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PICKWICK LANDING DAM
FIRST UTILITY DISTRICT OF HARDIN COUNTY
RAW WATER INTAKE LINE RELOCATION
FINAL ENVIRONMENTAL ASSESSMENT

Hardin County, Tennessee

Prepared by:
TENNESSEE VALLEY AUTHORITY
Chattanooga, Tennessee

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Symbols, Acronyms, and Abbreviations

APE	Area of Potential Effect
ARAP	Aquatic Resources Alteration Permit
BMPs	Best Management Practices
CCC	Civilian Conservation Corps
CFR	Code of Federal Regulation
EA	Environmental Assessment
EO	Executive Order
ESA	Endangered Species Act
FUDHC	First Utility District of Hardin County
GIS	Geographic Information Systems
HUC	Hydrologic Unit Code
IPaC	Information, Planning, and Consultation (System)
MGD	Million gallons per day
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NPS	National Parks Service
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NWI	USFWS National Wetlands Inventory
PCA	Packaging Corporation of America
SHPO	State Historic Preservation Office
SWPPP	Storm Water Pollution Prevention Plan
TDEC	Tennessee Department of Environmental Conservation
TWRA	Tennessee Wildlife Resources Agency
TVA	Tennessee Valley Authority
THC	Tennessee Historical Commission
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WMA	Wildlife Management Areas

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CHAPTER 1 – PURPOSE AND NEED FOR ACTION

1.1 Introduction and Background

In September 2016, Tennessee Valley Authority (TVA) completed the Pickwick Landing Dam South Embankment Seismic Upgrade Final Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) to document the potential effects of TVA's upgrades to the south embankment of Pickwick Landing Dam to improve performance of the dam during and after a large earthquake. Following the initial EA, changes were made to the design to reduce overall risks to the integrity of the dam during construction and to address construction challenges. TVA then completed a Supplemental EA and FONSI in January 2019, which evaluated the anticipated environmental impacts of the proposed design changes, which were necessary to upgrade the south embankment of Pickwick Landing Dam. This EA follows the two previous documents and addresses the necessary relocation of the First Utility District of Hardin County's (FUDHC) existing raw water intake line near Pickwick Landing Dam.

Construction of the Pickwick Landing Dam south embankment upgrades is currently underway in Hardin County, Tennessee. The upgrades will improve performance of the south embankment and prevent damage to the dam in the event of a large earthquake. The FUDHC has a raw water intake line and screen assembly immediately upstream of the south embankment and within the construction limits of the upstream berm footprint of the Pickwick Landing Dam improvements (Appendix A, Figure A-1; also Exhibit 1-1). The purpose of the project is to relocate the FUDHC intake and screen outside the construction limits of the Pickwick Landing Dam improvements project. The relocation project is necessary to mitigate the risk of damage to the line or intake and to ensure that FUDHC water supply service is not disrupted or impacted during construction. This EA addresses impacts related to the relocation of the raw water intake line including obtaining a permanent easement (as granted to FUDHC by TVA), a Section 26a permit, and a temporary construction license.

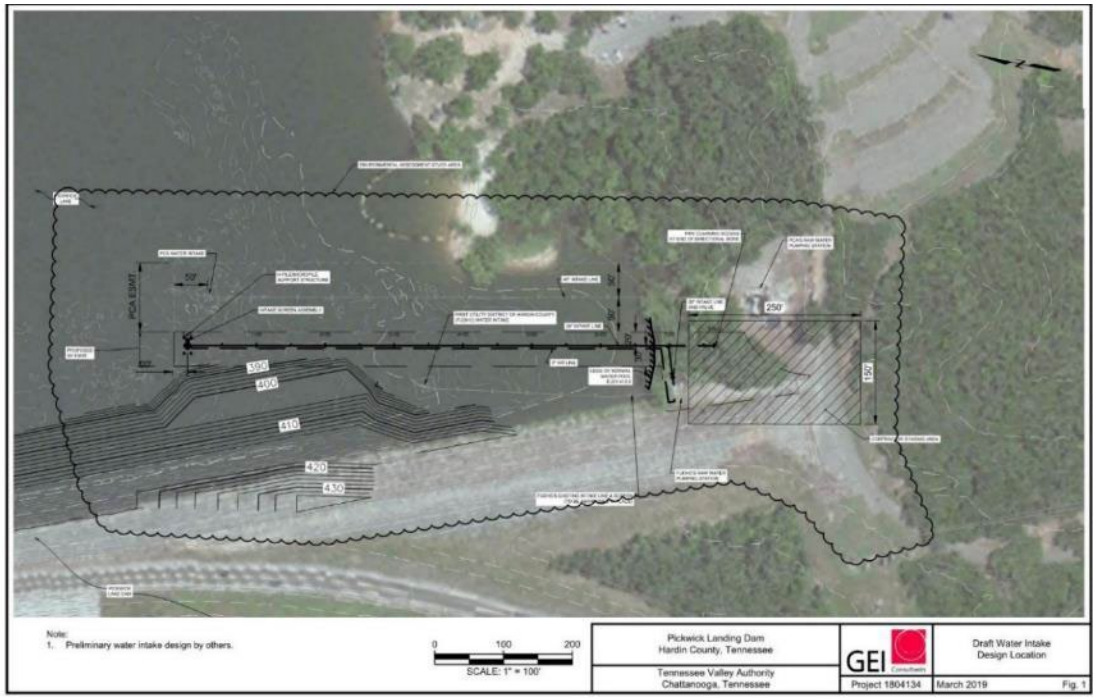

Exhibit 1-1. Proposed Raw Water Intake Location

The Pickwick Landing Dam is a multi-purpose concrete and earthen embankment dam located on the Tennessee River (Mile 206.7) in Hardin County, Tennessee, near Tennessee's border with Mississippi and Alabama. The dam was completed in the 1930s and is a significant producer of hydroelectric power and a vital navigation link on the Tennessee River. In addition to the 3,300-foot-long dam, which extends to the north and two large navigation locks, there is an earthen embankment that extends to the south approximately 4,380 feet. State Highway 128 crosses the entire length of the dam.

The FUDHC was developed to provide drinking water to the community of Counce and residents of the southwestern corner of Hardin County, Tennessee. The Tennessee River is the system's source of raw water. The raw water intake located on the upstream side of Pickwick Landing Dam withdraws water from the river and pumps it to the FUDHC's water treatment plant located nearby at 7439 Highway 57 in Counce, Tennessee. The FUDHC currently serves approximately 2,500 customers. The majority of these customers are residential consumers within the unincorporated area of Hardin County, with significant users including the TVA Pickwick Landing Dam, the Pickwick Landing State Park, the Shiloh National Battlefield Park, and a commercial paper mill.

Much of the water system was installed in the late 1960s when the treatment plant and raw water intake were originally built. The system has expanded over the years to serve a larger area within the southwestern corner of Hardin County. Various projects have been completed in an effort to improve service and meet the water demands within the FUDHC's service area. The existing FUDHC water system consists of a water treatment plant capable of treating 2 million gallons per day (MGD), a raw water intake, approximately 150 miles of water mains, and three water storage tanks.

An interagency agreement has been established between TVA and FUDHC. Although the relocation effort will be funded by TVA, all work will be implemented by FUDHC. TVA has developed this EA to consider the potential environmental impacts associated with the relocation of the FUDHC's raw water intake line, in fulfillment of responsibilities as a federal entity under the National Environmental Policy Act (NEPA), and to obtain a permanent easement (as granted to FUDHC by TVA), Section 26a permit, and temporary construction license.

1.2 Decision to be Made

The decision to be made is whether to approve or disapprove the proposed FUDHC raw water intake line relocation project and grant FUDHC a permanent easement, a Section 26a permit, and a temporary construction license within Pickwick Reservoir. Additional details of the proposed activities are provided in Section 2.1.2.

1.3 Scope of the Environmental Assessment

Pursuant to NEPA and the implementing regulations promulgated by the Council on Environmental Quality (CEQ) 40 Code of Federal Regulations [CFR] 1500–1508), federal agencies are required to evaluate the potential environmental impacts of any proposals for major federal actions. TVA has prepared this EA to assess the potential consequences of FUDHC's Proposed Action Alternatives on the environment and human health in accordance with NEPA requirements and TVA's guidelines for implementing NEPA requirements (TVA 1983).

This EA describes the existing environment within the Study Area, analyzes potential environmental and social impacts associated with the Proposed Action Alternatives and the No Action Alternative, and characterizes indirect and cumulative impacts that could result from the proposed project.

The project Study Area includes the areas along and adjacent to the FUDHC's existing raw water intake line (Appendix A, Figure 2). Under FUDHC's Preferred Alternative, there would also be an area needed for construction equipment and staging of materials in support of construction activities. The Study Area for the project encompasses approximately 13.35 acres to the east of Pickwick Landing Dam. Within the Study Area footprint, approximately 0.86 acres is proposed to be impacted by construction and 1.21 acres of new permanent easement would be associated with FUDHC's proposed raw water intake line relocation. Although most actions and environmental impacts associated with the proposed project would occur within the Study Area, the area of potential impacts to certain environmental resources is broader than the Study Area's boundaries.

