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GALLATIN FOSSIL PLANT
BOTTOM ASH PROCESS DEWATERING FACILITY
PERMANENT FLOW MANAGEMENT SYSTEM
FINAL SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

Sumner County, Tennessee

Prepared by:
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Symbols, Acronyms, and Abbreviations

BADW	bottom ash dewatering
BEA	U.S. Bureau of Economic Analysis
BMP	Best Management Practice
CAA	Clean Air Act
CCR	Coal Combustion Residuals
CEC	Categorical Exclusion Checklist
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CO	Carbon Monoxide
CRAC	Cumberland River Aquatic Center
CRM	Cumberland River Mile
dB	decibels
dBA	A-weighted decibel
DFGD	dry flue gas desulfurization
EA	Environmental Assessment
EIS	Environmental Impact Statement
ELG	Effluent Limitations Guidelines
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
GAF	Gallatin Fossil Plant
IPaC	Information for Planning and Conservation
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
mg/L	milligrams per liter
MGD	million gallons per day
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO_2	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NRS	Non-Registered Site
NRL	North Rail Loop
NSR	New Source Review
NWI	National Wetlands Inventory
O_3	Ozone
OSHA	Occupational Safety and Health Administration
Pb	Lead
PEIS	Programmatic Environmental Impact Statement
PM	Particulate Matter
PM_{10}	Particulate matter less than or equal to 10 micrometers
$PM_{2.5}$	Particulate matter less than or equal to 2.5 micrometers
PRB	Powder River Basin
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
SEA	Supplemental Environmental Assessment
SO_2	Sulfur Dioxide

SR	State Route
SWPPP	Storm Water Pollution Prevention Plan
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TN	Tennessee
TSS	total suspended solids
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resources Agency
U.S.	United States
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WMA	Wildlife Management Area
WQC	water quality criteria
yd^3	cubic yards

CHAPTER 1 - PURPOSE OF AND NEED FOR ACTION

1.1 Introduction and Background

Gallatin Fossil Plant (GAF) is in Sumner County, Tennessee, on 1,950 acres of land on the north bank of the Cumberland River (Figure 1.1-1). The plant has four turbo-generating units with a combined summer net generating capacity of 976 megawatts. Per the United States (U.S.) Environmental Protection Agency (EPA) CCR Rule (40 Code of Federal Regulations [CFR] Part 257), the Tennessee Valley Authority (TVA) has ceased sending coal combustion residuals (CCR) and process flows to the on-site surface impoundments (Ash Pond A, Ash Pond E, Middle Pond A, and Bottom Ash Pond, collectively referred to as the Ash Pond Complex) at GAF. In 2009, TVA also outlined a plan to eliminate wet storage of CCR at its fossil plants and convert all wet fly ash, bottom ash, and gypsum operations to dry storage. Fly ash at GAF is now mixed together with dry flue gas desulfurization (DFGD) byproduct and the dry co-mingled DFGD/ash waste is collected in a baghouse and transported to the on-site North Rail Loop (NRL) Landfill.

Process wastewater flows from GAF are currently routed to the interim flow management system where removal of bottom ash and other suspended solids occurs prior to discharge at Outfall 010. The plant process wastewater will ultimately be directed to a new bottom ash dewatering (BADW) facility, which is currently under construction at GAF. TVA completed an Environmental Assessment (EA) and issued a Finding of No Significant Impact (FONSI) for the BADW facility on July 19, 2017. Between cessation of flows as required by the CCR Rule and completion of the new BADW facility, an interim flow management system has been implemented at GAF. A National Environmental Policy Act (NEPA) review for the interim flow management system is on file with TVA under separate cover.

After the FONSI was issued for the BADW facility, TVA identified additional proposed actions related to the BADW facility and the associated interim flow management system and initiated this Supplemental Environmental Assessment (SEA). The SEA evaluates the No Action Alternative (permanent modifications to the interim flow management system and its continued operation) and an alternative that would close the Bottom Ash Pond and construct and operate a process water basin for incorporation into the permanent flow management system. Figure 1.1-2 includes the NEPA project boundary, which encompasses these items.

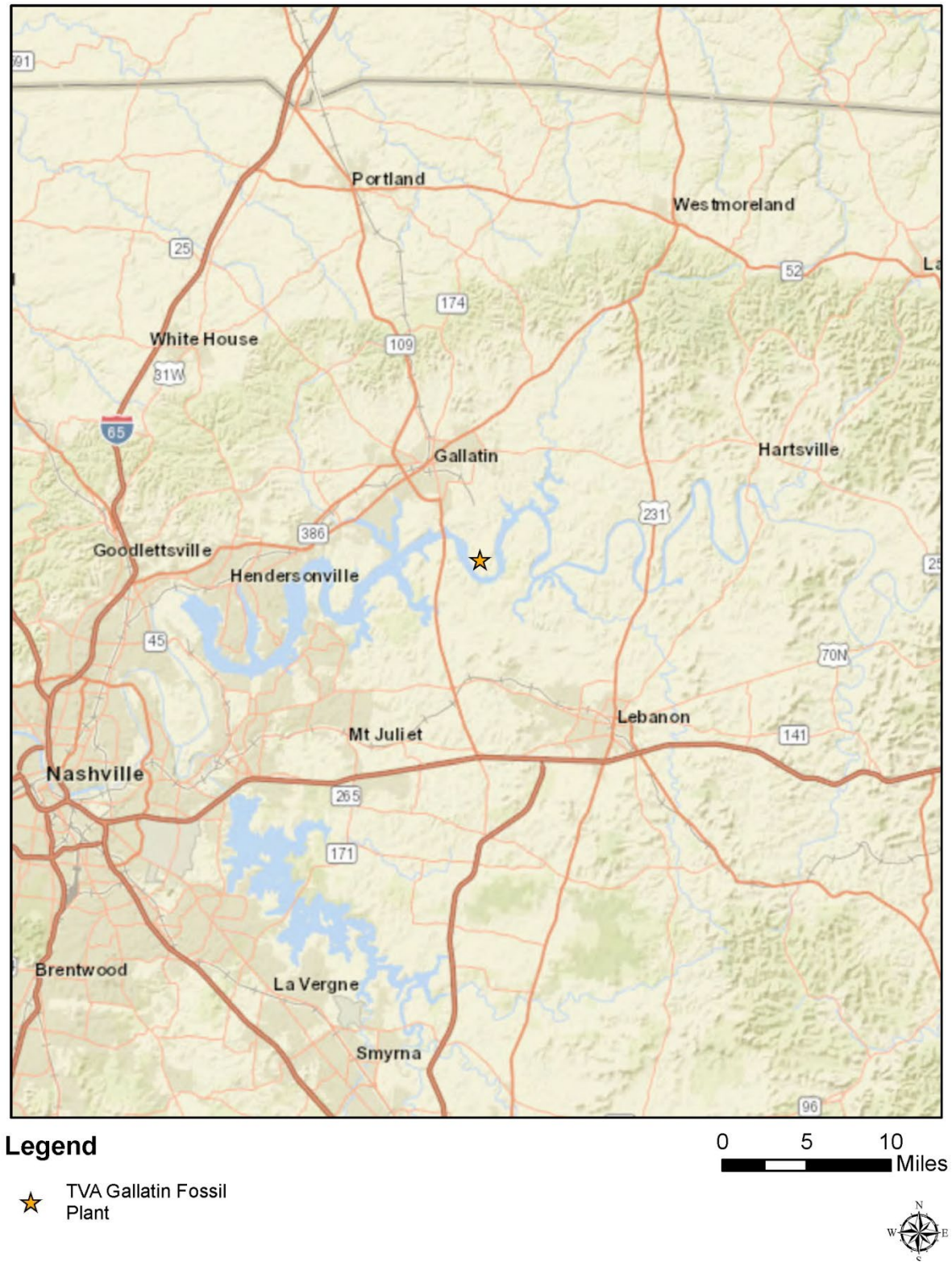

Figure 1.1-1. Project Vicinity Map

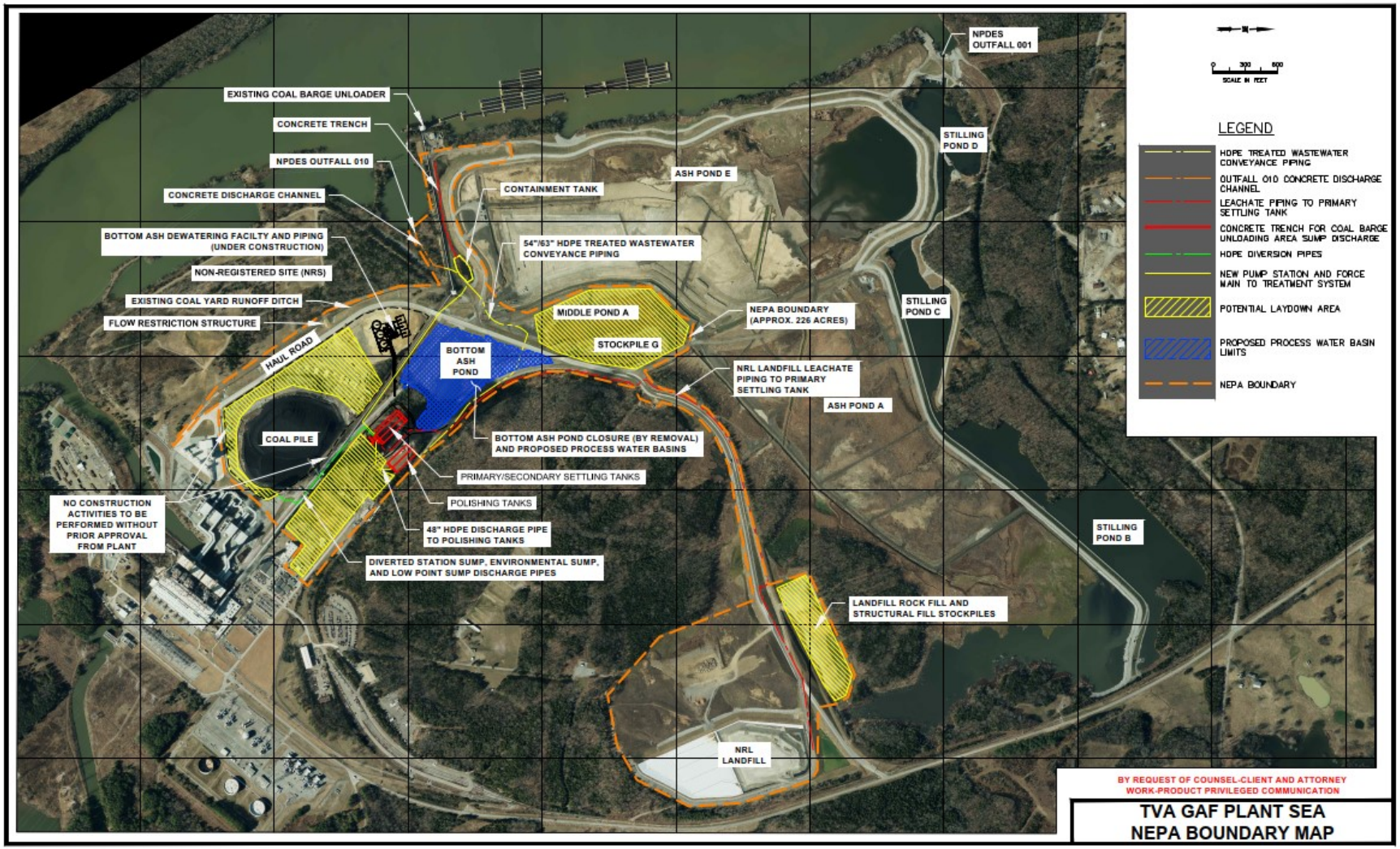

Figure 1.1-2. NEPA Environmental Boundary Map

1.2 Purpose and Need

The purpose of the proposed action is to implement a permanent flow management system at GAF to assist TVA in complying with state requirements, the EPA CCR Rule and TVA's own plans to transition to dry storage of CCR. This project would allow TVA to permanently handle process flows without use of the existing surface impoundments which is required by the CCR Rule. The proposed permanent flow management system would work with the BADW facility currently under construction.

1.3 Decision to be Made

This SEA is being prepared to inform TVA decision makers and the public about the environmental consequences of the proposed action and alternatives. The decision TVA must make is whether to continue the operation of the interim flow management system (with permanent modifications) or construct the process water basin(s) and permanent flow management system at GAF that would become part of the BADW facility to permanently handle process water flows and create dry CCR for storage in the approved on-site landfill.

TVA will use this SEA to support the decision-making process and to determine whether an Environmental Impact Statement (EIS) should be prepared or whether a FONSI may be issued.

1.4 Related Environmental Reviews and Consultation Requirements

The 2017 BADW Facility EA, and Categorical Exclusion Checklist (CEC) for the Interim Flow Management System help describe the GAF project area, operation of GAF, and the process for dewatering of CCR. The 2018 Borrow Site EA addresses borrow material that would potentially be needed for the proposed action. These reports are incorporated by reference in this SEA.

- *Gallatin Fossil Plant Bottom Ash Process Dewatering Facility Environmental Assessment (TVA 2017a)*.
- *TVA Gallatin Fossil Plant Borrow Site Final Environmental Assessment (TVA 2018a)*
- *CEC – Interim Flow Management System (TVA 2018b)*.

1.5 Scope of this Analysis

In consideration of the nature and scope of the proposed action, TVA determined that the potential impacts of the action alternatives under consideration on the following environmental resources are bounded by the analysis in the Final EA for the BADW Facility (TVA 2017a) and CEC for the Interim Flow Management System (TVA 2018b). Therefore, these resources are not reassessed in this SEA:

- Climate Change
- Aquatic Ecology
- Floodplains
- Natural Areas, Parks and Recreation
- Cultural and Historic Resources
- Land Use and Prime Farmland

- Visual Resources

The following resources have the potential to be directly or indirectly affected by the proposed action and alternatives and are therefore analyzed in this SEA:

- Air Quality
- Vegetation
- Wildlife
- Threatened and Endangered Species
- Surface Water and Wastewater
- Groundwater and Geology
- Wetlands
- Solid and Hazardous Waste
- Transportation
- Noise
- Socioeconomics and Environmental Justice
- Safety

1.6 Public and Agency Involvement

On September 10, 2019, the Draft SEA was released for a 30-day public review and comment period. The Draft SEA was transmitted to various federal, state, and local agencies and it was posted on TVA's public NEPA review website. A notice of availability including a request for comments was distributed with a media advisory in the Nashville and Gallatin areas. Advertisements appeared in the Gallatin News in the month of September informing the public how to participate and provide comments. Also, during the public comment period, TVA held an open house at the Gallatin Civic Center. Information and maps were provided on various projects happening at the Gallatin site including the SEA. Comments were accepted via TVA's website, mail, and e-mail. Appendix A contains the comments received and TVA's responses to those comments.

1.7 Necessary Permits or Licenses

The environmental permits to be obtained for the activities related to TVA's action include:

- Air permitting regulations under the Clean Air Act (CAA) may require TVA to secure an Air Pollution Control Permit to Construct prior to the commencement of the proposed construction.
- The project would include the disturbance of greater than one acre. By rule, any construction project that disturbs greater than one acre of land requires a National Pollutant Discharge Elimination System (NPDES) General Storm Water Construction Permit. A Storm Water Permit issued by Tennessee Department of Environment and Conservation (TDEC), under the Clean Water Act, would be required prior to commencement of construction. This would require a storm water pollution prevention plan (SWPPP) and Best Management Practices (BMP) Plan to ensure that storm water would be controlled on-site.

No permits or licenses are anticipated specifically for solid or hazardous waste transportation-related activities.

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CHAPTER 2 - ALTERNATIVES

2.1 Description of Alternatives

Alternatives evaluated in detail for this SEA are described below.

2.1.1 Alternative A – No Action

The EPA CCR Rule requires TVA to stop sluicing CCR material to surface impoundments on-site at GAF by EPA's deadline for CCR Rule compliance. To meet this goal, TVA needs to divert and/or treat all process water flows from the plant, coal yard, and coal handling areas that go to the Ash Pond Complex. To accomplish this, TVA has implemented an interim flow management system. However, this system is not intended to permanently replace use of the surface impoundments. Ultimately, CCR will be permanently dried and managed using the on-site BADW facility and a permanent flow management system. Under the No Action Alternative, TVA would continue to use the interim flow management system as the permanent flow management system after several minor modifications are made (e.g., removal/abandonment of some discharge piping or tanks) and it is connected with the BADW facility.

The interim flow management system consists of piping and a series of tanks designed to provide temporary bottom ash dewatering and process wastewater treatment. A primary settling tank receives process flow discharged from the existing bottom ash sluice piping and is used to remove bottom ash and suspended solids. In addition to the bottom ash process flows, leachate from the NRL Landfill and runoff from the coal pile and coal handling areas is redirected to the primary settling tank. Chemical coagulant is added as needed.

Adjacent to the primary settling tank is a concrete pad that facilitates removal of the collected solids. When cleanout occurs, removed bottom ash and solids are staged on the pad, allowed to drain and dry for transport, loaded into a truck and transported to the on-site landfill for disposal.

Following bottom ash removal in the primary settling tank, two (2) secondary settling chambers provide further suspended solids removal. Flocculant is added in the tanks as needed and the pH is adjusted as necessary. The discharge from the secondary settling chambers flow via gravity to a polishing tank comprised of two (2) chambers. Following final treatment in the polishing tank, the flow discharges via gravity through a HDPE pipeline and concrete channel to NPDES Outfall 010 located south of Ash Pond E.

See Figure 2.1-1 for a conceptual layout of the permanent flow management system.

2.1.2 Alternative B – Closure of the Bottom Ash Pond, Construction of Process Water Basin(s) and Permanent Flow Management System[1]

See Figure 2.1-2 for a conceptual layout of the process water basin(s) and permanent flow management system.

[1] Separate from this environmental review, TVA has agreed to remove the CCR from the Bottom Ash Pond. If TVA were to choose Alternative B, TVA would excavate the CCR from the Bottom Ash Pond in accordance with regulatory requirements and agreements with the State. The permanent disposition of any removed ash from the Bottom Ash Pond is not addressed in this environmental review and will be evaluated in other NEPA documents.

