport of this material would be managed under the requirements set forth under RCRA Subtitle D and in accordance with pertinent state and local requirements. Given the existing capacity of the landfill, disposal of this material would have a negligible impact on the long-term capacity of this facility; however, this impact would be incrementally greater than Alternatives B and C. Nonetheless, impacts from solid waste and hazardous waste generation are considered to be minor under this alternative.

3.21 Environmental Justice

On February 11, 1994, President Clinton signed EO 12898 Federal Actions to Address Environmental Justice (EJ) in Minority Populations and Low-Income Populations. EO 12898 mandates some federal-executive agencies to consider EJ as part of the NEPA. EJ has been defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income (EPA 2017) and ensures that minority and low-income populations do not bear disproportionately high and adverse human health or environmental effects from federal programs, policies, and activities. Although TVA is not one of the agencies subject to this order, TVA routinely considers EJ impacts as part of the project decision-making process.

Guidance for addressing EJ is provided by the CEQ's Environmental Justice Guidance under the National Environmental Policy Act (CEQ 1997). The CEQ defines minority as any race and ethnicity as classified by the U.S. Census Bureau (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). Low income populations are based on annual-statistical poverty thresholds also defined by the USCB.

3.21.1 Affected Environment

Project activities would temporarily result in construction related noise and exposure to fugitive dust and exhaust emissions to those persons near the construction site, borrow site, offsite landfill, and associated haul routes. Therefore, the spatial extent for the EJ analysis was defined as the 6 census block groups which encompass the project areas, the West Camden Sanitary Landfill, and associated haul routes. Included as secondary geographic areas of reference are Humphreys County, Benton County, and the State of Tennessee. Comparisons at multiple spatial scales provides a more detailed picture of populations that may be affected by the proposed actions including any EJ populations (e.g., minority and low income). Demographic and economic characteristics of resident populations were assessed using the 2012-2016 USCB American Community Survey (ACS) 5-year estimates provided by the USCB (2018a).

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).

Low-income populations are those with incomes that are less than the poverty level, which varies by the size of family and number of related children under 18 years (CEQ 1997). The 2016 USCB Poverty Thresholds states the poverty threshold as an annual household income of $24,563 for a family of four (USCB 2018b). For an individual, an annual income of $12,228 is the poverty threshold. A low-income population exists if either of the following two conditions is met:

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

Table 3-14 shows the results of the minority and poverty analyses of the project areas, and associated haul routes.

Table 3-14. Environmental Justice Characteristics

Geography	Total Population	Percent Minority Population	Percent of Population in Poverty
Project Areas, Borrow Haul Route, West Camden Sanitary Landfill and Haul Route	6,627	4.9%	18.9%
CUF and Haul Route from JOF to CUF	17,807	9.0%	18.8%
Benton County, Tennessee	16,173	7.0%	22.6%
Houston County, Tennessee	8,234	7.7%	20.9%
Humphreys County, Tennessee	18,216	7.5%	18.5%
Stewart County, Tennessee	13,257	9.0%	19.2%
State of Tennessee	6,548,009	27.2%	17.2%

Source: USCB 2018a and 2018b

The total minority population (i.e., all non-white racial groups and Hispanic or Latino, combined) comprise 27.2 percent of the population of the state of Tennessee. Of the four counties considered, Stewart County has the highest percentage of minority population (9 percent), followed by Houston County (7.7 percent), Humphreys County (7.5 percent), and Benton County (7.0 percent). Minority populations range from 0.0 to 10.3 percent of the population of block groups intersecting the study area around the project areas, borrow haul route, West Camden Sanitary Landfill, and landfill haul routes (average of 4.9 percent). None of these block groups exceeds EJ thresholds for minority populations when compared to the reference geographies. Within the block groups encompassing CUF and intersecting the haul route for the transport of unburned coal and sediment stockpiled on the coal yard from JOF to CUF, minorities comprise 1.8 to 24.3 percent of the population (average of 9 percent). These block groups do not exceed EJ thresholds for any minority population when compared to the reference geographies.

The poverty rate in Tennessee is 17.7 percent. Of the four counties considered, Benton County has the highest poverty rate (22.6 percent), followed by Houston (20.9 percent), Stewart (19.2 percent), and Humphreys (18.5 percent). Poverty rates within the block groups encompassing the proposed project areas, borrow haul route, West Camden Sanitary Landfill, and landfill haul route range from 11.6 percent to 30.4 percent of the population, within an average poverty rate of 18.9 percent. The selected block groups do not exceed EJ thresholds for poverty when compared to the reference geographies. Conversely, the poverty rate within the block groups encompassing CUF and intersecting the haul route from JOF to CUF ranges from 4 to 50.2 percent of the population (average of 18.8 percent); however, only two block groups (Block Group 1, Census Tract 1303 and Block Group 4, Census Tract 1303) located along the haul route in Humphreys County are considered sensitive populations subject to EJ consideration. These block groups are located along U.S. 70/State Highway 1 in Waverly, Tennessee.

3.21.2 Environmental Consequences

3.21.2.1 Alternative A – No Action

Under the No Action Alternative, TVA would not proceed with closure of the coal yard, closure of the coal yard runoff pond, construction of the process water basin, or development of a borrow site. Therefore, there would be no impacts to EJ populations under this alternative.

3.21.2.2 Alternative B – Coal Yard Material Consolidation and Cap Closure

There would be no impacts to EJ communities under Alternative B. No EJ populations were identified near the proposed project areas, along the borrow haul route, near the West Camden Sanitary Landfill, or along the associated landfill haul route. Two EJ groups were identified along the haul route from JOF to CUF. The transport of unburned coal and sediment stockpiled on the coal yard may result in indirect impacts to these communities due to the additional traffic, noise and dust generated from the increased truck traffic. However, given the minor increase in traffic and short duration of this action (up to 4.5 months) the impact would be minor and would be consistent across all communities (i.e., EJ and non-EJ) along the haul route. Therefore, there would be no disproportionate effects to minority or low-income populations under this alternative.

3.21.2.3 Alternative C – Coal Yard Full Cap Closure

Impacts under this alternative would be the same as those identified for Alternative B. Therefore, there would be no disproportionate effects to minority or low-income populations under this alternative.

3.21.2.4 Alternative D – Remove Coal Yard Material and Close

Impacts under this alternative would be the same as those identified for Alternative B. Therefore, there would be no disproportionate effects to minority or low-income populations under this alternative.

3.22 Cumulative Effects

This section supplements preceding analyses that include the potential for cumulative adverse impacts to the region's environment that could result from the implementation of the proposed projects. A cumulative impact analysis must consider the potential impact on the environment that may result from the incremental impact of a project when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). Baseline conditions reflect the impacts of past and present actions. The impact analyses

summarized in preceding sections are based on baseline conditions and either explicitly or implicitly already have cumulated the impacts of past and present actions with those of the proposed action.

TVA evaluated a full range of environmental resource issues for inclusion in the cumulative effects analysis. The proposed actions and their connected actions identified under Alternatives B, C, and D would occur mostly on land that was previously disturbed and is used for industrial purposes. The surrounding landscape is already subject to environmental stressors associated with continuing industrial operations. Consequently, as has been described in prior subsections of this EA, the existing quality of environmental resources with the potential to be directly or indirectly affected by project activities is generally low. The exception to this is the proposed borrow site, which would be constructed on land that is currently undeveloped and covered with forested and herbaceous vegetation. The proposed transportation of unburned coal and sediment stockpiled on the coal yard identified under Alternatives B, C and D and the transport of coal yard material under Alternative D would utilize existing roadways and this material would be managed on land developed as a landfill or operated as an industrial facility. As such, impacts associated with these actions are confined to those associated with the transportation of materials from JOF to the West Camden Sanitary Landfill or to CUF.

3.22.1 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 land and water resources within a 5-mile radius of the proposed actions were considered appropriate for consideration in this analysis. This geographic area also encompasses the coal yard project area at JOF, proposed laydown yard, and near offsite area proposed for borrow site development.

3.22.2 Identification of "Other Actions"

Past, present, and reasonably foreseeable future actions that are appropriate for consideration in this cumulative analysis are listed in Table 3-14. These actions were identified within the geographic area of analysis as having, in the aggregate, the potential to result in larger and potentially significant adverse impacts to the resources of concern.

Table 3-15. Summary of Other Reasonably Foreseeable Future Actions in the Vicinity of the Proposed Projects

Actions Description	Description	Timing and Reasonable Foreseeability
Operations of adjacent industrial facilities	Operations of facilities adjacent to JOF, including the JCT, Chemours Chemical Plant, OxyChem Plant, and the Herbet Sangravel facilities.	Past, Present, Reasonably Foreseeable Future
Decommissioning of JOF	TVA would decommission and deconstruct powerhouses and powerhouse equipment and associated coal-fired power generation units on JOF.	Reasonably Foreseeable Future

Actions Description	Description	Timing and Reasonable Foreseeability
Closure of Ash Pond 2	Closure of Ash Pond 2 which contains CCR in the form of Fly Ash and Bottom Ash. Methods being considered include closure-in-place and closure-by-removal to either a landfill or for beneficial reuse in addition to the No Action Alternative.	Reasonably Foreseeable Future
Piping and Junction Box on Ash Pond 2	TVA is considering extending piping across Ash Pond 2 and installing a junction mixing box near Outfall 001 to manage the process water flows from the coal yard runoff pond and JOF.	Reasonably Foreseeable Future
Lateral Divestiture Project	TVA is proposing to divest an approximately 28-mile long natural gas pipeline, existing metering station, associated easements and to grant an easement over approximately one acre of property on the JCT.	Reasonably Foreseeable Future
Closure of coal-fired facility at JOF	TVA retired all 10 coal-fired units at the JOF per the EPA Clean Air Agreements.	Past
JOF HRSG	TVA constructed a HRSG unit integrated into an existing CT unit at JCT.	Past
OxyChem barge terminal and outfall	Modifications to dock facility and installation of waste water outfall.	Past
Management of CCR Produced at CUF	TVA is considering options to manage CCR produced at CUF.	Reasonably Foreseeable Future
US-70 Upgrade	Tennessee Department of Transportation plans to upgrade US-70 from the Camden Bypass to the Tennessee River.	Reasonably Foreseeable Future

Actions that have 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.

3.22.2.1 Operations of the Adjacent Industrial Facilities

The JOF site is located along the eastern bank of the Tennessee River (Kentucky Reservoir) and is bordered by Chemours chemical plant and OxyChem plant to the north. The two facilities work under an agreement to utilize raw materials and services provided by each other. The facilities also include a shared barge docking facility and waste water outfall in the reservoir. To the south of JOF is a sand and gravel mining facility, Herbet Sangravel. This facility includes material stockpile areas, various supporting buildings, and

a barge docking facility. The JCT is located east of the JOF and operations at this facility will continue indefinitely regardless of the of the plant retirement/deconstruction option carried out at JOF. These facilities around JOF collectively are part of the base condition characterized by each of the environmental resources evaluated above and contribute to the previously developed elements of the environmental setting for this EA and on-going disturbance.

3.22.2.2 Decommissioning, Deactivation, Decontamination, and Demolition of JOF

Coal-fired power generation ceased at JOF in December 2017. Decommissioning of JOF is anticipated to be complete by 2021. The environmental impacts of activities associated with decommissioning are being assessed in an ongoing environmental review which will include a detailed cumulative effects assessment as part of the evaluation of alternatives, including the effects of this project.

3.22.2.3 Closure of Ash Pond 2

TVA is currently evaluating alternatives for closure of Ash Pond 2 at JOF including closing the impoundment in place or removing CCR from the impoundment and transporting offsite for disposal. Before closure activities begin, a detailed environmental review would be conducted to evaluate closure alternatives, which will include a detailed cumulative effects assessment.

Closure of Ash Pond 2 requires that all process flows cease being directed to Ash Pond 2. As JOF has been decommissioned, the majority of flows from the fossil plant have ceased with the exception of sump flows. Under this proposed project, TVA could extend piping from the coal yard runoff pond and JOF across Ash Pond 2 and install a junction box for mixing the flows prior to discharge directly through Outfall 001. Should TVA pursue this process flow project, TVA would conduct a NEPA environmental impact analysis to consider potential environmental impacts.

3.22.2.4 Lateral Divestiture Project

TVA is proposing to divest an approximately 28-mile long natural gas pipeline, existing metering station, associated easements and grant an easement over approximately 1 acre of property on the JCT site for the construction of a future metering station. The pipeline and easements are located in Humphreys and Hickman counties, the vicinity of JCT.

3.22.2.5 Closure of the Coal-fired Units at JOF

As described in Section 1.1 of this EA, coal-fired Units 5 through 10 were retired in December 2015, and all remaining units were retired in December 2017. Upon the closure of JOF, some of the infrastructure will remain in place to support operations at the JCT.

3.22.2.6 Johnsonville Combustion Turbine Facility

To allow TVA to continue to provide steam to the Chemours manufacturing facility after the closure of the coal-fired units at JOF, TVA installed a HRSG unit integrated into an existing CT unit at the JCT. A new water line was installed from the existing fire suppression system intake at the north end of the harbor to supply water to the plant.

3.22.2.7 OxyChem Barge Terminal and Outfall

In 2013, the barge terminal at the Chemours chemical plant (formerly DuPont) was modified to support the adjacent OxyChem plant. The modifications included installing equipment to allow for the unloading of rock salt, as well as for loading of liquid caustic into barges for transport to customers. OxyChem also installed a waste water outfall in the Kentucky Reservoir approximately 625 feet downstream of an existing outfall for Chemours. These modifications were performed following approval by TVA under Section 26a of the TVA Act, and by USACE under Section 404 of the CWA.

3.22.2.8 Management of CCR Produced at CUF

As part of TVA's goal to eliminate wet CCR storage at its coal plants, TVA is considering construction and operation of several projects at CUF to manage CCRs. Although a decision regarding all specific actions associated with these activities has not been finalized, the closure of existing CCR impoundments, construction of a bottom ash dewatering facility, construction of process water basins, which includes removal of CCR from a portion of the Main Ash Impoundment and the Stilling Impoundment , and long-term management and storage of future CCR generated at CUF, including construction of a landfill on CUF property, are reasonably foreseeable activities. The environmental impacts of activities associated with these actions have been assessed and cumulative effects have been considered as part of the evaluation of alternatives.

3.22.2.9 Tennessee Department of Transportation Project

The Tennessee Department of transportation has plans to upgrade US-70 in Benton County, across the river from JOF. The project is currently in the right of way acquisition stage. This rural access project will upgrade approximately 4.1 miles of US-70 from the Camden bypass to the Tennessee River (TDOT 2018).

3.22.3 Analysis of Cumulative Effects

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 1508.7 and may include individually minor, but collectively significant actions taking place over a period of time.

This analysis is limited only to those resource issues potentially adversely affected by project activities or connected actions. Accordingly, geology, aquatic ecology, floodplains, wetlands, visual resources, cultural resources, natural areas, parks and recreation, land use, prime farmland, hazardous materials/waste, socioeconomics and environmental justice populations are not included in this analysis as these resources are either not adversely affected, or the effects are beneficial.

Primary adverse cumulative effects of the proposed actions as described in the preceding sections of Chapter 3 are related to the potential additive and overlapping effects on air quality, soils, surface water, terrestrial ecosystems, transportation, and noise. It is likely that the construction phase of the other reasonably foreseeable future actions identified within the region may overlap with the term operations associated with the proposed action. The

potential for cumulative effects to the identified environmental resources of concern are analyzed below for Alternatives B, C, and D.

3.22.3.1 Air Quality

Among the other identified actions within the geographic area, on-going operations of the JCT, Chemours, OxyChem, and the Herbet Sangravel facilities do not have the potential to contribute to additional impacts to air quality. On-going operations of these facilities and the related impacts to air quality are considered part of the existing environmental setting and are not expected to increase in the foreseeable future. Future development within the industrial area may result in adverse effects to air quality; however, those actions are not in the foreseeable future. Furthermore, it is assumed that any potential impacts from future development would be addressed during the permitting process.

Closure of Ash Pond 2, decommissioning of JOF, construction of the junction box to redirect process water flows from JCT and JOF and the US-70 upgrade could result in some minor emissions during the construction phase of these projects due to fugitive dust and emissions from construction equipment and vehicles. If these projects overlap with the construction of the proposed projects there would be a cumulative impact to air quality. However, these impacts would be temporary and cease once construction activities are complete.

Transportation of borrow material to JOF could result in minor, short-term impacts to air quality. Impacts would be minimized through TVA's fugitive dust control plan and the use of BMPs. If the reasonably foreseeable future actions identified in Table 3-14 occur at the same time as the proposed projects, there would be potential for minor and short-term cumulative impacts to air quality. However, exceedances of applicable ambient air quality standards are not expected. Therefore, no cumulative effects to air quality would occur as a result of Alternatives B, C or D.

Activities associated with all of the proposed alternatives include the transport of unburned coal and sediment excavated from the coal yard runoff pond that is stockpiled on the coal yard to the West Camden Sanitary Landfill or to CUF. Offsite transport of material excavated from the coal yard to support closure under Alternative D would occur for approximately 20 months (1.7 years) following the removal of the stockpiled material on the coal yard. Impacts on air quality would be incrementally greater than under Alternatives B and C due to the increase in duration of transport but would be minor compared to regional air emissions. If activities associated with CCR management at CUF and other reasonably foreseeable future actions overlap with the proposed actions, there would be potential for minor and short-term cumulative impacts. However, air quality impacts would be temporary and localized and cease once the proposed construction activities at JOF are complete. Therefore, exceedances of applicable ambient air quality standards are not expected, and no cumulative effects to air quality are anticipated as a result of the proposed project alternatives.

3.22.3.2 Soils

Grading and construction activities associated with the development of the borrow site have the potential to disturb soil stability and increase erosion. Construction activities associated with the regionally foreseeable future actions listed in Table 3-14 also have the potential to disturb soil stability and increase erosion during construction activities such a clearing and

grubbing and other activities associated with site preparation. However, implementation of the proper BMPs would minimize the impacts to soils and therefore the cumulative impact would be negligible.

3.22.3.3 Surface Water

The potential for cumulative effects to surface waters and water quality are largely driven by the variety of uses of and inputs into the Tennessee River (Kentucky Reservoir). As described in Section 3.17, the reservoir is a major focal point for water-related outdoor recreation, including boating, fishing, and swimming. Additionally, in the area around JOF there are a number of other industrial facilities that discharge into the reservoir, contributing to the existing surface water quality.

Among the other identified actions within the geographic area, on-going operations of the Chemours, OxyChem, JCT and the Herbet Sangravel facilities are considered part of the existing environmental setting and are not expected to increase in the foreseeable future. Past actions, including the OxyChem outfall that was added in 2013, have contributed to the current surface water conditions. In addition, it is expected that the recent closure of coal-fired units at JOF would over time result in improved water quality conditions due to the cessation of discharge from the facility and reduced intake of surface water for operations. Future foreseeable actions would also be expected to result in improved water quality condition and surface runoff storm water flows would remain.

Under all of the proposed alternatives, storm water runoff from the coal yard project area would be directed to a new storm water outfall to the Tennessee River (Kentucky Reservoir). In addition, a new NPDES permitted outfall to the Tennessee River would be installed on the west peninsula to manage flows from the proposed process water basin.

Within the borrow site, Little Indian Creek would be crossed by installing a temporary culvert. The stream crossing would be appropriately permitted, and construction would utilize BMPs. After borrow activities have ceased, the culvert would be removed and the stream would be restored. During excavation, existing storm water flow patterns would be routed around the borrow sites. Sediment basins would be constructed in each of the three excavation areas to prevent sediment deposition into adjacent waterways.

Wastewater and storm water discharges associated with construction of future foreseeable actions would meet existing NPDES and TMSP permit limits. In addition, it is expected that any construction activities would utilize BMPs to minimize indirect impacts to surface water. Because impacts as a result of the proposed actions are minor, and because any potential future actions would adhere to permit limits, cumulative effects to surface water are not expected to be significant.

3.22.3.4 Terrestrial Ecosystems

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 all the proposed alternatives, construction activities would remove vegetation within the proposed borrow site and in the north rail loop. However, terrestrial ecosystems within the impacted areas are comprised of communities that are common or of relatively low to moderate quality. Additionally, sections of the forested habitat within the borrow site are already fragmented by the presence of a utility

corridor and do 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 vicinity of JOF.

The forested habitat within the borrow site and the north rail loop is suitable summer foraging and roosting habit for Indiana bat and northern long-eared bat, vegetation clearing to accommodate the proposed construction would result in the removal of approximately 42 acres of suitable summer roosting habitat for Indiana bat and northern long-eared bat. Conservation measures would be implemented to minimize impacts to these species. Protected bat species are not known to occur within 5 miles of the project area and as the reasonably foreseeable future actions would occur within the existing industrial facility that does not contain suitable habitat, 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.