This EA consists of seven chapters discussing the Proposed Action Alternatives, environmental resources potentially affected by the alternatives, and analyses of impacts. The structure of the EA is outlined below:

- **Chapter 1:** Describes the purpose and need for the project, the decision to be made, related environmental reviews and consultation requirements, necessary permits or licenses, and the EA overview.

- **Chapter 2:** Describes the No Action and Action Alternatives, provides a comparison of alternatives, and identifies the Preferred Alternative.

- **Chapter 3:** Discusses the affected environment within the Study Area.

- **Chapter 4:** Discusses the potential direct, indirect, and cumulative impacts on environmental resources caused by the No Action and Action Alternatives. Mitigation measures also are proposed, as appropriate.

- **Chapters 5, 6, and 7:** Contain the list of preparers of this EA, the list of EA recipients, and the literature cited in preparation of this EA, respectively.

TVA expects that most of the resources reviewed in the EA would only be minimally affected by FUDHC's proposed project; thus, the EA analyses of these resources are concise. The *primary* environmental issues related to these resources include:

- Clearing of wooded areas (approximately 0.35 acres);

- Impacts to water supplies and water quality;

- Noise impacts;

- Impacts due to construction traffic; and

- Recreation (recreational boaters could be impacted).

Most actions associated with the proposed project are minor and would occur between FUDHC's existing raw water intake and Packaging Corporation of America's (PCA) existing raw water intake; therefore, impacts to resources are anticipated to be minimal.

1.4 Necessary Permits or Licenses

FUDHC would secure any permits necessary to undertake the Proposed Action Alternative. All permits would be held by FUDHC. Permits or licenses that would be required are described below.

1.4.1 Section 26a Permit

In compliance with the TVA Act, a Section 26a Permit is required for obstructions across, along, or in the Tennessee River, TVA reservoirs, and stream reaches downstream of TVA dams. Obstructions are those construction projects that affect navigation, flood control, or public lands on the Tennessee River or its tributaries. Section 26a Permit conditions would include standard best management practices (BMPs) used during construction. Additionally, if the reservoir level falls below the elevation of the water intake, the applicant (FUDHC) would be responsible for finding another source of raw water.

Some of the conditions that TVA will set for the 26a permit are:

- The permit will have a specific expiration date.
- The permit will have a maximum allowable withdrawal volume (peak day withdrawal in million gallons/day).
- The permit holder (Hardin County) will be required to report annual water usage to TVA by March 1 of each year.

1.4.2 General Construction Permit

A Tennessee Department of Environmental Conservation (TDEC) Construction General Stormwater Permit would be needed if more than 1 acre is disturbed. This permit also requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP).

1.4.3 Permanent Easement

FUDHC requests that TVA grant 1.21 acres of new permanent easement within Pickwick Reservoir for the proposed raw water intake line relocation adjacent to the existing PCA easement.

1.4.4 Aquatic Resource Alteration Permit (ARAP) Section 401 Water Quality Certification

In compliance with Section 401 of the Clean Water Act (CWA), an Aquatic Resource Alteration Permit (ARAP) Section 401 Water Quality Certification would be coordinated through the TDEC Division of Water Resources for the proposed discharge of fill material and dredging in open waters.

1.4.5 Section 10 River and Harbors Act / Section 404 Clean Water Act Permit

The U.S. Army Corps of Engineers (USACE) is the regulatory authority for dredge and fill activities in navigable and jurisdictional waters of the U.S, including wetlands pursuant to

Section 10 of the Rivers and Harbor Act and Section 404 of the CWA. FUDHC would coordinate with the USACE to obtain these authorizations.

1.4.6 Consultation Requirements

1.4.6.1 National Historic Preservation Act

Consultation with the State Historic Preservation Officer (SHPO) at the Tennessee Historical Commission (THC) on potential impacts to Tennessee historic and archaeological sites is required under Section 106 of the National Historic Preservation Act (NHPA). In addition, TVA must consult with interested federally recognized Indian tribes on the impact areas that may be of religious and cultural significance.

1.4.6.2 Executive Order 11988 (Floodplain Management)

Consistent with Executive Order (EO) 11988 (Floodplain Management), TVA would analyze the proposed project using the hydraulic model in the effective Flood Insurance Study to determine whether the Base Flood Elevation of the Tennessee River would increase as a result of the project. Based upon the outcome of the hydraulic analyses, TVA would either document that the project would not cause a rise in flood elevations, or TVA would begin coordination of the Letter of Map Revisions with the Hardin County Floodplain Administrator.

1.5 Public Outreach

Because of the interest in the local community and the potential risk for a temporary loss of water supply to the public, the Draft EA was released to the public for a 30-day comment period. The Draft EA was posted on the TVA website and notices of its availability and requests for comments were sent to government agencies, organizations, and interested individuals. TVA also announced its availability and request comments in a press release and via local media.

Six comments were received during the Draft EA comment period. Those comments have been incorporated in this document and can be found in Appendix D.

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CHAPTER 2 – ALTERNATIVES

Three alternatives are under consideration: the No Action Alternative; Alternative B, which would involve directionally boring the relocated intake; and Alternative C, which would involve conventional excavation and using pipe supports for the relocated intake. Below are descriptions of each alternative under consideration, a table comparing the alternatives, and the identified Preferred Alternative.

2.1 Description of Alternatives

2.1.1 Alternative A – No Action Alternative

Under the No Action Alternative, the FUDHC would not relocate the raw water line from the construction limits of the TVA improvements and the line would remain in place, an easement would not be granted, a 26a permit would not be issued, and a temporary construction license would not be needed. If the existing line is damaged during construction, the FUDHC would not have a reliable water supply for 2,500 residential and industrial customers. The FUDHC has a single water intake line. Without a reliable water supply source, the FUDHC would need to purchase water from other systems until repairs to the line could be made or the line could be relocated. Repairs or relocations could result in limited water availability and delays as a result of permits, right of way, or construction activities. Additionally, connections to other systems may not provide the capacity to meet Hardin County's needs. For these reasons, the No Action Alternative does not meet the purpose and need of the project.

2.1.2 Alternative B – Action Alternative – Directionally Bored Intake Line

Under this alternative, TVA would grant FUDHC a permanent easement lying parallel and contiguous with the PCA 1.91-acre intake line easement within Pickwick Reservoir. A Section 26a permit and temporary construction license would also be issued. The proposed installation method would be to directionally bore a new 30-inch intake line underground from a point on land above the summer pool elevation and into the lake near the north boundary of the proposed easement west of PCA's intake structure. A stainless steel intake screen and associated piping would be connected to the end of the 30-inch intake line. The intake screen and piping assembly would be supported on a structural steel assembly supported by H-piles or micro piles driven into the overburden of the lake bottom.

A 3-inch airline would be laid from the pump station to the intake screen assembly to provide means for removing sediment and debris from the intake screen slots using an air burst cleaning system. The airline would be installed in a shallow trench along the bottom of the lake and weighted down with suitable collars to prevent floatation. The intake screen, support system, and 3-inch airline would be constructed using divers and applicable construction equipment on portable barges.

A flanged access connection assembly is proposed at each end of the directionally bored pipe. The existing intake line and screen assembly would be abandoned in place following completion of the new intake line and screen assembly.

All earth and sediment displaced from the lake bottom by construction activities, including the directional boring, would be redistributed under the influence of gravity within the confines of the lake and not removed from the lake.

2.1.3 Alternative C – Action Alternative – Conventionally Excavated Intake Line

Under this alternative, TVA would permit and grant FUDHC a permanent easement lying parallel and contiguous with the PCA 1.91-acre intake line easement within Pickwick Reservoir. A Section 26a permit and temporary construction license would also be issued. The proposed installation method of a new line and screen would be a combination of construction techniques including both conventional excavation and supporting the remaining pipe segments on structural steel cross members supported by H-piles or micro piles driven into the overburden of the lake bottom. The existing intake line and screen assembly would be abandoned in place following completion of the new intake line and screen assembly.

All earth and sediment displaced from the lake bottom by construction activities, including the directional boring, would be redistributed under the influence of gravity within the confines of the lake and not removed from the lake.

2.1.4 Alternatives Considered but Eliminated From Further Discussion

An additional alternative considered was connecting the existing line to a new intake line and relocating the screen assembly. Due to the potential for construction-related problems or delays during connection, limiting the FUDHC's ability to supply water to its customers, this alternative was rejected.

2.2 Comparison of Alternatives

Table 2-1 compares the environmental consequences of the No Action Alternative with both Proposed Action Alternatives B and C.