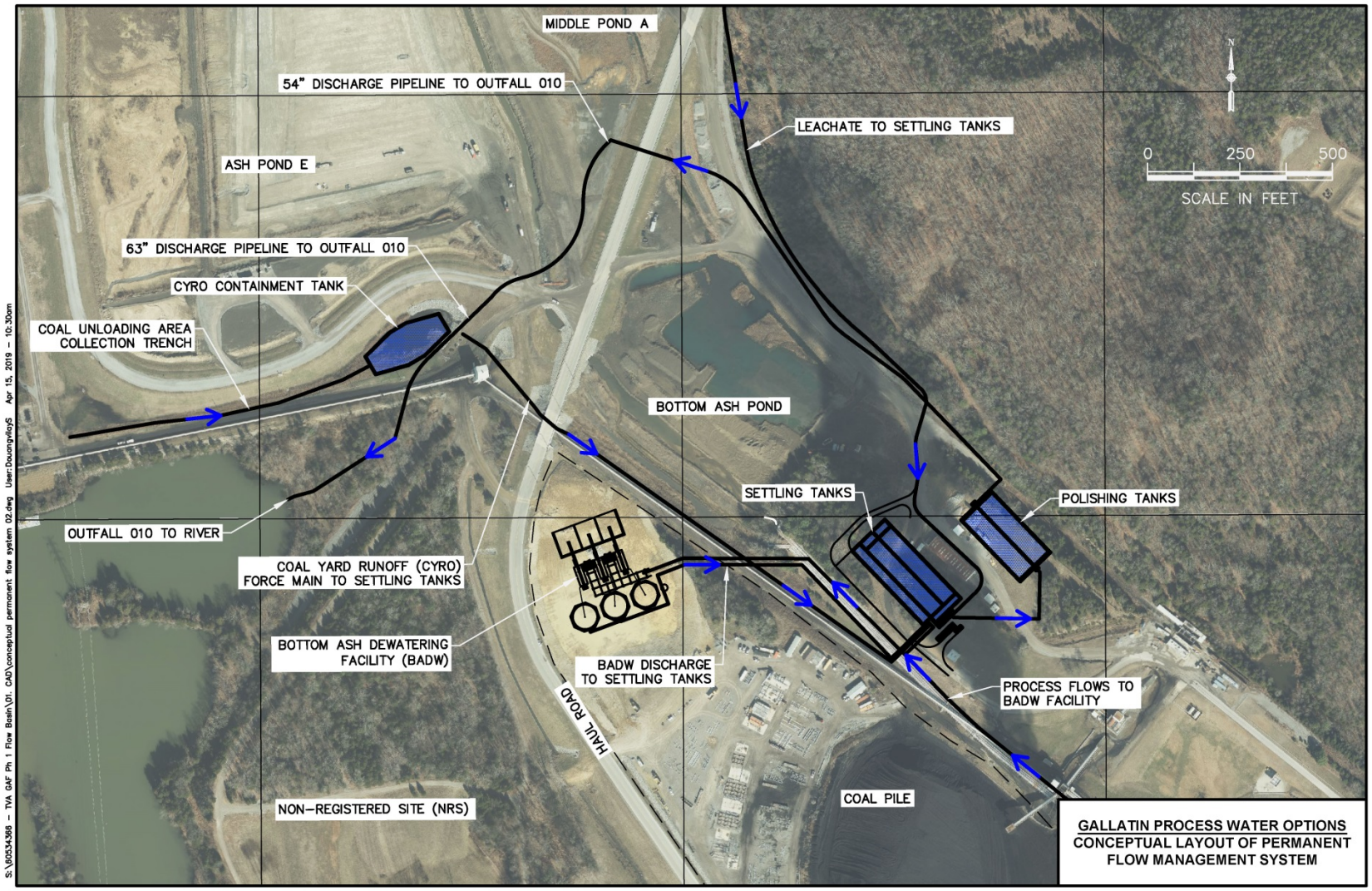

Figure 2.1-1. Conceptual Layout of Permanent Flow Management System

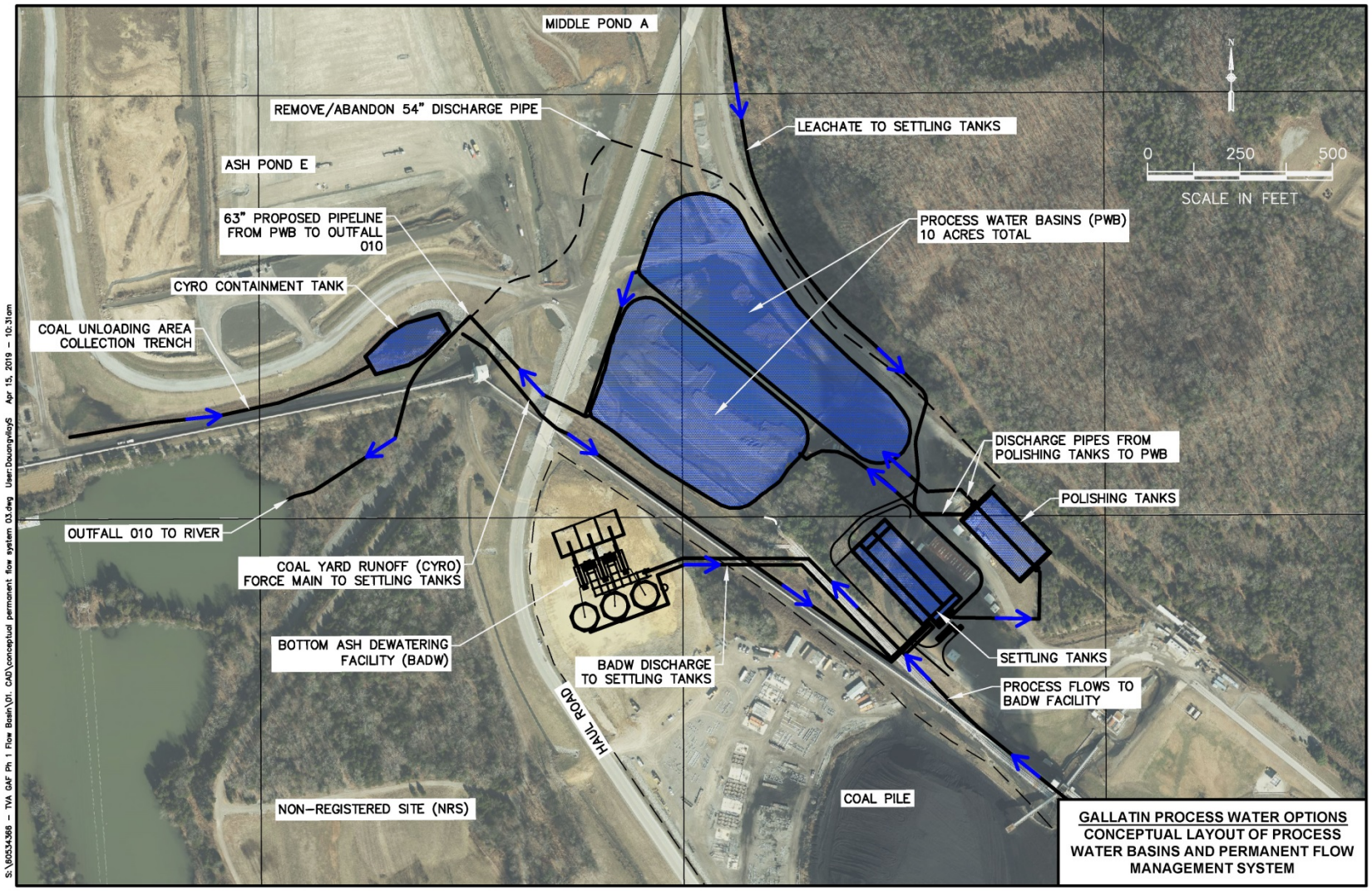

Figure 2.1-2. Conceptual Layout of Process Water Basins and Permanent Flow Management System

Surface Impoundment Closure – Bottom Ash Pond and Temporary Stockpile of CCR in the Existing On-site Landfill

The existing Bottom Ash Pond would be closed. TVA proposes to close the pond by removal and would excavate all visible bottom ash and some soil (approximately 1 foot) under the bottom ash within the approximate 15-acre pond limits. Excavated bottom ash and soil would be removed and transported by truck to the on-site landfill where it would be temporarily stockpiled or beneficially reused for appropriate and approved uses within the landfill.

Construction of a Lined Process Water Basin

An approximate 10-acre process water basin (or two basins equaling approximately 10 acres) would be constructed in the former location of the Bottom Ash Pond following removal of all CCR and an appropriate amount of the underlying soil in that location. Backfill from an approved source (e.g., GAF borrow site) would be obtained and the area would be lined with a geosynthetic liner underlain by a clay liner to prevent seepage through the basin. The process water basin(s) would be incorporated into the flow management system and receive treated process flows and provide for treatment to meet NPDES discharge limits from the flows. Following treatment in the process water basin(s), process waters would be discharged via gravity to NPDES Outfall 010.

Flow Management System

Permanent modifications (e.g., removal/abandonment of some discharge piping or tanks) would be made to the interim flow management system (see No Action Alternative). Discharge from the polishing tanks would flow into the process water basin(s).

Laydown and Stockpile Areas

Figure 1.1-2 shows the existing stockpile areas and the potential laydown areas that could be used for the project. The area adjacent to and surrounding the coal pile could potentially be used for laydown of materials during construction. The Middle Pond A area would also be improved to provide an area for laydown of materials. The improvements would be made using soil from Stockpile G, an existing stockpile consisting of spoils from the scrubber construction. Stockpile G is located within Middle Pond A.

Structural fill would be required to provide access along the alignment of the treated wastewater conveyance piping. Fill from Stockpile G or the existing landfill rock fill and structural fill stockpiles adjacent to the on-site landfill would be utilized for the construction. The rock fill and structural fill stockpile areas could also be utilized as a potential laydown area if needed. Aggregate from off-site commercial sources or the TVA owned borrow site north of the plant may also be utilized.

2.1.3 Preferred Alternative from the 2017 Bottom Ash Dewatering Environmental Assessment

The alternative to construct a BADW facility and recirculation system was selected as TVA's preferred alternative in the 2017 environmental assessment. The evaluation in this SEA does not impact the preferred alternative in the original BADW Facility EA and does not prevent future recirculation/reuse of the bottom ash effluent as part of the BADW facility operation.

2.2 Comparison of Alternatives

The environmental impacts of the alternatives are summarized in Table 2.2-1. These summaries are derived from the information and analyses provided in Chapter 3.

Table 2.2-1. Summary and Comparison of Alternatives by Resource Area

Resource Area	Impacts	
	Alternative A – No Action	**Alternative B – Closure of the Bottom Ash Pond, Construction of a Process Water Basin and Permanent Flow Management System**
Air quality	No Impact	Minor short-term construction impact. Minor operations impact due to fugitive dust emissions.
Vegetation	No Impact	No significant impact
Wildlife	No Impact	Minimal impact
Threatened and endangered species	No Impact	No significant impact. Potential minor beneficial impact to listed bat species
Surface water and wastewater	No Impact	Minor temporary or potentially beneficial impacts
Groundwater and geology	No Impact	No significant impact
Wetlands	No Impact	No adverse impact
Solid and hazardous waste	No Impact	No significant impact
Transportation	No Impact	Minor short-term construction impact
Noise	No Impact	No significant impact
Socioeconomics and Environmental Justice	No Impact	Minor short-term beneficial impacts during construction. No significant impacts during operation. No disproportionate impacts to Environmental Justice populations.
Safety	No Impact	Minor short-term negative impacts during construction.

2.3 Identification of Mitigation Measures

The following mitigation measures and BMPs have been identified to reduce potential environmental effects:

- Mitigation measures would be implemented as needed to reduce fugitive emissions as specified in the Title V Operating Permit 561209 and any air construction permits issued by the TDEC Division of Air Pollution Control.
- Erosion prevention and sedimentation controls would be implemented as required by the Tennessee (TN) General Construction Storm Water Permit (TNR100000) or any specific construction storm water permit issued by the TDEC Division of Water Resources, and the Tennessee Erosion Prevention and Sediment Control Handbook.
- Mitigation measures as required by the facility's Class II solid waste permit (IDL #83-0219) for the handling and management of coal combustion byproduct materials.

2.4 Preferred Alternative

TVA's preferred alternative is Alternative A, under which permanent modifications would be made to the interim flow management system and it would continue to treat process water flows from GAF. The flow management system would be connected to the new BADW facility once construction is completed and it becomes operational. Under Alternative A, the Bottom Ash Pond would not be closed for the purpose of constructing the process water basin(s), and the process water basin(s) would not be constructed.

As TVA has progressed with the interim flow management system, TVA has learned that these tank systems are an efficient and effective way to treat process water flows to maintain compliance with the GAF NPDES permit limits. It is anticipated that the system will further improve once the BADW facility is completed and operational. Therefore, TVA has elected not to construct the process water basin(s) to treat water in conjunction with the BADW facility at this time.

CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment (existing conditions) of environmental resources in the Project Area and the anticipated environmental consequences that would occur from adoption of the alternatives described in Chapter 2. The affected environment descriptions below are based on published and unpublished reports, historical data, and online database retrievals, as necessary. A list of applicable source documents is provided in Chapter 6.

3.1 Air Quality

3.1.1 Affected Environment

Through its passage of the CAA, Congress has mandated the protection and enhancement of our nation's air quality resources through various programs including the promulgation and attainment of National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50). EPA has established NAAQS to protect the public health and welfare for the following "criteria" pollutants:

- Sulfur dioxide (SO_2)
- Ozone (O_3)
- Nitrogen dioxide (NO_2)
- Particulate matter less than or equal to 10 micrometers (PM_{10})
- Particulate matter less than or equal to 2.5 micrometers ($PM_{2.5}$)
- Carbon monoxide (CO)
- Lead (Pb)

There are two types of NAAQS: primary standards (set to protect public health) and secondary standards (set to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings).

Air quality in the Tennessee Valley and the Nation has steadily improved following the enactment of the CAA, subsequent amendments to that Act, and the promulgation of increasingly stringent regulations by EPA and the states. This has resulted in significant emission reductions from industrial and other categories of sources, such as motor vehicles. Air quality levels of all criteria pollutants have significantly decreased by over 60 percent from 1990 to 2011 (EPA 2016).

The EPA periodically reviews existing standards for each criteria pollutant and sets or revises new NAAQS as it deems fit. States submit recommendations to the EPA as to whether an area is attaining the NAAQS for a criteria pollutant. States base these recommendations on air quality data collected from monitors at locations in urban and rural settings as well as other information characterizing air quality such as modeling. After working with the states and considering the information from air quality monitors and/or models, EPA will "designate" an area as attainment or nonattainment for the standard. The air quality in Sumner County, Tennessee, where GAF is located, meets applicable federal and state air quality standards. Sumner County and the surrounding counties (Wilson, Davidson, Robertson, and Trousdale) are all in attainment with applicable NAAQS (EPA 2018a; EPA 2018b).

Construction at the GAF site may be affected by several air quality considerations. One such factor is the regulatory status or attainment of air quality standards. Air emission sources located in clean air areas are subject to the Prevention of Significant Deterioration (PSD) New Source Review (NSR) rules, whereas those located in or affecting areas failing to attain air quality standards must comply with nonattainment NSR. An overriding constraint in either NSR program is that no source may cause or significantly contribute to a violation of an ambient air quality standard. The project would not be subject to NSR review because it would not be a major modification under state air quality regulations (TDEC Air Pollution Control 1200-03-09-.01(5)(b)(2) [TDEC 2009]).

3.1.2 Environmental Consequences

3.1.2.1 Alternative A – No Action

Under Alternative A, the process water basin(s) would not be constructed. When the BADW facility is completed, it will operate with the flow management system to handle process water flows and create dry CCR for storage in the approved on-site landfill. Therefore, there would be no changes to the existing air quality beyond those that currently exist at GAF.

3.1.2.2 Alternative B – Closure of the Bottom Ash Pond, Construction of a Process Water Basin(s) and Permanent Flow Management System

Construction

Transient air pollutant emissions would occur during the construction phase of the process water basin. Construction-related air quality impacts would occur during site preparation, excavation of the Bottom Ash Pond, construction of the process water basin(s), and related transportation activities.

Site preparation, removal of CCR material, and vehicular traffic over paved and unpaved roads at the construction site would result in the emission of fugitive dust particulate matter (PM) during active construction periods. The largest fraction (greater than 95 percent by weight) of fugitive dust emissions would be deposited within the construction site boundaries (Buonicore and Davis 1992). The remaining fraction of the dust would be subject to transport beyond the property boundary.

Fugitive emission control is part of the GAF CCR compliance program. Specific measures to control CCR fugitive dust at GAF are included in the CCR Fugitive Dust Control Plan (TVA 2017b). Mitigation measures would also be implemented as needed to reduce fugitive emissions as specified in GAF's Title V Operating Permit 561209 and any air construction permits issued by the TDEC Division of Air Pollution Control. If necessary, emissions from open construction areas and paved/unpaved roads would be mitigated by spraying water on the roadways to reduce fugitive dust emissions. Trucks transporting bottom ash to the on-site landfill may be required to cover and/or moisten the load with water as a mitigation method.

Combustion of gasoline and diesel fuels by internal combustion engines (vehicles, generators, construction equipment, etc.) would generate local emissions of PM, nitrogen oxides, CO, volatile organic compounds, and SO_2 during the site preparation and construction period. The total amount of these emissions would be small and would result in minimal impacts to air quality.

Air quality impacts from construction activities would be temporary (12 to 18 months), and would depend on both man-made factors (intensity of activity, control measures, etc.) and natural

factors such as wind speed and direction, soil moisture, etc. However, even under unusually adverse conditions, these emissions would have, at most, a minor transient impact on off-site air quality and would be well below the applicable ambient air quality standard. Overall, the potential impacts to air quality from construction-related activities for the project would be minor.

Operations

The proposed process water basin and permanent flow management system would be operated in compliance with TDEC regulations and therefore is subject to specific TDEC process regulations and fugitive dust regulations. Operations are also subject to review for applicability of the PSD regulations for inhalable particulate matter (PM_{10}) and total particulates.

Because the emissions of PM_{10} and total particulates would be below PSD significance levels of 15 tons per year and 25 tons per year, respectively, PSD does not apply to this project. Because the proposed project is in an attainment area for $PM_{2.5}$, it is not subject to nonattainment NSR analysis. The $PM_{2.5}$ emissions increase associated with the proposed dewatering facility would not be significant since a very small percentage of the fugitive dust generated would be expected to be in that size range.