The reasonably foreseeable future actions would occur on land that is used for industrial purposes or within an existing roadway corridor and as such much of the native vegetation has already been altered. Therefore, cumulative effects to terrestrial ecosystems would be minor.

3.22.3.5 Transportation

Among the other identified actions within the geographic area, on-going operations of the Chemours, OxyChem, JCT, and the Herbet Sangravel facilities do not have the potential to contribute to additional impacts to transportation. On-going operations of these facilities and the traffic they generate are considered part of the existing environmental setting and are not expected to increase in the foreseeable future.

The reasonably foreseeable future projects that are planned to occur on JOF or the JCT such as the Ash Pond Closure and decommissioning of JOF could contribute to cumulative impacts on the local transportation network if these activities overlap with the proposed construction projects. If Ash Pond 2 is closed by removal, these impacts could be significant. The number of trucks transporting debris from JOF demolition, added to the number of trucks required to remove CCR from Ash Pond 2 and the proposed closure of the coal yard and coal yard runoff pond, construction of the process water basin and haul of borrow to JOF could result in a very large number of trucks entering and exiting the facility on a daily basis. This could lead to congestion along US-70. TVA would mitigate congestion with a traffic plan, as needed. Possibilities include staging of trucks, spacing logistics, or timing truck traffic to occur during lighter traffic hours (such as not in the morning or afternoon commute hours). With these mitigations, cumulative impacts to transportation would be minimal.

The potential for cumulative effects to transportation from reasonably foreseeable future actions would also be related to traffic associated with the construction workforce and the shipments of goods and equipment to and from the construction sites. The construction phase traffic would occur in addition to the existing traffic generated by the operation of the JCT and the surrounding industrial facilities. However, once construction is completed, maintenance phase traffic associated with the foreseeable future projects would be negligible.

Reasonably foreseeable CCR management actions at CUF may also result in roadway transport of either CCR or borrow material, depending on the selected alternative. Should ash impoundment closure by removal at CUF result in transport of CCR to existing offsite solid waste disposal facilities, such actions would result in substantial increases in truck traffic on existing roadways. The transport of unburned coal to CUF under all alternatives would contribute to this increase in truck traffic and related traffic safety concerns. However, road networks near JOF are anticipated to have sufficient capacity remaining to handle the resulting increase in truck traffic from the proposed JOF projects in combination with other present and future anticipated traffic. Therefore, cumulative effects would be negligible.

The proposed upgrades to US-70 across the river may also contribute to cumulative impacts to transportation due to congestion. Under Alternatives B and C trucks would transport stockpiled coal and sediment excavated from the coal yard runoff pond to the West Camden Sanitary Landfill. In addition, under Alternative D, TVA would also transport coal and spent bed material excavated from the coal yard to this landfill. The haul route would include the area on US-70 that is scheduled to be upgraded. If trucks transporting construction debris from JOF decommissioning and the CCR from JOF Ash Pond 2 west on US-70 to disposal areas, and the road were under construction, significant congestion could result. Should construction on US-70 create an issue, TVA would evaluate other potential routes to and from JOF.

3.22.3.6 Noise

Among the other identified actions within the geographic area, on-going operations of the Chemours, OxyChem, JCT, and the Herbet Sangravel facilities do not have the potential to contribute to additional impacts to noise. On-going operations of these facilities and the related impacts to noise are considered part of the existing environmental setting and are not expected to increase in the foreseeable future.

Implementation of the foreseeable future projects have the potential to contribute to additional noise impacts. Due to the temporary nature of construction activities, distance to the nearest sensitive noise receptors, noise from construction associated with these activities at JOF or the JCT are not expected to cause significant adverse impacts.

Offsite noise emissions associated with transport of unburned coal and sediment excavated from the coal yard runoff pond that is stockpiled on the coal yard under all alternatives and from the transport of material excavated from the coal yard under Alternative D would result in minor effects to receptors located along the haul routes. As described above, reasonably foreseeable CCR management actions at CUF may result in roadway transport of either CCR or borrow material, depending on the selected alternative. If Ash Pond 2 is closed by removal the transport of CCR to existing offsite solid waste disposal facilities would result in substantial increases in truck traffic and related noise emissions. Similarly, the offsite transport of construction debris associated with JOF decommissioning would also result in increases in truck traffic and related noise emissions. However, offsite transport of these materials would utilize interstate highways or major arterial roadways as much as possible where residences or other noise-sensitive receptors are generally set back from the road at distances greater than 500 feet and likely would not have a noticeable increase traffic noise in the vicinity of those major roadways. Therefore, cumulative effects to noise would be negligible.

Under any of the proposed action alternatives, noise emissions associated with the use of local public roadways to transport borrow is expected to result in minor, temporary noise impacts to receptors along the haul route. The proposed borrow site may be used in conjunction with the foreseeable future actions at JOF. However, operations would generally only occur during specific construction periods, which would vary based on project timelines. Therefore, cumulative noise impacts are not anticipated in relation to the operation of the proposed borrow site.

3.23 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 the proposed activities have the potential to cause unavoidable adverse effects to natural and human environmental resources.

Impacts associated with the closure of the coal yard, coal yard runoff pond, and construction and operation of a process water basin would primarily occur during construction. Activities associated with the use of construction equipment may result in varying amounts of dust, air emissions, noise and vibration that may potentially impact onsite workers. 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.

In addition, temporary impacts to water quality from runoff at the site could impact nearby receiving water bodies during construction activities. BMPs to minimize runoff would be implemented, and water discharged in the course of construction activities would meet established TDEC permit limits.

The transport of unburned coal and sediment stockpiled on the coal yard to the West Camden Sanitary Landfill or to CUF and the landfill under all alternatives as well as the transport of material excavated from the coal yard under Alternative D to the West Camden Sanitary Landfill would increase truck traffic volumes on public roads which could compromise public safety. This additional construction-related traffic would also increase noise and fugitive dust in areas in proximity to these roads. Emissions from the haul trucks are minimized through implementation of BMPs including proper vehicle maintenance.

Direct impacts to Little Indian Creek would occur as a result of installation of a temporary culvert. The temporary culvert would be removed, and the stream channel would be restored to its previous condition when borrow material is no longer needed. This activity would be completed in compliance with applicable TDEC and USACE 404/401 permits obtained for the proposed action. Although direct impacts to project area wetlands are not anticipated, indirect impacts resulting from the development and operation of the borrow site could include erosion and sedimentation from storm water runoff during construction and operation into nearby jurisdictional and non-jurisdictional wetlands. BMPs in accordance with site-specific erosion control plans would be implemented to minimize this potential. Impacts to wetlands and streams due to construction activities would be short-term and minor.

Development of the borrow site would be on lands currently undeveloped and either barren or covered with forested or herbaceous vegetation. Clearing and grading and excavation of the site would result in long-term impacts to species composition and wildlife habitat. However, the impact is considered minor and is not expected to result in notable large-scale habitat alteration or destabilization of any wildlife species.

With the application of appropriate BMPs and adherence to permit requirements, these unavoidable adverse effects would be minor.

3.24 Relationship of Short-Term Uses to 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 closure of coal yard, the coal yard runoff pond, construction and operation of a process water basin, and borrow site development. For the purposes of this section, these actions are considered to be short-term uses of the environment. The long-term is considered to be initiated upon completion of closure and construction activities and upon cessation of borrow activities.

Most environmental impacts during construction activities would be relatively short-term and would be addressed by BMPs and mitigation measures. Construction activities would have a limited, yet favorable short-term impact to the local economy through the creation of construction jobs and associated revenue. In addition, construction activities would have a negative effect on a limited amount of short-term uses of the environment, such as air, noise, and transportation resources as described above. Some wildlife may be displaced during clearing and development of the borrow site and closure of the coal yard and coal yard runoff pond. Most environmental impacts during construction and borrow activities would be relatively short-term and would be addressed by BMPs and mitigation measures.

The proposed closure of the coal yard and coal yard runoff pond and process water basin project area at JOF as well as the temporary laydown area are located in areas that have been previously disturbed and support industrial uses. No loss of natural resources is anticipated. In the long term, after JOF is decommissioned, the lands could be reused and made available for other uses. Safety and security requirements as well as post-closure monitoring could impact future uses of the project areas. However, since these project areas are located on land presently dedicated for industrial uses, future land use would be limited to those compatible with industrial uses.

Upon cessation of borrow excavation, the borrow site would be graded and seeded or sodded and would eventually resume providing wildlife habitat which would have a beneficial impact on long-term productivity.

3.25 Irreversible and Irretrievable Commitments of Resources

A resource commitment is considered irreversible when impacts from its use would limit future use options and the change cannot be reversed, reclaimed, or repaired. Irreversible commitments generally occur to nonrenewable resources such as minerals or cultural resources and to those resources that are renewable only over long timespans, such as soil productivity. A resource commitment is considered irretrievable when the use or consumption of the resource is neither renewable nor recoverable for use by future generations until reclamation is successfully applied. Irretrievable commitments generally apply to the loss of production, harvest, or natural resources and are not necessarily irreversible.

Resources required by construction activities, including labor, fossil fuels and construction materials, would be irretrievably lost. Nonrenewable fossil fuels would be irretrievably lost through the use of gasoline and diesel-powered equipment during construction. In addition, construction materials (such as liners and cover systems) would be consumed. However, it is unlikely that their limited use in these projects would adversely affect the overall future availability of these resources

The transfer of borrow material from the borrow site to JOF could be both an irreversible and irretrievable commitment of resources. The loss of soil (which requires a very long time to generate) would constitute an irreversible and irretrievable resource commitment; however, revegetating the borrow site, coal yard, and coal yard runoff pond would return these sites to productive status. Thus, the loss of vegetation until the borrow area is successfully revegetated would be an irretrievable commitment, but not irreversible.

The clearing of trees would constitute an irretrievable short-term and long-term loss of wildlife habitat and vegetation. Until the area is successfully reclaimed (i.e., revegetated), the loss of these habitats would be an irretrievable, but not an irreversible commitment of resources.

The land used for the coal yard if it is closed under Alternative B or C would be irreversibly committed as the coal yard material would remain in place for the foreseeable future, representing a permanent commitment of the land and precluding future use of the land. However, as this site would be vegetated, it would support some natural resources.

Land used if the coal yard is closed under Alternative D is not irreversibly committed because once closure is complete, the land could be returned to other industrial or non-industrial uses at some time in the future.

Nonrenewable fossil fuels would be irretrievably lost through the use of fuel by trucks used to transport unburned coal and sediment stockpiled on the coal yard to the West Camden Sanitary landfill or CUF. Due to the greater number of miles travelled, this impact would be greater for Alternative D which would require the longest duration of transport relative to Alternatives B and C. However, this impact would still be minor relative to existing supplies. Both the West Camden Sanitary Landfill and CUF are existing facilities, and there would be no changes to the committed materials and resources associated with the use of these facilities.

CHAPTER 4 – LIST OF PREPARERS

4.1 NEPA Project Management

Name:	**W. Doug White** (TVA)
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Experience:	14 years of experience in water resource management and NEPA Compliance.

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Name:	**Bill Elzinga**
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4.2 Other Contributors

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Name:	**Robert Marker**
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Name:	**Ray Finocchiaro**
Education:	Ph.D. Soils, M.S. Nat. Resources Management /Wetland Ecology, B.A. Biology
Project Role:	Soils, Air Quality and Climate Change
Experience:	14 years' experience in ecological studies.
Name:	**Linda Hart**
Education:	B.S., Business and Biology
Project Role	Technical Editing
Experience:	30 years of experience in production of large environmental documents including technical editing, formatting, and assembling.
Name:	**Connie Heitz**
Education:	M.P.A. Environmental and Natural Resource Management, B.S. Public Affairs
Project Role:	Technical Review, Public Health and Safety
Experience:	25 years in environmental and land use planning.
Name:	**Tom Hensel**
Education:	BS Science (Major Geology)
Project Role:	Geology and Groundwater
Experience:	28 years of experience as a professional geologist for geologic, geotechnical, and environmental projects.
Name:	**Emily Kinzinger**
Education:	B.S., Environmental Science
Project Role:	Environmental Justice, Natural Areas, Parks and Recreation, Noise
Experience:	4 years of experience in NEPA.
Name:	**Stephanie Miller**
Education:	M.S., Biology and B.S., Marine Biology
Project Role:	Land Use and Prime Farmland, Visual Resources
Experience:	8 years of experience in visual assessment, land use, aquatic and terrestrial ecology.

Name:	**Keara Pringle**
Education:	M.S., Environmental Science and B.S., Biology
Project Role:	Vegetation, Threatened and Endangered Species
Experience:	2 years of professional experience in the environmental industry providing wetland delineations, vegetation surveys, threatened and endangered species habitat assessments, fish surveys, and water quality analysis.

Name:	**Kendra Rogers**
Education:	B.S., Architectural Engineering
Project Role:	Transportation
Experience:	3 years of transportation experience.

Name:	**Stan Rudzinski**
Education:	M.S., Biology; B.S., Wildlife Management
Project Role:	Senior Biologist
Experience:	29 years of experience conducting and managing field studies and permitting for industrial, commercial, and federal clients.

CHAPTER 5 – ENVIRONMENTAL ASSESSMENT RECIPIENTS

5.1 Federal Agencies

U.S. Army Corps of Engineers

U.S. Environmental Protection Agency

U.S. Fish and Wildlife Service

5.2 State Agencies

Humphries County Economic Development Council

Tennessee Department of Environment and Conservation

Tennessee Department of Transportation

Tennessee State Historic Preservation Officer

Tennessee Wildlife Resources Agency

5.3 Federally Recognized Tribes

Absentee Shawnee Tribe of Oklahoma

Cherokee Nation

Chickasaw Nation

Coushatta Tribe of Louisiana

Eastern Band of Cherokee Indians

Eastern Shawnee Tribe of Oklahoma

Kialegee Tribal Town, Muscogee (Creek) Nation

Shawnee Tribe

Thlopthlocco Tribal Town

United Keetoowah Band of Cherokee Indians in Oklahoma

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Appendix A – Public and Agency Comments and TVA's Response

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Appendix A –Public and Agency Comments and TVA's Response

A draft of the EA was released for public review and comment on December 19, 2018. A notice of availability including a request for comments on the Draft EA was published in newspapers serving the Humphreys County, Tennessee area, and the Draft EA was posted on TVA's Web site. TVA's agency involvement included notification of the availability of the Draft EA to local, state, and federal agencies and federally recognized tribes. Comments were accepted through January 21, via TVA's Web site, mail, and e-mail.

TVA received one comment submission from the Tennessee Department of Environment and Conservation (TDEC). TVA carefully reviewed all of the comment statements in the submission and edited the text of the final EA as appropriate. Responses to TDEC's comments are provided below. A copy of TDEC's comment letter is included at the end of this section.

1. **Comment:** TDEC believes the Draft EA adequately addresses potential impacts to cultural and natural resources within the proposed project area.

   Response: Comment Noted.

2. **Comment:** Based on the scope of the temporary coal reclamation process, including recovery, washing, crushing and sizing of coal, it is likely that air permitting will be required, and the process has potential for small amounts of particulate emissions during the processing of the residual usable coal. TDEC recommends TVA include these considerations in the Final EA.

   As TVA notes in the Draft EA, the proposed project will likely require modifications to the facility's existing Title V major source air permit for both the possible generation of fugitive dust on-site during the proposed closure project and to allow for the installation of a temporary coal recovery, cleaning and sizing process on-site.

   Response: As indicated in Chapter 3.1 of the EA, The reclamation process could result in in fugitive dust emissions that may trigger added permitting requirements and modification to the site Title V Air Permit. TVA has edited the EA to specify that it would adhere to all terms and conditions of the permit. Including the incorporation of BMPs, such as dust suppression, resulting in minor, temporary impacts to air quality during the processing operation. Also, as stated in Section 1.7 of the Draft EA, TVA anticipates the preferred alternative may require modification of Johnsonville Fossil Plant's Title V permit.

3. **Comment:** On page 26 of the Draft EA, the document discusses use of an approved cover system that incorporates "geomembrane liner and cover consisting of either protective/vegetative soil or a turf system which consists of an engineered turf and sand fill." However, the document does not detail the specific approval process that TVA will go through to obtain approval of the cover system. TDEC recommends that the Final EA provide more detail on the approval process that TVA will utilize to seek an approval for the cover system.

   Response: Although the coal yard is not a CCR facility governed under the CCR Rule, the facility received coal ash in the past. TVA recognizes that closure of the coal yard is subject to the administrative order entered by TDEC (Commissioner's Order OGC15-0177). Although the coal yard is not subject to the federal CCR

Rule, TVA would utilize a cover system that would be designed and constructed to meet the criteria identified in 40 C.F.R. § 257.102(d) including:

a) The permeability of the final cover system must be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1 × 10−5 cm/sec, whichever is less.

b) The infiltration of liquids through the closed CCR unit must be minimized by the use of an infiltration layer that contains a minimum of 18 inches of earthen material.

c) The erosion of the final cover system must be minimized by the use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.

d) The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence.

TVA may select an alternative final cover system design, provided the alternative final cover system is designed and constructed to meet the aforementioned design criteria. The final cover system must include an infiltration layer that achieves equivalent reduction in infiltration, an erosion layer that provides equivalent protection from wind or water erosion and must accommodate settling and subsidence as specified above.

TVA has revised Section 2.1.2.1 and 2.3 to clarify that the cover system will be designed to meet the above criteria and will meet all applicable state and federal requirements.

4. **Comment:** TVA notes that there is the potential that a construction stormwater general permit (CGP) will be required, including a Stormwater Pollution Prevention Plan (SWPPP), as well as a new or modified NPDES permit, a Tennessee Stormwater Multi-Sector General Permit for Industrial Activities (TMSP) and an Aquatic Resource Alteration Permit (ARAP). These permits (new or modified) and the SWPPP will all be necessary for the project. Since the closure of the coal yard will involve the removal and possibly capping of CCR materials, the closure will have to be in compliance with the current TDEC Commissioner's Order. TDEC recommends that TVA include these considerations in the Final EA.

   Response: TVA will adhere to all terms and conditions of all applicable permits and state regulatory requirements including compliance with the TDEC Commissioner's Order and has edited Section 1.7 accordingly.

5. **Comment:** The primary Water Resources considerations will involve the effects of each proposal on groundwater (and seepage into the Tennessee River), and surface discharges, including potentially contaminated stormwater discharges.

   Response: Comment noted. As identified in Section 3.4 and 3.5 of the EA, minor impacts to groundwater and surface water may be expected during construction of the projects. TVA will implement appropriate BMPs, as described in the project-specific SWPPP to control sediment infiltration from storm water runoff during construction phases of the project. The closure cover system for the coal yard would reduce surface water infiltration and would facilitate management of storm water thereby reducing contact with the underlying material

and subsequent leaching to groundwater and receiving surface waters which would have a beneficial impact on these resources.

6. **Comment:** From an ARAP perspective, the borrow areas will be a focus. TVA will need to have all of the stream and wetland delineations reviewed and approved by DWR. They will need to provide more details on alternative analysis specific to minimizing wetland impacts when applying for ARAP permit. TDEC recommends TVA include these considerations in the Final EA.

   Response: Unavoidable direct impacts to wetlands would be mitigated as required by both state and federal agencies in accordance with the Tennessee Water Quality Control Act and Section 404 of the CWA. The Draft EA outlines potential permitting requirements for TVA's proposed action, which includes a TDEC Aquatic Resources Alteration Permit (ARAP) and water quality certification under Section 401 of the CWA. Additional information needed will be provided as part of the permitting process.

7. **Comment:** It should be noted that TVA may choose to pursue CCR impoundment closure-in-place at any of its Fossil Plants. However, should TVA begin CCR surface impoundment closures at any of its Tennessee Fossil Plants and TDEC subsequently determines based on soil, surface water, ground water and/or geologic instability that closure in place is not protective of public health and/or the environment, then TDEC shall, in accordance with the Commissioner's Order, require TVA to commence appropriate corrective action including removal of CCR surface impoundments where TVA has begun or completed closure-in-place. Further, TVA is on notice that Tennessee Code Annotated Section 68-211-106(j) may require a permit or other approval from TDEC for the disposal or use of coal ash.

   Response: Although the coal yard is not a CCR facility governed under the CCR Rule, TVA recognizes that closure of the coal yard is subject to the administrative order entered by TDEC (Commissioner's Order OGC15-0177). TVA also acknowledges that any actions taken before the Order process is complete are subject to the potential for TDEC to subsequently require TVA to take other and/or further remedial actions as a result of the investigative process.