Table 2-1. Summary and Comparison of Alternatives by Resource Area

Resource Area	Impacts From No Action Alternative	Impacts From Proposed Action Alternatives B and C
Geology and Soils	No direct or indirect impacts.	No changes related to geology are anticipated. Minimal impacts to soils during construction, boring, and installation of the air burst pipe are likely. Any excess soils generated by installation of the air burst pipe would be redistributed on the lake bottom. Sediment and erosion control devices and BMPs would be used during construction.
Floodplains	No direct or indirect impacts. The 100-year floodplain would remain unchanged because there would be no changes to the existing floodplain.	The 30-inch raw water intake would be located within the 100-year floodplain and floodway of the Tennessee River. The intake would be located on the bottom of the reservoir and the floodway is over one mile wide at this location. Therefore, the 30-inch-diameter intake line is not anticipated to increase flood elevations or create an obstruction in the floodway.

Resource Area	Impacts From No Action Alternative	Impacts From Proposed Action Alternatives B and C
Groundwater and Surface Water	No direct or indirect impacts.	Minimal impacts to groundwater are anticipated as BMPs would be used to avoid hazardous materials to reach groundwater. Sediment and erosion control BMPs would be installed and maintained to minimize direct impacts to surface waters. Temporary minor impacts would be expected.
Water Supply	A No Action Alternative would potentially impact FUDHC's existing raw water intake due to construction of the Pickwick Landing Dam seismic upgrades, potentially impacting the water supply for the FUDHC's customers.	Construction of the proposed upgrades should have no impacts to the amount of water available for either water supply. The only change would be the location of withdrawal of the raw water from Pickwick Reservoir for FUDHC. The PCA existing water supply intake would receive minimal if any impacts with BMPs installed for turbidity during construction.
Wetlands	No direct or indirect impacts.	There are no wetlands present within the proposed project footprint; therefore there will be no impacts to wetlands.
Aquatic Ecology	No direct or indirect impacts	Alternative B - Direct impacts to aquatic ecology in Pickwick Reservoir are not anticipated. Temporary indirect impacts may be associated with increased suspended sediment from construction activities in the adjacent uplands. BMPs would be used during construction to prevent silt and sediment from entering the reservoir and reduce the potential for cumulative impacts to aquatic species. Alternative C - Under this alternative, the new intake will be installed via conventional excavation. Direct impacts to the reservoir bottom would occur from the excavated trench and supporting piles. All sediment excavated from the reservoir bottom would be redistributed within the confines of the reservoir resulting in a temporary increase in suspended solids. BMPs such as floating silt screens, would be implemented to minimize the effect

Resource Area	Impacts From No Action Alternative	Impacts From Proposed Action Alternatives B and C
		of siltation. Impacts to the aquatic ecology within the Study Area would be temporary and expected to return to pre-work activities once the project is complete.
Terrestrial Wildlife and Terrestrial Vegetation	No direct or indirect impacts.	Approximately 0.35 acres of Oak-Hickory-Pine forest will be impacted for the proposed contractor staging area, bore pit, and easements. Minor impacts to wildlife are anticipated as existing populations would disperse to habitats in surrounding areas.
Threatened and Endangered Species	No direct or indirect impacts.	No occurrences of threatened or endangered species are known to exist within the Study Area. Bald eagle foraging habitat exists in Pickwick Reservoir. BMPs would be used to minimize impacts (e.g., sedimentation) in the reservoir. Actions are in compliance with the National Bald Eagle Management Guidelines. With the use of BMPs, bald eagles would not be significantly impacted by the Proposed Action Alternatives. Bat foraging habitat is present within forested sections and Pickwick Reservoir. Associated conservation measures will be reviewed/implemented as part of the proposed project.
Natural Areas, Parks, and Recreation	No direct or indirect impacts.	Minimal impacts related to noise are anticipated to occur at Pickwick Landing State Park. No lake level related impacts to recreation are anticipated as lake levels would operate as they currently do and waters would not be drawn down. Fishing and boat access would be temporarily closed for the duration of the project.
Air Quality	No direct or indirect impacts.	Implementation of the proposed project will result in minor impacts to air quality by temporary increased levels of dust and particulate matter air emissions from construction activities and transportation of materials to the site. FUDHC's would implement

Resource Area	Impacts From No Action Alternative	Impacts From Proposed Action Alternatives B and C
		BMPs to address air quality during construction through implementation of control measures such as dust suppression.
Transportation	No direct or indirect impacts.	Roadways would be impacted temporarily with increased truck traffic hauling materials and equipment to the site for construction. Flaggers would be utilized to avoid conflicts between construction and local traffic.
Utilities	A No Action Alternative would potentially impact FUDHC's existing raw water intake due to construction of the Pickwick Landing Dam seismic upgrades, potentially impacting the water supply for the FUDHC's customers.	Temporary impacts to water intakes due to turbidity from construction. BMPs would be used to minimize impacts. No impacts would occur to hydropower generation.
Solid Waste	No direct or indirect impacts.	Construction associated with either proposed action alternative would generate nonhazardous waste. BMPs would be implemented throughout construction to minimize impacts from potential spills.
Socioeconomic Conditions and Environmental Justice	No direct or indirect impacts; however, damage to the existing line for the implementation of the Pickwick Landing Dam improvements project may result in the loss of water supply to the FUDHC that would directly affect customers in the surrounding region.	No direct or indirect impacts would occur related to environmental justice for the Proposed Action Alternatives. There would be a potential increase in employment during construction.
Cultural Resources	No direct or indirect impacts.	The entire archaeological area of potential effects has been previously disturbed by multiple construction projects. No adverse effects to historic properties or cultural resources are anticipated.
Noise Levels	No direct or indirect impacts.	Minimal temporary impacts to noise levels would occur during construction.

2.3 The Preferred Alternative

Alternative B is identified as the Preferred Alternative. Under this Alternative, the FUDHC would relocate their raw water intake line and screen out of the construction area for the Pickwick Landing Dam south embankment improvement project. TVA would grant a permanent easement, issue a Section 26a permit, and issue a temporary construction license for the relocated intake. The new intake line would be installed by directional boring. Directional boring will reduce impacts to the lake bottom and limit turbidity in the water column that could negatively affect water quality and aquatic species as compared to installation using conventional excavation construction methods.

2.4 Identification of Mitigation Measures

Mitigation measures are discussed by resource in Chapter 4. In addition to the requirements of any necessary permits, FUDHC would implement the following mitigation measures to avoid, minimize, or mitigate potential adverse impacts on the environment. All applicable permits would be acquired; therefore, associated permit-related mitigation measures and BMPs would be implemented to further minimize impacts.

- Erosion controls and other BMPs to reduce storm water runoff would be implemented, in accordance with a SWPPP developed in coordination with TDEC. All erosion and sediment controls would be installed, placed, implemented, or constructed in accordance with the provisions of the Tennessee Erosion and Sediment Control Handbook.

- To address impacts to reservoir surface waters, floating silt barriers/turbidity curtains would be placed in reservoir waters adjacent to the construction area to contain turbidity during construction. FUDHC or contractor personnel would conduct regular sampling of adjacent waters and continual visual inspections of waters to monitor for turbidity. Additional measures would be considered if necessary to control turbidity, including the use of flocculants (after the coordination and approval from TDEC).

- Water quality protection measures would be implemented (e.g., water quality monitoring during construction).

- To comply with EO 13112 (Invasive Species), disturbed areas would be revegetated with native species to avoid the introduction or spread of invasive species.

- Navigation notices concerning construction activities adjacent to the dam's navigational lock would be issued; navigation markers would be placed in the areas of the intake screen in the reservoir to denote boating hazards.

- Fill material would be clean and free of contaminants.

- Prior to mobilization, FUDHC would develop an evacuation plan to relocate flood-damageable, loose, or valuable equipment out of the floodplain during potential flood events.

CHAPTER 3 – AFFECTED ENVIRONMENT

This chapter describes the Study Area's existing physical, biological, and cultural resources. The Study Area for the project encompasses approximately 13.35 acres to the east of the south embankment along Pickwick Landing Dam, in Hardin County, Tennessee. The Study Area consists of 6.99 acres of open water (Pickwick Reservoir) and the remaining areas consist of the reservoir shoreline, Pickwick Landing Dam berm, the existing FUDHC and PCA Raw Water Pumping Stations, and adjacent forested areas (Appendix A, Figure A-2).

As presented in Chapter 2, TVA has evaluated the Proposed Action Alternatives and determined that certain environmental resources would not be permanently affected due to the proposed activities. Resources that could potentially be affected by the Preferred Alternative, should BMPs not be implemented throughout construction, are considered further in this EA. TVA expects that most of the potentially affected resources would only be minimally affected by the proposed project, and thus, the EA analyses of these resources are concise. Most of the activities would occur in adjacent uplands within the approximate 0.86-acre temporary staging area and within the proposed 1.21-acre FUDHC permanent easement. The information presented in this chapter establishes the baseline conditions against which comparisons can be made from the potential effects of the alternatives under consideration.