Fugitive dust emission standards state that fugitive dust may not be emitted in quantities that produce visible emissions beyond the property for more than 5 minutes per hour or 20 minutes per day. During loading bottom ash would be moistened to 15 to 20 percent moisture content. This would be used for dust control when bottom ash is transported to the NRL landfill. The open trucks would then be covered to further reduce the chance of fugitive emissions. Therefore, air quality impacts associated with project operations would be minor.

3.2 Vegetation

3.2.1 Affected Environment

GAF lies completely within the Outer Nashville Basin of the Interior Plateau Ecoregion. The Interior Plateau is a diverse ecoregion extending from southern Indiana and Ohio to northern Alabama (Griffith et al. 2001). The natural vegetation of this ecoregion is primarily oak-hickory forest, with some areas of bluestem prairie and cedar glades. The dominant land cover types currently are deciduous forest and pasture/cropland (Griffith et al. 2001).

Approximately 30 percent of the GAF reservation is covered by vegetation and can be classified based on plant community types; the remaining 70 percent is currently being used for facility operations (i.e., developed) and is not considered further in the vegetation discussion. Field surveys conducted near the Project Area and in conjunction with the Bottom Ash Dewatering Facility EA (TVA 2017a) revealed that the vegetation in the area is a mixture of common native and non-native herbaceous and woody species. A small percentage of the Project Area is covered by vegetation, which consists mainly of herbaceous vegetation and mixed evergreen-deciduous forest.

The limited areas of vegetation within the proposed Project Area (Figure 3.2-1) include three forested patches adjacent to the BADW facility (Forest Areas 2, 3, and 6). Trees in these areas include northern red oak, chinquapin oak, shag-bark hickory, mockernut hickory, eastern cottonwood, eastern red cedar, sweetgum, white ash, black locust, and sugar maple. Forest

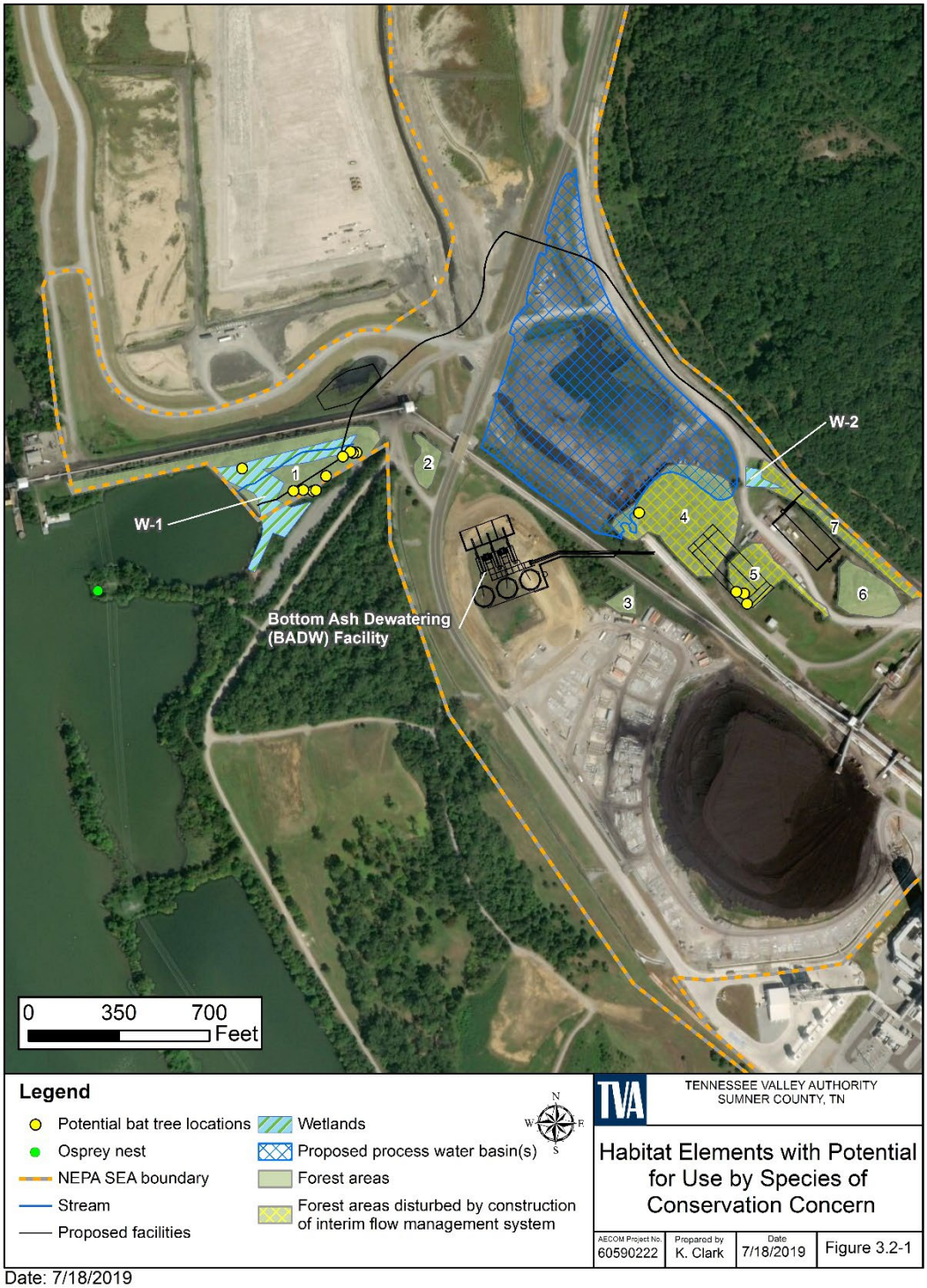

Figure 3.2-1. Habitat Elements near the Proposed Process Water Basin(s) and Permanent Flow Management System

Areas 4, 5, and 7 were previously disturbed during the construction of the interim flow management system. Trees and related vegetative debris generated from clearing and grubbing activities were grinded and turned into mulch for use on-site. Another forested area (Forested Area 1) of approximately 4 acres is present near NPDES Outfall 010, located on the lake embayment on the western boundary of the Project Area. In this area, the dominant trees include cottonwood, hackberry, chinquapin oak, hickory, black locust, and eastern red cedar, and shrubs include bush honeysuckle, stiff dogwood, and sumac (TVA 2017a). The 1.5-acre wetland within this forested area supports sycamore, black willow, sugar maple, sweet gum, river birch, and sugarberry in the tree stratum and netted chain fern, jewelweed, false nettle, and common reed in the herbaceous layer. About 0.72 acres of Forest Area 1 were also disturbed during the construction of Outfall 010 and associated discharge channel. There are no uncommon terrestrial plant communities, designated critical plant habitats, or otherwise noteworthy botanical areas occurring on or adjacent to the Project Area or the GAF reservation.

3.2.2 Environmental Consequences

3.2.2.1 Alternative A – No Action

Under the No Action Alternative, TVA would not construct the process water basin(s). When the BADW facility is completed, it will operate with the flow management system to treat process water flows and create dry CCR for storage in the approved on-site landfill. The property where the interim flow management system is located would remain in its current condition with minor maintenance over time as needed. The GAF reservation, including the Project Area, has no conservation value based on vegetation, and the adoption of Alternative A would not change that situation. The plant communities present on and around the GAF reservation are common and representative of the region, and no direct or indirect impacts are expected to occur to these botanical resources because of the No Action Alternative. The few vegetated areas within the Project Area would continue to be dominated by non-native and early successional species common in disturbed habitats. Any changes occurring in the vegetation on-site would be the result of other natural or anthropogenic factors rather than Alternative A. No additional direct or indirect impacts to vegetation resources are expected to occur because of the No Action Alternative.

3.2.2.2 Alternative B – Closure of the Bottom Ash Pond, Construction of Process Water Basin(s) and Permanent Flow Management System

Construction and Operation

Alternative B would result in the construction of an approximately 10-acre process water basin (or two basins equaling approximately 10 acres) on the site of the former Bottom Ash Pond (following removal of all CCR at that location) and the components of the interim flow management system would be made permanent. Construction of the process water basin(s) would also entail the use of several already developed areas as temporary laydown and stockpile areas (Figure 2.1-2). Currently, the areas where these activities would occur are predominantly unvegetated or are covered with grasses and other herbs. The vegetation that does exist within the Project Area consists of low-quality, mixed evergreen-deciduous forest, and non-native turf grasses, weeds, and other early successional plants, which have no conservation value. Given the small areas of common vegetation that would be lost, direct and indirect impacts on vegetation resources from Alternative B would not be significant.

3.3 Wildlife

3.3.1 Affected Environment

Habitats within the Project Area and the surrounding areas of the GAF reservation have been heavily impacted from years of construction, industrial activities, and traffic. The native wildlife community has been permanently altered throughout the years. Much of the Project Area is developed and devoid of natural vegetation (including office areas, laydown and steel yards, stockpile locations, and flue gas desulfurization site) or consists of early successional habitats dominated by herbaceous vegetation (construction parking, transport routes, portions of landfill area, stockpile locations). See Section 3.2 for a more detailed description of the various plant communities that provide habitat for wildlife on the GAF and within the Project Area.

Early successional habitats within the Project Area (maintained lawns, fields, pipeline rights-of-way, isolated woodlots, and roadway shoulders) can support many common bird species, such as the Canada goose, eastern meadowlark, European starling, killdeer, field sparrow, song sparrow, indigo bunting, wild turkey, red-winged blackbird, Carolina wren, and mourning dove. The white-tailed deer, eastern cottontail, striped skunk, and rodents such as the white-footed mouse are also frequently associated with early successional habitats. Reptiles found in these habitats include the northern black racer, black rat snake, and eastern garter snake.

Due to the extensive clearing of land that has previously occurred in the Project Area, only a limited area of mixed evergreen-deciduous forest fragments remains around the primary settling tanks, polishing tanks, and new NPDES Outfall 010 that is part of the interim flow management system. The small, fragmented areas of forest within the Project Area provide poor quality habitat overall for terrestrial animals. A site survey was conducted on November 15, 2018 and focused on the habitats in these areas. Several common birds were observed in the forest fragments, including the tufted titmouse, eastern towhee, northern cardinal, blue jay, American crow, eastern phoebe, American robin, and Carolina chickadee. Mammals such as the eastern chipmunk and eastern gray squirrel were also observed in these forest areas. Common amphibians and reptiles that may be found in this disturbed habitat include the eastern box turtle, copperhead, eastern fence lizard, and eastern garter snake. Forested wetlands within and adjacent to the Project Area provide habitat for amphibians such as the northern cricket frog, upland chorus frog, and dusky salamander.

Two wading bird colonies have historically been recorded along the Cumberland River on the west side of the GAF reservation within 3 miles of the Project Area, with the nearest located approximately 900 feet from the Project Area. However, no nests remain at those sites (TVA CEC July 2018). Osprey nests have been observed historically along the river, and one osprey nest was observed near the Project Area during the 2018 field surveys. This nest is located on a transmission tower at the end of a peninsula of land approximately 470 feet south of the existing barge unloader. No caves or other unique wildlife habitats were observed during field surveys conducted on the GAF reservation in 2011, 2012, 2016, and 2018.

An Information for Planning and Conservation (IPaC) report was obtained for the GAF reservation from the U. S. Fish and Wildlife Service (USFWS) website. It identified six migratory birds of particular conservation concern that have the potential to occur in the project vicinity: the Kentucky warbler, lesser yellowlegs, prairie warbler, redheaded woodpecker, semipalmated plover, and wood thrush. These species have the potential to occur in the project vicinity during their breeding season or during migration, and several have been reported by birding enthusiasts on the GAF property (TVA 2018b). The Bottom Ash Pond in the Project Area and coal ash ponds in the vicinity currently offer potential low-quality foraging habitat for shorebirds,

including the lesser yellowlegs and semipalmated plover during migration. The Kentucky warbler, prairie warbler, redheaded woodpecker, and wood thrush potentially could nest in the wooded habitats in spring and summer (USFWS 2018a).

3.3.2 Environmental Consequences

3.3.2.1 Alternative A – No Action

Under the No Action Alternative, the Project Area where the interim flow management system is located would remain in its current condition with minor maintenance over time as needed; thus, vegetation likely would remain in its current state. The Project Area provides minimal habitat for wildlife, and the adoption of Alternative A would not change that situation. Because the wildlife species present on and near the Project Area are common and representative of the region, no direct or indirect impacts are expected to occur to these wildlife resources because of the No Action Alternative. The few areas of undeveloped habitat within the Project Area would continue to be utilized principally by species common in disturbed habitats. Any changes occurring in the wildlife community on-site would be the result of other natural or anthropogenic factors rather than Alternative A. No additional direct or indirect impacts on wildlife are expected to occur because of the No Action Alternative.

3.3.2.2 Alternative B – Closure of the Bottom Ash Pond, Construction of Process Water Basin(s) and Permanent Flow Management System

Construction and Operation

Alternative B would result in the construction of an approximately 10-acre Process Water Basin (or two basins equaling approximately 10 acres) on the site of the former Bottom Ash Pond (following removal of all CCR at that location) and the components of the interim flow management system would be made permanent. Construction of the process water basin(s) would also entail the use of several already developed areas as temporary laydown and stockpile areas (Figure 2.1-2). Currently, the areas where these activities would occur are predominantly unvegetated or are covered with grasses and other herbs. The vegetation that does exist within the Project Area consists of small, fragmented areas of low-quality forest habitat, and open habitats of non-native turf grasses, weeds, and other early successional plants. These forest habitats are fragmented and isolated from other forest areas and do not support a wildlife community that is diverse or abundant.

Wildlife habitats that could be altered by Alternative B are limited to very small areas. Direct effects to some individuals may occur if those individuals are immobile during the time of habitat removal. This could be the case if activities took place during breeding/nesting seasons. Habitat removal likely would disperse mobile wildlife into surrounding areas to find new sources of food and shelter and to re-establish territories, potentially resulting in added stress or energy use. If the surrounding areas are already overpopulated, further stress could occur in those individuals presently utilizing these areas as well as in those attempting to relocate. Considering the small number of animals the forest fragments proposed for removal are likely to support and the large size of adjacent, higher-quality, forest fragments, the addition of displaced individuals in adjacent areas is not likely to overpopulate those habitats.

Populations of the six migratory birds of particular conservation concern that have the potential to occur in the project vicinity would not be adversely affected by Alternative B. Although the Bottom Ash Pond and other coal ash ponds in the vicinity currently may be used as low-quality foraging habitat by shorebirds, including the lesser yellowlegs and semipalmated plover, extensive areas of higher-quality foraging habitat exist along the Cumberland River/Old Hickory

Lake such that dewatering of the ponds would not affect shorebird populations. No nesting records of these shorebird species are known from the Project Area or other GAF reservation areas. Construction of the process water basin(s) including any tree removal would not have any direct effects on the Kentucky warbler, prairie warbler, red-headed woodpecker, and wood thrush and there is an abundance of similar or higher-quality habitat in the surrounding landscape. Thus, direct or indirect impacts associated with Alternative B would not have significant adverse impacts on wading bird colonies or other populations of migratory birds.

As discussed above, an osprey nest was observed in November 2018 on a transmission tower located on a point of land approximately 470 feet from the existing barge unloader. The barge unloader is in constant use and apparently did not disturb the ospreys sufficiently to deter them from nesting. Given the tolerance of the ospreys to the barge unloader, the temporary construction activities are unlikely to disturb them sufficiently to cause nest abandonment. However, if this nest were to become active in spring/summer during the period when construction activities would occur within a 660-foot protective buffer zone around the nest, mitigation measures may be required. TVA has a permit from the U.S. Department of Agriculture (USDA) regarding disturbance of ospreys, so USDA would be consulted to determine mitigation actions that may be required, such as potentially shifting the construction schedule to avoid the active nesting season.

Given the limited extent and low quality of the wildlife habitats potentially lost under Alternative B and the few, common species that may be affected, this alternative is not expected to substantially impact wildlife populations in the Project Area. Therefore, direct and indirect impacts on terrestrial wildlife from Alternative B would not be significant.

3.4 Threatened and Endangered Species

3.4.1 Affected Environment

The Endangered Species Act (ESA) provides protection for species of animals and plants that are listed as threatened or endangered in the United States or elsewhere, and specifically outlines procedures (Section 7[a]2) for federal agencies to follow when taking actions that may jeopardize federally listed species or adversely affect their designated critical habitat. Additionally, Section 7(a)1 of the ESA states that federal agencies must seek to conserve endangered and threatened species and use their authorities to further the purposes of the Act. The Project Area includes primarily disturbed land and industrial operating facilities. Small wooded areas and Bottom Ash Pond are in the Project Area. A team of biologists surveyed potential habitats within the Project Area in October 2016, May 2018, and November 2018. Because it was determined by TVA in the Final EA for the BADW Facility (TVA 2017a) that the activities that would occur in this Project Area would have no impact on aquatic ecology, this evaluation of potential impacts on listed species is limited to terrestrial species and aquatic species are not included.

3.4.1.1 Potentially Occurring Terrestrial Species

A review of the TVA Regional Natural Heritage database on July 13, 2018 for recorded occurrences of terrestrial animal species within 3 miles of the Project Area resulted in records for one federally listed species (gray bat), one state-listed species (Allegheny woodrat), and one federally protected species not listed under the ESA (bald eagle) (TVA 2018b).

The USFWS IPaC report for the vicinity of the GAF reservation (USFWS 2018a) indicates that several additional federally listed terrestrial species potentially may occur in the area. These include three threatened or endangered mammals (gray bat, Indiana bat, and northern long-eared bat) and three endangered plants (Braun's rock-cress, leafy prairie-clover, and Spring Creek bladderpod). The federally threatened northern long-eared bat is known to occur in Sumner County, and the federally endangered Indiana bat is thought to occur throughout the state of Tennessee, although records of this species have not yet been reported from Sumner County. Although the northern long-eared bat and Indiana bat have not been recorded within 3 miles of the Project Area, they have been included in this assessment because they have the potential to occur in the area (TVA 2018b). The Allegheny woodrat and bald eagle, which have a state status of deemed in need of management, have been recorded within 3 miles of the Project Area. The streamside salamander, which also has a state status of deemed in need of management, has not been recorded within 3 miles of the Project Area, but it has been recorded in Sumner County (TDEC 2018a). In addition, the TVA Regional Natural Heritage database includes two occurrences of water stitchwort, a state special concern species, in Wilson County south of the Cumberland River. These species and their federal and state status are summarized in Table 3.4-1.