8. **Comment:** Regarding the removal of the existing unburned coal in the coal yard for either landfill disposal or use at another facility, TDEC supports any and all actions that will reclaim materials in a manner that would be protective of human health and environment and present itself as a financially viable option.

   Response: Comment noted. TVA considers potential impacts to human health and the environment as well as cost when considering uses of reclaimed material.

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
NASHVILLE, TENNESSEE 37243-0435

DAVID W. SALYERS, P.E.
COMMISSIONER

BILL LEE
GOVERNOR

January 21, 2019

Via Electronic Mail to wdwhite0@tva.gov
Attn: W. Douglas White, NEPA Specialist
Tennessee Valley Authority
400 West Summit Hill Drive, WT 11B
Knoxville, TN 37902

Dear Mr. White:

The Tennessee Department of Environment and Conservation (TDEC) appreciates the opportunity to provide comments on the Tennessee Valley Authority (TVA) *Draft Environmental Assessment* (EA) to evaluate the closure of the Johnsonville Fossil Plant (JOF) coal yard and coal yard runoff pond[1], construction and operation of a process water basin for the Johnsonville Combustion Turbine (JCT) plant site, and development of a borrow site to facilitate closure of the coal yard and coal yard runoff pond, as well as to support other proposed projects currently being evaluated under separate reviews.[2] TVA's purpose for considering closure activities and construction and operation of a process water basin at JOF is because there is no longer a need for coal at JOF, since TVA has retired all coal-fired units at the site.

Actions considered in detail within the Draft EA include:

- **Alternative A – No Action Alternative**. Under the No Action Alternative, TVA would not proceed with closure of the coal yard and coal yard runoff pond, construction of a process water basin, or development of a borrow site on TVA-owned property. There would be no change to the environmental conditions of these respective sites. TVA would continue to secure and maintain the coal yard and coal yard runoff

[1] The coal yard, the coal yard runoff pond and west peninsula are contained within an approximately 64-acre project area (Figure 1-1). During the first few years of plant operation, coal ash was sluiced into the north end of the coal yard to raise the grade to match the south end of the coal yard. Current estimates indicate that approximately 600,000 cubic yards (yd3) of coal combustion residuals (CCR), are located under the northern half of the coal yard. Additionally, in the early 1990s, fill consisting of bottom ash and spent-bed material (bottom ash mixed with lime) was placed in the southern half of the coal yard to construct a stabilized surface to support heavy equipment operation and coal piles as part of a coal yard resurfacing project. A July 2017 sampling report indicated the presence of extractable petroleum hydrocarbons in stockpiled soil located at the coal yard. A remediation project was completed in the summer of 2017 to remove and dispose of the affected soils (Stantec 2017).

[2] Because of the historic presence of CCR in the coal yard project area, closure of the coal yard must comply with the August 2015 Administrative Order entered by the Tennessee Department of Environment and Conservation (TDEC) (OGC15-0177) which requires that TVA evaluate and remediate, if necessary, CCR risks at its plants in Tennessee. The administrative order, as well as other environmental regulatory programs, helps ensure that CCR management activities at TVA's facilities will continue to be protective of human health and the environment. The execution of the requirements of the TDEC Order, with respect to the underlying CCR, will necessarily drive the decision on closure methodology as well as potential corrective measures.

pond to ensure they do not degrade over time. According to TVA, the No Action Alternative is not reasonable as it would not meet the project purpose and need, which is to close the coal yard and coal yard runoff pond because they are no longer needed. In addition, implementation of the No Action Alternative would not provide a means for TVA to manage stormwater and process water or provide borrow material to support planned and future projects at JOF and the JCT. However, the No Action Alternative sets a baseline for comparison of Alternatives B, C and D.

- **Alternative B – Coal Yard Material Consolidation and Cap Closure** . Under this Alternative, TVA would close the coal yard and coal yard runoff pond, construct a process water basin and develop a borrow site. Closure of the coal yard and coal yard runoff pond would all occur within the approximately 64-acre coal yard project area that includes the coal yard, coal yard runoff pond and west peninsula. Three options for the construction of the process water basin are being considered. Two potential locations would be within the coal yard project area as previously described and the other would be in the north rail loop project area. Each of these actions is described below.

  TVA has identified an approximately 7.7-acre area southeast of the north rail loop on JOF property that would be used for staging of vehicles, equipment, and materials during construction. The laydown area is a previously disturbed undeveloped site. Upon completion of construction activities, it is anticipated that this area would be restored to its previous state.

  - **Coal Yard** – Closure of the coal yard includes the removal of approximately 24,000 yd3 of unburned coal and 20,000 yd3 of sediment from the coal yard runoff pond that is stockpiled on the coal yard. This material would be transported to the nearest landfill that can accept this material and has the capacity to do so, which TVA has determined at this time is the West Camden Sanitary Landfill. Coal would be transported to the landfill by over-the-road dump trucks primarily utilizing existing roadways along the approximately 12-mile (24-mile round trip) haul route. Based on the estimated volume of material to be removed and the use of over-the-road dump trucks (capacity of 15 yd3), the transport of all of the unburned coal and sediment excavated from the coal yard runoff pond that is stockpiled on the coal yard to the landfill would entail the use of approximately 90 truckloads (180 truck trips) per day operating approximately 5 days per week for a period of approximately 1.5 months.

    Alternatively, TVA could also elect to consider implementing a turn-key reclamation process to recover the maximum amount of reusable fuel remaining in the coal stockpile. TVA estimates that this process would allow the reuse of approximately 70 to 90 percent of available material. The reclamation process could trigger added permitting requirements and modification to the site Title V Air Permit. The reclamation process is a five-step process which includes:

    1. *Collection* – The raw material would be compiled using heavy equipment such as bulldozers, excavators, and trucks.

    2. *Screening/Sizing* – Mobile screening equipment (powered by one 250-kilowatt diesel generator) would be used to sort the raw material into useable fuel and waste material.

    3. *Separation* – Material ¼ inch to 2 inches in size would be separated into useable fuel or aggregate material. The separation process uses water cycling in a closed circuit. The process requires approximately 600 to 800 gallons per minute (gpm). One or two 6-inch diesel pumps

would pump water from the coal yard runoff pond into the closed system for the separation process. The water would later be returned to the coal yard runoff pond at a similar rate.

4. *Loading* – The useable coal is loaded onto trucks for delivery to another TVA facility. The waste material and leftover aggregate material would be hauled to an offsite, permitted landfill for disposal.

5. *Grading* – The coal yard would be graded to ensure proper drainage.

- **Coal Yard Runoff Pond Closure** – Closure of the coal yard runoff pond would include the following:

  - Dewatering of the coal yard runoff pond
  - Removal of pumps, pipes, platforms, and mechanical equipment
  - Excavation of sediment from the bottom of the pond and the perimeter ditch and stockpiling the sediments in the coal yard to be transported to the offsite landfill as described above
  - Construction of a stormwater outfall structure and discharge pipe to the Tennessee River (Kentucky Reservoir), subject to completion of National Pollution Discharge Elimination System (NPDES) permitting
  - Placement of a minimum of 6 inches of cover soil and establishing vegetation on areas of bare soil within the coal yard runoff pond

- **Process Water Basin Construction** – TVA would construct a process water basin to manage non-CCR process water and stormwater from the CT plant site and makeup water from the existing wastewater treatment plant. TVA is considering three possible locations for the proposed process water basin. Location 1 is within the footprint of the coal yard runoff pond and could be constructed prior to closing both the coal yard runoff pond and the coal yard. Process water basin Location 2 is on the south side of the coal yard in the area that would be excavated for consolidation. Consequently, if constructed in this location, the process water basin would be constructed after the coal yard is closed, but the coal yard runoff pond could remain in operation during construction of the process water basin. Both potential locations would be contained within the limits of the coal yard project area, and therefore, the environmental impacts would be expected to be similar for both locations and are analyzed concurrently.

  Location 3 is located to the southeast of the coal yard in the north rail loop project area. The north rail loop project area is previously disturbed. In order to construct the process water basin in this location, TVA would need to remove approximately 10,000 cubic yards of concrete construction debris to an onsite or offsite location to be determined at a later date. In any location, the process water basin would consist of two basins that would be lined with an approved liner system. One basin would collect effluent from the JCT's oil water separator and the water treatment plant. The second basin would be idle. The process flows would be diverted to the second basin when the first basin requires sediment removal. Effluent would reach the process water basin either by gravity drain or pumps and ultimately be discharged through a newly constructed and permitted NPDES outfall to the Tennessee River (Kentucky Reservoir).

- **Borrow Site Development** – TVA conducted a study to identify potential borrow sites to support closure activities at JOF (Stantec 2016). This study evaluated potential new borrow sites as well as existing commercial sites. In addition, TVA investigated obtaining borrow material from a commercial landfill project located 10 miles from JOF as part of this study.

  Eight parcels of land that met the initial size requirements estimated to be needed to provide borrow material to support activities at JOF were identified within a 3-mile radius of JOF. Initially, three sites were identified as most favorable for borrow site development as they were closest to JOF, had sufficient borrow capacity to meet plant needs, and contained TVA transmission line easements that allow for minimization of tree clearing. Additional evaluation indicated that two of these sites were in private ownership and had adverse site conditions including topography and onsite drainage features; hence, they were unsuitable and were dropped from further consideration.

  Two offsite commercial properties were also considered by TVA. One of the sites was not open at the time of the study, and the other site did not have sufficient volume available. Viability of the use of borrow material from a commercial landfill project was also considered and dismissed due to distance from JOF and uncertainty regarding availability of soil. Therefore, a reliable supply of suitable soil may not be available when needed at JOF.

  TVA considered these factors and determined that the development of a borrow area on TVA property is preferred. Although this option would result in impacts to the environment as a result of development of the borrow site as identified in the EA, these impacts would be minor. This option would minimize transport distance and use of public roadways, thus decreasing the long-term impacts associated with air emissions, increased traffic and associated safety risks, and disruptions to the public that would be associated with transport of borrow from sources further from JOF. In addition, the use of borrow from TVA-owned property optimizes the use of TVA resources and minimizes cost.

  In consideration of the above factors, TVA has identified as the preferred location an approximately 165-acre borrow site on TVA-owned property approximately 1.8 miles south of JOF. Within the borrow site limits, two sub areas (Areas B and C) totaling approximately 44 acres would be disturbed and TVA would construct a gravel access road at grade to reach these areas. Preliminary estimates indicate that a sufficient quantity of suitable soil could be obtained from the excavation areas within the borrow site; accordingly, these 44 acres would be analyzed in this EA. TVA has also identified a third excavation area within the limits of the 165-acre borrow site that may be developed for future use. However, development of this third area in the future would be analyzed under a separate NEPA Review.[3]

- **Alternative C – Coal Yard Full Cap Closure.** Under Alternative C, closure of the coal yard runoff pond, construction of the process water basin, and borrow site development would be the same as described under Alternative B. As with Alternative B, TVA would transport the unburned coal and sediment excavated from the coal yard runoff pond that is stockpiled on the coal yard to the West Camden

[3] Soil excavation would involve the use of heavy equipment, including bulldozers, backhoes, excavators, and over-the-road dump trucks. TVA would remove vegetation, including approximately 51 acres of forested lands within the proposed excavation areas. Any marketable timber would be salvaged where feasible; otherwise, woody debris and other vegetation may be disposed onsite through open burning, mulching or sent offsite to an approved solid waste facility for disposal. TVA would adhere to all appropriate state and county regulatory requirements if burning of landscape waste is conducted.

Sanitary Landfill for disposal. Alternatively, TVA could again elect to implement the turn-key reclamation process to recover the maximum amount of reusable fuel inside the coal yard. However, under Alternative C, TVA proposes to cap the coal yard in its current footprint with a protective/vegetative soil layer or a turf system which consists of an engineered turf and sand fill. The area would be graded for proper drainage. Stormwater would be routed to a new outfall to the Tennessee River (Kentucky Reservoir), subject to completion of NPDES permitting. The closure system would be in compliance with all applicable TDEC regulations and guidance. Because the full extent of the coal yard would be capped under this alternative, TVA determined that for this alternative, the process water basin would be constructed in Location 1 (within the footprint of the coal yard runoff pond) or Location 3 (north rail loop project area).

- **Alternative D – Coal Yard Remove Material and Close.** Under Alternative D, removal of the unburned coal and sediment excavated from the coal yard runoff pond that is stockpiled on the coal yard, closure of the coal yard runoff pond, and borrow site activities would be the same as described under Alternatives B and C. Similar to Alternative B, under this alternative the process water basin could be constructed in Location 1 or 2 (within the footprint of the coal yard runoff pond or the footprint of the coal yard) or in Location 3 (the north rail loop).

  Under this alternative, closure of the coal yard would include the excavation of all coal remnants and underlying CCR including bottom ash/spent-bed material fill within the extent of the current footprint. Once the coal yard material is removed, the site would be graded for proper drainage and reseeded with vegetation on areas of bare soil. Stormwater would be routed to a new outfall to the Tennessee River (Kentucky Reservoir).

  TVA estimates that in addition to the removal of the stockpile of unburned coal and sediment excavated from the coal yard runoff pond as described above, under Alternative D approximately 600,000 yd3 of material from the coal yard would be excavated and transported to the West Camden Sanitary Landfill using over-the-road dump trucks (capacity of 15 yd3). Based on the estimate of the volume of coal remnants and underlying CCR including bottom ash/spent-bed material fill that would be excavated from the coal yard, closure would require approximately 90 truckloads (180 truck trips) per day, five days a week, for a period of roughly 20 months (1.7 years).

TDEC has reviewed the Draft EA and has the following comments regarding the proposed action and its alternative:

Cultural and Natural Resources

TDEC believes the Draft EA adequately addresses potential impacts to cultural and natural resources within the proposed project area.[4]

[4] This is a state-level review only and cannot be substituted for a federal agency Section 106 review/response. Additionally, a court order from Chancery Court must be obtained prior to the removal of any human graves. If human remains are encountered or accidentally uncovered by earthmoving activities, all activity within the immediate area must cease. The county coroner or medical examiner, a local law enforcement agency, and the state archaeologist's office should be notified at once (Tennessee Code Annotated 11-6-107d).

Air Resources

Based on the scope of the temporary coal reclamation process, including recovery, washing, crushing and sizing of coal, it is likely that air permitting will be required, and the process has potential for small amounts of particulate emissions during the processing of the residual usable coal. TDEC recommends TVA include these considerations in the Final EA.

As TVA notes in the Draft EA, the proposed project will likely require modifications to the facility's existing Title V major source air permit for both the possible generation of fugitive dust on-site during the proposed closure project and to allow for the installation of a temporary coal recovery, cleaning and sizing process on-site.

Solid Waste

On page 26 of the Draft EA, the document discusses use of an approved cover system that incorporates "geomembrane liner and cover consisting of either protective/vegetative soil or a turf system which consists of an engineered turf and sand fill." However, the document does not detail the specific approval process that TVA will go through to obtain approval of the cover system. TDEC recommends that the Final EA provide more detail on the approval process that TVA will utilize to seek an approval for the cover system.

Water Resources

TVA notes that there is the potential that a construction stormwater general permit (CGP) will be required, including a Stormwater Pollution Prevention Plan (SWPPP), as well as a new or modified NPDES permit, a Tennessee Stormwater Multi-Sector General Permit for Industrial Activities (TMSP) and an Aquatic Resource Alteration Permit (ARAP). These permits (new or modified) and the SWPPP will all be necessary for the project. Since the closure of the coal yard will involve the removal and possibly capping of CCR materials, the closure will have to be in compliance with the current TDEC Commissioner's Order. TDEC recommends that TVA include these considerations in the Final EA.[5]

The primary Water Resources considerations will involve the effects of each proposal on groundwater (and seepage into the Tennessee River), and surface discharges, including potentially contaminated stormwater discharges. From an ARAP perspective, the borrow areas will be a focus. TVA will need to have all of the stream and wetland delineations reviewed and approved by DWR. They will need to provide more details on alternative analysis specific to minimizing wetland impacts when applying for ARAP permit. TDEC recommends TVA include these considerations in the Final EA.

It should be noted that TVA may choose to pursue CCR impoundment closure-in-place at any of its Fossil Plants. However, should TVA begin CCR surface impoundment closures at any of its Tennessee Fossil Plants and TDEC subsequently determines based on soil, surface water, ground water and/or geologic instability that closure in place is not protective of public health and/or the environment, then TDEC shall, in accordance with the Commissioner's Order, require TVA to commence appropriate corrective action including removal of CCR surface impoundments where TVA has begun or completed closure-in-place. Further, TVA is on notice that Tennessee Code Annotated Section 68-211-106(j) may require a permit or other approval from TDEC for the disposal or use of coal ash.

[5] For more information on TDEC Division of Water Resources permits, please visit https://www.tn.gov/environment/permit-permits/water-permits.html.

Regarding the removal of the existing unburned coal in the coal yard for either landfill disposal or use at another facility, TDEC supports any and all actions that will reclaim materials in a manner that would be protective of human health and environment and present itself as a financially viable option. TDEC appreciates the opportunity to comment on this Draft EA. Please note that these comments are not indicative of approval or disapproval of the proposed action or its alternatives, nor should they be interpreted as an indication regarding future permitting decisions by TDEC. Please contact me should you have any questions regarding these comments.

Sincerely,

Kendra Abkowitz, PhD
Assistant Commissioner, Office of Policy and Sustainable Practices
Tennessee Department of Environment and Conservation
Kendra.Abkowitz@tn.gov
(615) 532-8689

cc: Daniel Brock, TDEC, DOA
Lacey Hardin, TDEC, APC
Chuck Head, TDEC, BOE
Lisa Hughey, TDEC, DSWM
Tom Moss, TDEC, DWR
Joseph Sanders, TDEC, OGC
Robert Wilkinson, TDEC, BOE
Stephanie Williams, TDEC, DNA

Appendix B – Preliminary Conceptual Closure Plans

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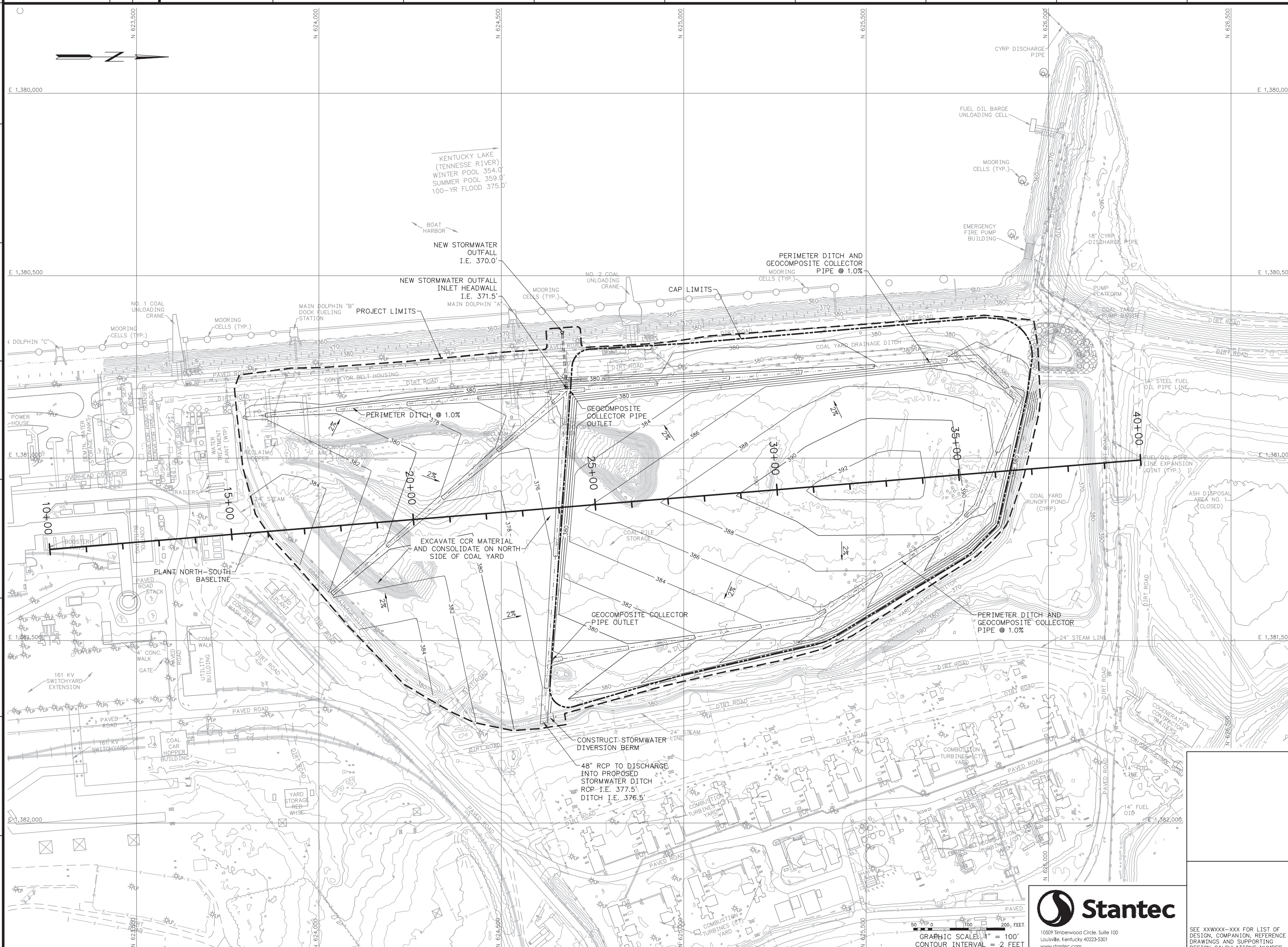