3.1 Physical Environment

The Study Area is located within the Southeastern Plains and Hills Level IV Ecoregion with elevations ranging from approximately 390 to 440 feet above mean sea level (ft. MSL) (Appendix A, Figure A-3). This ecoregion is characterized by dissected irregular plains and some low hills with broad tops that have a mosaic of cropland, woodland, and forest. Natural vegetation consists of oak-hickory, oak-hickory-pine, and some bottomland hardwoods. Streams in this region have relatively low to moderate gradients and are sandy-bottomed with fairly wide bottoms having broad, undulating terraces (Griffith et al. 1998).

The Study Area contains deciduous, evergreen, and mixed forested areas; forested wetlands; and open areas. Additional surrounding land uses include recreational and light industrial/commercial areas.

3.1.1 Geology

The Study Area is located within the East Gulf Coastal Plain section of the Coastal Plain physiographic province of the Atlantic Plain division, along the western border of the Interior Low Plateaus province (NPS 2017). In the contiguous U.S., the Coastal Plain physiographic province extends between coastal Texas and Cape Cod, Massachusetts, spanning approximately 2,200 miles. The Coastal Plain does not extend far inland except where it stretches into southwestern Kentucky and southeastern Missouri. Sediments within the East Gulf Coastal Plain date to the Tertiary Period (LandScope America 2019a; NPS 2019). The landscape of the East Gulf Coastal Plain varies greatly in topography from rolling hills near the Appalachian Mountains to the flat, sandy, coastal regions near the Gulf of Mexico, and generally slopes seaward in a series of terraces.

The Study Area borders the Western Highland Rim section of the Interior Low Plateaus province. The Interior Low Plateaus extend from northern Alabama north through central Tennessee and Kentucky into southern Illinois, Indiana, and Ohio, spanning approximately

74,000 square miles (LandScope America 2019b). The Western Highland Rim is underlain by carbonate bedrock of the Mississippian Period (Brahana et al. 1986a).

Being located along the border of the Coastal Plain and Interior Plateaus, topography within the Study Area reflects the range of topography observed throughout both provinces. Cretaceous-age Coastal Plain deposits of silt, sand, clay, and gravel overlie the older limestone, shale, and chert bedrock (Griffith et al. 1998). However, many streams in this transition area between physiographic provinces have incised into the Mississippian, Devonian, and Silurian-age bedrock and may look similar to those of the Interior Plateau.

3.1.2 Soils

The Natural Resources Conservation Service's (NRCS) Web Soil Survey indicates that primary soil series consist of Sequatchie fine sandy loams, Waynesboro fine sandy loam, and Waynesboro gravelly sandy loams (NRCS 2019). These soils are generally formed in loamy alluvium and located on low terraces and floodplain benches. No soils within the Study Area are recorded on the NRCS's Hydric Soils List. Sequatchie fine sandy loam (ScB2) and Waynesboro fine sandy loam (WfC) are classified by the NRCS as prime farmland. NRCS soils located within the Study Area are illustrated on Figure A-4 (Appendix A).

3.1.3 Floodplains

A floodplain is the relatively level land area along a stream or river that is subjected to periodic flooding. The area subject to a one-percent annual chance of flooding (100-year flood) in any given year is normally called the 100-year floodplain. It is necessary to evaluate development in the 100-year floodplain to ensure that the project is consistent with the requirements of EO 11988 (Floodplain Management).

The fixed water intake, access port to the water line, and underground water line are located within the Study Area, highlighted in red on Exhibit 3-1, at Tennessee River Mile 206.7, in Hardin County, Tennessee. At this location, the 100-year flood and TVA Flood Risk Profile (FRP) elevations are both 419.0 ft. MSL, referenced to National Geodetic Vertical Datum 1929. The FRP is the elevation of the 500-year flood that has been adjusted for surcharge at the dam. Surcharge is the ability to raise the water level behind the dam above the top-of-gates elevation.

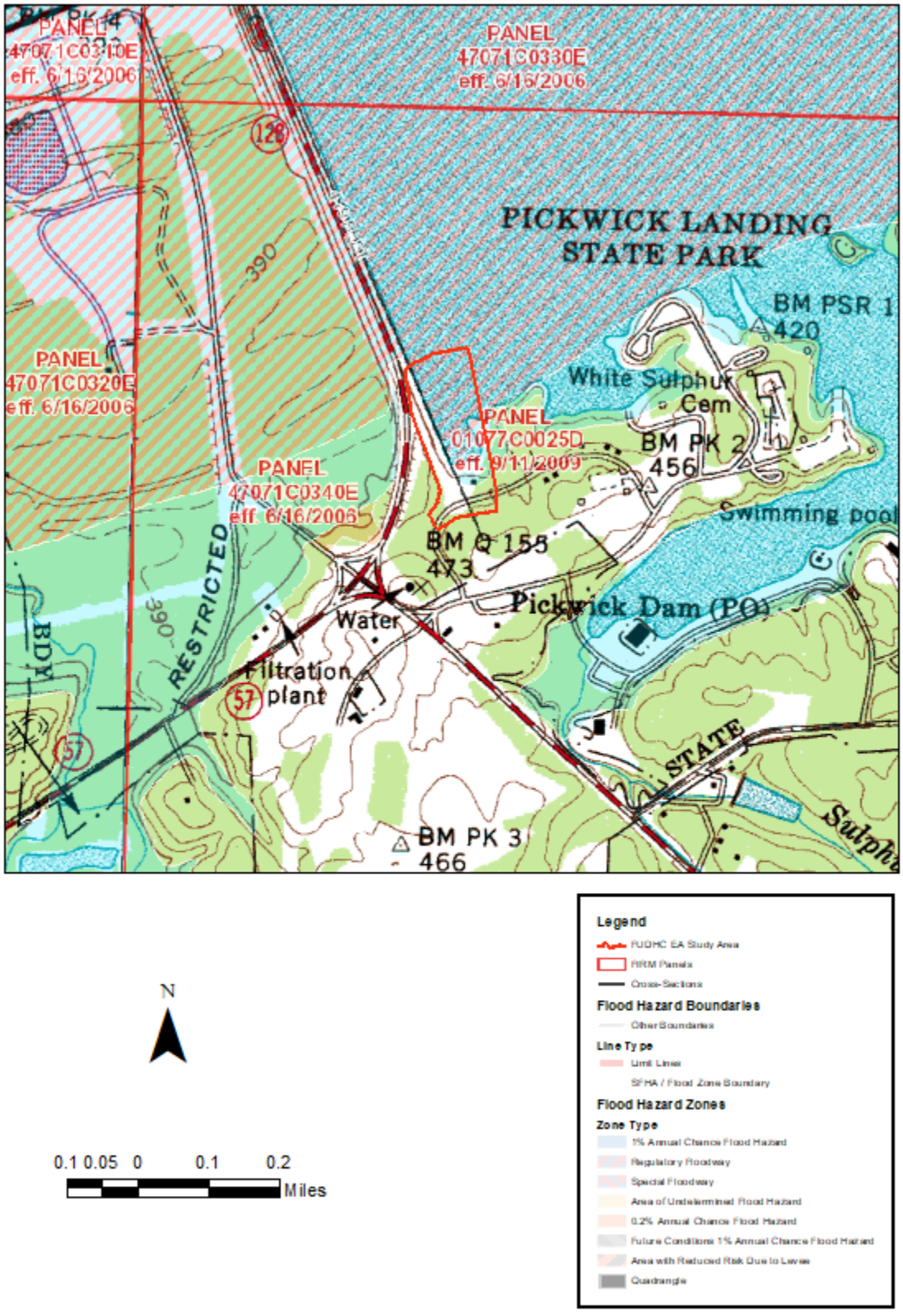

Exhibit 3-1. Site Location and Floodplains

3.2 Water Resources

Water resources were identified using a combination of the U.S. Geological Survey (USGS) topographic maps, aerial photographs, USGS National Hydrography Dataset (NHD) digital data, and the USFWS National Wetlands Inventory (NWI) illustrated on Figure A-5 (Appendix A).

3.2.1 General Setting

The FUDHC water intake line relocation project is located within 10-digit Hydrologic Unit Code (HUC) Watershed (0603000512) Indian Creek-Pickwick Lake. The Pickwick Landing Dam impounds the Tennessee River within the Study Area. TVA operates Pickwick Reservoir for a variety of purposes including power production, flood control, recreation, water supply management, water quality, and aquatic habitat.

3.2.2 Groundwater and Groundwater Quality

The Study Area is located in the Cretaceous aquifer system, which consists of unconsolidated sediments of the Late Cretaceous age. These sediments are comprised primarily of sands and gravel, with interbedded clays and marls. The sands and gravels have a high primary (intergranular) porosity and permeability. Groundwater is recharged by precipitation through overlying permeable deposits. This aquifer system has generally good water quality and is used as a source for domestic and public water supplies (Brahana et al. 1986b). Groundwater in the Study Area is expected to occur in the regolith and flow toward and discharge into the Tennessee River.