Table 3.4-1. Terrestrial Listed Species and Other Species of Conservation Concern Potentially Occurring and/or with Recorded Occurrences within 3 Miles of GAF

Common Name	Scientific Name	Status (1)	
		Federal	State (Rank) (2)
Mammals			
Gray bat	*Myotis grisescens*	LE	E (S2)
Indiana bat (3)	*Myotis sodalis*	LE	E (S1)
Northern long-eared bat (4)	*Myotis septentrionalis*	LT	(S1S2)
Allegheny wood rat	*Neotoma magister*	--	D (S3)
Birds			
Bald eagle	*Haliaeetus leucocephalus*	DM	D (S3)
Amphibians			
Streamside salamander	*Ambystoma barbouri*	--	D (S2)
Plants			
Braun's rock-cress	*Arabis perstellata*	LE	E (S1)
Leafy prairie-clover	*Dalea foliosa*	LE	E (S2S3)
Spring Creek bladderpod	*Lesquerella perforata*	LE	E (S1)
Water stitchwort	*Stellaria fontinalis*	--	SC (S3)

Sources: TVA 2018b and TDEC 2018a

(1) Status Codes: LE = Listed Endangered; E = Endangered; LT = Listed Threatened; T = Threatened; SC = Special Concern; D = Deemed in need of management; DM = recovered, delisted, and being monitored

(2) State Ranks: S1 = Extremely rare and critically imperiled; S2 = Very rare and imperiled; S3 = Vulnerable; S4 = Apparently secure, but with cause for long-term concern; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)

(3) Federally endangered species that is not yet known from Sumner County but is thought to occur statewide.

(4) Federally threatened species that is not yet known from Sumner County but is thought to occur statewide.

3.4.1.2 Species Descriptions

The species included in Table 3.4-1 are discussed below.

Animals

The primary range for the gray bat is concentrated in the cave regions of Alabama, Arkansas, Kentucky, Missouri, and Tennessee (USFWS 2009). Gray bats roost in caves year-round and migrate between summer and winter roosts during spring and fall. They prefer to forage over water bodies (Brady et al. 1982). The gray bat has been documented in Sumner County. However, the nearest recorded occurrence of a gray bat is from a cave located in Wilson County approximately 1,300 feet across the Cumberland River/Old Hickory Lake from the southern portion of the GAF reservation. This cave has been monitored since 1976, with estimated bat numbers ranging from 0 to 17,000 per survey. The most recent survey was conducted in the summer of 2013 and found an estimate of around 17,000 bats (the most since monitoring began). No caves have been documented in the Project Area, and none were encountered during field investigations. Foraging habitat is available in the stilling ponds, drainage canals, and cooling channel near the Project Area, as well as along the Cumberland River/Old Hickory Lake. Fourteen caves have been recorded within 3 miles of the Project Area. The nearest extant gray bat record is from a cave hibernaculum located approximately 0.5 mile from the Project Area, on the opposite side of the Cumberland River/Old Hickory Lake (TVA 2018b). The13 additional caves are all at least 0.5 mile away from the Project Area and are also located on the Cumberland River/Old Hickory Lake (TVA 2017a).

Indiana bats inhabit caves during winter and migrate to roost under exfoliating bark and within cavities of trees (typically greater than or equal to 5 inches in diameter) during summer. Foraging occurs along riparian areas and along the tops of trees, forested edges, and tree lines. Many habitat requirements of the Indiana bat overlap with those of the northern long-eared bat, which also roosts in caves or cave-like structures in winter and utilizes cave-like structures as well as live and dead trees (typically greater than or equal to 3 inches in diameter) with exfoliating bark and crevices in the summer. The northern long-eared bat is thought to forage primarily within forests below the canopy layer.

No records of Indiana bats are known from Sumner County, Tennessee. The nearest known Indiana bat record is from a maternity colony approximately 16.1 miles southeast of the Project Area in Wilson County, Tennessee. The nearest known record for the northern long-eared bat is from a cave in Sumner County approximately 16.2 miles away. As previously discussed, there are 14 known caves within 3 miles of the Project Area, the closest of which is approximately 0.5 mile away. No other winter roosting habitat is known from the Project Area. Low-quality foraging habitat exists over coal ash ponds in and near the Project Area. Higher-quality foraging habitat exists over the nearby Cumberland River/Old Hickory Lake, as well as over and around trees within the Project Area. Similar of more-suitable vegetative foraging habitat is plentiful in the surrounding area (TVA 2018b).

The Allegheny woodrat has a state status of deemed in need of management but no federal status. It utilizes habitats associated with rock outcroppings, rocky cliffs, talus slopes, and caves, especially when found in a mixed conifer-hardwood forest. The nearest record of the Allegheny woodrat is from a cave approximately 0.5 mile from the Project Area. Thirteen additional caves, which potentially may provide habitat this species, are known within 3 miles of the Project Area. Suitable habitat for this species does not exist within the Project Area (TVA 2018b).

The bald eagle is federally protected under the Bald and Golden Eagle Protection Act and has a state status of deemed in need of management. Bald eagles require for nesting mature trees capable of supporting their massive nests. These trees are usually found adjacent to large bodies of water where they forage for food. The nearest bald eagle nest record location is approximately 0.5 mile from the project footprint. Remnants of this nest were observed in 2009 and 2012, but no bald eagle activity was reported during either of those surveys, and this nest is no longer active. One additional bald eagle nest is known within 3 miles of the Project Area, but this nest had been taken over by an osprey at last observation. Thus, bald eagles currently do not nest in enough proximity to the Project Area to be impacted by the proposed project activities (TVA 2018b).

The streamside salamander has a state status of deemed in need of management but no federal status. In central Tennessee, this salamander occurs in scattered populations in limestone habitats within upland forests close to streams. It is found in streams with limestone bedrock, and not in pools or ditches (TWRA 2018). It prefers to breed in first and second order streams that are seasonally ephemeral, have natural barriers such as waterfalls that prevent the presence of predatory fish, and that have large, flat rocks beneath which eggs are laid (International Union for Conservation of Nature and Natural Resources 2018). The only stream within the Project Area is a small first-order stream within the forested wetland W-1. This stream is approximately 500 feet in length and drains to the west into the Cumberland River/Old Hickory Lake adjacent to the proposed location of the new NPDES Outfall 010. The substrate of this stream is covered in leaves and organic matter and does not include characteristics such as limestone bedrock and large, flat rocks. Thus, suitable habitat for the streamside salamander does not exist within the Project Area, and this species has not been recorded within 3 miles of the Project Area.

Plants

Of the known occurrences of Braun's rock-cress in Tennessee, the closest is a population site near the southern boundary of Wilson County (USFWS 2018b), south of the Cumberland River well beyond 5 miles from the GAF reservation. Braun's rock-cress inhabits limestone bluffs, a habitat not present in the Project Area. Spring Creek bladderpod is known to occur within 3 miles of GAF; however, it has been found only in Wilson County, south of the Cumberland River from GAF. Spring Creek bladderpod inhabits cultivated fields, floodplains, and outcrops, habitats not present in the Project Area. Occurrences of leafy prairie-clover have been reported from Sumner County, but not within 3 miles of GAF. Leafy prairie-clover inhabits rocky washes in glades, habitats not present in the Project Area. Water stitchwort, a state species of special concern, has been recorded south of the Cumberland River in Wilson County, not in Sumner County. Water stitchwort inhabits seeps and limestone creek beds, habitats not present in the Project Area. No endangered, threatened, or rare plants or habitats to support them were observed during site visits. No critical habitat was reported in the IPaC report for the vicinity of the GAF reservation.

3.4.2 Environmental Consequences

3.4.2.1 Alternative A – No Action

Under the No Action Alternative, TVA would not close the Bottom Ash Pond for the purpose of constructing the process water basin(s) and the process water basin(s) would not be constructed. The property where the interim flow management system is located would remain in its current condition with minor maintenance over time as needed; thus, vegetation and habitats in the Project Area likely would remain in their current condition. The Project Area

provides minimal habitat for wildlife, and the adoption of Alternative A would not change that situation. Thus, there would be no impacts to threatened, endangered, or other special status plant or animal species because of the No Action Alternative.

3.4.2.2 Alternative B – Closure of the Bottom Ash Pond, Construction of Process Water Basin(s) and Permanent Flow Management System

Construction and Operation

One federally listed animal species, the gray bat, has recorded occurrences within 3 miles of the Project Area. Any construction or excavation associated with Alternative B would be short-term and would occur across the Cumberland River and greater than 0.5 mile from the closest gray bat cave. No gray bat winter roosting habitat would be impacted by the proposed action. Low-quality foraging habitat for the gray bat, including the open water of the Bottom Ash Pond and the other coal ash ponds, is present within and near the Project Area. The Cumberland River/Old Hickory Lake provides higher-quality foraging habitat adjacent to the Project Area such that removal of the ponds would not affect foraging bats. Several activities potentially associated with the proposed project were addressed in TVA's programmatic consultation with USFWS on routine actions and federally listed bats in accordance with ESA Section 7(a)(2), which was completed in April 2018. For those activities with the potential to affect bats, TVA committed to implementing specific conservation measures. These activities and associated conservation measures are identified on pages 6-11 of the TVA Bat Strategy Project Screening Form. Conservation measures would be reviewed and implemented as required in conjunction with the activities included in Alternative B to prevent or minimize impacts to the gray bat or other listed bat species (TVA 2018b).

No caves or other hibernacula for the gray bat, Indiana bat, or northern long-eared bat exist in the Project Area or would be impacted by the project. Low-quality foraging habitat exists for all three species of bats over open-water areas, including the Bottom Ash Pond within the Project Area and the discharge channel and ash impoundments in the vicinity. Alternative B would result in the Bottom Ash Pond being closed and replaced by a larger process water basin, or two basins, totaling 10 acres. Thus, open-water foraging habitat within the Project Area likely would increase somewhat because of Alternative B. The forest fragments within the Project Area also may offer a small amount of low-quality foraging habitat for the Indiana bat and northern long-eared bat. However, an abundance of higher-quality foraging habitat exists in the surrounding landscape over the larger forested and open areas and the open water of the reservoir. Therefore, implementation of Alternative B is not expected to have a measurable impact on foraging habitat available for the gray bat, Indiana bat, or northern long-eared bat on and near the Project Area, and it is not likely to adversely affect these species.

The small areas of forest in the Project Area were surveyed for potential bat summer roosting habitat in May and November 2018. The surveys identified 14 trees that may provide suitable summer roosting habitat for the Indiana bat and northern long-eared bat (Figure 3.2-1). Five of the potential summer roosting trees in Forest Areas 4 and 5 were previously removed during construction of the interim flow management system. No additional potential bat summer roosting habitat would be removed in the Project Area and Alternative B would not adversely affect the Indiana bat and northern long-eared bat.

Activities associated with the proposed project (including tree removal) were addressed in TVA's programmatic consultation with USFWS on routine actions and federally listed bats in accordance with ESA Section 7(a)(2), completed in April 2018. For those activities with the potential to affect bats, TVA committed to implementing specific conservation measures. These

activities and associated conservation measures are identified on pages 6-11 of the TVA Bat Strategy Project Screening Form and would be reviewed and implemented as required in conjunction with Alternative B (TVA 2018b).

Habitat for the Allegheny woodrat is not present on the Project Area for the proposed action. A cave where this species has been recorded approximately 0.5 mile from the Project Area and 13 additional caves within 3 miles would not be impacted by the proposed action. Suitable habitat for the Allegheny woodrat does not exist within the Project Area. Therefore, the Allegheny woodrat would not be adversely affected by Alternative B (TVA 2018b).

Suitable foraging habitat for the bald eagle exists adjacent to the project site; however, this habitat, the Cumberland River/Old Hickory Lake, will not be adversely affected by Alternative B.

Suitable breeding habitat for the streamside salamander is not provided by the short stream segment present within the Project Area, and this salamander has not been recorded within 3 miles of the Project Area. Therefore, the streamside salamander would not be adversely affected by Alternative B.

Previous construction, operation, and maintenance activities on the GAF reservation have resulted in significant disturbance of natural habitats, and implementation of Alternative B would result in some additional disturbance in the Project Area. Habitats suitable for the three federally listed plant species and one state special concern plant species potentially occurring in the region are not present on or near the Project Area. Therefore, Alternative B would not affect federally or state-listed plants because those species are not present within the Project Area.

3.5 Surface Water and Wastewater

3.5.1 Affected Environment

GAF is located on the northern side of a bend in the Cumberland River between Cumberland River mile (CRM) 240 and 246. This site is in Sumner County, Tennessee and is in the Lower Cumberland- Old Hickory Lake (05130201) 8-digit hydrologic unit code (HUC) watershed. The main plant area is drained by permitted storm water outfalls, WWCs, intermittent streams, the condenser cooling water discharge (Outfall 002), and the intake screen backwash (Outfall 004) along with process water discharges from the intermediate flow management system (Outfall 010), and storm water driven discharges from the ash pond system (Outfall 001).

This portion of the Cumberland River is impounded by Old Hickory Dam (owned and operated by the U.S. Army Corps of Engineers [USACE]) at approximately CRM 216.2. Stream flow varies with rainfall and averages about 21 inches of runoff per year. This equates to approximately 1.5 cubic feet per second (cfs) per square mile of drainage area. Pool elevations (feet above sea level) for CRM 242.5 are:

- Normal Minimum: 442.00
- Normal High: 445.00
- 10 Year Storm: 451.50
- 25 Year Storm: 451.80
- 50 Year Storm: 452.20
- 100 Year Storm: 452.60

Old Hickory Lake is a mainstream storage impoundment on the Cumberland River operated by the USACE. The reservoir contains 22,500 surface acres at an elevation of 445 feet (above sea level) and extends 97.3 river miles. Water level fluctuations are minimal with minimum pool elevation at 442 feet (USACE 2012a).

The surface area and volume of the reservoir at normal minimum and high pool elevations are 19,550 and 22,500 acres, respectively; and 357,000 and 420,000 acre-feet, respectively.

For the period 1957 through 2005, the annual mean flow at Old Hickory Dam was 19,110 cfs, the lowest daily mean was 200 cfs (Nov. 3, 1957); the annual 7-day minimum was 1,070 cfs (Oct. 28, 1969), and 90 percent of the time flow exceeded 5,390 cfs. During 2005, the mean flow was 20,440 cfs and the lowest daily mean flow was 4,270 cfs (USGS 2005).

The USACE maintains water quality monitoring locations above and below GAF at CRMs 245.0 and 241.0, respectively. Parameters monitored are mostly related to eutrophic conditions (dissolved oxygen, temperature, pH, and nutrients), but some data is available for a comprehensive list of parameters including major and minor ions and trace metals. The Cumberland River and its tributaries generally exhibit moderate to high concentrations of calcium and magnesium and a slightly alkaline pH because much of the basin is comprised of limestone and dolomitic bedrock. Total dissolved solids concentrations, a measure of all salts in solution, range from 94 to 173 milligrams per liter (mg/L) in the data retrieved from the USACE monitoring stations between June of 2012 and September of 2015. The metals concentrations at both station locations above and below the GAF facility were evaluated. The metals concentrations were found to display concentrations below the TDEC water quality criteria (WQC), except for thallium, cadmium and one lead reading (upstream of the facility). The thallium and cadmium exception (found at both upstream and downstream locations) are an artifact produced by the method of treating censored data (i.e., values below detection limits set equal to one-half detection limit), and the fact that the thallium and cadmium detection laboratory limits of 0.0005 mg/L exceed the TDEC criterion. These results, however, are due to limitations in testing methods and do not represent true impacts to water quality due to thallium and cadmium concentrations. The one iron concentration that was higher than the WQC was upstream in 2012 and was not assumed to be site related. Please note that when WQC were based on dissolved metals concentrations, that only the dissolved concentration data set was evaluated (USACE 2012-2015).

Intake samples of source water for GAF were collected in October of 2018 and again in February of 2019. These samples displayed similar trends as the USACE data discussed above, with all metals being below WQC, expect for thallium, which were all below detection, due to the sensitivity of the analytical method. Please note that all the samples collected were analyzed for total concentrations and for more information see Table 3.5-1 for constituent details.

Table 3.5-1. In-Stream Mixing Concentrations of Current Operations from Outfall 010

Element	Current Baseline	Current Operations		Water Quality Criteria (2) Conc. (mg/L) @ 100 mg/L hardness
	Intake Conc. (1) (mg/L)	Flow Management Discharge (1) Conc. (mg/L)	Mixing Conc. At Cumberland River 1Q10 (mg/L)	
Antimony	<0.002	<0.002	0.00100	0.0056
Arsenic	<0.002	<0.002	0.00100	0.01
Barium	0.0209	0.11	0.02446	2.0
Beryllium	<0.002	<0.002	0.00100	0.004
Cadmium	<0.001	<0.001	0.00050	0.00025
Chromium	<0.002	<0.002	0.00100	0.1
Copper	<0.002	<0.002	0.00100	0.009
Iron	0.258	<0.1	0.18200	
Lead	<0.002	<0.002	0.00100	0.0025
Mercury	0.00000169	0.000000804	0.00000165	0.00005
Nickel	<0.002	<0.002	0.00100	0.052
Selenium	<0.002	<0.002	0.00100	0.005
Silver	<0.002	<0.002	0.00100	0.0032
Thallium	<0.002	<0.002	0.00100	0.00024
Zinc	<0.025	<0.025	0.01250	0.13

Flow Management Discharge 20.9
1QQ10 River flow 552
Flows taken from NPDES flow schematic 2017 for Permit No. TN0005428 permit renewal
(1) Data was taken from most recent NPDES Permit sampling.
(2) TDEC Criteria, Rule 0400-40-03-.03

Generally, the mainstream Cumberland River exhibits lower suspended solids concentrations than its tributaries. The lower Cumberland watershed tributaries, west of Nashville, are characterized by higher suspended solids concentrations ranging from 300 to 2,000 mg/L. The higher values in the lower Cumberland watershed tributaries are caused in part by differences in soils and rock formation. The Mississippian materials of the lower watershed are generally more erosion-prone than the Ordovician materials of the upper watershed. Topography and land usage also influence the erodibility of the lower Cumberland tributary valleys (TVA 1995).