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LEGEND

- LIGHT POLE
- POLE
- POWER POLE
- SIGN
- MANHOLE
- TRANSMISSION TOWER
- BUILDING
- RAILROAD
- UNDERGROUND ELECTRIC
- FUEL OIL PIPELINE
- UNDERGROUND RAW WATER LINE
- FORCE MAIN
- EDGE OF WATER OR FLOW LINE
- FENCE LINE
- EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- INDEX CONTOUR
- INTERMEDIATE CONTOUR
- PROJECT LIMITS
- CAP LIMITS
- BASELINE
- RIPRAP PROTECTION

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NOT FOR CONSTRUCTION

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
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R A	10/06/17	JRW	RRP	PSS	SHB	RSH	MST	JCK		–	–

ISSUED FOR REVIEW

DISCIPLINE INTERFACE

SCALE: 1"=100' EXCEPT AS NOTED

YARD
COAL YARD

COAL YARD CLOSURE ALTERNATIVES ALTERNATIVE 2 – PARTIAL CAP GRADING PLAN

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
J.R. WALTON	R.R. PETTY	P.S. SRIDHAR	S.H. BICKEL	J.R. CURTSINGER	M.S. TURNBOW	J.C. KAMMEYER

JOHNSONVILLE FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

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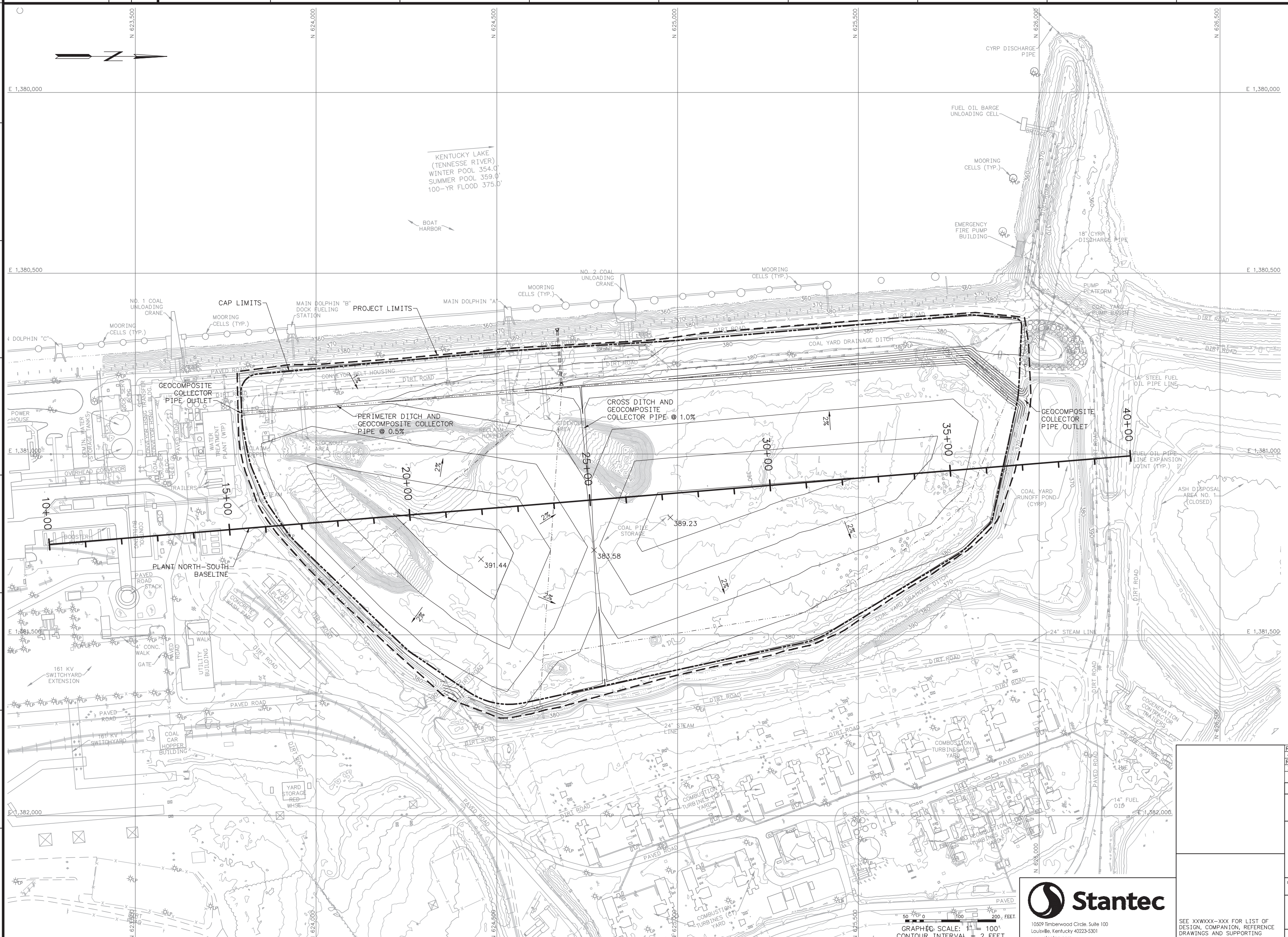
PLOT DATE: 09/22/2017



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LEGEND

- LIGHT POLE
- POLE
- POWER POLE
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- MANHOLE
- TRANSMISSION TOWER
- BUILDING
- RAILROAD
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- FUEL OIL PIPELINE
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- PROJECT LIMITS
- CAP LIMITS
- BASELINE
- RIPRAP PROTECTION

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R A	10/06/17	JRW	RRP	PSS	SHB	RSH	MST	JCK		–	–

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DISCIPLINE INTERFACE: 1, 2, 3, 4

SCALE: 1"=100' EXCEPT AS NOTED

YARD
COAL YARD

COAL YARD CLOSURE ALTERNATIVES ALTERNATIVE 1 – FULL CAP GRADING PLAN

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
J.R. WALTON	R.R. PETTY	P.S. SRIDHAR	S.H. BICKEL	J.R. CURTSINGER	M.S. TURNBOW	J.C. KAMMEYER

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PLOT DATE: 08/24/2017 USER: WALTON, REESE

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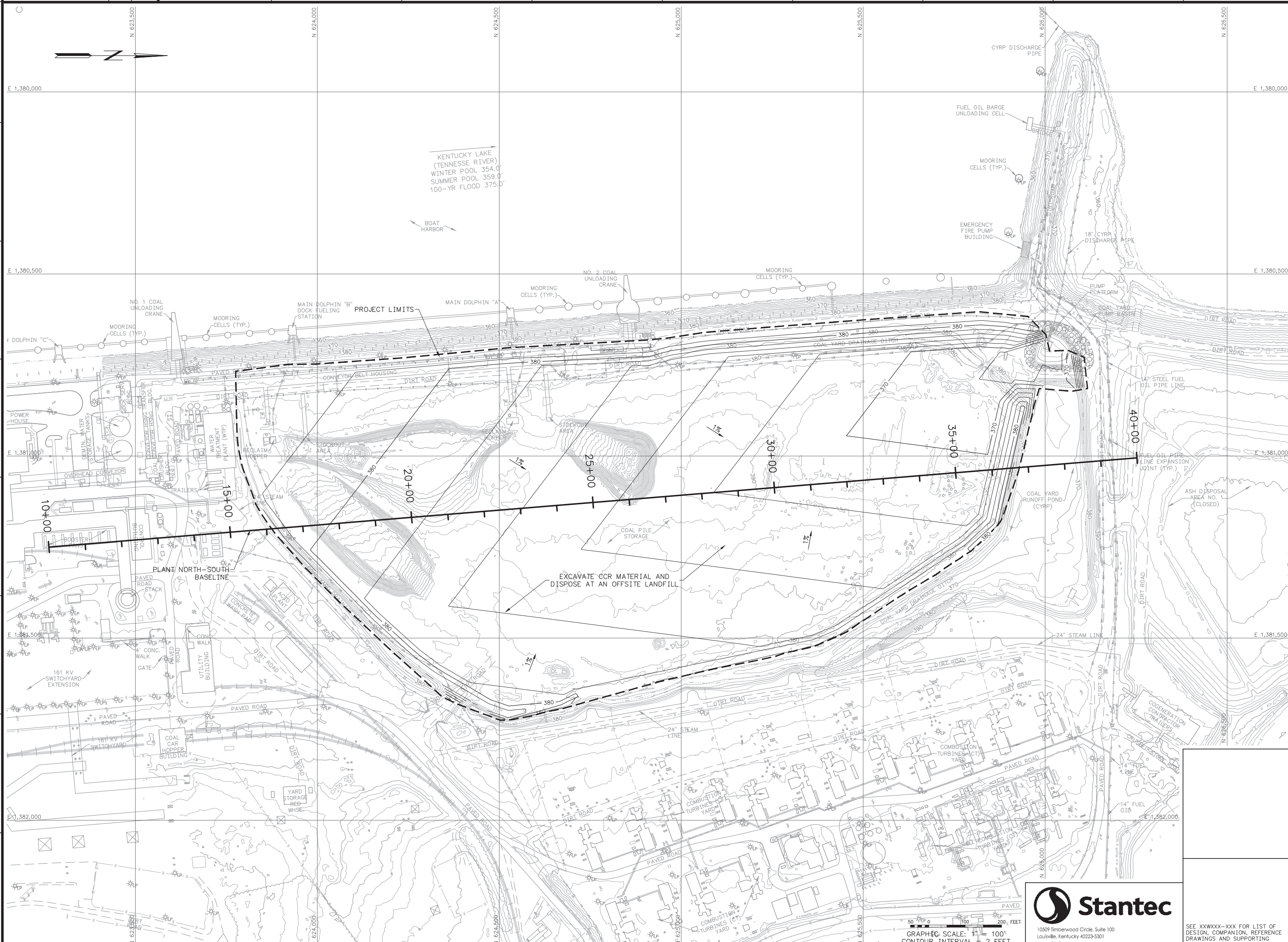

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- BASELINE
- RIPRAP PROTECTION

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R A	10/06/17	JRW	RRP	PSS	SHB	RSH	MST	JCK		–	–

ISSUED FOR REVIEW

SCALE: 1"=100' EXCEPT AS NOTED

YARD
COAL YARD

COAL YARD CLOSURE ALTERNATIVES ALTERNATIVE 3 – CLOSURE BY REMOVAL – GRADING PLAN

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
J.R. WALTON	R.R. PETTY	P.S. SRIDHAR	S.H. BICKEL	J.R. CURTSINGER	M.S. TURNBOW	J.C. KAMMEYER

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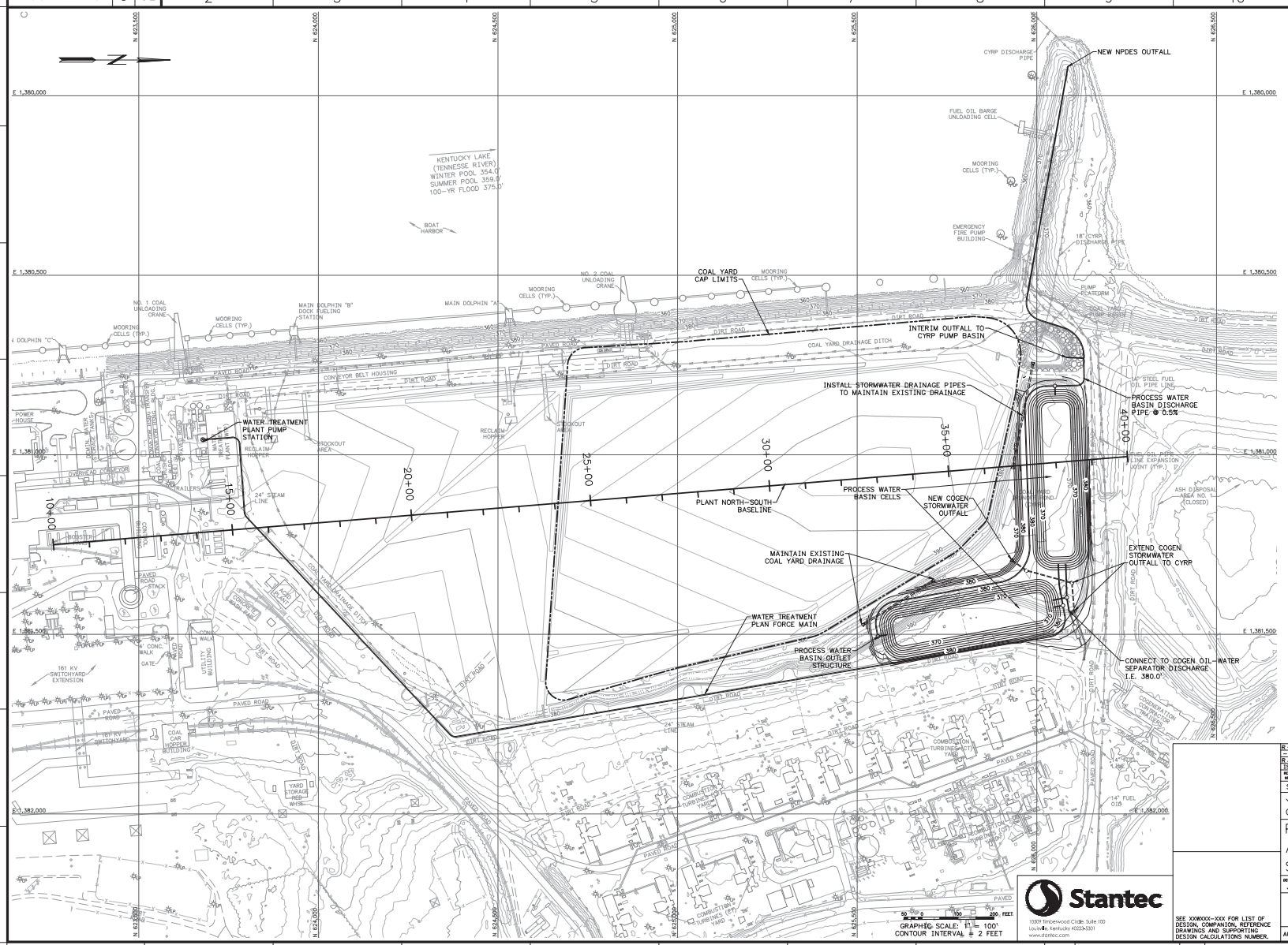
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FUEL OIL PIPELINE
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EXISTING INTERMEDIATE CONTOUR
INDEX CONTOUR
INTERMEDIATE CONTOUR
PROJECT LIMITS
STORMWATER DRAINAGE PIPE
CAP LIMITS
BASELINE
RIPRAP PROTECTION
NEW NPDES OUTFALL
CYRP DISCHARGE PIPE
FUEL OIL BARGE UNLOADING CELL
MOORING CELLS (TYP.)
EMERGENCY FIRE PUMP BUILDING
18" CYRP DISCHARGE PIPE
KENTUCKY LAKE (TENNESSE RIVER) WINTER POOL 354.0' SUMMER POOL 359.0' 100-YR FLOOD 375.0'
BOAT HARBOR
COAL YARD CAP LIMITS
INTERIM OUTFALL TO CYRP PUMP BASIN
COAL YARD DRAINAGE DITCH
INSTALL STORMWATER DRAINAGE PIPES TO MAINTAIN EXISTING DRAINAGE
PROCESS WATER BASIN DISCHARGE PIPE @ 0.5%
WATER TREATMENT PLANT PUMP STATION
PLANT NORTH-SOUTH BASELINE
PROCESS WATER BASIN CELLS
NEW COGEN STORMWATER OUTFALL
MAINTAIN EXISTING COAL YARD DRAINAGE
EXTEND COGEN STORMWATER OUTFALL TO CYRP
WATER TREATMENT PLAN FORCE MAIN
PROCESS WATER BASIN OUTLET STRUCTURE
CONNECT TO COGEN OIL-WATER SEPARATOR DISCHARGE I.E. 380.0'
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CONTOUR INTERVAL = 2 FEET
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PROCESS WATER BASIN
ALTERNATIVE 3 - INSIDE CYRP
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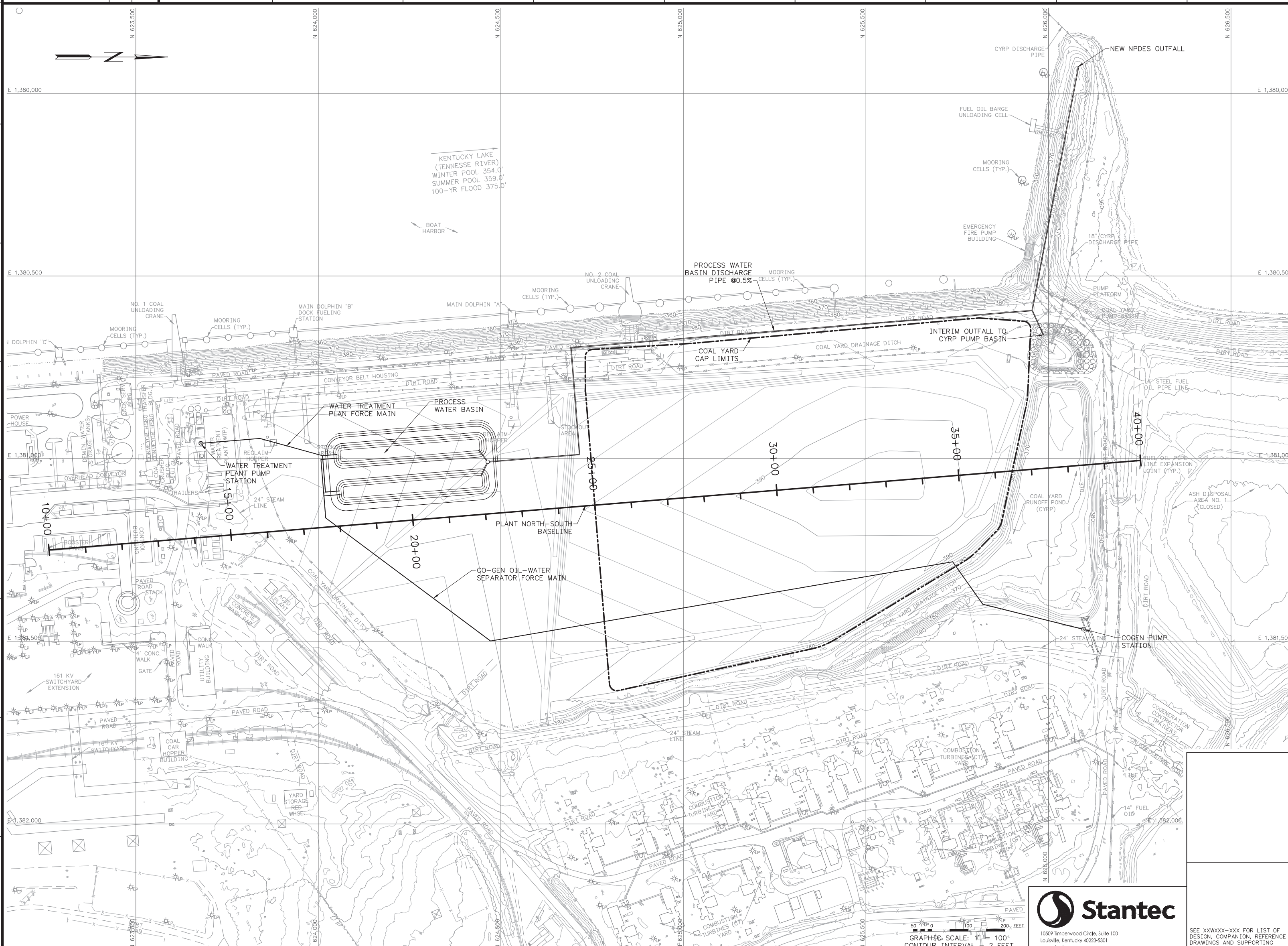

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- BASELINE
- RIPRAP PROTECTION

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NOT FOR CONSTRUCTION

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2 FEET

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R –	–	–	–	–	–	–	–	–	–	–	–
R A	10/06/17	JRW	RRP	PSS	SHB	RSH	MST	JCK		–	–

ISSUED FOR REVIEW

SCALE: 1"=100' EXCEPT AS NOTED

YARD
COAL YARD

PROCESS WATER BASIN ALTERNATIVE 1 – NEAR WTP SITE LAYOUT

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
J.R. WALTON	R.R. PETTY	P.S. SRIDHAR	S.H. BICKEL	J.R. CURTSINGER	M.S. TURNBOW	J.C. KAMMEYER

JOHNSONVILLE FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

AUTOCAD R 2013 | DATE 10/06/17 | 30 | C | 10WXXX-02 | R A

STANTEC | A
TASK COMPLETED BY: | REV NO.