3.2.3 Water Supply

Pickwick Reservoir supports two permitted water intakes on the upstream side of the dam's south embankment. This includes a municipal water supply intake for the FUDHC and an industrial intake for PCA. Both of these water supply lines are located within the Study Area.

3.2.4 Wetlands

The Tennessee Water Quality Control Board defines wetlands as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (TDEC 2013). Wetlands form the transitional boundary between terrestrial and aquatic ecosystems; as such, they tend to be highly productive and biologically diverse ecosystems. They provide a multitude of ecological and public services, including flood control, reservoir shoreline stabilization, water quality protection, and habitat for fish and wildlife resources.

In the broader Pickwick Reservoir area, wetlands are commonly associated with the floodplains of tributary streams and rivers in low-lying, poorly drained areas and along the reservoir shoreline.

The Study Area contains jurisdictional wetlands which were identified as bottomland hardwood wetlands along the shoreline of the Pickwick Reservoir. These features are located outside the proposed water line relocation disturbance area footprint.

3.2.5 Surface Water and Surface Water Quality

Surface water is described as water flowing through a defined watercourse (e.g., rivers, streams, or creeks) or stored within a reservoir, pond, or lake. The Study Area drains to

waterways within the 10-digit HUC (0603000512) Indian Creek-Pickwick Lake watershed. The Tennessee River, which is impounded by the Pickwick Landing Dam, is the only named stream within the Study Area. TVA biologists conducted a survey for jurisdictional surface waters and identified the Tennessee River/Pickwick Reservoir as the only surface waterbody located within the Study Area.

Precipitation in the general project vicinity averages about 58.2 inches per year. The wettest month is May with approximately 6.69 inches of precipitation, and the driest month is August with 3.39 inches. The average annual air temperature is 60.7 degrees Fahrenheit, ranging from a monthly average of 48.7 degrees Fahrenheit to 72.7 degrees Fahrenheit (US Climate Data 2019). Stream flow varies with rainfall and averages about 23.97 inches of runoff per year (i.e., approximately 1.77 cubic feet per second, per square mile of drainage area) (USGS 2008).

The federal CWA requires 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 United States Environmental Protection Agency (USEPA).

TDEC has established water quality standards and designated uses for streams and lakes across the state, and issues periodic reports on waterbodies not meeting these standards and uses. Generally, characteristics considered during the assessments are temperature, dissolved oxygen, pH, nutrients, sedimentation, siltation, loss of habitat and contaminants. As part of this program, TDEC issues a list of impaired waters called the “303(d) List,” referring to Section 303(d) of the federal CWA. TDEC’s 2018 303(d) List classifies Pickwick Reservoir as “not supporting” designated uses due to the primary pollutant of Phosphorus (TDEC 2018). Designated uses are water quality goals specific to the beneficial uses of waterbodies. Table 3-1 provides a listing of local streams in the Study Area and vicinity with state-designated uses (TDEC 2013). In addition to the designations listed below, all streams in Table 3-1 are classified as Exceptional TN Waters due to the project being in the direct vicinity of Pickwick Landing State Park (TDEC 2016a). Additional water quality information is noted in the following Section 3.3 as it relates to aquatic ecology.

Table 3-1. Stream Designations Located in the Vicinity of the Study Area

Stream Name	Use Classification						
	NAV	DOM	IWS	FAL	REC	LWW	IRR
Tennessee River/Pickwick Reservoir	X	X	X	X	X	X	X
Cold Spring Branch				X	X	X	X
Slate Rock Creek				X	X	X	X
Sulphur Creek				X	X	X	X
Robinson Creek				X	X	X	X

[1] Codes: NAV = Navigation; DOM = Domestic Water Supply; IWS = Industrial Water Supply; FAL = Fish and Aquatic Life; REC = Recreation; LWW = Livestock Watering and Wildlife; IRR = Irrigation.

3.3 Aquatic Ecology

As noted in Section 3.2.5, Pickwick Reservoir is the only surface water feature identified within the Study Area. TVA began a program to systematically monitor the ecological conditions of its reservoirs in 1990. Reservoir (and stream) monitoring programs were combined with TVA’s fish tissue and bacteriological studies to form an integrated Ecological Health Indicator. Indicators focus on (1) physical/chemical characteristics of waters, (2) physical/chemical characteristics of

sediments, (3) benthic macroinvertebrate community sampling, and (4) fish assemblage sampling (Dycus and Baker 2001).

Benthic macroinvertebrates are included in aquatic monitoring programs because of their importance to the aquatic food chain and because they have limited capability of movement, thereby preventing them from avoiding undesirable conditions. Sampling and data analysis are based on seven parameters: (1) species diversity, (2) presence of selected taxa that are indicative of good water quality, (3) occurrence of long-lived organisms, (4) total abundance of all organisms except those indicative of poor water quality, (5) proportion of total abundance comprised by pollution-tolerant oligochaetes, (6) proportion of total abundance comprised by the two most abundant taxa, and (7) proportion of samples with no organisms present. The overall ecological health condition of Pickwick Reservoir rated 80 (scoring range is 20 to 100) in 2016. The average (1994–2017) score for Pickwick Reservoir is 73. Pickwick Reservoir typically scores near (slightly above or slightly below) the breakpoint between good (scores >72) and fair (score 52-72) ratings, with year-to-year variations primarily dependent on chlorophyll concentrations (which are affected by reservoir flows) and conditions in the Bear Creek embayment, which generally rates lower than other monitoring locations on the reservoir.

3.4 Terrestrial Ecology

Terrestrial vegetation communities in the Southeastern Plains and Transition Hills ecoregion of Tennessee generally consist of oak-hickory-pine forest, mixed forest, deciduous forests, and pine plantations. Some cropland and pastures are also present in narrow valley bottoms and on gently sloping hills and bottomland hardwoods (sycamore, sweetgum, tupelo, oaks, and cypress) (Griffith et al. 1998).

3.4.1 Terrestrial Vegetation

A field survey was conducted by HDR biologists on August 7, 2019, to document plant communities, the presence of invasive plants, and to search for protected plant species habitat within the Study Area. The Study Area is approximately 52 percent open water (Pickwick Reservoir) with intact forested areas located along the south and southeast corner (Appendix A, Figure A-6). The following are descriptions of observed vegetative communities.

3.4.1.1 Bottomland Hardwoods

The Bottomland Hardwoods community is located along the reservoir shoreline and wetland depressions. Mature tree species (12 to 30-inch-diameter breast height [dbh]) observed included bald cypress (*Taxodium distichum*), sweetgum (*Liquidambar styraciflua*), river birch (*Betula nigra*), green ash (*Fraxinus pennsylvanica*), American sycamore (*Platanus occidentalis*), cherry (*Prunus* sp.), red maple (*Acer rubrum*), and black willow (*Salix nigra*). A dense understory species (4 to 10-inch dbh) included silver maple (*Acer saccharinum*), water hickory (*Carya aquatic*), water tupelo (*Nyssa aquatic*), buttonbush (*Cephalanthus occidentalis*), tag alder (*Alnus serrulata*), Chinese privet (*Ligustrum sinense*), paw (*Asimina triloba*), sugarberry (*Celtis laevigata*), shining false indigo (*Amorpha nitens*), Euonymus (*Euonymus* sp.), and arrowwood viburnum (*Viburnum dentatum*). Herbaceous and vine species included false nettle (*Boehmeria cylindrica*), jumpseed (*Persicaria virginiana*), river oats (*Chasmanthium latifolium*), swamp milkweed (*Asclepias incarnata*), cardinal flower (*Lobelia cardinalis*), iris (*Iris s*p.), swamp leather flower (*Clematis crispa*), hop sedge (*Carex lupulina*), giant sedge (*Carex gigantea*), Japanese honeysuckle (*Lonicera japonica*), trumpet creeper (*Campsis radicans*), greenbrier (*Smilax rotundifolia*), muscadine grape (*Vitis rotundifolia*), cross-vine (*Bignonia capreolata*), and Japanese stilt grass (*Microstegium vimineum*). Dominant species along the water's edge

included water willow (*Justicia Americana*), lizard's tail (*Saururus cernuus*), swamp rose-mallow (*Hibiscus moscheutos*), and various sedges (*Carex* sp.).

3.4.1.2 Oak-Hickory-Pine

The Oak-Hickory-Pine community is located in uplands in the southern portion of the Study Area. Mature tree species (12 to 30-inch dbh) observed included sweetgum, mockernut hickory (*Carya tomentosa*), shag bark hickory (*Carya ovata*), tulip poplar (*Liriodendron tulipifera*), shortleaf pine (*Pinus echinata*), American beech (*Fagus grandifolia*), southern red oak (*Quercus falcata*), northern red oak (*Quercus rubra*), cherrybark oak (*Quercus pagoda*), and post oak (*Quercus stellata*). Understory species (4 to 10-inch dbh) included sweetgum, mockernut hickory, tulip poplar, hop hornbeam (*Ostrya virginiana*), paw paw, eastern redcedar (*Juniperus virginiana*), Chinese privet, thorny elaeagnus (*Elaeagnus pungens*), autumn olive (*Elaeagnus umbellata*), American holly (*Ilex opaca*), eastern redbud (*Cercis canadensis*), red mulberry (*Morus rubra*), and honey locust (*Gleditsia triacanthos*). Herbaceous and vine species were sparse and included riveroats, vetch (*Vicia* sp.), oriental bittersweet (*Celastrus orbiculatus*), Virginia creeper (*Parthenocissus quinquefolia*), greenbrier, and poison ivy (*Toxicodendron radicans*).