The Cumberland River from CRM 216.2 to 309.2 (Confluence with Caney Fork River) is classified by TDEC (TDEC 2013) for the following uses:

- Domestic Water Supply
- Industrial Water Supply
- Fish and Aquatic Life
- Recreation
- Livestock Watering and Wildlife
- Irrigation Livestock Watering and Wildlife
- Navigation

Water quality standards or criteria are established for each of these uses with the most stringent associated with domestic water supply and fish and aquatic life. TDEC assesses the status of the streams, rivers, and lakes annually. The project area drains to the Cumberland River (at Old Hickory Reservoir) and its tributaries. To provide a baseline for the proposed project's impacts, both upstream and downstream existing conditions are noted below. Additionally, the federal 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 EPA. The term "303(d) list" refers to the list of impaired and threatened streams and water bodies identified by the state. None of the water features in the project area are listed on the TDEC 303(d) list. However, there are streams in the vicinity (both upstream and downstream) of the project that are listed as impaired.

Upstream tributaries of the project site include Bledsoe Creek and its tributaries. All the off-site streams upstream of the project are classified for fish and aquatic life, recreation, livestock watering, and irrigation. However, portions of Bledsoe Creek in Bledsoe Creek State Park, Old Hickory Wildlife Management Area (WMA), and Cragfront State Historic Area are also designated by the state as exceptional Tennessee Waters (TDEC 2016a). Brunley Branch is listed as impaired for loss of biological integrity because of siltation and alteration of stream-side or littoral vegetation due to pasture grazing (TDEC 2018b). However, the upstream main stem of the Old Hickory Lake/Cumberland River fully supports its designated uses.

In the downstream vicinity of the project area there are several streams that are listed as impaired including, but not limited to: Rankin Branch of Station Camp Creek, which is listed for impairments including alteration of stream-side or littoral vegetation, total phosphorus, and E coli due to pasture grazing, channelization, and discharges from a MS4 area; Town Creek is listed for, total phosphorus, impairments due to loss of biological integrity due to sedimentation/siltation and other anthropogenic habitat alternations caused by discharges from MS4 area, channel erosion and hydromodification; and Dry Fork Branch of Spencer Creek which is listed for loss of biological integrity due to siltation and alteration of stream-side or littoral vegetation due to pasture grazing. Additionally, a biological advisory has been listed for the Cumberland River/Cheatham Lake from Mile 185.7 to 190.6 in the Metro Nashville area, far downstream) from the current proposed project site. This advisory is primarily due to discharges from municipal separate storm sewer system area (TDEC 2019).

Existing Wastewaters

GAF operates a surface water intake structure that withdraws an average of 915.8 million gallons per day (MGD) from the Cumberland River for use as CCW and plant process water (i.e., sluice water, fire protection, boiler feed water and miscellaneous wash water). Outfall 002 discharges to CRM 242.5. The plant's permitted discharges into this stream are once-through cooling water, auxiliary cooling water, and storm water runoff. The current NPDES Permit contains limitations on the condenser cooling water discharge for temperature, total residual oxidants (TRO), and toxicity. TRO and toxicity are only monitored when oxidants are added to the waste stream. This permit also requires reporting of flow, intake temperature and time of chlorination. Approximately 98 percent of the water withdrawal is used for cooling, while approximately 2 percent is used for process water. The withdrawn water is returned to the river after appropriate treatment and is in compliance with GAF's NPDES permit.

There are several existing wastewater streams at GAF permitted under NPDES Number TN0005428 (TDEC 2018c). Because the ash pond discharge (Outfall 001), the new Outfall 010 the condenser cooling water discharge channel (Outfall 002), and the addition to storm water discharges are the primary off-site discharge streams potentially affected by the proposed actions, they will be the focus of discussion. In mid-June 2019 process water discharges began being discharged from the new NPDES Outfall 010. This has reduced the flows from Outfall 001, from approximately 21 MGD to approximately 1.5 - 2 MGD, with now only precipitation driven flows being discharged from the ash pond, based on flow data from June 2019. Outfall 001 discharges to CRM 240.5. The pH of the ash pond discharge generally ranges from 7.05 standard units (s.u.) to 7.71 s.u., based on samples from July 2018 through June 2019. The TSS of the 001 Outfall discharge ranges from 7.6 mg/L to 23.5, with an average concentration of 12.9 mg/L., based on samples from July 2018 through June 2019. Discharge metals concentrations are expected to decrease from this discharge.

Currently most process flows are now being routed through the permanent flow management system and discharged from NPDES Outfall 010. This system provides physical and chemical treatment to the process flows prior to discharge from Outfall 010 to ensure they meet NPDES permit limitations and Tennessee WQC. This system utilizes chemicals to help treat and improve discharge water quality. These chemicals have been evaluated in this discharge to ensure that they will not be detrimental to aquatic organisms and the chemical feeds will not contribute to aquatic toxicity.

Although there is limited data for this new outfall currently the flow fluctuates between 22 and 24 MGD, the pH range so far is 7.99 – 8.12 s.u., and TSS has been seen at 5.8 mg/L. Please see metals data in Table 3.5-1 for additional details.

The current NPDES permit contains two tiers of limitation and reporting of constituents depending on the circumstances of discharge. Tier I covered conditions and includes limitations on the ash pond discharge for pH, oil and grease, total suspended solids (TSS) and toxicity. Tier I also require reporting of twenty-six other constituents including aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, iron, lead, selenium, thallium, molybdenum, mercury, nickel, silver, zinc, sulfate, fluoride, lithium, radium 226 + 228, flow, calcium, and total dissolved solids (TDS). Tier II covers the discharges from Outfalls 001 and 010 after the conversion to lined impoundments and after ash pond dewatering. During Tier II coverage, the reporting parameters mentioned above are the same, however the reporting constituents do not include: sulfate, fluoride, boron, molybdenum, calcium, TDS, and radium 226 and 228. Currently evaluating Tier I conditions for Outfall 001 and Tier II conditions for Outfall 010.

Existing Coal Combustion Residuals (CCR) Solid and Wastewater Streams

As described above, an on-site flow management system receives and treats wastewater effluents and consists of a series of treatment tanks and chemicals, which provides treatment to settle out fine particles, provide pH control, and provide ammonia uptake and other treatment prior to waters being discharged from Outfall 010. An on-site landfill receives dry handled byproducts.

Fly Ash and Dry Flue Gas Desulfurization

GAF currently burns 100 percent powder river basin (PRB) coal. GAF burns between 3.5 and 4.4 million tons of coal annually with total ash production ranging from approximately 174,500 to 292,000 tons of ash per year. The ash is collected as either fly ash, which is fine enough and

light enough to be carried with the flue gas stream exiting the boiler, or as bottom ash, which is coarser and heavier and falls to the bottom of the boiler. Currently all fly ash is mixed together with DFGD byproduct process and the dry commingled DFGD/ash waste is collected in a baghouse and transported to an on-site landfill. The DFGD waste production ranges between 153,000 and 254,000 tons per year but is permitted to produce up to 987,000 tons per year.

There is a potential that GAF could change fuels to burn a higher sulfur blend. The fuel blend expected to produce the most CCR would be a 50/50 blend of PRB and Illinois basin coal. With this blend the coal could average 7 percent ash; therefore, total ash production would average approximately 245,000 to 308,000 tons of ash per year. Fly ash production would be expected to average approximately 196,000 to 246,400 tons per year. Such a change in fuels would not impact GAF's ability to meet its permit limits.

Dry Flue Gas Desulfurization

The DFGD systems are primarily dry systems, except for the use of injection nozzles that require cleaning out several times daily. This system mixes together the fly ash and DFGD solid CCR waste stream together in a baghouse. The nozzle wash out could contain ash, hydrated lime, calcium sulfite, and calcium sulfate. Additionally, other miscellaneous wastewater streams would include sumps, drains, and DFGD wash. The volume of water from this process is a relatively low flow stream with approximately 0.0981 MGD which is routed to the low point sump and then to the interim flow management system for discharge through Outfall 010. Storm water flows from the area are estimated to be 0.0391 MGD.

Bottom Ash

Bottom ash collects in the bottom of the boiler, is washed from the boiler bottoms with jets of water, sluiced to the interim flow management system and is dewatered in tanks, where the bottom ash is removed and disposed of in the on-site landfill. Water is then treated and released from Outfall 010. Bottom ash production currently ranges from 21,000 to 38,500 tons per year. The BADW facility (under construction) along with the flow management system will more efficiently remove bottom ash particles from the sluiced waste stream.

Outfall 010 Discharge Characterization

To characterize the current conditions and changes in the Outfall 010 discharge, an evaluation of in-stream mixing calculations of chemical characteristics was conducted. This can be useful in predicting potential impacts to water quality that may arise from changes in process water quality. This evaluation was based on a worst-case scenario just for evaluation purposes based on a minimum river flow (1Q10 = 678.8 MGD).

Even with that worst-case assumption, the evaluation of the in-stream mixing concentrations show that all the constituents except thallium would meet the TDEC lowest criteria (i.e., the limit equal to minimum of the water quality criteria). The thallium exception is the result from testing methods that can only detect these constituents in concentrations over the TDEC criterion of 0.00024 mg/L. So, these results are due to limitations in testing methods and do not represent true impacts to water quality due to thallium concentrations. The mass balance analysis indicates that the overall impact of current operations does not cause impacts to surface water quality.

3.5.2 Environmental Consequences

3.5.2.1 Alternative A – No Action

Under the No Action Alternative, the Bottom Ash Pond would not be closed for the purpose of constructing the process water basin(s), and the process water basin(s) would not be constructed. TVA would continue to use the interim flow management system until minor permanent modifications are made and it is connected with the BADW facility.

The interim flow management system would be operated to ensure compliance with all TDEC regulations and limits and TN Water Quality criteria. Wastewater treatment chemicals used in the treatment system have been communicated in writing to TDEC and tested to ensure they do not contribute to aquatic toxicity. Current conditions of discharges from process water Outfall 010, are discussed and evaluated above in the affected environment section and are presented in Table 3.5-1. Additionally, the discharge flow from the Outfall 001 would be expected to be even further reduced and would be expected to have only 1 - 2 MGD with reduced discharge loading of metals. This discharge waste stream would be expected in the future to be driven to more closely resemble storm water discharges characteristics. In the future the treatment system may require upgrading as part of meeting effluent limitations guidelines (ELG requirements for bottom ash sluice discharges, by adding recirculation as detailed in the BADW Facility EA (TVA 2017a).

Continued operations at GAF under the No Action Alternative would not be expected to cause any additional direct or indirect effects to local surface water resources and therefore, would not change existing conditions. This system, as with any treatment system, would need to continue to be evaluated to ensure compliance with TDEC NPDES regulations and limits and TN WQC as plant operations change in the future.

3.5.2.2 Alternative B – Closure of the Bottom Ash Pond, Construction of Process Water Basin(s) and Permanent Flow Management System

Surface Water Withdrawal and Discharge Rates

Withdrawal and discharge rates would not change with the implementation of Alternative B. The discharge characteristics (including thermal loading) at Outfall 002 would not be changed by the current project. Raw and potable waters utilized in the bottom ash dewatering process, other process and storm water flows associated with this project would remain at current temperatures; therefore, no additional thermal impacts would be anticipated. Flows that were previously discharged from Outfall 001 are now treated by the interim flow management system and discharged through the newly permitted discharge Outfall 010, as detailed above and as further addressed below.

Flow Management Streams

The wastewater streams that could change under this alternative would be:

- Discharges from the Bottom Ash Pond,
- Discharges from Outfall 001,
- Discharges from newly permitted Outfall 010, and
- Outage washes associated with plant activities and the BADW facility.

Construction

Construction and activities associated with the closure of the Bottom Ash Pond, conversion of the interim flow management system to a permanent system, conversion of conveyance piping, construction of the process water basin and use of laydown and stockpile areas 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. Wastewaters generated during construction of the proposed project may include construction storm water runoff, dewatering of work areas, domestic sewage, non-detergent equipment washings, dust control water, and hydrostatic test discharges.

Surface Runoff

Demolition and construction activities have the potential to temporarily affect surface water via storm water runoff. TVA would comply with appropriate state and federal permit requirements. Demolition and construction activities of the associated project would be located on the plant property. Appropriate BMPs would be followed, and 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 would be required for this project (TDEC 2016b). This permit requires development of a project-specific SWPPP. This plan would identify specific BMPs to address construction-related activities that would be adopted to minimize storm water impacts. Additionally, BMPs, as described in the *Tennessee Erosion and Sediment Control Handbook*, would be used to avoid contamination of surface water in the Project Area (TDEC 2012). Where soil disturbance could occur, the area would be stabilized and vegetated with noninvasive grasses and mulched, as described in the above-mentioned handbook (TDEC 2012). BMPs or equivalent measures would be used to avoid contamination of surface water in the Project Area. Therefore, no significant impacts to surface water would be expected due to surface water runoff from the construction site. Additionally, because this project would not take place in “Waters of the United States” or “Waters of the State of Tennessee” or in regulated adjacent waters, no water quality certification or USACE permit would be required.

Impervious buildings and infrastructure prevent rain from percolating through the soil and result in additional runoff of water and pollutants into storm drains, ditches, and streams. Existing structures and infrastructure would be removed from the project site; however, they would be replaced with lined ponds, tanks and conveyances, which would alter the current storm water flows. Because the site is currently industrialized and partially covered with impervious structures, this construction would increase the impervious surface area, but not significantly. Under this proposed alternative, the concentrated storm water flow from the project area would be taken under consideration by providing for additional storm water detention. Flows would need to be treated with either implementation of the proper BMPs or by diverting the storm water discharges to settling basins for co-treatment.

Domestic Sewage

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

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 TN0005428.

Hydrostatic Testing

The hydrostatic testing discharges would be handled in accordance with NPDES Permit TN0005428 or the TDEC General NPDES Permit for Discharges of Hydrostatic Test Water (TN670000).

With the implementation of appropriate BMPs, no significant impacts to surrounding surface waters are expected from construction activities.

Operations

Existing flows to the Bottom Ash Pond are being routed to the interim flow management system, where removal of solids takes place in addition to other treatment prior to discharge from Outfall 010. The proposed plan to close the Bottom Ash Pond would not take place until the BADW facility and the flow management system are in service and discharging from the new NPDES Outfall 010. Bottom Ash Pond dewatering operations would be in accordance with the current NPDES permit conditions. Ash would be removed from the pond and would be temporarily stockpiled in the existing on-site landfill. The closure of this pond would be integrated into the GAF master strategy for closure of the Ash Pond Complex in accordance with regulatory requirements and agreements with the State, which would be discussed in a subsequent NEPA document.

The main operational change that would take place with the closure of the Bottom Ash Pond is the change in management of the on-site storm water and process waste water that would be treated by the flow management system and BADW facility. After the closure of the Bottom Ash Pond, the construction of process water basin(s) would take place in the former location of the Bottom Ash Pond. The area would be lined with a geosynthetic liner underlain by a clay liner to prevent seepage through the basin. The process water basin(s) would be incorporated into the flow management system and receive treated process flows and provide additional treatment to meet NPDES discharge limits, prior to discharge via Outfall 010 to the Cumberland River at CRM 241.5. The permanent treatment system(s) would be designed and operated to ensure compliance with all TDEC regulations and limits and TN Water Quality Standards. Waste water treatment chemicals used in the treatment system or pond would be communicated in writing to TDEC. In the future this treatment system may require upgrading as part of meeting ELG requirements for bottom ash sluice discharges, by adding recirculation as detailed in the BADW Facility EA (TVA 2017a).

Changing from pond treatment and interim flow management to the proposed permanent wastewater treatment system and process water basin(s) would require replacing the assimilative capacity currently used for treating storm water, low volume waste streams, and station sump discharges with equivalent or greater treatment in the new facilities. After the completion of the proposed process water basin(s) the discharge flows from Outfall 010 may only change marginally from the current discharge flows from Outfall 010. No direct negative impacts to the surface waters would be anticipated from the proposed actions because the discharges would not be expected to change significantly from current discharges and any discharges would be required to meet NPDES limits and Tennessee WQC that are developed to be protective of designated uses.

Discharge Characterization

The major change between current operations with an interim flow management system and the proposed permanent wastewater treatment and process water basin(s) operation, would be the addition of assimilative capacity of the flow management system and process water basin(s) as

an additional treatment. This proposed permanent treatment system and process water basin(s) would change the dynamics of the Outfall 010 outfall discharges by providing additional dewatering, physical/chemical and settling treatment. This proposed implementation of additional wastewater treatment has the potential to not only control pH and TSS concentrations but has the potential to further reduce metals in this wastewater streams as well.

To characterize the current conditions and changes in the Outfall 001 and Outfall 010 discharge, an evaluation of in-stream mixing calculations of chemical characteristics was conducted. These measures are useful in predicting potential impacts to water quality that may result from the changes to the proposed waste streams and treatment.

Results of the surface water mixing analysis under current operations are presented in Table 3.5-1. For the current operations analysis, metals data were collected from the Outfall 010 discharge. This information was used to show current operations with the resultant discharge concentrations after mixing with the receiving stream.

Results of the in-stream mixing concentrations show that all the constituents except thallium currently meet the TDEC lowest criteria (i.e., the limit equal to minimum of the drinking water and aquatic toxicity limits). The thallium exception results from testing methods that can only detect thallium in concentrations over 0.002 mg/L while the TDEC criterion is 0.00024 mg/L. Since no thallium was detected, the mass balance calculation conservatively assumes one-half the detection limit; thus, weighting the calculation with assumed thallium detections of 0.001 mg/L. The conservative use of these assumed values at more than four-times the health-protective TDEC criterion for thallium salts, predisposes the thallium results to exceed TDEC criteria. These results, however, are due to limitations in testing methods and do not represent true impacts to water quality due to thallium concentrations. The analysis indicates that the overall impact of current operations does not cause impacts to surface water quality.

Future metal discharge concentrations for the proposed operation are conservatively represented by current conditions depicted in Table 3.5-1. Although the treatment method and flow configuration would change the discharge concentrations would be treated to ensure that discharges would be below NPDES regulated limitations and TDEC WQC. Thus, current operations would be like future concentrations of in-stream metals below Tennessee WQC, except for thallium as described previously. Additionally, in-stream metals concentrations could be further reduced in the proposed dewatering process, permanent treatment system and process water basin(s) through settling or treatment with waste water treatment chemicals in the dewatering clarifiers. Additionally, the discharge flow from the Outfall 001 would be greatly reduced and would be expected to have only 1-2 MGD with reduced discharge loading of metals. This discharge waste stream, after the proposed changes, would be expected to more closely resemble storm water discharges characteristics.