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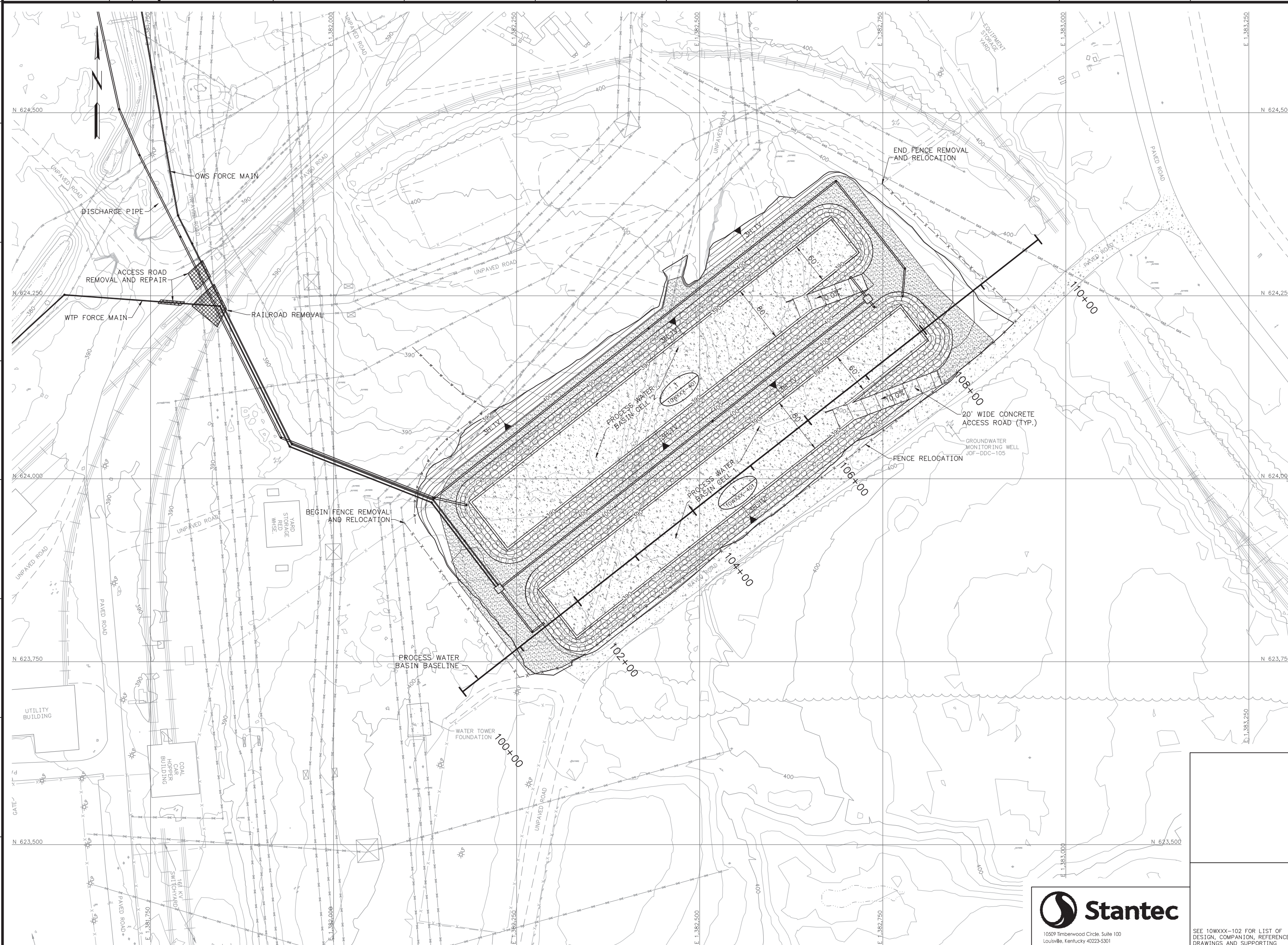
C.A.D. DRAWING
DO NOT ALTER MANUALLY



TOPOGRAPHIC MAPPING SOURCE NOTES:

1. DRAWINGS WERE PREPARED USING TOPOGRAPHIC INFORMATION OBTAINED FROM THE U.S. DEPARTMENT OF AGRICULTURE, SERVICE CENTER AGENCIES. THE PROJECT BASEMAP WAS DEVELOPED FROM TVA DRAWINGS OF RECORD AND FEATURES DIGITIZED FROM AERIAL IMAGERY OBTAINED FROM THE U.S. DEPARTMENT OF AGRICULTURE, SERVICE CENTER AGENCIES. ACTUAL CONDITIONS MAY VARY FROM THOSE SHOWN ON THESE PLANS FOR CONSTRUCTION AND SHOULD BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
2. SURVEY COORDINATES ARE REFERENCED TO TENNESSEE STATE PLANE COORDINATE SYSTEM NAD83. ELEVATIONS ARE BASED ON NGVD29.

SURVEY CONTROL NOTE:

A GLOBAL POSITIONING SYSTEM (GPS) BASE STATION HAS BEEN ESTABLISHED AND TRANSFORMATION PARAMETERS DETERMINED BY TVA USING SELECTED SURVEY CONTROL MONUMENTS. CONTACT WITH TVA SURVEYING DEPARTMENT (423)751-8416 OR (423)751-2571 SHALL BE MADE BEFORE ANY SURVEY OR CONSTRUCTION WORK IS COMMENCED. BASE STATION FREQUENCIES AND TRANSFORMATION PARAMETERS WILL BE PROVIDED TO THE CONTRACTOR FOR USE IN CONSTRUCTION ACTIVITIES AT THE SITE. PREVIOUSLY USED OR ESTABLISHED CONTROL POINTS AND MONUMENTS SHALL NOT BE USED BY THE CONTRACTOR WITHOUT PRIOR APPROVAL BY TVA SURVEYING DEPARTMENT.

LEGEND

- LIGHT POLE
- POLE
- POWER POLE
- SIGN
- MANHOLE
- TRANSMISSION TOWER
- TREE LINE
- RAILROAD
- UNDERGROUND ELECTRIC
- OVERHEAD ELECTRIC
- FIBER OPTIC CABLE
- UNDERGROUND RAW WATER
- FORCE MAIN
- UNKNOWN UNDERGROUND LINE
- TVA PROPERTY BOUNDARY
- EDGE OF WATER OF FLOW LINE
- EXISTING FENCE LINE
- EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- INDEX CONTOUR
- INTERMEDIATE CONTOUR
- LINER LIMITS
- FENCE LINE
- SILT FENCE
- BASELINE
- PAVED ROAD
- GRAVEL ROAD
- DEMOLITION

60% SUBMITTAL
ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

25 0 50 100 FEET
GRAPHIC SCALE: 1" = 50'
CONTOUR INTERVAL = 2 FEET

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R –	–	–	–	–	–	–	–	–	–	–	–
R A	10/26/18	JRW	RRP	PSS	SHB	JRC	MST	JCK	611489	–	–

ISSUED FOR REVIEW

DISCIPLINE INTERFACE

SCALE: 1"=50' EXCEPT AS NOTED

YARD
NORTH RAIL LOOP

PROCESS WATER BASIN FINAL GRADE PLAN

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
J.R. WALTON	R.R. PETTY	P.S. SRIDHAR	S.H. BICKEL	J.R. CURTSINGER	M.S. TURNBOW	J.C. KAMMEYER

JOHNSONVILLE FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

SEE 10WXXX-102 FOR LIST OF DESIGN, COMPANION, REFERENCE DRAWINGS AND SUPPORTING DESIGN CALCULATIONS NUMBER.

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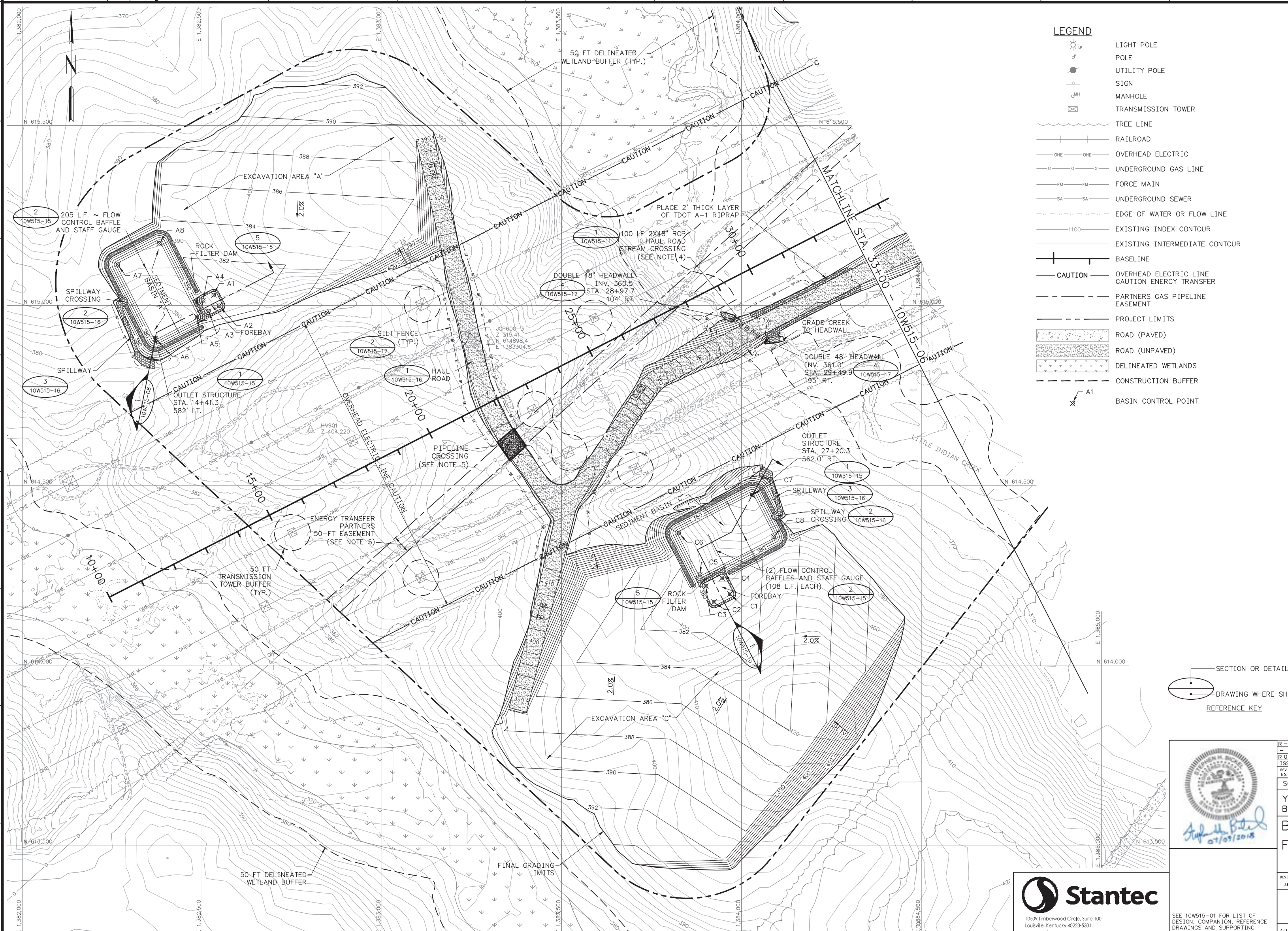
AUTOCAD R 2013 | DATE 10/26/18 | 30 | C | 10WXXX-201 | R A

STANTEC | A
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:1
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY



LEGEND

- LIGHT POLE
- POLE
- UTILITY POLE
- SIGN
- MANHOLE
- TRANSMISSION TOWER
- TREE LINE
- RAILROAD
- OVERHEAD ELECTRIC
- UNDERGROUND GAS LINE
- FORCE MAIN
- UNDERGROUND SEWER
- EDGE OF WATER OR FLOW LINE
- EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- BASELINE
- CAUTION — OVERHEAD ELECTRIC LINE CAUTION ENERGY TRANSFER
- PARTNERS GAS PIPELINE EASEMENT
- PROJECT LIMITS
- ROAD (PAVED)
- ROAD (UNPAVED)
- DELINEATED WETLANDS
- CONSTRUCTION BUFFER
- A1 BASIN CONTROL POINT

TOPOGRAPHIC MAPPING SOURCE NOTES:

1. DRAWINGS WERE PREPARED USING TOPOGRAPHIC INFORMATION OBTAINED FROM THE U.S. DEPARTMENT OF AGRICULTURE, SERVICE CENTER AGENCIES. THE PROJECT BASEMAP WAS DEVELOPED FROM TVA DRAWINGS OF RECORD AND FEATURES DIGITIZED FROM AERIAL IMAGERY OBTAINED FROM THE U.S. DEPARTMENT OF AGRICULTURE, SERVICE CENTER AGENCIES. ACTUAL CONDITIONS MAY VARY FROM THOSE SHOWN ON THESE PLANS FOR CONSTRUCTION AND SHOULD BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
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SURVEY CONTROL NOTE:

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NOTES:

1. FOR INFORMATION ON UTILITY CLEARANCES SEE 10W515-07.
2. FOR CONSTRUCTION OF THE HAUL ROAD STREAM CROSSING THE CONTRACTOR SHALL LIMIT DISTURBANCE TO 200 LF OF STREAM LENGTH WITHIN LITTLE INDIAN CREEK.
3. CONTRACTOR SHALL COORDINATE WITH ENERGY TRANSFER PARTNERS AND TVA WORK PERFORMED WITHIN THE ENERGY TRANSFER PARTNERS EASEMENT. PIPELINE CROSSING SHALL BE CONSTRUCTED BY OTHERS. SEE 10W515-07 FOR ADDITIONAL INFORMATION.

BASIN CONTROL POINT TABLE

POINT	NORTHING	EASTING	ELEVATION (FT.)	DESCRIPTION
A1	615,028.24	1,382,532.53	378.0	FOREBAY CORNER
A2	614,998.86	1,382,547.56	378.0	FOREBAY CORNER
A3	614,983.83	1,382,518.19	378.0	FOREBAY CORNER
A4	615,013.21	1,382,503.16	378.0	FOREBAY CORNER
A5	614,967.47	1,382,486.10	376.0	BASIN CORNER
A6	614,908.21	1,382,370.42	376.0	OUTFALL STRUCTURE
A7	615,112.95	1,382,265.62	376.0	BASIN CORNER
A8	615,172.21	1,382,381.43	376.0	BASIN CORNER
C1	614,197.99	1,383,968.13	378.0	FOREBAY CORNER
C2	614,175.22	1,383,923.62	378.0	FOREBAY CORNER
C3	614,219.73	1,383,900.85	378.0	FOREBAY CORNER
C4	614,242.50	1,383,945.36	378.0	FOREBAY CORNER
C5	614,251.80	1,383,884.54	376.0	BASIN CORNER
C6	614,367.46	1,383,825.25	376.0	BASIN CORNER
C7	614,472.20	1,384,030.02	376.0	OUTFALL STRUCTURE
C8	614,356.53	1,384,089.20	376.0	BASIN CORNER

GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2 FEET

SECTION OR DETAIL NO.
DRAWING WHERE SHOWN
REFERENCE KEY

ISSUED FOR CONSTRUCTION

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R –	–	–	–	–	–	–	–	–	–	–	–
R 0	07/09/18	JRW	RRP	MAT	SHB	JRC	MST	JCK	608486	–	–

ISSUED FOR CONSTRUCTION AS PER PROJECT ID 608486

SCALE: 1"=100' EXCEPT AS NOTED

YARD
BORROW AREA

BORROW SITE FINAL GRADING PLAN

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
J.R. WALTON	R.R. PETTY	M.A. TUCKER	S.H. BICKEL	J.R. CURTSINGER	M.S. TURNBOW	J.C. KAMMEYER

JOHNSONVILLE FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

SEE 10W515-01 FOR LIST OF DESIGN, COMPANION, REFERENCE DRAWINGS AND SUPPORTING DESIGN CALCULATIONS NUMBER.

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AUTOCAD R 2013 | DATE 07/09/18 | 30 | C | 10W515-05 | R 0

STANTEC | 0
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:1
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

LEGEND

- LIGHT POLE
- POLE
- UTILITY POLE
- SIGN
- MANHOLE
- TRANSMISSION TOWER
- TREE LINE
- RAILROAD
- OVERHEAD ELECTRIC
- UNDERGROUND GAS LINE
- FORCE MAIN
- UNDERGROUND SEWER
- EDGE OF WATER OR FLOW LINE
- EXISTING INDEX CONTOUR
- EXISTING INTERMEDIATE CONTOUR
- BASELINE
- CAUTION — OVERHEAD ELECTRIC LINE CAUTION ENERGY TRANSFER
- PARTNERS GAS PIPELINE EASEMENT
- PROJECT LIMITS
- ROAD (PAVED)
- ROAD (UNPAVED)
- DELINEATED WETLANDS
- CONSTRUCTION BUFFER
- A1 — BASIN CONTROL POINT

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NOTES:

1. FOR INFORMATION ON UTILITY CLEARANCES SEE 10W515-07.
2. CONTRACTOR SHALL COORDINATE WITH ENERGY TRANSFER PARTNERS AND TVA WORK PERFORMED WITHIN THE ENERGY TRANSFER PARTNERS EASEMENT. SEE 10W515-07 FOR ADDITIONAL INFORMATION.

BASIN CONTROL POINT TABLE

POINT	NORTHING	EASTING	ELEVATION (FT.)	DESCRIPTION
B1	616,354.97	1,384,351.96	378.0	FOREBAY CORNER
B2	616,341.20	1,384,325.59	378.0	FOREBAY CORNER
B3	616,367.91	1,384,311.93	378.0	FOREBAY CORNER
B4	616,381.60	1,384,338.64	378.0	FOREBAY CORNER
B5	616,397.94	1,384,370.67	376.0	BASIN CORNER
B6	616,616.58	1,384,797.97	376.0	OUTFALL STRUCTURE
B7	616,589.90	1,384,811.67	376.0	BASIN CORNER
B8	616,371.26	1,384,811.67	376.0	BASIN CORNER

SECTION OR DETAIL NO.
DRAWING WHERE SHOWN
REFERENCE KEY

50 0 100 200 FEET
GRAPHIC SCALE: 1" = 100'
CONTOUR INTERVAL = 2 FEET

ISSUED FOR CONSTRUCTION

REV. NO.	DATE	DSGN	DRWN	CHKD	SUPV	RVWD	APPD	ISSD	PROJECT ID	AS CONST	REV CD
R –	–	–	–	–	–	–	–	–	–	–	–
R 0	07/09/18	JRW	RRP	MAT	SHB	JRC	MST	JCK	608486	–	–

ISSUED FOR CONSTRUCTION AS PER PROJECT ID 608486

SCALE: 1"=100' EXCEPT AS NOTED

YARD
BORROW AREA

BORROW SITE
FINAL GRADING PLAN

DESIGNED BY:	DRAWN BY:	CHECKED BY:	SUPERVISED BY:	REVIEWED BY:	APPROVED BY:	ISSUED BY:
J.R. WALTON	R.R. PETTY	M.A. TUCKER	S.H. BICKEL	J.R. CURTSINGER	M.S. TURNBOW	J.C. KAMMEYER

JOHNSONVILLE FOSSIL PLANT
TENNESSEE VALLEY AUTHORITY
FOSSIL AND HYDRO ENGINEERING

SEE 10W515-01 FOR LIST OF DESIGN, COMPANION, REFERENCE DRAWINGS AND SUPPORTING DESIGN CALCULATIONS NUMBER.

AUTOCAD R 2013 | DATE 07/09/18 | 30 | C | 10W515-06 | R 0

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STANTEC | 0
TASK COMPLETED BY: | REV NO.