3.4.1.3 Open/Maintained

Early successional species are dominant in the Open/Maintained community on the upstream berm of Pickwick Landing Dam in the western portion of the Study Area. Shrubby woody species observed included sweetgum, Bradford pear (*Pyrus calleryana*), honey locust, slippery elm (*Ulmus rubra*), smooth sumac (*Rhus glabra*), and blackberry *(Rubus* sp.). Herbaceous species consisted of Johnson grass (*Sorghum halepense*), jewelweed (*Impatiens capensis*), wooly mullein (*Verbascum thapsus*), vetch, and ragweed (*Ambrosia* sp.).

3.4.2 Non-Native Invasive Species

Non-native invasive species are primarily along the forested edges and open/maintained areas throughout the Study Area. These species consisted of mimosa (*Albizia julibrissin*), Chinese privet, thorny elaeagnus, autumn olive, oriental bittersweet, Johnson grass, and Japanese honeysuckle.

3.4.3 Terrestrial Wildlife

Terrestrial communities within the Study Area may support a diverse number of wildlife species. Herbaceous fields that have been heavily disturbed by activities associated with transmission lines offer little suitable habitat for rare wildlife species, but can be used by common species. Birds that utilize these areas include chipping sparrow (*Spizella passerina*), field sparrow (*Spizella pusilla*), grasshopper sparrow (*Ammodramus savannarum*), red-tailed hawk (*Buteo jamaicensis*), red-winged blackbird (*Agelaius phoeniceus*), and white-throated sparrow (*Zonotrichia albicollis*) (National Geographic 2002). Mammals that can be found in these areas are common mole (*Scalopus aquaticus*), coyote (*Canis latrans*), ground hog (*Marmota monax*), least shrew (*Cryptotis parva*), white-footed mouse (*Peromyscus leucopus*), and white-tailed deer (*Odocoileus virginianus*) (Whitaker 1996). Reptiles that may use these habitats in this region include black racer (*Coluber constrictor*), black rat snake (*Pantherophis obsoletus*), corn snake (*Pantherophis guttatus*), eastern kingsnake (*Lampropeltis getula*), and eastern milksnake (*Lampropeltis Triangulum*) (Gibbons and Dorcas 2005).

Birds that utilize small patches of disturbed forest along reservoirs in this region include American robin (*Turdus migratorius*), belted kingfisher (*Megaceryle alcyon*), blue jay (*Cyanocitta*

cristata), Carolina chickadee (*Poecile carolinensis*), Carolina wren (Thry*othorus* ludovicianus), eastern bluebird (*Sialia sialis*), eastern towhee (*Pipilo erythrophthalmus*), indigo bunting (*Passerina cyanea*), Louisiana waterthrush (*Parkesia motacilla*), ovenbird (Seiurus aurocapilla), osprey (*Pandion haliaetus*), red-bellied woodpecker (*Melanerpes carolinus*), tufted titmouse (*Baeolophus bicolor*), northern cardinal (*Cardinalis cardinalis*), northern mockingbird (*Mimus polyglottos*), northern parula (*Setophaga americana*), red eyed-vireo (*Vireo olivaceus*) and white-eyed vireo (*Vireo griseus*) (National Geographic 2002). Mammals found in and around these areas include common raccoon (*Procyon lotor*), eastern chipmunk (*Tamias striatus*), eastern gray squirrel (*Sciurus carolinensis*), Virginia opossum (*Didelphis virginiana*), and white-footed mouse (*Peromyscus leucopus*) (Whitaker 1996). Common amphibian and reptile species that also use similar habitats include American toad (*Anaxyrus americanus*), black rat snake, eastern box turtle (*Terrapene carolina carolina*), eastern garter snake (*Thamnophis sirtalis sirtalis*), five-line skink (*Plestiodon fasciatus*), Fowler's toad (*Anaxyrus fowleri*), green frog (*Rana clamitans*), gray treefrog (*Hyla versicolor*), leopard frog (*Lithobates pipiens*), rough green snake (*Opheodrys aestivus*), and ring-necked snake (*Diadophis punctatus*) (Powell et al. 2016).

A review of the TVA Regional Natural Heritage Database in September 2019 indicated that no records of caves exist within three miles of the Study Area. In addition, no records of heron rookeries or osprey nests are known within three miles of the Study Area.

3.4.4 Migratory Birds

EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds) directs certain federal agencies to take certain actions to further implement the Migratory Bird Treaty Act. This act prohibits "by any means or manner to pursue, hunt, take, capture [or] kill" any migratory birds except as permitted by regulations issued by the USFWS. TVA reviews proposed activities associated with their projects to ensure they are planned and performed in compliance with this EO.

A review of the USFWS's Information for Planning and Consultation (IPaC) website in September 2019 identified nine migratory bird species of conservation concern that have the potential to occur in the Study Area: American kestrel (*Falco sparverius*), bald eagle (*Haliaeetus leucocephalus*), eastern whip-poor-will (*Caprimulgus vociferous*), Le Conte's Sparrow (*Ammodramus leconteii*), prairie warbler (*Setophaga discolor*), prothonotary warbler (*Protonotaria citrea*), red-headed woodpecker (*Melanerpes erythrocephalus*), red-throated loon (*Gavia stellata*), and wood thrush (*Hylocichla mustelina*). Suitable habitat exists in the terrestrial portion of the Study Area for eastern whip-poor-will, prairie warbler, prothonotary warbler, red-headed woodpecker, and wood thrush. Red-throated loon may also use Pickwick Reservoir as stop-over habitat during migration. Bald eagles may use the reservoir for foraging habitat.

3.5 Threatened and Endangered Species

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

In addition to the ESA, the State of Tennessee provides protection for species considered threatened, endangered, or deemed in need of management within the state other than those federally listed under the ESA. Plant species are protected in Tennessee through the Rare Plant Protection and Conservation Act of 1985. The listing of species is managed by TDEC. Additionally, the Tennessee Natural Heritage Program and TVA both maintain databases of

aquatic and terrestrial plant and animal species that are considered threatened, endangered, of special concern, or are otherwise tracked in Tennessee because the species is rare and/or vulnerable within the state.

TVA biologists and natural resource specialists used the TVA Regional Natural Heritage Database to assess the presence of threatened and endangered species within the proximity of the Study Area, which includes the proposed construction areas, access roads, contractor staging area, existing public recreation areas, Tennessee River, and Pickwick Reservoir. The TVA Regional Natural Heritage Database was created to ensure that environmental compliance activities are conducted in a consistent manner across the TVA region and that these activities meet the requirements of NEPA and the ESA. Database searches were based on the following criteria: (1) proximity to Pickwick Landing Dam; (2) presence/absence; (3) element occurrence rank values; and (4) species or type of element present. Specific to proximity, plants were assessed within a 5-mile radius, aquatic species 10-digit HUC (0603000512) Indian Creek - Pickwick Lake watershed, and terrestrial species within 3 miles. TVA's Natural Heritage GIS Database layers are illustrated on Figure A-7 (Appendix A).

3.5.1 Plants

HDR biologists indicated that no habitat for state- or federally listed plant species was observed within the Study Area during the botanical field survey. A review of the TVA Regional Natural Heritage Database indicated that no protected plant species have been observed in the Study Area. Recorded occurrences of 27 state-protected species were noted within a 5-mile radius of Pickwick Landing Dam (Table 3-2). No federally protected plant species are known to occur within the 5-mile-radius proximity; however, Price's potato-bean (*Apio priceana*), a threatened plant species, has been known to or is believed to occur in Hardin County (USFWS 2019).