Consequently, future operations of the permanent flow management system/water treatment and process water basin(s) would be expected to have minor temporary, even potentially beneficial, impacts on the receiving stream. This system, as designed, would not meet future ELG requirements, which calls for no discharge of bottom ash sluice. Any further reductions in discharges required by ELG requirements would need to be achieved by retrofitting this proposed design.

TVA would conduct an operational characterization of the altered and new waste streams to confirm that no significant impacts to the Cumberland River would occur from this action. Additionally, no direct negative (toxic) impacts on the Cumberland River are anticipated

because Outfalls 010 and 001 would be required to meet NPDES chronic toxicity limits. If the operational characterization showed impacts, then mitigation measures, including altered settling times and chemical treatments, would be undertaken to meet requirements ensuring discharges meet NPDES and chronic toxicity limits and not cause an exceedance of in-stream TDEC WQC.

Any discharges into surface waters would comply with all NPDES permit limits. Thus, continued operations at GAF under Alternative B conditions would not be expected to cause any additional direct or indirect effects to local surface water resources.

3.6 Groundwater and Geology

3.6.1 Affected Environment

The Project Area is underlain by Ordovician-, Silurian-, and Devonian-aged rocks of the Interior Low Plateaus Physiographic Province. Rock types are distinctly different from the coastal plain sands of western Tennessee, and elevations are lower than the Appalachian region to the east. The Outer Nashville Basin is composed of a rolling and hilly topography with slightly higher elevations than the surrounding terrain. The region encompasses most of the outer areas of the generally non-cherty Ordovician limestone bedrock. The higher hills and knobs are capped by cherty Mississippian-age formations and some Devonian-age Chattanooga shale, remnants of the Highland Rim. These carbonate rocks, which are primarily limestone with some dolostone, are also the principal aquifers in large areas of Middle Tennessee and are part of the Central Basin aquifer system. The carbonate rock aquifers consist of limestone and minor dolostone, interlayered with confining units of shale and shaley limestone. The middle Ordovician Stones River Group (Carters and Lebanon Limestones) contains the most important carbonate-rock aquifers in the Project Area.

Groundwater is present in fractures within the limestone bedrock. Locally, these fractures may be enlarged due to dissolution of the limestone. Features characteristic of karst development, such as sinkholes, have been observed in specific areas in the vicinity of the GAF reservation, but there does not appear to be a significant groundwater conduit flow beneath the Project Area. The limestone bedrock beneath portions of the Project Area is overlain by variable thicknesses of overburden consisting primarily of residuum derived from weathering of the underlying bedrock. Closer to the river, significant thicknesses of a clay alluvium are present.

Precipitation is the primary source of recharge for the Central Basin aquifer system. Most of the precipitation becomes overland runoff to streams, but some percolates downward through soil to the underlying bedrock. The GAF reservation is located in a karst landscape, but it is not a site that experiences an active sinkhole occurrence interval within the Ash Pond Complex. Based on information obtained, no caves or significant voids have been identified beneath the ash ponds that could be susceptible to a collapse of the ash pond foundation. The Non-Registered Site (NRS) at GAF is not considered a karst area as it has had no documented karst activity and has thick layers of lower permeability alluvial soils overlying the bedrock. The Carters Limestone has been defined as a local aquifer due to permeability enhanced by solution openings, especially at weathered portions of the T-3 bentonite layer (Hanchar 1988). Bentonite zones in the Carters Limestone play a significant role in the hydrology of the Central Basin aquifer system. In areas where the bentonite layers are unbreached, the downward movement of groundwater is restricted. Where the bentonite zones are breached by open joints or intersecting stream valleys, solution openings can form in the underlying limestone (Brahana

and Bradley 1986). At GAF, both conditions exist. In contrast, shale units within the formations typically act as local confining units for groundwater (Brahana and Bradley 1986).

In 1978, divider dikes were constructed within the historical Ash Complex and created the Ash Pond Complex consisting of Ash Pond A, Middle Pond A, Bottom Ash Pond, and Ash Pond E. Historical field investigations indicate the thickness of the native soils above bedrock at the Ash Pond Complex range from approximately 0.3 foot to 45.9 feet with an average thickness of 15.8 feet. The clay thickness at 80 percent of the sampled locations varies in thickness from 2.8 feet to 29.5 feet. The permeability of the clay soils varies from 3.01×10^{-7} centimeters per second to 1.16×10^{-8} centimeters per second (AECOM 2016).

Groundwater in bedrock beneath the Ash Pond Complex generally flows north to a large area of low hydraulic head (hydraulic trough) with groundwater elevations similar to the Cumberland River elevation. Groundwater flows through relatively low permeability clayey overburden horizontally beneath the NRS from east to the south, west, and north toward the river.

3.6.1.1 Groundwater Quality

The groundwater in the carbonate formations in the Central Basin aquifer system is typically of the calcium or calcium-magnesium bicarbonate water type. Groundwater chemistry is controlled primary by dissolution of limestones, dolomites, and gypsum (Hileman and Lee 1993). Water quality conditions can be highly variable, with total dissolved solids varying from under 500 mg/l to over 10,000 mg/l, due to the presence of localized flow systems. Groundwater in the Central Basin is commonly hard and contains hydrogen sulfide gas (Brahana and Bradley 1986).

Groundwater compliance monitoring is performed by TVA at GAF Ash Pond Complex as required under the EPA CCR Rule and state monitoring program. The NRL Landfill is also monitored under state compliance requirements. The groundwater monitoring system at the Ash Pond Complex was installed in 2017 and is a multi-unit system (40 CFR 257.91(d)) designed to monitor the following four CCR surface impoundments: Ash Pond A, Ash Pond E, Middle Pond A, and the Bottom Ash Pond (AECOM 2018).

The Ash Pond Complex multi-unit groundwater monitoring well system contains 23 monitoring wells: 7 background monitoring wells and 16 downgradient monitoring wells. The background monitoring wells represent conditions unaffected by CCR. Four of the wells monitor groundwater conditions in the Lebanon Limestone, and three monitor groundwater in the shallower Carters Limestone. The closest monitoring wells downgradient of the Bottom Ash Pond are GAF-450C, GAF-451C, and GAF-450L. The first detection monitoring event was conducted in October 2017. Low-flow groundwater sampling and analysis activities are conducted in accordance with the sampling and analysis program developed per 40 CFR 257.93 (TVA 2018a).

A Statistically Significant Increase over the Background Upper Prediction Limit was detected for sulfate at GAF-450C and GAF-451L and elevated total dissolved solids were detected in GAF-451C. GAF-450 C and GAF-450L had elevated levels of boron and higher levels of calcium were detected at GAF-450C, GAF 451-C, and GAF-450L (TVA 2018a).

3.6.1.2 Groundwater Use

The Central Basin aquifer system is an important source of drinking water for Middle Tennessee, as it supplies most of the rural domestic wells and many public drinking wells in the Central Basin and surrounding region. Private residential wells are present north of GAF, but none occur near or downgradient from the Project Area. Public water for Sumner County is

supplied by surface water sources (EPA 2012). The Project Area is not within a state-designated Source Water Protection Area.

3.6.2 Environmental Consequences

3.6.2.1 Alternative A – No Action

Under the No Action Alternative, the Bottom Ash Pond would not be closed for the purpose of constructing the process water basin(s), and the process water basin(s) would not be constructed. TVA would continue to use the interim flow management system until minor permanent modifications are made and it is connected with the BADW facility. When the BADW facility is completed, it will operate with the flow management system to treat process water flows and create dry CCR for storage in the approved on-site landfill. The property where the interim flow management system is located would remain in its current condition with minor maintenance over time as needed. Therefore, there would be no changes to the geology and groundwater at GAF beyond those that currently exist from ongoing operations.

3.6.2.2 Alternative B – Closure of the Bottom Ash Pond, Construction of Process Water Basin(s) and Permanent Flow Management System

Construction

The construction of an approximately 10-acre process water basin (or two basins equaling approximately 10 acres) would be on the site of Bottom Ash Pond, which would be closed by removal. Following removal of all CCR, the area would be lined with a geosynthetic liner underlain by a clay liner to prevent seepage through the basin into any groundwater. Closure of the bottom ash pond will meet the requirements of 40 CFR 257.102 and 104.

Conversion of the interim flow management system to a permanent system could require some minor piping changes and realignments. Any excavation that may be required would be shallow (less than about 8 feet deep) and would not be expected to encounter significant groundwater. Groundwater control, if needed, would be limited to short-term dewatering from excavations. Appropriate and applicable BMPs would be used to avoid contamination of groundwater in the Project Area. BMPs would be used to control sediment infiltration from storm water runoff during construction phases of the project. With the use of BMPs, there would be no significant impacts to groundwater or groundwater resources.

Operations

Groundwater near the process water basin(s) would continue to be monitored after construction activities were completed. Routine inspection and maintenance would also ensure that no adverse impacts to groundwater occur. Dewatered bottom ash would be transported by truck directly to the approved on-site landfill where it will be temporarily stockpiled or beneficially reused for appropriate and approved uses. Groundwater at the landfill is monitored in accordance with a permit (IDL #83-0219) issued by TDEC (TVA 2016) and the CCR Rule.

3.7 Wetlands

3.7.1 Affected Environment

Wetlands are those areas inundated by surface water or groundwater such that vegetation adapted to saturated soil conditions is prevalent. Examples include swamps, marshes, bogs, and wet meadows. Wetland fringe areas also are found along the edges of most watercourses and impounded waters, both natural and man-made. Land use/land cover data generated by

EPA in 1999 indicated wetlands make up less than 1 percent of overall land use types in the Cumberland River watershed (TDEC 2007). The GAF reservation is on a large peninsula surrounded on the east, south, and west by Old Hickory Lake, a reservoir of the Cumberland River. Wetlands on the GAF reservation are associated with ash disposal ponds, intermittent/ephemeral streams, reservoir/riverine shoreline, and topographical depressions (vernal pools).

Wetlands within the Project Area initially were identified using National Wetlands Inventory (NWI) maps and aerial photography. Wetland field surveys were conducted in May 2018 in accordance with USACE guidance and procedures (USACE 2012b), which require documentation of hydrophytic vegetation, hydric soils, and wetland hydrology. Broader definitions of wetlands were also considered, including the definition provided in Executive Order (EO) 11990 (Protection of Wetlands), the USFWS definition (Cowardin et al. 1979), and the TVA Environmental Review Procedures definition. Two wetlands totaling 1.617 acres were identified and delineated within the Proposed Project Area (Figure 3.2-1). Table 3.7-1 summarizes the characteristics of these wetlands, including their type/classification, acreage, and jurisdictional status. Only the larger wetland is considered jurisdictional, based on its hydrological connection to the Cumberland River.

Table 3.7-1. Summary of Wetlands Identified in the Project Area

Wetland ID	Wetland Type (1)	Area (acres)	Potential Water of the US or State?
W-1	PFO	1.485	Yes
W-2	PFO/PSS	0.132	No

(1) Cowardin Classification:
PFO = palustrine, forested
PSS = palustrine, scrub-shrub

Construction of NPDES Outfall 010 and the associated conveyance channel disturbed approximately 0.30 acre of Wetland W-1. The location of the polishing tanks, which are part of the interim flow management system were sited so that disturbance of wetland W-2 was avoided (TVA 2018b).

The proposed Project Area also includes the Bottom Ash Pond, an approximately 4-acre, man-made, ash settling pond located in the north-central portion of the Project Area. The Bottom Ash Pond is an industrial pond and is not a water of the United States. The only stream within the Project Area is a small first-order stream within the forested wetland W-1. This stream is approximately 500 feet in length and drains to the west into the Cumberland River/Old Hickory Lake adjacent to the proposed location of the new NPDES Outfall 010.

3.7.2 Environmental Consequences

3.7.2.1 Alternative A – No Action

Under the No Action Alternative, the Project Area where the interim flow management system is located would remain in its current condition with minor maintenance over time as needed. Existing wetlands on or near the Project Area would continue to be influenced by the operation and maintenance of the site and likely would be maintained in their current state. Any changes occurring in the wetlands on or near the Project Area would be the result of other natural or

anthropogenic factors rather than Alternative A. No additional direct and/or indirect impacts on wetlands are expected to occur because of the No Action Alternative.

3.7.2.2 Alternative B – Closure of the Bottom Ash Pond, Construction of Process Water Basin(s) and Permanent Flow Management System

Construction and Operation

As discussed in Section 3.7.1, construction of the conveyance channel for NPDES Outfall 010 disturbed approximately 0.3 acre of Wetland W-1. The proposed Process Water Basin would extend very close to the smaller on-site wetland (Figure 3.2-1). If avoidance of direct impacts to this wetland is not practicable, TVA would pursue Section 404 and Aquatic Resource Alteration permits for the impacts. Mitigation required by both TDEC and USACE would offset wetland impacts to an insignificant level.

The potential for indirect wetland impacts resulting from the construction would be minimized through the implementation of BMPs to prevent erosion and sedimentation. BMPs would be implemented within and around the Project Area to ensure that neither on-site nor off-site wetlands would be impacted by runoff and sedimentation. Thus, Alternative B would not result in indirect impacts to wetlands outside the Project Area. With these measures in place, there would be no adverse impacts to wetlands associated with Alternative B.

3.8 Solid Waste and Hazardous Waste

3.8.1 Affected Environment

Solid waste consists of a broad range of materials that include refuse, sanitary wastes, contaminated environmental media, scrap metals, nonhazardous wastewater treatment plant sludge, nonhazardous air pollution control wastes, various nonhazardous industrial waste (e.g., coal combustion residual) and other materials (solid, liquid, or contained gaseous substances). Subtitle D Resource Conservation and Recovery Act (RCRA) and its implementing regulations establish minimum federal technical standards and guidelines for nonhazardous solid waste management. States are primarily responsible for planning, regulating, implementing, and enforcing 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 the Occupational Safety and Health Administration (OSHA) standards, Emergency Planning and Community Right to Know Act, RCRA, the Comprehensive Environmental Response, Compensation and Liability Act of 1980 and Toxic Substances Control Act.

Existing GAF Waste Production

GAF operates four coal-fired, steam-generating units that burn low-sulfur blend coal (primarily PRB coal), to reduce sulfur dioxide emissions. GAF burns between 3.5 and 4.4 million tons of coal annually with total ash production ranging from approximately 174,500 to 292,000 tons of ash per year. Currently all fly ash is mixed together with DFGD byproduct process and the dry commingled DFGD/ash waste is collected in a baghouse and transported to an on-site landfill. Bottom ash collects in the bottom of the boiler, is washed from the boiler bottoms with jets of water, sluiced to the interim flow management system and is dewatered in tanks, where the

bottom ash is removed and disposed of in the on-site landfill. Water is then treated and released from Outfall 010.

Nonhazardous materials not disposed on-site are taken to the Sumner County solid waste transfer station and then shipped for disposal by Republic Waste Services to the Middle Point Sanitary Landfill in Murfreesboro, Tennessee. This landfill, a Subtitle D landfill with two clay liners and two synthetic liners, opened in September 1997. There are no construction and demolition [Class IV] landfills within Sumner County; however, four such landfills are in nearby counties, including the Southern Services and Central Pike landfills in Davidson County, the Wilson County Landfill, and the Middle Point Landfill (TVA 2017a).

GAF generates a limited quantity of hazardous waste and is considered a small quantity generator of hazardous waste; generating between 100 to 1,000 kilograms hazardous waste per month. Currently generated wastes streams are related to maintenance and testing activities and include small quantities of waste paint, paint chips, solvents, mercury waste, absorbents, solvent-contaminated rags, silver containing wastes from x-ray operations, welding, abrasive wastes, and liquid-filled fuses. Used oils including pump lube oils, gear box oils, vacuum pump oils, used engine and transmission oils from vehicles and heavy equipment, hydraulic oils and cutting oils are also generated from maintenance activities. These used oils are generally recycled.

Limited amounts of universal wastes (batteries, and lamps) are routinely generated from the plant infrastructure and operations. GAF is considered a small quantity handler of universal wastes.

3.8.2 Environmental Consequences

3.8.2.1 Alternative A – No Action

Under Alternative A, no additional hazardous or solid wastes would be generated beyond those from ongoing construction and operational activities at GAF.

3.8.2.2 Alternative B – Closure of the Bottom Ash Pond, Construction of Process Water Basin(s) and Permanent Flow Management System

Construction

Closure of the Bottom Ash Pond would include removal and excavation of visible bottom ash and some soil (approximately 1 foot); followed by transport to the on-site landfill where it would be temporarily stockpiled or beneficially reused for appropriate and approved uses. Construction of the process water basin(s) would include site preparation and construction activities generating typical construction debris along with small volumes of hazardous wastes. Construction activities would also include laydown and stockpile areas along with grading, road modifications, and paving.

TVA would manage all solid wastes generated from construction in accordance with established procedures. Solid wastes generated during construction or uncovered during site preparation activities would be subject to the Solid and Hazardous Waste Rules and Regulations of the State of Tennessee and would be managed as required by the applicable regulations in conformity with TVA's environmental procedures and BMPs. Any soils generated due to grading or excavation would be managed on-site. Facility solid waste construction impacts are expected to be minor.

Prior to any demolition activities that might be required, TVA would notify TDEC in advance as required under the state of Tennessee asbestos regulations. If Regulated Asbestos-Containing Material is identified as present or likely to be encountered during the proposed project, appropriate measures would be taken to abate the asbestos as needed.

Nonhazardous waste generated during site preparation and construction activities would be placed in roll-offs and disposed off-site in a Subtitle C and D landfill in nearby counties, including the Southern Services and Central Pike landfills in Davidson County, the Wilson County Landfill, and the Middle Point Landfill (TVA 2017a). This nonhazardous construction waste would include a limited amount of construction debris including paper, wood, plastic, metal, and other debris.

Hazardous materials used during site preparation and construction may include limited quantities of fuels, lubricating oils, solvents, paints, adhesives, welding material, 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. All wastes would be characterized for appropriate disposal and a permitted third-party waste disposal facility would be used for ultimate disposal of the wastes. Therefore, no significant impacts associated with the use of fuels, oil, lubricants, and the limited quantities of other hazardous materials during construction would be expected.