PLOT FACTOR:1
W_TVA

C.A.D. DRAWING
DO NOT ALTER MANUALLY

DISCIPLINE INTERFACE

PLOT DATE: 07/12/2018

30 C 10W515-06

Appendix C – Bat Strategy Project Assessment

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Project Screening Form - TVA Bat Strategy *(05/08/2018)*

This form is to assist in determining alignment of proposed projects and any required measures to comply with TVA's ESA Section 7 programmatic consultation for routine actions and federally-listed bats[1]

Project Name: JJOF Coal Yard/CYRP Closure, PWB, Borrow Area - Environmental Assmt **Date**: 08/28/2018
Contact(s): Carol Freeman, Env; Jason Curtsinger, Prj Mgr **CEC#**: _____ **RLR#:** _____ **Project ID**: 32553

Project Location (City, County, State): Waverly, Humphreys, Tennessee

Project Description: Closure of the coal yard and coal yard runoff pond, construction of a new process water basin, and development of a proposed borrow area. Activities below reflect all EA alternatives considered and not eliminated.

STEP 1) Select Appropriate TVA Action (or check here □ if none of the Actions below are applicable):

☐	**1**	Manage Biological Resources for Biodiversity and Public Use on TVA Reservoir Lands	☐	**6**	Maintain Existing Electric Transmission Assets
☐	**2**	Protect Cultural Resources on TVA-Retained Land	☐	**7**	Convey Property associated with Electric Transmission
☑	**3**	Manage Land Use and Disposal of TVA-Retained Land	☐	**8**	Expand or Construct New Electric Transmission Assets
☐	**4**	Manage Permitting under Section 26a of the TVA Act	☐	**9**	Promote Economic Development
☑	**5**	Operate, Maintain, Retire, Expand, Construct Power Plants	☐	**10**	Promote Mid-Scale Solar Generation

STEP 2) Select **all** activities from **Tables 1 and 2** (Column 1 only) included in proposed project. If you have an activity that is not listed below, describe here): _____

Table 1. Activities (CHECK ALL THAT APPLY) with No Effect on Federally Listed Bats. If none, check here: □

	#	ACTIVITY		#	ACTIVITY
□	**1**	Loans and/or grant awards	□	**12**	Sufferance agreement
□	**2**	Purchase of property	■	**13**	Engineering or environmental planning or studies
□	**3**	Purchase of equipment for industrial facilities	□	**14**	Harbor limits
□	**4**	Environmental education	□	**19**	Site-specific enhancements in streams and reservoirs for aquatic animals
□	**5**	Transfer of ROW easement or ROW equipment	□	**20**	Nesting platforms
□	**6**	Property and/or equipment transfer	□	**41**	Minor water-based structures
□	**7**	Easement on TVA property	□	**42**	Internal renovation or internal expansion of existing facility
□	**8**	Sale of TVA property	□	**43**	Replacement or removal of TL poles, or cutting of poles to 4-6 ft above ground
□	**9**	Lease of TVA property	□	**44**	Conductor and OHGW installation and replacement
□	**10**	Deed modification of TVA rights or TVA property	□	**49**	Non-navigable houseboats
□	**11**	Abandonment of TVA retained rights			

Table 2. Activities (CHECK ALL THAT APPLY) and Associated Conservation Measures. If none, check here: □

	#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
■	**15**	Windshield or ground surveys for archaeological resources	□ a. NV1 □ b. HP2	□ b. HP1
□	**16**	Drilling	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3 □ g. L1, L2	□ a NV3, NV4 / □ a1. NV2
■	**17**	Mechanical vegetation removal; does not include removal of trees or tree branches ≥ 3" in diameter.	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ f. SSPC4, SSPC7
■	**18**	Erosion control – minor	■ a. NV1 ■ f. SPCC1, SSPC2, SSPC3, SSPC5	None
□	**21**	Herbicide use	□ d. SSPC1, SSPC2, SSPC3, SSPC5	□ d. SSPC6, SSPC7
■	**22**	Grubbing	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ f. SSPC4
□	**23**	Prescribed burns, burn piles, or	□ c. SHF1, SHF4, SHF5	□ c. SHF2, SHF3, SHF6, SHF7,

	#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
		brush piles		SHF8, SHF9
□	24	Tree planting	□ a. NV1 □ f. SSCP1, SSPC2, SSPC3, SSPC5	None
■	25	Maintenance, improvement or construction of pedestrian or vehicular access corridors	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ a1. NV2 □ f. SSPC7
■	26	Maintenance or construction of access control measures	□ a. NV1 □ b. HP2 □ f. SSPC1, SSPC2, SSPC3,SSPC5 □ g. L1, L2	□ a NV3, NV4 / □ a1. NV2 □ b. HP1 □ f. SSPC7
■	27	Restoration of sites following human use and abuse	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3	□ f. SSPC7
■	28	Removal of debris (e.g., dump sites, hazardous material, unauthorized structures)	■ a. NV1 ■ f. SSPC1, SSPC2, SSPC3	■ f. SSPC7
■	29	Acquisition and use of fill/borrow material	■ a. NV1 ■ f. SSPC1, SSPC2, SSPC3	■ f. SSPC7
□	30	Dredging and excavation; recessed harbor areas	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	None
■	31	Stream/wetland crossings	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ f. SSPC7
□	32	Clean-up following storm damage	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3	□ f. SSPC4, SSPC7
□	33	Removal of hazardous trees or tree branches	□ a. NV1 □ d. TR7, TR8 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ d. TR1, TR2, TR3, TR4, TR5, TR6, TR9, □ f. SSPC4, SSPC7
■	34	Mechanical vegetation removal, includes trees or tree branches three inches or greater in diameter	□ a. NV1 □ d. TR7, TR8 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ d. TR1, TR2, TR3, TR4, TR5, TR6, TR9, □ f. SSPC4, SSPC7
■	35	Stabilization (major erosion control)	■ a. NV1 ■ f. SSPC1, SSPC2, SSPC3, SSPC5	■ f. SSPC4, SSPC7
■	36	Grading	■ a. NV1 ■ f. SSPC1, SSPC2, SSPC3, SSPC5 ■ g. L1, L2	■ f. SSPC4, SSPC7
■	37	Installation of soil improvements	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3 □ g. L1, L2	□ a1. NV2 □ f. SSPC7
■	38	Drainage installations (including for ponds)	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3 □ g. L1, L2	□ f. SSPC7
□	39	Berm development	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, □ g. L1, L2	None
□	40	Closed loop heat exchangers (heat pumps)	□ f. SSPC5	None
□	45	Stream monitoring equipment-placement, use	□ a. NV1	None
□	46	Floating boat slips within approved harbor limits	□ f. SSPC5	None
□	47	Conduit installation	□ a. NV1	□ a1. NV2
■	48	Laydown areas	■ a. NV1 ■ f. SSPC1, SSPC2, SSPC3, ■ g. L1, L2	None
□	50	Minor land-based structures	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5 □ g. L1, L2	None
□	51	Signage installation	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	None
□	52	Floating buildings	□ a. NV1 □ f. SSPC2, SSPC3,SSPC5 □ g. L1, L2	□ a1. NV2
□	53	Mooring buoys or posts	□ a. NV1	

	#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
			□ f. SSPC2, SSPC3, SSPC5	None
□	54	Maintenance of water control structures (dewatering units, spillways, levees)	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	□ f. SSPC6, SSPC7
□	55	Solar panels	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	□ f. SSPC7
□	56	Culverts	□ a. NV1 □ f. SSPC1, SSPC3, SSPC5	None
□	57	Water intake - non-industrial	□ a. NV1 □ f. SSPC3, SSPC5	None
■	58	Wastewater outfalls	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	None
□	59	Marine fueling facilities	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5 □ g. L1, L2	None
□	60	Commercial water-use facilities (e.g., marinas)	□ a. NV1 □ f. SSPC2, SSPC5 □ g. L1, L2	None
□	61	Septic fields	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	None
□	62	Blasting	■ a. NV1 ■ f. SSPC1, SSPC2, SSPC3, ■ g. L1, L2	■ a NV3, NV4 / □ a1. NV2
□	63	Foundation installation	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3	□ a1. NV2
□	64	Installation of steel structure, overhead bus, equipment, etc.	□ a. NV1 □ g. SSPC1, SSPC2, SSPC3	□ a1. NV2
□	65	Pole and/or tower installation and/or extension	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3	□ a1. NV2
□	66	Private, residential docks, piers, boathouses	□ a. NV1 □ f. SPCC5 □ g. L1, L2	None
■	67	Siting of temporary office trailers	■ a. NV1 ■ f. SSPC1, SSPC2, SSPC3, SSPC5 ■ g. L1, L2	None
□	68	Financing for speculative building construction	□ a. NV1 □ f. SSPC5	None
□	69	Renovation of existing structures	□ a. NV1 □ f. SSPC1, SSPC3, SSPC5 □ g. L1, L2	□ e. AR1, AR2, AR4, AR5
□	70	Lock maintenance and construction	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	□ a1. NV2
□	71	Concrete dam modification	□ a. NV1 □ f. SSPC2, SSPC3	□ a1. NV2
□	72	Ferry landings/service operations	□ a. NV1 □ f. SSPC5 □ g. L1, L2	None
□	73	Boat launching ramps	□ a. NV1 □ f. SSPC2, SSPC5	□ a1. NV2
□	74	Recreational vehicle campsites	□ a. NV1 □ g. SPCC5	None
■	75	Utility lines/light poles	□ a. NV1 □ f. SPCC5 □ g. L1, L2	None
□	76	Concrete sidewalk	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	None
□	77	Construction or expansion of land-based buildings	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5 □ g. L1, L2	□ e. AR1, AR2, AR5
□	78	Wastewater treatment plants	□ a. NV1 □ f. SSPC2, SSPC5 □ g. L1, L2	□ a1. NV2
□	79	Swimming pools and associated	□ a. NV1	

	#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
		equipment	□ f. SSPC5 □ g. L1, L2	None
□	80	Barge fleeting areas	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	□ a1. NV2
□	81	Water intakes - Industrial	■ a. NV1 ■ f. SSPC2, SSPC3, SSPC5	None
□	82	Construction of dam/weirs/ Levees	□ a. NV1 □ f. SPCC2, SPCC3, SPCC5	□ a1. NV2
□	83	Submarine pipeline, directional boring operations	■ a. NV1 ■ f. SSPC2, SSPC3, SSPC5	□ a1. NV2
□	84	On-site/off-site public utility relocation or construction or extension	□ a. NV1 □ f. SSPC1, SSPC3, SSPC5	None
□	85	Playground equipment - land-based	□ a. NV1 □ f. SSPC5	None
□	86	Landfill construction	□ a. NV1 □ f. SSPC2, SSPC3 □ g. L1, L2	□ a1. NV2
□	87	Aboveground storage tanks	□ a. NNV1 □ f. SSPC2, SSPC3, SSPC5	None
□	88	Underground storage tanks (USTs)	□ a. NV1 □ g. SSPC2, SSPC3, SSPC5	None
□	89	Structure demolition	■ f. SSPC1, SSPC2, SSPC3	■ e. AR1, AR2, AR4, AR5
■	90	Pond closure	□ a. NV1 □ f. SSPC2, SSPC3	None
□	91	Bridge replacement	□ a. NV1 □ f. SSPC3, SSPC5	□ a1. NV2 □ e. AR1, AR2, AR3, AR5,
□	92	Return of remains to former burial sites	□ a. NV1 □ b. HP2	□ b. HP1
□	93	Standard license	□ a. NV1 □ f. SSPC5	None
□	94	Special use license	□ a. NV1	None
□	95	Recreation license	□ a. NV1 □ f. SSPC5	None
□	96	Land use permit	□ a. NV1 □ f. SSPC5	None

STEP 3) Are all project activities limited to Table 1? If **YES**, **STOP HERE**. No Bat Strategy Conservation Measures required. Include this form in environmental documentation (e.g., attach to CEC) and send to batstrategy@tva.gov. If **NO**, proceed to Step 4.....□ **YES** ■ **NO**

STEP 4) Check ALL relevant characteristics below. If **none** apply, **STOP HERE** and check ☐. No Bat Strategy Conservation Measures required. Include form in environmental documentation and send to batstrategy@tva.gov

■ **a**. Project may occur outside, involves human presence, or use of equipment that **generates noise or vibration** (e.g., drilling, blasting, loud machinery).

□ **a1.** Project involves continuous noise (i.e., ≥ 24 hrs) that is >75 decibels measured on A scale (e.g., loud machinery).

□ **b**. Project may involve **human entry into/survey of a potential bat roost** (cave, bridge, other structure).

□ **c**. Project may involve **fire (e.g., prescribed fire, burn piles) or preparation of fire breaks** within 0.25 mi of trees, caves, or water sources. **If prescribed burn**, estimated acreage: _____

■ **d**. Project may involve **tree removal.**
Tree removal may need to occur **outside of winter**.....☑ **YES** ☐ **NO**
Tree removal will occur **only in winter**.....☐ **YES** ☐ **NO**

Estimated number of trees or acres to be removed: _____ □ acres □ trees
If warranted, project has flexibility for bat surveys (May 15-Aug 15):.....■ **MAYBE** □ **YES** □ **NO**

□ **e**. Project may involve **alteration or removal of bridges or other human structures**.

■ **f**. Project may involve land use activities involving **ground disturbance or use of chemicals or fuels** near water sources, wetlands, sinkholes, caves, or exposed limestone/karst.

■ **g**. Project may involve use of artifical lighting at night.

STEP 5) *Please contact Holly LeGrand or other Bat Strategy support staff for assistance if needed*. For those Activities selected in Table 2: select all Conservation Measures with letters (e.g., a-g) that correspond to characteristics selected in Step 4. If this results in selection of Conservation Measures in the last column of Table 2, a review by a terrestrial zoologist is required. Based on selection of Conservation Measures, does project require review by a terrestrial zoologist? If **YES**, **STOP HERE** and submit form as part of environmental review request; if **NO**, skip to **STEP 16**.....■ **YES** □ **NO**

Terrestrial Zoologist SME Verification (Steps 6-11 will be completed by a terrestrial zoologist if warranted):

STEP 6) Project is within range of: ☑ Gray bat ☐ VA Big-eared bat ☑ Indiana bat ☑ Northern long-eared bat

STEP 7a) Project includes the following:

- □ Removal/burning of suitable trees within 0.5 mile (0.8 km) of P1-P2 Indiana bat hibernacula or 0.25 mile (0.4 km) of P3-P4 Indiana bat hibernacula or any northern long-eared bat hibernacula.
- □ Removal/burning of suitable trees within 10 miles of documented Indiana bat hibernacula or within 5 miles of northern long-eared bat hibernacula.
- □ Removal/burning of suitable trees greater than 10 miles from documented Indiana bat hibernacula or greater than 5 miles from documented northern long-eared bat hibernacula.
- □ Removal/burning of trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity roost tree.
- □ Removal/burning of suitable trees within 2.5 miles of Indiana bat roost trees or within 5 miles of Indiana bat capture sites.
- □ Removal/burning of suitable trees greater than 2.5 miles from Indiana bat roost trees or greater than 5 miles from Indiana bat capture sites.
- □ Removal/burning of documented Indiana bat or northern long-eared bat roost tree, if still suitable.

STEP 7b) Amount of SUITABLE tree/acreage removal or burned (may be different than total amount of removal): N/A □ acres □ trees

STEP 8) Select anticipated date range of burning/tree removal in table below:

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	□ Oct 15 - Nov 14	□ Nov 15 - Mar 31	□ Apr 1 - May 31, Aug 1- Oct 14	□ Jun 1 - Jul 31
VA	□ Sep 16 - Nov 15	□ Nov 16 - Apr 14	□ Apr 15 - Sep 15	□ Jun 1 - Jul 31
AL	□ Oct 15 - Nov 14	□ Nov 15 - Mar 15	□ Mar 16 - May 31, Aug 1 - Oct 14	□ Jun 1 - Jul 31
NC	□ Oct 15 - Nov 14	□ Nov 15 - Apr 15	□ Apr 16 - May 31, Aug 1 - Oct 14	□ Jun 1 - Jul 31
MS	□ Oct 1 - Nov 14	□ Nov 15 - Apr 14	□ Apr 15 - Sep 30	□ Jun 1 - Jul 31

STEP 9) Presence/absence surveys (visual, mist net, acoustic) were/will be conducted: □ **YES** □ **NO** □ **TBD**

STEP 10) Result of presence/absence surveys (if conducted), on _____ (date): □ **NEGATIVE** □ **POSITIVE** □ **N/A** *NOTES*: No caves within 3 miles. None found during field survey.

STEP 11) ■ Conservation measures have been verified (and modified, if necessary) in Table 2. *NOTES*: During a field review on 2/14/2018, buildings proposed for demolition were identified as suitable roosting habitat for gray bat, Indiana bat, little brown bat, and northern long-eared bat.

Bat Strategy Compliance Verification (Steps 12-15 will be completed by SME/Bat Strategy Support staff):

STEP 12) Project □ **WILL** □ **WILL NOT** require use of Incidental Take in the amount of N/A □ acres or □ trees, proposed to be used during the □ **WINTER** □ **VOLANT** □ **NON-VOLANT** bat season (or ■ **N/A**).

STEP 13) Available Incidental Take as of N/A for N/A (Action):

TVA Action	Total 20-year acreage	Winter Burning/Removal	Volant Season Burning/Removal	Non-Volant Season Burning/Removal

STEP 14) Amount contributed to TVA's Bat Conservation Fund upon activity completion: _____or ■ **N/A**

STEP 15) Project Effects Determinations: ***Gray Bat***:☐NE ☑NLAA ☐N/A;***Virginia Big-eared Bat***:☐NE ☐NLAA ☑N/A ***Northern Long-eared Bat***: ☐NE ☑NLAA ☐LAA ☐N/A; ***Indiana Bat***: ☐NE ☑NLAA ☐LAA ☐N/A

NOTES: Drinking water and foraging habitat for all three bats exists over TN River adjacent to project footprint. During field review, buildings proposed for demolition were identified as suitable roosting habitat for gray bat, Indiana bat, and northern long-eared bat.

TVA's ESA Section 7 Bat Strategy Conservation Measures Required for:

STEP 16) Based on completion of Step 5, select the appropriate Conservation Measures listed in the table below (this will be completed/verified by a Terrestrial Zoologist if a Terrestrial Zoologist review is required) and review the following bullets. Save this form in project environmental documentation AND send a copy of form to batstrategy@tva.gov. Submission of this form is an indication that the Project Lead Eddie Mullinax (name) is (or will be made) aware of the requirements below.

- Implementation of conservation measures identified below is required to comply with TVA's programmatic Endangered Species Act bat consultation.
- Confirmation of completion (e.g., report from contractor, time stamped photos pre and post completion) for Conservation Measures below with an * (as well as any additional confirmation noted here by Terrestrial Zoologist: Bat surveys of buildings need to be performed within same season (see Step 8) as demolition) will be provided to TVA's Bat Strategy Compliance Officer (batstrategy@tva.gov) following completion of activit (ies).
- TVA may conduct post-project monitoring to determine if conservation measures were effective in minimizing or avoiding impacts to federally listed bats.

STEP 17) For projects that require use of Take and/or contribution to TVA's Bat Conservation Fund, please acknowledge the following statement:

□ Project Lead/Contact acknowledges that proposed project will result in use of N/A □ acres/□ trees in Incidental Take and will require N/A contribution to TVA's Conservation Fund upon completion of activity.