Table 3-2. State-Protected Plant Species Documented within a 5-Mile Radius of Pickwick Landing Dam

Scientific Name	Common Name	Federal Status	State Status	State Rank
*Actaea racemosa**	Black bugbane	--	SLNS	S1S2
*Aesculus grabra**	Ohio buckeye	--	SLNS	S2
*Aquilegia canadensis**	Wild columbine	--	SLNS	S1S2
*Asarum canadense**	Canada wild-ginger	--	SLNS	S2S3
*Cheilanthes lanosa**	Hairy lipfern	--	SLNS	S2
*Chelone glabra**	White turtlehead	--	SLNS	S3
Erythronium rostratum	Yellow trout-lily	--	SPCO	S2
*Fraxinus quadrangulata**	Blue ash	--	SLNS	S2
*Heuchera villosa var. macrorhiza**	Giant alumroot	--	SLNS	S1
*Hybanthus concolor**	Green violet	--	SLNS	S2S3
Lysimachia fraseri	Fraser loosestrife	--	END	S2
*Muhlenbergia tenuiflora**	Muhly	--	SLNS	S1S2
*Pachysandra procumbens**	Allegheny-spurge	--	SLNS	S3
*Panax quinquefolius**	American ginseng	--	SLNS	S3
*Pellaea atropurpurea**	Purple cliff-brake	--	SLNS	S1S2
*Philadelphus hirsutus**	Streambank mock orange	--	SLNS	S1
*Pinus virginiana**	Virginia pine	--	SLNS	S2
*Polemonium reptans**	Greek valerian	--	SLNS	S2S3
Prenanthes barbata	Barbed rattlesnake-root	--	SPCO	S2
*Salix caroliniana**	Carolina willow	--	SLNS	S3
Salvia azurea var. grandiflora	Blue sage	--	SPCO	S3

Scientific Name	Common Name	Federal Status	State Status	State Rank
*Sedum ternatum**	Stonecrop	--	SLNS	S2
Silene ovata	Ovate catchfly	--	END	S2
*Staphylea trifolia**	American bladdernut	--	SLNS	S3
Stylisma humistrata	Southern morning-glory	--	THR	S1
Symplocos tinctoria	Horsesugar	--	SPCO	S2
*Tiarella cordifolia**	Heart-leaved foam-flower	--	SLNS	S2

NOTES
*Species documented in Mississippi
-- Indicates no status

State Status
END – State Endangered
SLNS – No State Status
SPCO – State Species of Special Concern
THR – State Threatened

State Rank
S1 – Extremely rare and critically imperiled in the state, 5 or fewer occurrences, or very few remaining individuals, or because of some special condition where the species is particularly vulnerable to extinction.
S2 – Very rare and imperiled within the state, 6 to 20 occurrences, some factor(s) making it vulnerable to extinction.
S3 – Rare or uncommon in the state, from 21 to 100 occurrences.

3.5.2 Aquatic Animals

A query of the TVA Regional Natural Heritage Database and the USFWS online IPaC database indicated that 10 federally listed and seven additional state-listed aquatic animals are currently known from Hardin County, Tennessee and/or within the 10-digit HUC (0603000512) Indian Creek-Pickwick Lake watershed (Table 3-3). Freshwater mussels listed as historical (>25 years old) suggests these species are very rare or no longer occur in this area of their former range.

Table 3-3. Threatened and Endangered Aquatic Animal Species from Hardin County, Tennessee and/or within 10-digit HUC (00603000512) Indian Creek-Pickwick Lake watershed and the USFWS IPaC Database

Scientific Name	Common Name	Federal Status	State Status	State Rank
Carpiodes velifer	Highfin carpsucker	--	NMGT	S2S3
Cumberlandia monodonta	Spectaclecase	LE	TRKD	S2S3
Cyprogenia stegaria	Fanshell	LE	END	S1
Hemistena lata	Cracking pearlymussel	LE	END	S1
Hemitremia flammea	Flame chub	--	NMGT	S3
Ichthyomyzon gagei	Southern brook lamprey	--		S1
Lampsilis abrupta	Pink mucket	LE	END	S2
Lithasia armigera	Armored rocksnail	--	TRKD	S1S2
Lithasia geniculata	Ornate rocksnail	--	TRKD	S2
Lithasia salebrosa	Muddy rocksnail	--	TRKD	S2
Obovaria retusa	Ring pink	LE	END	S1
Orconectes wrighti	Hardin crayfish	--	END	S2
Plethobasus cicatricosus	White wartyback	LE	END	S1
Plethobasus cooperianus	Orangefoot pimpleback	LE	END	S1
Plethobasus cyphyus	Sheepnose	LE	TRKD	S2S3
Pleuronaia dolabelloides	Slabside pearlymussel	LE	END	S2
Quadrula cylindrica	Rabbitsfoot	LT	--	--

NOTES
-- Indicates no status

Federal Status
LE – Listed Endangered
LT – Listed Threatened

State Status
END – State Endangered
NMGT – In Need of Management
TRKD – State Tracked

State Rank
S1 – Extremely rare and critically imperiled in the state, 5 or fewer occurrences, or very few remaining individuals, or because of some special condition where the species is particularly vulnerable to extinction.
S2 – Very rare and imperiled within the state, 6 to 20 occurrences, some factor(s) making it vulnerable to extinction.
S3 – Rare or uncommon in the state, from 21 to 100 occurrences.

3.5.3 Terrestrial Animals

A review of the TVA Natural Heritage Database in September 2019 indicated that there are two Tennessee state-listed terrestrial animal species including hellbender (*Cryptobranchus alleganiensis*) and western pygmy rattlesnake (*Sistrurus miliarius streckeri*) and one federally protected terrestrial animal species (bald eagle) recorded within a 3-mile radius of the Study Area. Two federally listed terrestrial animal species including gray bat (*Myotis grisescens*) and northern long-eared bat (*Myotis septentrionalis*) have been reported from Hardin County, Tennessee. The USFWS determined that the federally listed Indiana bat (*Myotis sodalist)* also has the potential to occur throughout the state of Tennessee (Table 3-4).

Table 3-4. Federal and State-Listed Terrestrial Animal Species known to or thought to have the potential to occur in Hardin County, Tennessee and other species of concern documented within 3 miles of the Study Area[1]

Scientific Name	Common Name	Federal Status	State Status	State Rank
Cryptobranchus alleganiensis	Hellbender[2]	PS	E	S3
Haliaeetus leucocephalus	Bald eagle	DM	D	S3
Myotis grisescens	Gray bat[3]	LE	E	S2
Myotis sodalis	Indiana bat[4]	LE	E	S1
Myotis septentrionalis	Northern long-eared bat[3]	LT	T	S1S2
Sistrurus miliarius streckeri	Western pygmy rattlesnake	--	T	S2S3

NOTES
-- Indicates no status
Federal Status
DM – Delisted, recovered, and still being monitored
LE – Listed Endangered
LT – Listed Threatened
PS – Partial Status

State Status
D – Deemed in need of management
E – Endangered
T – Threatened
State Rank
S1 – Extremely rare and critically imperiled in the state, 5 or fewer occurrences, or very few remaining individuals, or because of some special condition where the species is particularly vulnerable to extinction.
S2 – Very rare and imperiled within the state, 6 to 20 occurrences, some factor(s) making it vulnerable to extinction.
S3 – Rare or uncommon in the state, from 21 to 100 occurrences.

3.5.3.1 Hellbender

Hellbender favor large, fast-flowing streams and rivers with large shelter rocks. Eggs are laid in depressions created beneath large rocks or submerged logs (Petranka 1998). The closest record of this species is approximately one mile away in the tailwaters of Pickwick Landing Dam. This record is from 1954 and is historic. Suitable habitat for this species that occurred in the main stem of the Tennessee River was greatly impacted by construction of the dam. Occurrence of this species in Pickwick Reservoir immediately upstream of the dam is unlikely.

[1] Source: TVA Regional Natural Heritage Database and USFWS Information for Planning and Consultation (https://ecos.fws.gov/ipac/), extracted 9/3/2019.
[2] A subspecies of hellbender found in the Ozarks of Missouri and Arkansas is federally listed. Species of hellbender found in Tennessee are not federally listed.
[3] Federally listed species known from Hardin County, Tennessee, but not within three miles of the Study Area.
[4] Federally listed species that is not yet known from Hardin County, Tennessee, but is thought to occur statewide.

3.5.3.2 Bald Eagle

Bald eagles are protected under the Bald and Golden Eagle Protection Act (USFWS 2013). This species is associated with larger mature trees capable of supporting its massive nests. Bald eagles are usually found near large waterways where they forage (USFWS 2007). Records document the occurrence of three bald eagle nests in Hardin County, Tennessee. The nearest nesting record is approximately 2.4 miles away from the Study Area but is historic. The closest extant record is approximately 2.6 miles away from the Study Area. Foraging habitat for bald eagle exists in Pickwick Reservoir; however, no potential nesting trees occur in the terrestrial portion of the Study Area. The trees in this area are too small to withstand the immense weight of a bald eagle nest. No bald eagles or bald eagle nests were observed within 660 feet of the Study Area during field surveys conducted in June 2019.

3.5.3.3 Gray Bat

Gray bats roost in caves year-round and migrate between summer and winter roosts during spring and fall (Brady et al. 1982; Tuttle 1976a). Bats disperse over bodies of water at dusk where they forage for insects emerging from the surface of the water (Tuttle 1976b). Gray bats have been captured in mist net surveys in other areas of Hardin County. The closest reported capture is approximately 10.3 miles away from the Study Area. No caves or other roosting habitat were observed during field surveys of the Study Area, and the nearest recorded cave is over 3 miles away. Foraging habitat and sources of drinking water exist in Pickwick Reservoir.