Operation

Operation of the proposed dewatering system would generate a similar amount of CCR as existing operations. TVA received permit approval from TDEC for disposal of the CCR in the approved on-site landfill on 30 June 2014. This permit allows the disposal of CCR including mill and coal breaker rejects, boiler slag, cinders, and clinker. This permit describes the liner for the permitted disposal facility, from top to bottom, as flexible material, CCR-resistant polymer-treated geosynthetic clay liner, compacted clay, and geological buffer (TDEC 2014).

Limited quantities of used oils would be generated during operation of the proposed system from vacuum pumps, liquid and slurry transfer pumps, gear boxes, compressors and other machinery. Hydraulic oils may also be generated from components of the proposed system and associated equipment. These types of used oil are currently generated by GAF, and the anticipated increase rate of waste generation is not expected to be significant. Used oil is recycled in accordance with applicable regulations and TVA’s procedures.

Hazardous materials would be handled and disposed in accordance with federal, state, and TVA requirements. Limited quantities of hazardous wastes likely generated during the operation of the system may include flocculants, adhesives, paints, paint chips, degreasing solvents, absorbents, solvent-contaminated rags, sandblasting wastes, and abrasive wastes. GAF is expected to remain a small quantity generator of hazardous waste.

Operation of the proposed facility would also generate limited quantities of universal wastes including batteries and lamps. These universal wastes would continue to be managed through TVA BMPs and in accordance with RCRA requirements. GAF is expected to remain a small quantity universal waste handler. Therefore, no significant impacts associated with solid and hazardous waste during operation of Alternative B would be expected.

3.9 Transportation

3.9.1 Affected Environment

GAF is currently served by highway and barge modes of transportation. U.S. Highway 109, a major thoroughfare, is the primary north-south route in the vicinity. State Highway 25/Hartsville Pike runs east-west on the east side of Gallatin and provides a direct connection to Steam Plant Road.

U.S. Highway 109 provides truck and automobile access to GAF from the west via Odoms Bend Road to Steam Plant Road. Steam Plant Road provides direct access to GAF from the east. Odoms Bend Road and Steam Plant Road are both two-lane asphalt roads. Coles Ferry Road, also a two-lane asphalt road, intersects Odoms Bend Road and extends to the north, just west of and parallel to Steam Plant Road toward the City of Gallatin where it veers to the west. Traffic generated by existing operations at GAF is composed of a mix of cars and light duty trucks, as well as medium duty to heavy duty trucks. The 2016 Annual Average Daily Traffic counts and existing levels of service on key roadways in the immediate vicinity of GAF are provided in the Gallatin Fossil Plant Borrow Site EA (TVA 2018a).

3.9.2 Environmental Consequences

3.9.2.1 Alternative A – No Action

Under Alternative A, there would be no changes or impacts to current transportation activities associated with GAF beyond those from ongoing construction and operational activities.

3.9.2.2 Alternative B – Closure of the Bottom Ash Pond, Construction of Process Water Basin(s) and Permanent Flow Management System

Construction and Operation

Alternative B would result in temporary increases of construction traffic. These increases would result from workforce traffic to and from GAF, trucks utilizing internal GAF roadways to transport excavated material from the Bottom Ash Pond for temporary disposition in the on-site landfill, truck transport of equipment and material to and from existing on-site laydown and stockpile areas, and truck traffic to and from the GAF Borrow Site.

The daily workforce during construction activities is expected to be 20-40 full-time workers. Workforce traffic would predominantly consist of a mix of passenger cars and light duty trucks (such as delivery trucks). Assuming one person per commuting vehicle, there would be a daily morning inbound traffic volume of 20-40 vehicles and a daily outbound traffic volume of 20-40 vehicles for a total potential maximum of 80 vehicles per day. Workforce traffic is assumed to be distributed during peak morning period (to the site) and during a peak evening period (away from the site). This traffic volume is expected to disperse into the surrounding road network and have negligible effects on these roads.

Approximately 300,000 cubic yards (yd^3) of bottom ash would need to be excavated from the Bottom Ash Pond and transported to the on-site landfill. In addition to the bottom ash, approximately 100,000 yd^3 of impacted soil material and rock would also need to be excavated from the Bottom Ash Pond. Of the additional excavated soil and rock material, the following breakdown is anticipated:

- Approximately 40,000 yd^3 could potentially be reused as structural fill for the process water basin(s), with the excess soil or rock stockpiled on-site.

- The remaining 60,000 yd^3 would be transported to the on-site landfill for temporary stockpile or beneficial reuse.

Approximately 35,000 yd^3 of additional soil fill above and beyond the 40,000 yd^3 of excavated soil and rock material that could be reused for structural fill would be required to be transported from the GAF Borrow Site.

For on-site hauling of bottom ash and the soil and rock excavation, 25 yd^3 capacity trucks would be used. Transport of these materials from the Bottom Ash Pond to the on-site landfill would use the internal GAF road network and trucks would not use any existing public roads. Transport of the excavated bottom ash would result in approximately 12,000 truckloads or 24,000 total truck trips. Assuming a 1-year duration for the excavation and approximately 210 working days per year the estimated number of truck trips per day would be 114. The transport of the excess soil and rock excavated from the Bottom Ash Pond would result in an additional 2,400 truckloads or 4,800 total truck trips. Using the same 210 working days estimate for this activity, this would equate to approximately 23 truck trips per day.

TVA would transport the excavated soil fill from the off-site borrow site along existing public roads. Depending on the need of individual projects, TVA estimates an average soil use of up to approximately 500 yd^3 per day. Using an average truck capacity of 15 yd^3, this would equate to approximately 34 truckloads of borrow or 68 truck trips along Steam Plant Road during borrow site use (TVA 2018a).

3.10 Noise

3.10.1 Affected Environment

The area surrounding GAF consists, for the most part, of semi-rural, sparsely populated areas along the outer limits of the town of Gallatin, Tennessee. There are some small waterfront subdivisions along the bank of the Cumberland River south of GAF. The closest homes are located approximately 3,500 to 4,000 feet south of GAF. Population density within one mile of GAF is low.

Noise is measured in logarithmic units called decibels (dB). Given that the human ear cannot perceive all pitches or frequencies in the sound range, noise measurements are typically weighted to correspond to the limits of human hearing. This adjusted unit of measure is known as the A-weighted decibel, or the dBA. A-scale weighting reflects the fact that a human ear hears poorly in the lower octave-bands. It emphasizes the noise levels in the higher frequency bands heard more efficiently by the ear and discounts the lower frequency bands.

The equivalent sound level, or L_{eq}, is the constant sound level that conveys the same sound energy as the actual varying instantaneous sounds over a given period. It averages the fluctuating noise heard over a specific period as if it had been a steady sound. The day-night sound level, or L_{dn}, is the 24-hour average noise level with a 10-dBA penalty between 10 p.m. and 7 a.m. to account for the fact that most people are more sensitive to noise while they are sleeping.

The City of Gallatin limits noise emissions to 45 dBA during nighttime hours. The City of Lebanon references OSHA guidelines as suggested noise limits; however, OSHA does not stipulate residential noise limits. Since GAF is not in the city limits of Gallatin or Lebanon, EPA suggested limits are most applicable to the facility. The EPA suggests that noise be limited at

noise-sensitive areas during nighttime hours to a Day-Night Average (L_{dn}) of 55 dBA. Research by the U.S. Air Force has established suggested levels of annoyance experienced by nearby receptors to various background L_{dn} levels (Table 3.10-1).

Table 3.10-1. Estimated Annoyance from Background Noise

L_{dn} (dBA)	Percent Highly Annoyed	Average Community Reaction
75 and above	37%	Very severe
70	25%	Severe
65	15%	Significant
60	9%	Moderate
55 and below	4%	Slight

Source: Federal Interagency Committee on Noise 1992.

Noise levels near GAF typically are well below 55 dBA, with only occasional excursions beyond that level.

Typical noise measurements at residences in a semi-rural setting can average 46 dBA during periods without coal unloading activity. Usually the loudest noises are from cars or farm equipment driving on gravel roads; traffic in this type of area is typically very light. Based on 2009 background noise level measurements made under similar conditions at the Kingston Fossil Plant, noise from ash handling at a power plant along with coal unloading can create average noise levels of 51 dBA near the residences located 1,000 to 2,000 feet away (TVA 2009). Periodically, during construction activities, noise levels can approach approximately 73 dBA near the residences. Overall, the homes experience relatively low noise levels much of the time.

As a part of the construction of the gas desulfurization plant at GAF, AECOM (formerly URS) conducted noise level surveys in response to noise complaints by residents in March 2016 (URS 2016). During the acoustical surveys, detailed notes were kept on the noise sources observed during the measurement period. The significant noise sources identified coming from the Gallatin power plant site were the induced draft fans (through the top of the exhaust stack), and to a much lesser degree, coal handling equipment (bulldozer on the coal pile), vehicle noise, impact noises, and construction activity on the south end of the property (near the Fish Hatchery). The induced draft fans were a consistent noise source when observed, while the other sources tended to be intermittent in nature. Data collected at a residence in Gallatin showed the noise levels ranged from 35 to 37 dBA, which is under the nighttime noise limit for Gallatin; while the noise level at a residence in Lebanon was 50 dBA, which is under the EPA suggested limit. In addition, TVA previously installed noise-reducing baffles to address local residential concerns with the new stack associated with the new gas desulfurization plant.

3.10.2 Environmental Consequences

3.10.2.1 Alternative A – No Action

Under the No Action Alternative, the Bottom Ash Pond would not be closed for the purpose of constructing the process water basin(s), and the process water basin(s) would not be constructed. TVA would continue to use the interim flow management system until minor permanent modifications are made and it is connected with the BADW facility. The Project Area would remain in its current condition with minor maintenance over time as needed. Therefore,

there would be no changes to current noise levels surrounding GAF and no noise related impacts beyond those that currently exist.

3.10.2.2 Alternative B – Closure of the Bottom Ash Pond, Construction of Process Water Basin(s) and Permanent Flow Management System

Construction and Operation

Under Alternative B, construction activities for the closure of the Bottom Ash Pond and construction of the process water basin(s) would last approximately 12 to 18 months. Most of the work would occur during the day on weekdays. Construction activities would result in a minor increase to traffic on roads near the plant, which would result in minor increases in intermittent noise at some nearby residences. During construction, noise would be generated by a variety of construction equipment, including compactors, front loaders, backhoes, graders, and trucks. Due to the temporary nature of construction, and the site's semi-rural location and distance to the nearest receptors (approximately 0.75 mile), noise from construction is expected to cause minor, short-term impacts. Operation of the process water basin and permanent flow management system would result in low noise levels and would be associated with equipment use during operations and maintenance activities. The results of the 2016 URS noise study, which involved much noisier operating equipment and a larger construction project, indicate that no significant noise related impacts are anticipated related to construction or operation of the dewatering facility and related systems. The operation of the additional equipment under this alternative, such as electric pumps should not perceptively change the ambient noise environment and no significant operational noise impacts would occur.

3.11 Socioeconomics and Environmental Justice

3.11.1 Affected Environment

3.11.1.1 Socioeconomics

The 2017 estimated population of Sumner County is 175,730, including 34,495 who live in Gallatin. Wilson County, across the Cumberland River from GAF, had a population of 128,874 (U.S. Census Bureau 2018a). Both counties are part of the Nashville Metropolitan Statistical Area, which includes all counties linked to the Nashville economy. In 2017, total employment in Sumner County was 85,329, and in Wilson County it was 67,948. No single industry dominates employment in Sumner County. In 2017, the two largest employment sectors in Sumner County were retail trade and government and government enterprises, which accounted for 10.8 and 10.4 percent of employment respectively. In Wilson County, retail trade accounted for 13.6 percent of total employment, and government and government enterprises accounted for 8.03 percent (U.S. Bureau of Economic Analysis [BEA] 2018a). In comparison, statewide, 11.1 percent of jobs were in government and 10.4 percent were in retail trade, while nationally, 12.4 percent of jobs were in government and 9.8 were in retail trade. Per capita income in 2017 was $46,998 in Sumner County, or 91 percent of the national average of $51,640. In Wilson County, average income was slightly higher at $47,335, or 91.6 percent of the national average. Statewide, per capita income was 88.1 percent of the national average, at $45,517 (BEA 2018b; BEA 2018c; BEA 2018d; BEA 2018e; and BEA 2018f).

3.11.1.2 Environmental Justice

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Under EO 12898, Environmental Justice, federal agencies identified in that EO are to address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. While EO 12898 does not apply to its actions, TVA assesses environmental justice impacts in its environmental reviews.

GAF is in Sumner County in Census Tract 209.01. Census Tract 301.01 and Census Tract 302.04 in Wilson County are to the east, south, and west across the Cumberland River. Census Tract 209.01, Block Group 1 in Sumner County and Census Tract 301.01, Block Group 1 and Census Tract 302.04, Block Group 2 in Wilson County are identified as the potentially affected area for environmental justice.

Minorities include individuals who identify themselves as members of the following population groups: American Indian or Alaskan Native, Asian, Native Hawaiian or Other Pacific Islander, Black, Hispanic, or two or more races (Council on Environmental Quality [CEQ] 1997). Minorities constitute 14.8 percent of the total population in Sumner County as of 2017 and 14.0 percent in Wilson County (Table 3.11-1). Census Tract 209.01, Block Group 1 has a minority population of 11 percent; Census Tract 301.01, Block Group 1 and Census Tract 302.04, Block Group 2 each have a minority population of 2.5 percent. Census Tract 209.01, Block Group 1 has a lesser proportion of minorities than does Sumner County as a whole. Census Tract 301.01, Block Group 1 and Census Tract 302.04, Block Group 2 have a lesser proportion of minorities than does Wilson County as a whole. The block group minority levels are below the state average of 25.7 percent and less than the national average of 38.5 percent. Therefore, residents of the block groups in the potentially affected area for the GAF site are not considered minority populations.

Table 3.11-1. 2017 Minority Population Data

Area	Total Population	Minority Population	Percent Minority Population
Block Group 1 Census Tract 209.01 (Sumner County)	1,469	162	11.0
Block Group 1 Census Tract 301.01 (Wilson County)	2,429	61	2.5
Block Group 2 Census Tract 302.04 (Wilson County)	5,370	134	2.5
Sumner County	175,730	25,943	14.8
Wilson County	128,874	18,072	14.0
Tennessee	6,597,381	1,698,493	25.7
United States	321,004,407	123,726,618	38.5

Note: 2013-2017 American Community Survey 5-Year Estimates.
Source: U.S. Census Bureau 2018b.

Low-income populations in an affected area are identified based on the annual statistical poverty thresholds from the U.S. Census Bureau (CEQ 1997). The portion of the population in Sumner County that has income below the poverty level as of 2017 is 9.7 percent and in Wilson

County is 9.2 percent (Table 3.11-2). Census Tract 209.01, Block Group 1 has 8.8 percent of the population living below the poverty level. This is below the Sumner County level of 9.7, the state average of 16.7 percent and national level of 14.6 percent. Census Tract 302.04, Block Group 2 has 3.4 percent of the population living below the poverty level. These are below the Wilson County level as well as below the state and the national levels of 16.7 and 14.6 percent, respectively. Census Tract 301.01, Block Group 1 has 9.6 percent of the population living below the poverty level, slightly higher than Wilson County, but well below the state and national levels. Therefore, residents of the block groups near the GAF site are not considered low-income populations.

Table 3.11-2. 2017 Poverty Level Data

Area	Total Population (1)	Persons Below Poverty Level	Percent of Persons Below Poverty Level
Block Group 1 Census Tract 209.01 (Sumner County)	1469	130	8.8
Block Group 1 Census Tract 301.01 (Wilson County)	2429	232	9.6
Block Group 2 Census Tract 302.04 (Wilson County)	5370	180	3.4
Sumner County	173,846	16,911	9.7
Wilson County	127,100	11,712	9.2
Tennessee	6,436,601	1,072,360	16.7
United States	313,048,563	45,650,345	14.6

(1) Population for whom poverty status is determined.
Note: 2013-2017 American Community Survey 5-Year Estimates.
Sources: U.S. Census Bureau 2018c.

3.11.2 Environmental Consequences

3.11.2.1 Alternative A – No Action

There would be no project related changes to population under the No Action Alternative. Current employment trends in the area would likely continue with most of the employment in the existing economic sectors of retail trade and government. There would be no new job creation. Minority and low-income populations in the area would not be impacted. Therefore, no impacts to socioeconomics or to environmental justice would be anticipated under Alternative A.

3.11.2.2 Alternative B – Closure of the Bottom Ash Pond, Construction of Process Water Basin(s) and Permanent Flow Management System

Construction and Operation

All work for the proposed project would be conducted on-site and would create temporary construction jobs for approximately 20 to 40 full-time construction workers over a 12- to 18-month period, adding short-term benefits to the economy of the region. The process water basin(s) and permanent flow management system would be operated by an estimated 1 full-time permanent employee. There would be a temporary increase in employment and income

and the purchase of materials, equipment, and services. This increase would be local or regional, depending on where the workers, goods, and services were obtained. It is likely that some of the construction workforce would be from local or regional sources. A portion could potentially come from out-of-state, temporarily increasing the local population. Also, some materials and services would be purchased locally in the Sumner County and Wilson County area. The direct impact to the economy associated with construction of the process water basin(s) and permanent flow management system would be short-term and beneficial.

Most of the indirect employment and income impacts would be from expenditure of the wages earned by the construction workforce, as well as the local workforce used to provide materials and services. Construction and operation of the process water basin(s) and permanent flow management system would have minor beneficial indirect impacts to short-term employment and income levels in Sumner and Wilson counties as well as the surrounding region.

The environmental justice impact analysis addresses potential disproportionately high and adverse human health or environmental effects of an action on minority and low-income populations. No minority or low-income populations have been identified in the potentially affected area for the GAF. Therefore, no disproportionate impacts to environmental justice populations are expected to occur because of implementation of Alternative B.

3.12 Safety

3.12.1 Affected Environment

GAF is bounded by the Cumberland River to the west, south, and east. The area north of GAF is sparsely populated.