	Conservation Measure Acronym	Conservation Measure Description
☑	NV1	Noise will be short-term, transient, and not significantly different from urban interface or natural events (i.e., thunderstorms) that bats are frequently exposed to when present on the landscape.
☐	NV2	Drilling, blasting, or any other activity that involves continuous noise (i.e., longer than 24 hours) disturbances greater than 75 decibels measured on the A scale (e.g., loud machinery) within a 0.5 mile radius of documented winter and/or summer roosts (caves, trees, unconventional roosts) will be conducted when bats are absent from roost sites.
☐	NV3	Drilling or blasting within a 0.5 mile radius of documented cave (or unconventional) roosts will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of the roost site.
☐	NV4	Drilling or blasting within 0.5 miles of a documented roost site (cave, tree, unconventional roost) that needs to occur when bats are present will first involve development of project-specific avoidance or minimization measures in coordination with the USFWS.
☐	HP1	Site-specific cases in which potential impact of human presence is heightened (e.g., conducting environmental or cultural surveys within a roost site) will be closely coordinated with staff bat biologists to avoid or minimize impacts below any potential adverse effect. Any take from these activities would be covered by TVA's Section 10 permit.
☐	HP2	Entry into roosts known to be occupied by federally listed bats will be communicated to the USFWS when impacts to bats may occur if not otherwise communicated (i.e., via annual monitoring reports per TVA's Section 10 permit). Any take from these activities would be covered by TVA's section 10 permit.
☐	SHF1	Fire breaks will be used to define and limit burn scope.
☐	SHF2	Site-specific conditions (e.g., acres burned, transport wind speed, mixing heights) will be considered to ensure smoke is limited and adequately dispersed away from caves so that smoke does not enter cave or cave-like structures.
☐	SHF3	Acreage will be divided into smaller units to keep amount of smoke at any one

		time or location to a minimum and reduce risk for smoke to enter caves.
☐	SHF4	If burns need to be conducted during April and May, when there is some potential for bats to present on the landscape and more likely to enter torpor due to colder temperatures, burns will only be conducted if the air temperature is 55° or greater, and preferably 60° or greater.
☐	SHF5	Fire breaks will be plowed immediately prior to burning, will be plowed as shallow as possible, and will be kept to minimum to minimize sediment.
☐	SHF6	Tractor-constructed fire lines will be established greater than 200 feet from cave entrances. Existing logging roads and skid trails will be used where feasible to minimize ground disturbance and generation of loose sediment.
☐	SHF7	Burning will only occur if site specific conditions (e.g. acres burned, transport wind speed, mixing heights) can be modified to ensure that smoke is adequately dispersed away from caves or cave-like structures. This applies to prescribed burns and burn piles of woody vegetation.
☐	SHF8	Brush piles will be burned a minimum of 0.25 mile from documented, known, or obvious caves or cave entrances and otherwise in the center of newly established ROW when proximity to caves on private land is unknown.
☐	SHF9	A 0.25 mile buffer of undisturbed forest will be maintained around documented or known gray bat maternity and hibernation colony sites, documented or known Virginia big-eared bat maternity, bachelor, or winter colony sites, Indiana bat hibernation sites, and northern long-eared bat hibernation sites. Prohibited activities within this buffer include cutting of overstory vegetation, construction of roads, trails or wildlife openings, and prescribed burning. Exceptions may be made for maintenance of existing roads and existing ROW, or where it is determined that the activity is compatible with species conservation and recovery (e.g., removal of invasive species).
☐	TR1*	Removal of potentially suitable summer roosting habitat during time of potential occupancy has been quantified and minimized programmatically. TVA will track and document alignment of activities that include tree removal (i.e., hazard trees, mechanical vegetation removal) with the programmatic quantitative cumulative estimate of seasonal removal of potential summer roost trees for Indiana bat and northern long-eared bat. Project will therefore communicate completion of tree removal to appropriate TVA staff.
☐	TR2	Removal of suitable summer roosting habitat within 0.5 mile of Priority 1/Priority 2 Indiana bat hibernacula, or 0.25 mile of Priority 3/Priority 4 Indiana bat hibernacula or any northern long-eared bat hibernacula will be prohibited, regardless of season, with very few exceptions (e.g., vegetation maintenance of TL ROW immediately adjacent to a known cave).
☐	TR3*	Removal of suitable summer roosting habitat within documented bat habitat (i.e., within 10 miles of documented Indiana bat hibernacula, within five miles of documented northern long-eared bat hibernacula, within 2.5 miles of documented Indiana bat summer roost trees, within five miles of Indiana bat capture sites, within one mile of documented northern long-eared bat summer roost trees, within three miles of northern long-eared bat capture sites) will be tracked, documented, and included in annual reporting. Project will therefore communicate completion of tree removal to appropriate TVA staff.
☐	TR4*	Removal of suitable summer roosting habitat within potential habitat for Indiana bat or northern long-eared bat will be tracked, documented, and included in annual reporting. Project will therefore communicate completion of tree removal to appropriate TVA staff.
☐	TR5	Removal of any trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity summer roost tree during non-winter season, range-wide pup season or swarming season (if site is within known swarming habitat), will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts),

		TVA will coordinate with the USFWS to determine how to minimize impacts to pups to the extent possible. May include establishment of artificial roosts before removal of roost tree(s).
☐	TR6	Removal of a documented Indiana bat or northern long-eared bat roost tree that is still suitable and that needs to occur during non-winter season, range-wide pup season, or swarming season (if site is within known swarming habitat) will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts), TVA will coordinate with USFWS to determine how to minimize impacts to pups to the extent possible. This may include establishment of artificial roosts before removal of roost tree(s).
☐	TR7	Tree removal within 100 feet of **existing transmission ROWs** will be limited to hazard trees. On or adjacent to TLs, a hazard tree is a tree that is tall enough to fall within an unsafe distance of TLs under maximum sag and blowout conditions and/or are also dead, diseased, dying, and/or leaning. Hazard tree removal includes removal of trees that 1) currently are tall enough to threaten the integrity of operation and maintenance of a TL or 2) have the ability in the future to threaten the integrity of operation and maintenance of a TL.
☐	TR8	Requests for removal of hazard trees on or adjacent to **TVA reservoir land** will be inspected by staff knowledgeable in identifying hazard trees per International Society of Arboriculture and TVA's checklist for hazard trees. Approval will be limited to trees with a defined target.
☐	TR9	If removal of suitable summer roosting habitat occurs when bats are present on the landscape, a funding contribution (based on amount of habitat removed) towards future conservation and recovery efforts for federally listed bats would be carried out. Project can consider seasonal bat presence/absence surveys (mist netting or emergence counts) that allow for positive detections without resulting in increased constraints in cost and project schedule. This will enable TVA to contribute to increased knowledge of bat presence on the landscape while continuing to carry out TVA's broad mission and responsibilities.
☑	AR1	Projects that involve structural modification or demolition of buildings, bridges, and potentially suitable box culverts, will require assessment to determine if structure has characteristics that make it a potentially suitable unconventional bat roost. If so a survey to determine if bats may be present will be conducted. Structural assessment will include: o Visual check that includes an exhaustive internal/external inspection of building to look for evidence of bats (e.g., bat droppings, roost entrance/exit holes); this can be done at any time of year, preferably when bats are active. o Where accessible and health and safety considerations allow, a survey of roof space for evidence of bats (e.g., droppings, scratch marks, staining, sightings), noting relevant characteristics of internal features that provide potential access points and roosting opportunities. Suitable characteristic may include: gaps between tiles and roof lining, access points via eaves, gaps between timbers or around mortise joints, gaps around top and gable end walls, gaps within roof walling or around tops of chimney breasts, and clean ridge beams. o Features with high-medium likelihood of harboring bats but cannot be checked visually include soffits, cavity walls, space between roof covering and roof lining. o Applies to box culverts that are at least 5 feet (1.5 meters) tall and with one or more of the following characteristics. Suitable culverts for bat day roosts have the following characteristics: ▪ Location in relatively warm areas

		▪ Between 5-10 feet (1.5-3 meters) tall and 300 ft (100 m) or more long ▪ Openings protected from high winds ▪ Not susceptible to flooding ▪ Inner areas relatively dark with roughened walls or ceilings ▪ Crevices, imperfections, or swallow nests o Bridge survey protocols will be adapted from the Programmatic Biological Opinion for the Federal Highway Administration (Appendix D of USFWS 2016c, which includes a Bridge Structure Assessment Guidance and a Bridge Structure Assessment Form). o Bat surveys usually are NOT needed in the following circumstances: ▪ Domestic garages /sheds with no enclosed roof space (with no ceiling) ▪ Modern flat-roofed buildings ▪ Metal framed and roofed buildings ▪ Buildings where roof space is regularly used (e.g., attic space converted to living space, living space open to rafters) or where all roof space is lit from skylights or windows. Large/tall roof spaces may be dark enough at apex to provide roost space.
☑	AR2	Additional bat P/A surveys (e.g., emergence counts) conducted if warranted (i.e., when AR1 indicates that bats may be present).
☐	AR3	Bridge survey protocols will be implemented, either by permittee (e.g., state DOT biologists) or qualified personnel. If a bridge is determined to be in use as an unconventional roost, subsequent protocols will be implemented.
☑	AR4	Removal of buildings with suitable roost characteristics within six miles of known or presumed occupied roosts for Virginia big-eared bat would occur between Nov 16 and Mar 31. Buildings may be removed other times of the year once a bat biologist evaluates a buildings' potential to serve as roosting habitat and determines that this species is not present and/or is not using structure(s).
☑	AR5	If evidence of bat use warrants seasonal modification or removal, TVA will carry out or recommend (i.e., to applicants) seasonal modification or removal. Risk to human safety, however, should take priority. For project-specific cases in which project is unable to accommodate seasonal modification or removal, and federally listed bat species are present, TVA will carry out or recommend consultation with the USFWS to determine the best approach in the context of the project-specific circumstance. This may include establishment of artificial roosts before demolition of structures with bats present.
☐	SSPC1	**Transmission actions and activities** will continue to Implement A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities. This focuses on control of sediment and pollutants, including herbicides. Following are key measures: o BMPs to minimize erosion and prevent/control water pollution in accordance with state-specific construction storm water permits. BMPS are designed to keep soil in place and aid in reducing risk of other pollutants reaching surface waters, wetlands and ground water. BMPs will undertake the following principles: ▪ Plan clearing, grading, and construction to minimize area and duration of soil exposure. ▪ Maintain existing vegetation wherever and whenever possible. ▪ Minimize disturbance of natural contours and drains. ▪ As much as practicable, operate on dry soils when they are least susceptible to structural damage and erosion. ▪ Limit vehicular and equipment traffic in disturbed areas. ▪ Keep equipment paths dispersed or designate single traffic flow

		paths with appropriate road BMPs to manage runoff. ▪ Divert runoff away from disturbed areas. ▪ Provide for dispersal of surface flow that carries sediment into undisturbed surface zones with high infiltration capacity and ground cover conditions. ▪ Prepare drainage ways and outlets to handle concentrated/increased runoff. ▪ Minimize length and steepness of slopes. Interrupt long slopes frequently. ▪ Keep runoff velocities low and/or check flows. ▪ Trap sediment on-site. ▪ Inspect/maintain control measures regularly and after significant rain. ▪ Re-vegetate and mulch disturbed areas as soon as practical. o Application of herbicide is in compliance with USEPA, state water quality standards, and state permits. Areas in which covered species are known to occur on existing transmission line ROW are depicted on referenced, applicable spreadsheets and include guidelines to follow for impact minimization or avoidance. During pre-job briefings, the ROW Forester will review location of resources with contractors and provide guidelines and expectations from TVA's BMP Manual (Appendix O). Herbicides labeled for aquatic use are utilized in and around wetlands, streams, and SMZs. Unless specifically labeled for aquatic use, measures are taken to keep herbicides from reaching streams whether by direct application or through runoff or flooding by surface water. Hand application of certain herbicides labeled for use within SMZs is used only selectively. o Specific guidelines regarding sensitive resources and buffer zones: ▪ Extra precaution (wider buffers) within SMZs is taken to protect stream banks and water quality for streams, springs, sinkholes, and surrounding habitat. ▪ BMPs are implemented to protect and enhance wetlands. Select use of equipment and seasonal clearing is conducted when needed for rare plants; construction activities are restricted in areas with identified rare plants. ▪ Standard requirements exist to avoid adverse impacts to caves, protected animals, and unique and important habitat (e.g., protective buffers around caves, restricted herbicide use, seasonal clearing of suitable habitat).
☑	SSPC2	Operations involving chemical/fuel storage or resupply and vehicle servicing will be handled outside of riparian zones (streamside management zones) in a manner to prevent these items from reaching a watercourse. Earthen berms or other effective means are installed to protect stream channel from direct surface runoff. Servicing will be done with care to avoid leakage, spillage, and subsequent stream, wetland, or ground water contamination. Oil waste, filters, other litter will be collected and disposed of properly. Equipment servicing and chemical/fuel storage will be limited to locations greater than 300-ft from sinkholes, fissures, or areas draining into known sinkholes, fissures, or other karst features.
☑	SSPC3	**Power Plant actions and activities** will continue to implement standard environmental practices. These include: o Best Management Practices (BMPs) in accordance with regulations:

		▪ Ensure proper disposal of waste, ex: used rags, used oil, empty containers, general trash, dependent on plant policy ▪ Maintain every site with well-equipped spill response kits, included in some heavy equipment ▪ Conduct Quarterly Internal Environmental Field Assessments at each sight ▪ Every project must have an approved work package that contains an environmental checklist that is approved by sight Environmental Health & Safety consultant. ▪ When refueling, vehicle is positioned as close to pump as possible to prevent drips, and overfilling of tank. Hose and nozzle are held in a vertical position to prevent spillage o Construction Site Protection Methods ▪ Sediment basin for runoff - used to trap sediments and temporarily detain runoff on larger construction sites ▪ Storm drain protection device ▪ Check dam to help slow down silt flow ▪ Silt fencing to reduce sediment movement o Storm Water Pollution Prevention (SWPP) Pollution Control Strategies ▪ Minimize storm water contact with disturbed soils at the construction site ▪ Protect disturbed soil areas from erosion ▪ Minimize sediment in storm water before discharge ▪ Prevent storm water contact with other pollutants ▪ Construction sites also may be required to have a storm water permit, depending on size of land disturbance (>1 acre) o Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to minimize fuel and chemical use
☐	SSPC4	Woody vegetation burn piles associated with **transmission construction** will be placed in the center of newly established ROWs to minimize wash into any nearby undocumented caves that might be on adjacent private property and thus outside the scope of field survey for confirmation. Brush piles will be burned a minimum of 0.25 miles from documented caves and otherwise in the center of newly established ROW when proximity to caves on private land is unknown.
☐	SSPC5	**Section** 26a permits and contracts associated with **solar projects**, **economic development projects** or land use projects include standards and conditions that include standard BMPs for sediment and contaminants as well as measures to avoid or minimize impacts to sensitive species or other resources consistent with applicable laws and Executive Orders.
☐	SSPC6	Herbicide use will be avoided within 200 ft of portals associated with caves, cave collapse areas, mines and sinkholes that are capable of supporting cave-associated species. Herbicides are not applied to surface water or wetlands unless specifically labeled for aquatic use. Filter and buffer strips will conform at least to federal and state regulations and any label requirements.
☐	SSPC7	Clearing of vegetation within a 200-ft radius of documented caves will be limited to that conducted by hand or small machinery clearing only (e.g., chainsaws, bush-hog, mowers). This will protect potential recharge areas of cave streams and other karst features that are connected hydrologically to caves.
☑	L1	Direct temporary lighting away from suitable habitat during the active season.
☑	L2	Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution when installing new or replacing existing permanent lights by angling lights downward or via other light minimization measures (e.g., dimming, directed lighting, motion-sensitive lighting).

[1]Bats addressed in consultation (02/2018), which includes gray bat (listed in 1976), Indiana bat (listed in 1967), northern long-eared bat (listed in 2015), and Virginia big-eared bat (listed in 1979).

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Appendix D – Coordination

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

March 2, 2017

Mr. E. Patrick McIntyre, Jr.
Executive Director
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA), PROPOSED BORROW PIT AT JOHNSONVILLE FOSSIL PLANT, HUMPHREYS COUNTY, TENNESSEE

TVA proposes to utilize an area within an existing TVA transmission line corridor as a soil borrow, for use in plant operations at the Johnsonville Fossil Plant (JOF) in Humphreys County, Tennessee. The transmission line corridor is a TVA right-of-way (ROW) that is used by 6 high power transmission lines. Soil borrow operations would consist of removing soil to depths of up to 10 feet using heavy equipment such as tracked excavators and dump trucks. Once the operation is completed, the area would be reseeded and returned to its natural vegetation. TVA has determined that this proposed project is an undertaking (as defined at 36 CFR § 800.16(y)) that has the potential to cause effects on historic properties. We are initiating consultation under Section 106 of the National Historic Preservation Act for this undertaking.

TVA determined the area of potential effects (APE) for archaeological resources consists of the ca. 64-acre area as depicted in Figure 1.1 of the enclosed report. There are no architectural resources in the ROW, and TVA does not consider the undertaking to have potential to result in adverse visual effects to any historic architectural properties that may be located within the viewshed.

TVA retained Tennessee Valley Archaeological Research (TVAR) to perform a Phase I archaeological survey of the APE. Enclosed are two bound copies of the draft report titled, *A Phase I Archaeological Survey of as Proposed Borrow Pit in New Johnsonville, Humphreys County, Tennessee*, along with two CDs containing digital copies of the report.

Background research performed prior to the field survey indicated that the APE has not been included in any previous archaeological survey and no archaeological sites have been recorded within the APE. The survey identified no archaeological sites or features. As documented by the report, much of the area within the APE has been disturbed by erosion and by past activities that included heavy equipment, and lacks intact Holocene soils.

TVA has read the report and agrees with the author's recommendation that no further archaeological investigations be required prior to project initation. TVA finds that the undertaking would have no effects on historic properties.

Pursuant to 36 CFR Sections 800.4(d)(1) and 800.5(b), we are seeking your concurrence with TVA's finding.

Pursuant to §800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding historic properties within the APE that may be of religious and cultural significance to the tribes.

Should you have any questions or comments, please contact Ted Wells in Knoxville by email, ewwells@tva.gov or by phone, (865) 632-2259.

Sincerely,

Clinton E. Jones
Manager
Biological and Cultural Compliance

SCC:ABM
Enclosures
cc (Enclosures);
Ms. Jennifer Barnett (Enclosure)
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

INTERNAL COPIES ONLY, NOT TO BE INCLUDED WITH OUTGOING LETTER:

A. Michelle Cagley, KFP 1T-KST
Stephen C. Cole, WT 11D-K
Kevin T. Davenport, LP 5E-C
Amy B. Henry, WT 11C-K
Susan Jacks, WT 11C-K
M. Susan Smelley, BR 4A-C
Edward W. Wells, WT 11D-K
ECM, WT CA-K

A Phase I Archaeological Survey of a Proposed Borrow Pit in New Johnsonville, Humphreys County, Tennessee

Tennessee Valley Archaeological Research

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

March 20, 2017

Mr. Clinton E. Jones
Tennessee Valley Authority
Biological and Cultural Compliance
400 West Summit Hill Drive
Knoxville, TN 37902

RE: TVA / Tennessee Valley Authority, Borrow Pit at Johnsonville Fossil Plant, Humphreys County, TN

Dear Mr. Jones:

In response to your request, we have reviewed the archaeological report of investigations and accompanying documentation submitted by you regarding the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Considering the information provided, we concur that no archaeological resources eligible for listing in the National Register of Historic Places will be affected by this undertaking. If project plans are changed or archaeological remains are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Questions or comments may be directed to Jennifer Barnett (615) 741-1588, ext. 105.

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jmb

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

March 21, 2018

Mr. E. Patrick McIntyre, Jr.
Executive Director
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA), JOHNSONVILLE FOSSIL PLANT, COAL YARD CLOSURE, COAL YARD RUNOFF POND CLOSURE, PROCESS WATER BASIN, AND BORROW PIT, HUMPHREYS COUNTY, TENNESSEE

TVA has ended power generation at the Johnsonville Fossil Plant (JOF) in Humphreys County, Tennessee. Earlier this year we consulted with your office regarding TVA's proposed deconstruction of the generating facility. Our offices agreed that deconstruction of JOF would result in no effects on historic properties. TVA proposes four additional actions at JOF related to the deconstruction of JOF:

- Closure of the JOF Coal Yard (CY)
- Closure of the JOF Coal Yard Runoff Pond (CYRP)
- Construction of a Process Water Basin (PWB)
- Development of a Borrow Site

Figure 1, below, shows the location of each of these proposed actions. The JOF CY is a graded area where TVA stockpiled coal prior to pulverizing it and feeding it into the plant's generating units. The JOF CYRP is a pond that was constructed to hold runoff from the CY. TVA proposes to close the CY one of three ways; capping the CY in its current footprint, consolidating the material in the CY footprint and capping it, or removing the CY material to an offsite landfill and covering the CY with soil and vegetation. TVA would also close the CYRP and construct a new storm water outfall to convey drainage from the site to Kentucky Lake. The PWB would be constructed to capture and treat storm water and process water flows from the Johnsonville gas plant site (also called the combustion turbine or "CT" site). TVA would construct the PWB within the footprint of the CY and/or the CYRP. TVA would obtain fill material for the CY, PWB, and CYRP projects from a new soil borrow site located south of the JOF generating facility.

The proposed actions would necessitate use of a construction laydown yard. Two existing laydowns areas located east of the plant switchyard would be utilized for this purpose. The actions also require the use of haul roads. Existing paved and gravel roads would be used as haul roads (the laydown yard and haul roads are shown in Figure 1). TVA does not consider

the continued use of an existing construction laydown, or the use of existing paved/gravel roads as haul roads, to have potential to result in effects on historic properties. TVA determined that the area of potential effects (APE) for archaeological sites includes the CY, the CYRP, and the proposed borrow site.