The site is accessible via Steam Plant Road, which may be reached from I-40, by traveling north on Highway 109, then east on Odom's Bend Road, and finally south on Steam Plant Road. The GAF campus is surrounded by a chain link security fence with guarded entrance gates. Additionally, GAF is on a peninsula with a single road, Steam Plant Road, as the only vehicle access point. Population in the immediate area (within approximately 0.75-mile radius) is very sparse, with only a few dwellings in the vicinity. A recreation area and a public boat access area are located north of and adjacent to GAF on Steam Plant Road less than 1 mile from the plant. Prior to 2017, the Gallatin Gun Club operated a shooting range on-site; this lease has been terminated due to internal agency security concerns. In addition, portions of GAF west of Steam Plant Road and south of Pond B are designated wildlife management areas. These have also been closed to public access due to the construction of the approved on-site landfill, further limiting public access to the facility and surrounding area. Public hunting is still permitted on the east side of Steam Plant Road and on both the north and south side of Odom's Bend Road, north of Stilling Pond B. Because activity related to the Proposed Project would take place within the GAF property boundary, health and safety-related impacts to the general population would be insignificant.

Numerous workers and subcontractors work at GAF each day. It is TVA policy that contractors have in place a site-specific health and safety plan prior to conducting construction activities at TVA properties. A health and safety plan would also be required for workers responsible for operating the systems after construction is complete.

3.12.2 Environmental Consequences

3.12.2.1 Alternative A – No Action

Under the No Action Alternative, the Bottom Ash Pond would not be closed for the purpose of constructing the process water basin(s), and the process water basin(s) would not be constructed. TVA would continue to use the interim flow management system until minor permanent modifications are made and it is connected with the BADW facility. The Project Area would remain in its current condition with minor maintenance over time as needed. No changes to current public health and safety concerns associated with GAF are anticipated under this alternative. There would be no additional health and safety impacts to workers and the public under Alternative A.

3.12.2.2 Alternative B – Closure of the Bottom Ash Pond, Construction of Process Water Basin(s) and Permanent Flow Management System

Construction and Operation

Alternative B would involve construction and operation activities to close the Bottom Ash Pond, construct the process water basin(s), and convert the interim flow management system to a permanent system. Construction and operation activities would follow established TVA health and safety policies and procedures along with appropriate BMPs. Public health and safety concerns related to these activities would be minor and would consist primarily of potential incidents with construction and construction traffic to and from the facility. No hazardous materials that might affect human safety are expected to be utilized under this alternative. Therefore, health and safety impacts to workers and the public would be minor. Potential impacts from construction impacts would be temporary.

3.13 Cumulative Impacts

Cumulative impacts are defined in the *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (CEQ 2005) as follows:

> "Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

This section discusses those resources and receptors that could result in perceivable, but insignificant, cumulative impacts from TVA's alternative actions. For the proposed alternative, no substantive cumulative impacts are expected.

3.13.1 On-site activities

3.13.1.1 On-site Landfill

The GAF reservation is currently using the approved on-site landfill for fly ash and scrubber waste dry storage. This use of the landfill would continue in addition to the storage of the dry bottom ash materials. As the landfill is currently in use and all haul roads and associated infrastructure have already been constructed, cumulative impacts from the addition of the dry bottom ash to the waste stream are not anticipated.

3.13.1.2 Bottom Ash Dewatering Facility

In June of 2016, TVA issued a Final Programmatic Environmental Impact Statement (PEIS) that analyzed methods for closing ash impoundments that hold CCR materials at TVA fossil plants. In this document, TVA identified specific screening and evaluation factors to help frame its assessment of ash impoundment closures at additional facilities. A Record of Decision was released in July 2016 that would allow future environmental reviews of CCR impoundment closures to tier from the PEIS. TVA analyzed the potential impacts of constructing a bottom ash dewatering facility at GAF. TVA completed an EA and issued a FONSI for the BADW facility on July 19, 2017 (TVA 2017a). TVA is currently in the process of constructing this facility at GAF. This new facility along with the flow management system will more efficiently remove bottom ash particles from the sluiced waste stream at GAF. Any cumulative impacts incurred would likely be minor, but primarily beneficial.

3.13.1.3 Borrow Site

TVA has developed a borrow site on TVA-owned property near GAF to support ongoing operations and maintenance activities at GAF. The potential environmental impacts of this borrow area were evaluated in the TVA Gallatin Fossil Plant Borrow Site Final EA (TVA 2018a). Current and future actions which may require borrow material may include minor erosion repair, site grading, drainage improvements, ash impoundment closure projects, landfill development projects, access road improvements and other general maintenance projects for existing facilities. When and if such actions are undertaken, they will receive separate NEPA review. As the borrow site is near GAF where the currently proposed action would occur, in an industrial area, cumulative impacts to air quality, noise, transportation, groundwater and surface water are possible, but likely minor.

3.13.2 Federal Activities

3.13.2.1 Old Hickory Powerhouse

There is one Federal Project in the planning stages near the GAF reservation. The USACE is planning on rehabilitating Unit #4 at the Old Hickory Powerhouse. This is a hydroelectric generator located approximately 15 miles west of the GAF reservation on the east side of Hendersonville (USACE 2016). The district completed 90 percent of plans for the project in 2015 to repair the Kaplan turbine runner and rewind and realign the unit to restore full operation. In March 2017, GE /Alstom was awarded a contract to make repairs, with an expected return to service by July 2019 (Hydro Review 2017). Due to the distance, and the proposed construction date of 2018, this project should not contribute to cumulative impacts concurrent with the process water basin construction and operation.

3.13.2.2 Tennessee Wildlife Resources Agency

The Tennessee Wildlife Resources Agency (TWRA) receives federal funding for the operation of fish hatcheries, upgrading fishing piers to accommodate handicapped anglers, renovation and construction of boat ramps, acquisition of stream access sites, evaluation of length limits and stocking success on reservoirs, stream habitat improvement projects, statewide construction and maintenance of fish attractors, and habitat protection (which includes investigating pollution problems and fish population surveys on reservoirs, lakes, and streams). As the GAF is located along a reservoir which has several water access sites in the near proximity – including one on the reservation, it is likely that some of these activities are taking place on or near the GAF. Additionally, the Cumberland River Aquatic Center is located on the GAF reservation. However, as the proposed process basin would be located at the Bottom Ash Pond site, which is already considered industrial in terms of land use, none of these activities is

likely to be impacted by the construction and operation of the process water basin. Federally funded TWRA activities on-site and near the GAF reservation would not contribute to cumulative impacts (TWRA 2016).

3.13.2.3 Tennessee Department of Transportation

Federal funding is also used by the Tennessee Department of Transportation (TDOT) for transportation projects on both federal and state roads. There is one federally funded TDOT project in the GAF reservation area, the State Route (SR) 109 widening project. Currently, this project is underway, and most of the activities in the GAF vicinity are complete. Completed project activities include the Gallatin Bypass, the Cumberland Bridge replacement, the Gallatin Bypass at Portland, and the widening of SR 109 north of I-40 to south of SR 24. The widening of SR 109 from the Cumberland Bridge to the Gallatin Bypass is currently under construction and slated to be complete in 2019. One additional section to the south of the bridge is under construction. No other federally- or state-funded TDOT projects are in the GAF vicinity (TDOT 2018). Depending on the routes chosen for material delivery to GAF for the construction of the process basin, minor cumulative negative impacts to traffic could occur in conjunction with the state road widening project. Minor increases in traffic delays could occur if materials are delivered to the GAF using the section of SR 109 that is currently under construction. Additional delays may be caused by construction workers living in the area travelling to and from the proposed facility site. However, large numbers of additional vehicles are not anticipated, and delays would be temporary and only during construction of the dewatering facility.

3.13.3 Local Projects

The Gallatin area is experiencing rapid growth due to its proximity to Nashville. As a result, there are some local projects which could lead to cumulative impacts. The City of Gallatin has recently acquired 207 acres for a new industrial park. Lots became available in 2012 (Gallatin Economic Development Agency 2016). This industrial park is located to the north of the GAF reservation on Airport Road. If major construction of industrial facilities occurs simultaneously with the construction of the process water basin, minor negative cumulative impacts to transportation could occur. These impacts would only occur during construction however and are not anticipated to be significant.

3.13.4 Private projects

As the Gallatin area is growing rapidly, there are several privately funded developments occurring in the vicinity. The Bradford Company is planning an expansion which will result in an additional 25 jobs at their packaging plant (Tennessee Department of Economic and Community Development 2016). Multiple residential developments are being constructed in Gallatin and Hendersonville. According to local real estate agents, construction cannot keep up with demand for new residential properties. Thousands of homes have either been recently constructed or are under construction in the area (Memphis Daily News 2016). Although these construction projects may cause minor cumulative negative impacts to transportation, impacts would not be considered significant. The residential and industrial construction projects are not near the GAF reservation, and should therefore not result in any significant cumulative impacts as workers and materials would be travelling on different roads.

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CHAPTER 4 - LIST OF PREPARERS

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Involvement: Vegetation

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Involvement: Cumulative Impacts

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Involvement: Aquatics

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Education: MS, Civil Engineering; BS Civil Engineering
Experience: 6 years in floodplains and flood risk, 3 years in river forecasting, 11 years in compliance monitoring
Involvement: Floodplains and Flood Risk

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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

Tennessee Department of Agriculture

Tennessee Department of Transportation

Tennessee Department of Economic and Community Development

Tennessee Wildlife Resources Agency

Tennessee Department of Environment and Conservation

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APPENDIX A

RESPONSE TO COMMENTS

Appendix A – Public and Agency Comments Received on the Draft Supplemental EA and TVA's Response to Comments

INTRODUCTION

A Draft Supplemental Environmental Assessment (SEA) of the proposed Gallatin Fossil Plant (GAF) Bottom Ash Dewatering Facility Permanent Flow Management System was released for public review and comment from September 10 to October 9, 2019. During the public comment period, Tennessee Valley Authority (TVA) held an open house at 5:00 pm on Tuesday, September 24, 2019, at the Gallatin Civic Center located at 210 Albert Gallatin Avenue, Gallatin, Tennessee, 37066. Information and maps were provided on various projects happening at the Gallatin site including the SEA. TVA staff was there to answer questions and assist the public in providing comments.

The Draft SEA was transmitted to various federal, state and local agencies. It was posted on TVA's public National Environmental Policy Act (NEPA) review website. A notice of availability (NOA) including a request for comments on the Draft SEA was distributed with a media advisory in the Nashville and Gallatin areas. Advertisements appeared in the Gallatin News in the month of September informing the public how to participate and provide comments. Comments were accepted via TVA's website, mail, and e-mail.

TVA received comment letters on the Draft EA from the Tennessee Department of Environment and Conservation (TDEC), the U.S. Fish and Wildlife Service (USFWS), and from one private citizen. These comments are included at the end of this appendix. TVA's responses to these comments are provided below.

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

The project as proposed will include the disturbance of more than one acre and will therefore require a NPDES – General Stormwater Construction Permit, as well as a Storm Water Pollution Prevention Plan and Best Management Practices Plan. TDEC acknowledges that this consideration is included in the Draft EA and recommends that it be included in the Final EA.

Response: Thank you for your comment. The consideration for a NPDES – General Stormwater Construction Permit, as well as a Storm Water Pollution Prevention Plan and Best Management Practices Plan, will be included in the Final EA as requested.

TDEC Comment #2: Based on the nature of the proposed action and its alternative, air permitting regulations may require TVA to secure a modification to its existing Title V permit for the facility (Permit # 561209). TDEC encourages TVA to reflect the potential need for a Title V permit amendment in its Final SEA.

Response: TVA submitted a construction permit application for the bottom ash dewatering operation on August 8, 2017. TDEC responded to the submittal on August 17, 2017, stating that the operations described in TVA's application constituted "*insignificant activities or insignificant emissions units*, as defined in Tennessee Comprehensive Rules and Regulations 1200-03-09-.04(5)(a)4." TDEC further stated that the paved and unpaved haul roads associated with the bottom ash dewatering operation were "exempt pursuant to 1200-03-09-.04(5)(f)1 and 2, and not required to be included in the Title V application."

If a revised permit application is required to be submitted to TDEC as a result of the action proposed herein, TVA will follow all requirements in accordance with the Tennessee Air Pollution Control Rule 1200-3-9-.02 and .04.

TDEC Comment #3: TDEC recommends that TVA include discussion in the Final SEA as to how CCR material identified for removal will be handled to prevent any fugitive dust emissions and what best management practices will be implemented to reduce fugitive dust emissions.

Response: On April 17, 2015, the U. S. Environmental Protection Agency (EPA) adopted 40 Code of Federal Regulations (CFR) 257 Subpart D – Standards for the Disposal of Coal Combustion Residuals (CCR) in Landfills and Surface Impoundments [80 FR 21302 (April 17, 2015)]. Section 257.80 requires the owner or operator of a CCR landfill, CCR surface impoundment, or any lateral expansion of a CCR unit to adopt measures that will effectively minimize CCR from becoming airborne at the facility, including CCR fugitive dust originating from CCR units, roads, and other CCR management and material handling activities. In addition to the fugitive dust control requirements listed (source-specific fugitive emissions requirements), TVA must implement additional fugitive dust management practices as part of the GAF CCR compliance program. These measures include:

- Prepare and operate in accordance with a CCR fugitive dust control plan. The plan must identify and describe the CCR fugitive dust control measures the owner or operator will use to minimize CCR from becoming airborne.
- The plan must include procedures to log citizen complaints involving CCR fugitive dust events.
- The owner or operator must periodically assess the effectiveness of the control plan.
- The plan must be certified by a qualified professional engineer.
- The owner or operator must prepare an annual CCR fugitive dust control report that includes a description of the actions taken by the owner or operator to control CCR fugitive dust, a record of all citizen complaints, and a summary of any corrective measures taken.
- The owner or operator must comply with the notification, recordkeeping, and internet requirements specified in Part 257, Subpart D.

A CCR Fugitive Dust Control Plan was prepared for GAF and certified by a registered professional engineer (last amended on December 15, 2017). This plan describes the specific measures that are used to control CCR fugitive dust at GAF. The plan also states that in accordance with the GAF Title V Operating Permit, “there will be no visible fugitive dust emissions leaving the GAF property boundary.” The plan also provides contact information for members of the public to report complaints or concerns related to fugitive dust. The Plan states that upon receipt of a complaint/concern, appropriate personnel will investigate the complaint and implement any required additional dust control measures.

TVA prepared its most recent Annual CCR Fugitive Dust Control Report on December 14, 2018. This report describes the specific measures that have been used to control CCR fugitive dust since submittal of the Fugitive Dust Control Plan. The report also states, “Since the implementation of the Fugitive Dust Control Plan, no complaints and/or concerns have been submitted by the public.”

TDEC Comment #4: TDEC recommends that TVA include information on the method of disposal and management of any trees and related vegetative debris generated from the project area. Further, TDEC encourages TVA to use methods other than open burning whenever possible.

Response: Trees and related vegetative debris within the project area have been turned into mulch for use on site. Any additional vegetative debris that might be generated within the project area would also be handled in a similar fashion.

TDEC Comment #5: TDEC encourages TVA to include discussion relating to the need to complete appropriate notification(s) in advance of any demolition activities as required under the state of Tennessee asbestos regulations and that if Regulated Asbestos-Containing Material is identified as present or likely to be encountered during the proposed project, that appropriate measures be taken to abate the asbestos as needed.

Response: TVA will include the requested reference in the Final SEA. Required asbestos management measures and notifications will be performed as needed.

TDEC Comment #6: Based on review of the Draft SEA there is limited information on the flow capacities of the two alternatives. Flow capacities of the two alternatives have implications on future changes in landfill operating practices and any future landfill expansion permitting, development, and operations. TDEC encourages TVA to include discussion relating to how these two alternatives relate to potential future capacity needs.

Response: The current interim flow management system was designed to meet and treat current and some future GAF process water flows (e.g., flows related to closure of the ash pond complex and future ash dry handling). The system's capacity is dependent on the treatment needs of the wastewaters treated including treatment retention times and units and systems on-line at the site. Capacities and treatment may change as processes change within the plant. The introduction of process water basins would allow for an additional treatment step if needed; however, the interim flow management system is currently meeting required discharge limits and is designed to continue meeting those limits for anticipated future flows. Any landfill process and storm water discharges will be managed to meet appropriate NPDES/Tennessee Stormwater Multi-Sector General Permit (TMSP) discharge limits. Any changes in landfill operating practices for the existing on-site landfill or any future landfill expansion permitting, development, or operations would be addressed through appropriate solid waste permitting processes and resulting changes to process and surface waters would be addressed through modification of the NPDES/TMSP permits to ensure appropriate treatment.

TDEC Comment #7: TDEC recommends that any wastes associated with the proposed action or its alternatives be managed in accordance with the Solid and Hazardous Waste Rules and Regulations of the State of Tennessee. TDEC recommends that the Final SEA reference that any wastes that are generated during the construction process or uncovered during site preparation are subject to the Solid and Hazardous Waste Rules and Regulations of the State of Tennessee.

Response: TVA will include the requested reference in the Final SEA.

TDEC Comment #8: TDEC concurs with TVA that both alternatives are going to require a Construction Stormwater Permit and a Multi-Sector General Stormwater Pollution Prevention Plan and associated best management practices since the project will involve the disturbance of more than one acre of land.

Response: Thank you for your comment.

TDEC Comment #9: On page 3-14, TVA notes that monitoring parameters for thallium and cadmium exceeded TDEC guidelines because the test method had detection limits over the TDEC criterion for each metal. TDEC encourages TVA to include additional discussion and justification in the Final SEA for why this test method was used and why TVA did not use a test method that is more capable of monitoring these parameters relative to the TDEC criterion.

Response: The analytical methods utilized to obtain data are compliant with 40 CFR 136.3 analytical methods and with required reporting levels established by TDEC. Additionally, there are cases in which the in-stream criteria are less than current chemical technological capabilities for analytical detection, which includes thallium and cadmium in this case.

USFWS Comment #1: In accordance with the National Environmental Policy Act, the TVA must consider impacts to federally threatened and endangered species. Additionally, section 7 of the Endangered Species Act of 1973, as amended, requires federal agencies to consult with the Service when an action may affect a federally threatened or endangered species. Therefore, if it is determined that the action may affect a federally listed species, the TVA should initiate consultation with the Service and incorporate avoidance and minimization measures to avoid or reduce adverse effects.

Response: TVA concluded in the SEA that neither Alternative A nor Alternative B would adversely affect any federally threatened or endangered species. However, if the Proposed Action were to change and a new determination was made that the action may affect a federally listed species, TVA would initiate consultation with the USFWS and incorporate avoidance and minimization measures to avoid or reduce adverse effects.

Public Comment #1: When and where are you having the community meetings?

Response: TVA held a public open house on Tuesday, September 24, 2019, at the Gallatin Civic Center. There will not be an additional meeting for this project; however, there will be additional Gallatin meetings early in 2020.