Part of the area affected by the JOF Deconstruction project extends into the CY, and was discussed in our January 25, 2018 letter to your office concerning that project. Figure 2, below, shows the CY and CYRP areas with modern satellite imagery. Figure 3 shows an overlay of TVA's 1937 land acquisition map for Kentucky Reservoir on satellite imagery of these areas. In evaluating the potential for intact Holocene deposits in the CY and CYRP areas, we examined TVA's 1937 land acquisition map for Kentucky Reservoir, TVA's original plant grading plan from 1949, current satellite imagery (as shown in Figure 1), and previous archaeological investigations. Prior to construction of JOF these areas consisted of two branches of a small creek and its terraces. As documented in TVA's technical report on JOF (TVA 1958:207-208) and by the 1949 grading plan, TVA construction crews excavated and graded soil to depths ranging from approximately 3 feet to nearly 20 feet throughout the CY and surrounding area during plant construction (JOF was constructed between 1949 and 1952). Based on these historical documents TVA finds that the CY and CYRP areas have no potential to contain intact archaeological sites due to these past land disturbing activities.

TVA proposes to borrow soil from an approximately 164-acre area south of the generating site (see Figure 1). The proposed soil borrow straddles an existing transmission line corridor. TVA performed a Phase I Archaeological survey of the portion of the proposed soil borrow that lies in the transmission line corridor in 2016, and consulted with your office on the findings. The survey identified no archaeological sites, and your office agreed (by letter dated March 20, 2017) with TVA's finding of "no historic properties affected".

In order to identify archaeological sites in the remaining portion of the proposed soil borrow, which encompasses approximately 100 acres, TVA retained Tennessee Valley Archaeological Research (TVAR) to perform a Phase I Archaeological survey. Enclosed are two copies of the draft report, titled, *A Phase I Archaeological Survey of a Proposed Borrow Pit in New Johnsonville, Humphreys County, Tennessee*.

The survey included the excavation of 470 shovel test pits in the APE. One isolated find, consisting of three flakes, was identified. The survey identified no archaeological sites. TVAR recommends that the isolated find is ineligible for inclusion in the National Register of Historic Places. The survey findings indicate that the majority of the APE has been affected by severe soil erosion.

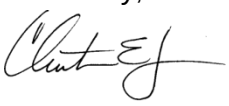
TVA has read the enclosed report and agrees with the authors' findings and recommendations. Based on this survey, TVA finds that the proposed undertaking would have no effect on historic properties.

Pursuant to 36 CFR Part 800.4(d)(1), we are seeking your concurrence with TVA's finding that no historic properties would be 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 are eligible for the NRHP.

Should you have any questions or comments, please contact Steve Cole in Knoxville by email, sccole0@tva.gov or by phone, (865) 632-2551.

Sincerely,



Clinton E. Jones
Manager
Cultural Compliance

SCC:ABM
Enclosures
cc (Enclosures):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

INTERNAL COPIES ONLY, NOT TO BE INCLUDED WITH OUTGOING LETTER:

Sheliah D. Baker, LP 5P-C
A. Michelle Cagley, KFP 1T-KST
Stephen C. Cole, WT 11D-K
Carol Freeman, BR 4A-C
Marty M. Gamble, WT 11C-K
Susan R. Jacks, WT 11C-K
Stacey S. McCluskey, OSA 1D-M
Rebecca J. Seaton, JOF A-NJT
M. Susan Smelley, BR 4A-C
Edward W. Wells, WT 11D-K
ECM, WT CA-K

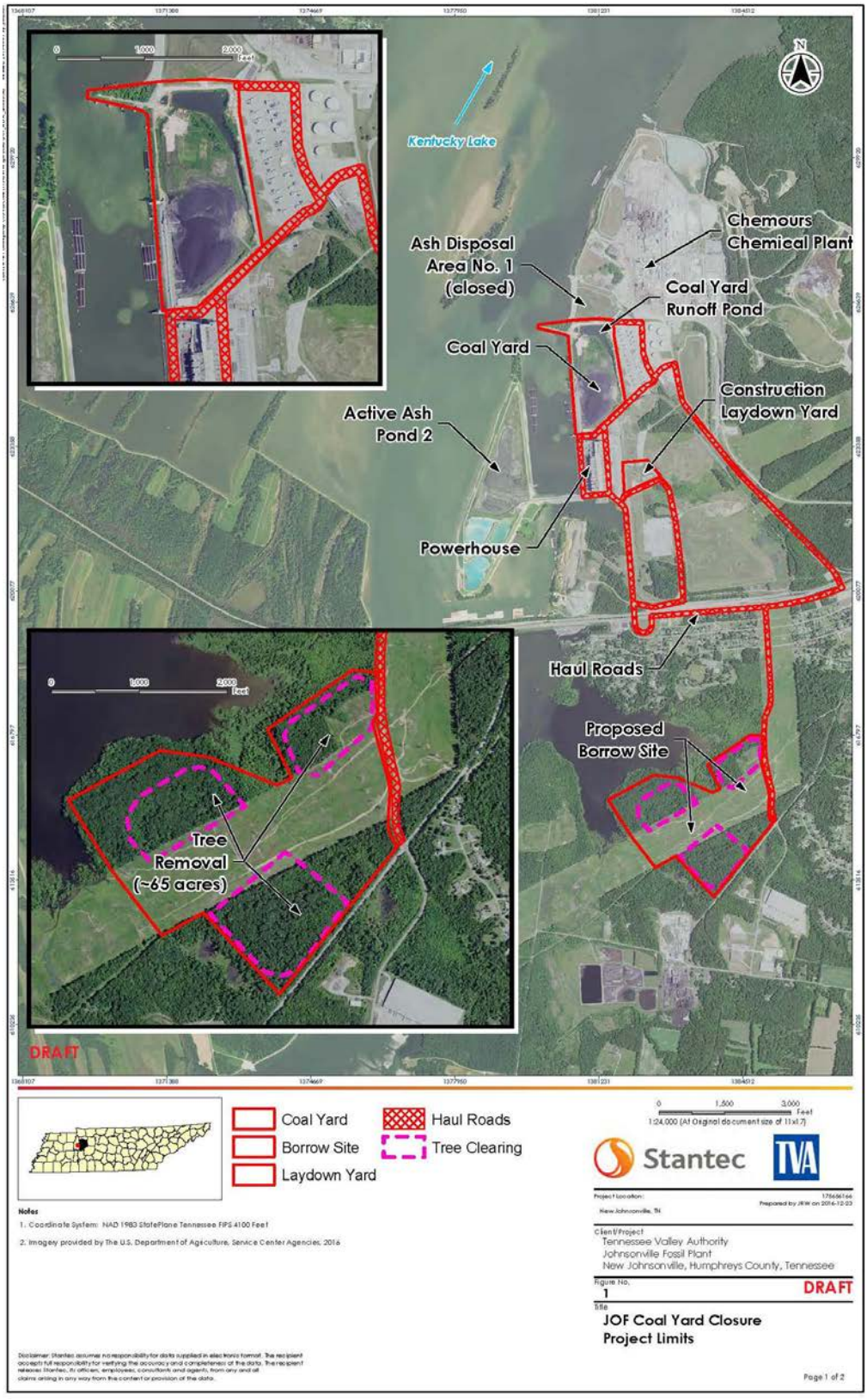


Figure 1. Locations of the proposed actions.

Figure 2. Location of the CY, CYRP, and haul roads in relation to the JOF Deconstruction APE.

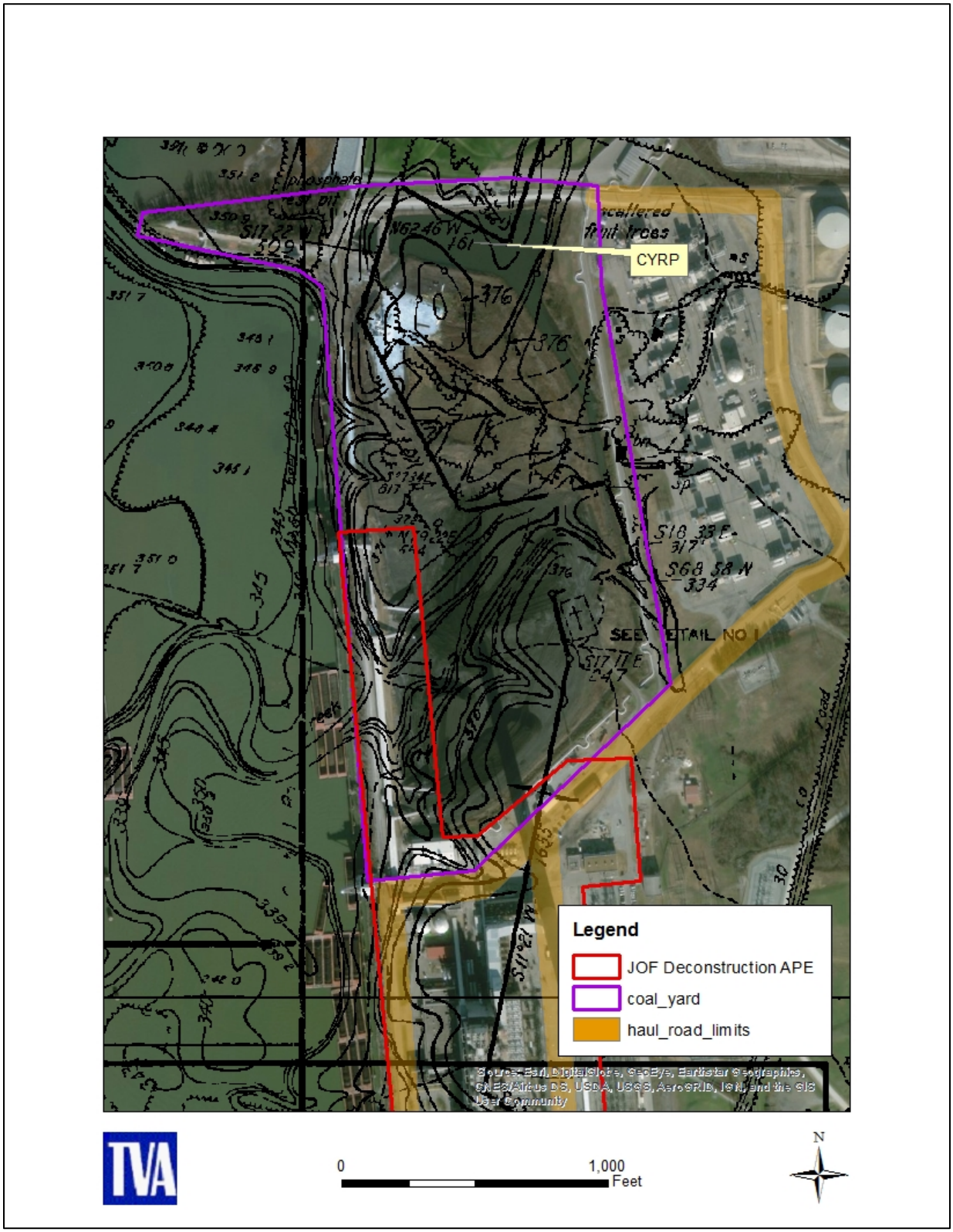


Figure 3. Project area with overlay of the 1937 land acquisition map.

A Phase I Archaeological Survey of a Proposed Borrow Pit in New Johnsonville, Humphreys County, Tennessee

Tennessee Valley Archaeological Research

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
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April 5, 2018

Mr. Clinton E. Jones
Tennessee Valley Authority
Biological and Cultural Compliance
400 West Summit Hill Drive
Knoxville, TN 37902

RE: TVA / Tennessee Valley Authority, Johnsonville Fossil Plant Coal Yard Closure, Coal Yard Runoff Pond Clouser, Process Water Basin, and Borrow Pit, New Johnsonville, Humphreys County, TN

Dear Mr. Jones:

In response to your request, we have reviewed the archaeological resources survey report and accompanying documentation submitted by you regarding the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Considering the information provided, we concur that no historic properties eligible for listing in the National Register of Historic Places will be affected by this undertaking. If project plans are changed or archaeological remains are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Questions or comments may be directed to Jennifer Barnett (615) 687-4780.

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jmb

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

November 5, 2018

Mr. E. Patrick McIntyre, Jr.
Executive Director
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA), JOHNSONVILLE FOSSIL PLANT (JOF), COAL YARD CLOSURE, COAL YARD RUNOFF POND CLOSURE, PROCESS WATER BASIN, AND BORROW PIT, HUMPHREYS COUNTY, TENNESSEE—EXPANDED AREA OF POTENTIAL EFFECTS (APE)

Earlier this year we consulted with your office regarding TVA's plans to close the coal yard and coal yard runoff pond, and to construct a process water basin as part of the undertaking. Our offices agreed that these actions would result in no effects on historic properties (please refer to your letter to Clinton E. Jones dated April 5, 2018).

More recently, TVA has proposed an alternate site for the process water basin, located in the North Rail Loop. This area has not been fully investigated previously for the presence of archaeological sites. Therefore, TVA has re-determined the APE for the undertaking to include the approximately 21-acre tract within the North Rail Loop that may be affected by construction of a process water basin.

In the consultation cited above and previous consultations, our offices have agreed that JOF is ineligible for inclusion in the National Register of Historic Places (NRHP) due to its lack of architectural significance and loss of integrity resulting from modern alterations. The process water basin would consist of one or two open impoundments surrounded by an earthen berm, piping to connect the basins with existing storm water and plant process water flows, and a pump station. The North Rail Loop is located approximately 0.75 miles north of the nearest community (New Johnsonville). TVA examined current topographic maps, satellite imagery, and images of JOF documented in a recent architectural survey (Karpynec and Weaver 2015). These documents show that the North Rail Loop is in a low-lying, flat landscape surrounded by the JOF coal pile, powerhouse, and switchyards to the west and south; the Johnsonville Combustion Turbine facility and a chemical plant (OxyChem) to the north; and a large transmission line corridor and closed coal combustion products landfill to the east. Therefore TVA finds that the proposed process water basin in the North Rail Loop would not affect any above-ground properties that are listed or eligible for listing in the NRHP.

TVA retained Tennessee Valley Archaeological Research (TVAR) to perform a Phase I Archaeological survey of the expanded portion of the APE. Enclosed are two copies of the draft report, titled, *A Phase I Archaeological Survey of the North Railyard in Connection with Construction of a Proposed Process Water Basin at Johnsonville Fossil Plant in New Johnsonville, Humphreys County, Tennessee*.

The survey consisted of pedestrian survey and systematic shovel testing. One isolated find consisting of two flakes in a single shovel test was identified. The survey identified no archaeological sites and documented that most of the project area has been disturbed by past activities associated with JOF operation and maintenance. TVAR recommends that the isolated find is ineligible for inclusion in the NRHP and that no additional archaeological investigations are required prior to implementation of the undertaking.

TVA has read the enclosed report and agrees with the authors' findings and recommendations. Based on this survey, TVA finds that no historic properties are located in the expanded portion of the APE.

Pursuant to 36 CFR Part 800.4(d)(1), we are seeking your comments on the enclosed report and TVA's finding of no historic properties in the expanded portion of the APE.

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 are eligible for the NRHP.

Should you have any questions or comments, please contact Steve Cole in Knoxville by email, sccole0@tva.gov or by phone, (865) 632-2551.

Sincerely,

Clinton E. Jones
Manager
Cultural Compliance

SCC:ABM
Enclosures
cc (Enclosures):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

INTERNAL COPIES NOT TO BE INCLUDED WITH OUTGOING LETTER:

Lana D. Bean, WT 10C-K
Stephen C. Cole, WT 11C-K
Patricia B. Ezzell, WT 7C-K
Carol Freeman,
Susan R. Jacks, WT 11C-K
Paul J. Pearman, BR 4A-C
M. Susan Smelley, BR 4A-C
Dana M. Vaughn, WT 11B-K
ECM, WT CA-K

A Phase I Archaeological Survey of the North Railyard in Connection with the Construction of a Proposed Process Water Basin at Johnsonville Fossil Plant in New Johnsonville, Humphreys County, Tennessee

Tennessee Valley Archaeological Research

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
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November 29, 2018

Mr. Clinton E. Jones
Tennessee Valley Authority
Biological and Cultural Compliance
400 West Summit Hill Drive
Knoxville, TN 37902

RE: TVA / Tennessee Valley Authority, Johnsonville Fossil Plant, Coal Yard Closure, Coal Yard Runoff Pond Closure, Process Water Basin, and Borrow Pit / Revised, New Johnsonville, Humphreys County, TN

Dear Mr. Jones:

In response to your request, we have reviewed the archaeological resources survey report and accompanying documentation submitted by you regarding the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Considering the information provided, we concur that no historic properties eligible for listing in the National Register of Historic Places will be affected by this undertaking. If project plans are changed or archaeological remains are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Questions or comments may be directed to Jennifer Barnett (615) 687-4780.

Your cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jmb

Absentee Shawnee Tribe of Oklahoma
Cultural/Tribal Historic Preservation Department
2025 S. Gordon Cooper Dr.
Shawnee, Oklahoma 74801
Phone: (405) 275-4030 ext 6340

5/8/18

RE: JOHNSONVILLE FOSSIL PLANT, COAL YARD CLOSURE, COAL YARD RUNOFF POND CLOSURE, PROCESS WATER BASIN, AND BORROW PIT, HUMPHREYS COUNTY, TENNESSEE

To Whom It May Concern:

This response is regarding the request from your office for a review of the project listed above. We have reviewed the information provided in your letter of March 21, 2018. We find after review of this information that we concur with your findings of no adverse effects. We have no objection to the project in Humphreys County, Tennessee, and we defer comment to your office as well as to the State Historic Preservation Office and/or the State Archaeologist.

We remain interested in further communications regarding this project due to the location. The Shawnee people have a documented historical presence in Tennessee. While there are no documented village sites within the project site or within a close proximity outside the project site, there still remains the potential of finding unknown sites in and surrounding the project location.

It is further advised that if the area of potential effect changes or in the event of an inadvertent discovery of human remains or other cultural resources that we receive notification within 48 hours. As well, any advertent discovery of human remains or other cultural resources should remain in situ until consultation with interested tribes and agencies is undertaken.

Thank you for your time and patience in communications regarding section 106 and NAGPRA issues. We appreciate your continued efforts in such matters. Please do not hesitate to contact me at the information below if you have any questions or concerns.

Best Regards,

Erin Thompson
Tribal Historic Preservation Officer
Absentee Shawnee Tribe of Oklahoma
2025 Gordon Cooper Drive
Shawnee, OK 74801
(P) 405.275.4030 Ext. 6340

GWYᏰ DᏃᏢ
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Office of the Chief

Bill John Baker
Principal Chief
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S. Joe Crittenden
Deputy Principal Chief
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April 23, 2018

Patricia Ezzell
Tennessee Valley Authority
400 W Summit Hill Drive
Knoxville, TN 37902

Re: Johnsonville Fossil Plant, Coal Yard Closure, Coal Yard Runoff Pond Closure, Process Water Basin, and Borrow Pit

Ms. Patricia Ezzell:

The Cherokee Nation (Nation) is in receipt of your correspondence about **Johnsonville Fossil Plant, Coal Yard Closure, Coal Yard Runoff Pond Closure, Process Water Basin, and Borrow Pit**, and appreciates the opportunity to provide comment upon this project. Please allow this letter to serve as the Nation's interest in acting as a consulting party to this project.

The Nation maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project, cross referenced the project's legal description against our information, and found instances where this project intersects or adjoins such resources, including the CHEROKEE TRAIL OF TEARS, Deas, Drane, Whitely, and Drane Water Detachment.

The Nation also reviewed the accompanying report *A Phase I Archeological Survey of a Proposed Borrow Pit in New Johnsonville, Humphreys County, Tennessee* prepared by Tennessee Valley Archeological Research in February 2018. Based on the report's findings, the Nation does not object to the project proceeding as long as the following recommendations are observed:

- The Nation requests that Tennessee Valley Authority (TVA) re-contact this Office if there are any changes to the scope of or activities within the Area of Potential Effect;

- The Nation requests that TVA halt all project activities immediately and re-contact this Office for further consultation if items of cultural significance are discovered during the course of this project;

- The Nation requests that TVA conduct appropriate inquiries with other pertinent Historic Preservation Offices regarding historic and prehistoric resources not included in the Nation's databases or records.

If you require additional information or have any questions, please contact me at your convenience. Thank you for your time and attention to this matter.

Wado,

Elizabeth Toombs, Tribal Historic Preservation Officer
Cherokee Nation Tribal Historic Preservation Office
elizabeth-toombs@cherokee.org
918.453.5389