3.5.3.4 Indiana Bat

Indiana bats hibernate in caves in winter and use areas around them for swarming (mating) in the fall and staging in the spring, prior to migration back to their summer habitat. During the summer, Indiana bats roost under the exfoliating bark of dead snags and living trees in mature forests with an open understory and a nearby source of water (Pruitt and TeWinkel 2007; Kurta et al. 2002). Indiana bats are known to change roost trees frequently throughout the season, while still maintaining site fidelity, returning to the same summer roosting areas in subsequent years (Pruitt and TeWinkel 2007). No records of Indiana bat are known from Hardin County, Tennessee. The closest Indiana bat occurrence is a maternity colony in McNairy County, Tennessee, approximately 10.7 miles away from the Study Area. The closest known Indiana bat hibernacula is historic and is approximately 14.4 miles away from the Study Area.

3.5.3.5 Northern Long-Eared Bat

The northern long-eared bat predominantly overwinters in large hibernacula such as caves, abandoned mines, and cave-like structures. During the fall and spring they utilize entrances of caves and the surrounding forested areas for swarming and staging. In the summer, northern long-eared bats roost individually or in colonies beneath exfoliating bark or in crevices of both live and dead trees (typically greater than 3 inches in diameter). Roost selection by northern long-eared bat is similar to that of Indiana bat; however, northern long-eared bats are thought to be more opportunistic in roost site selection. This species also roosts in abandoned buildings and under bridges. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (USFWS 2014). Several northern long-eared bats have been captured in mist net surveys in Hardin County in 2012 and 2014. The closest capture location is approximately 14.9 miles from the Study Area. The closest known northern long-eared bat hibernacula is approximately 14.4 miles away from the Study Area; however, no northern long-eared bats have been seen in this cave since 2004.

No known caves or suitable winter roosting structures for Indiana bat or northern long-eared bat exist in the Study Area. A field survey was conducted in June 2019 using the 2019 Range-Wide Indiana Bat Survey Guidelines (USFWS 2019b). This survey led TVA biologists to determine that, at this time, the section of forest proposed for land transfer, including the 0.35 acres of forest proposed for removal, does not offer suitable summer roosting habitat for either species. Trees in this area include pine, red oak, sycamore, cedar, sweetgum, tulip poplar, and locust. They were observed to be lacking suitable exfoliating bark, cracks, and/or crevices. This forest does offer foraging habitat for these bat species, however. While this forested section is dense and may be difficult to navigate internally, foraging habitat exists above the canopy and along the edges. Additional foraging habitat and a source of drinking water exists in Pickwick Reservoir.

3.5.3.6 Western Pygmy Rattlesnakes

Western pygmy rattlesnakes are found in a variety of habitats including wet prairies, wet hardwood forests, pine-hardwood forests, and on the edges of lakes and marshes. This species takes shelter under logs, in thickets, under stumps, and in borrows of other animals (NatureServe 2019). The closest record of this species is unverified, many decades old, and approximately 500 feet east of the Study Area. Suitable habitat for this species is present within shoreline forests of the Study Area.

3.6 Natural Areas, Parks and Recreation

Natural areas include ecologically significant sites; federal, state, or local park lands; national or state forests; wilderness areas; scenic areas; wildlife management areas (WMAs); recreational areas; conservation easements; greenways; trails; Nationwide Rivers Inventory (NRI) streams; and wild and scenic rivers.

TVA developed a Natural Areas land-use designation system to manage publicly owned land in and around its facilities and reservoirs. These sites are identified as Habitat Protection Areas, Small Wild Areas, Ecological Study Areas, or Wildlife Observation Areas. Their management includes restrictions on activities that might endanger significant natural features (TVA 2019).

The TVA Natural Heritage Database indicated that eight natural areas occur within a 5-mile radius of the Study Area (Table 3-5), as shown on Figure A-8 (Appendix A).

Table 3-5. Natural Areas

Natural Area Name	Distance from Study Area (miles)
Pickwick Landing State Park	0.10
Designated critical habitat for Rabbitsfoot	0.68
Kentucky Reservoir No. 2 state mussel sanctuary	0.68
Chambers Creek Wetland – Tennessee Wildlife Resources Agency	3.60
Dry Creek Wildlife Management Area – Tennessee Wildlife Resources Agency	4.46
Factory Hollow Registered State Natural Area	4.65
Agricultural conservation easement	4.80
Lauderdale Wildlife Management Area – Tennessee Wildlife Resources Agency	4.81

The Study Area lies immediately adjacent to Pickwick Landing State Park. Designated as a state park in 1970, the 681-acre park is managed for recreation, including hiking, camping,

fishing, boating, and birding. A portion of Kentucky Reservoir immediately downstream of Pickwick Landing Dam has been designated as critical habitat for multiple mussel species as well as a state mussel sanctuary.

Chambers Creek Wetland, Dry Creek WMA, and Lauderdale WMA are all managed by Tennessee Wildlife Resources Agency (TWRA) for hunting and wildlife habitat. Factory Hollow Registered State Natural Area is under private ownership, recognized by the state of Tennessee as unique and outstanding natural habitat.

3.7 Air Quality

The USEPA has established National Ambient Air Quality Standards (NAAQS) to protect the public health and welfare with respect to six pollutants: particulate matter, sulfur dioxide, ozone, nitrogen dioxide, lead, and carbon monoxide. Particulate matter has two standards: one for particulate matter less than 2.5 microns in diameter size (PM2.5), and one for particulate matter less than 10 microns in diameter size (PM10). The Clean Air Act requires states to establish monitoring programs for these NAAQS and to determine existing areas of attainment (regions where these pollutant levels are at or below the established NAAQS levels) and non-attainment (regions where these pollutant levels are above the established NAAQS levels). Hardin County is currently in attainment status for NAAQS pollutants (USEPA 2019).

3.8 Transportation

There are approximately 0.10 miles of road located within the Study Area. The only roadway within the Study Area is Playground Loop Road. Although this is the only roadway within the Study Area, nearby State Highway 128 would be used for access to the project and equipment and material deliveries. State Highway 128 has a Functional Classification of Minor Arterial. Playground Loop Road does not have a functional classification.

3.9 Navigation

The Pickwick Reservoir and a portion of the dam structure are located within the Study Area. Pickwick Reservoir was impounded by the construction of the Pickwick Landing Lock and Dam, and was opened to commercial navigation in 1938. Additional improvements, completed in 1948, provided a commercially navigable waterway up to Wilson Dam. Today, Pickwick Reservoir is an important link in the Tennessee River System, which provides 800 miles of slack-water navigation from Paducah, Kentucky to Knoxville, Tennessee, and includes several navigable tributaries such as the Hiwassee and Clinch Rivers. The Tennessee-Tombigbee Waterway enters Pickwick Reservoir at river mile 415.0. The Tennessee River Waterway is in turn linked to the 12,000-mile National Inland Waterway in several places, and supports local, national, and international commerce. Approximately 35 to 40 million tons of commodities move on the Tennessee River System annually. On average, nearly 17.5 million tons of commodities travel through Pickwick Lock each year (USACE 2013). Approximately 8 miles upstream on the Tennessee River and 2 miles downstream on the Tennessee-Tombigbee Waterway lies Yellow Creek State Inland Port Authority near Iuka, Mississippi, which handles between 0.5 and 1 million tons of cargo each year, primarily iron and steel products.

3.10 Utilities

Utility infrastructure exists within the Study Area. Two water intakes are located in the Study Area in reservoir waters and are owned by the FUDHC and PCA. There is also power utility which supplies power to the pump stations associated with the intakes.

3.11 Solid Waste

Solid waste may include a variety of components normally generated from construction activities, including biodegradable waste (e.g., food and kitchen waste), recyclable materials (e.g., paper, glass, metals, certain plastics), and inert materials (e.g., construction waste, dirt, rocks). Sources of solid waste include construction activities, construction equipment and maintenance, commercial and industrial facilities, and households and the generation of discarded items such as scrap metal, appliances, and furniture. Generally, solid waste is managed by reduction, reuse, recycling, and disposal in landfills.

Hardin County is part of the Shiloh Municipal Solid Waste Planning Region, which also services Chester, McNairy, and Wayne Counties. Hardin County has no active landfills. Solid wastes from Hardin County are deposited into one of three landfills: the Decatur Landfill, a Class I facility in neighboring Decatur County; the Northeast Mississippi Regional Landfill, a Class I Facility in Tippah County, Mississippi; and the McNairy County Demolition Landfill, a Class II/IV facility in McNairy County. There are 13 solid waste convenience centers located throughout Hardin County for residents outside the City of Savannah. Recyclables are taken to the Hardin County Solid Waste Shop for processing and cardboard is processed at the West Tennessee Regional Recycling Hub in Chester County (Southwest Tennessee Development District 2012).

3.12 Socioeconomic Conditions and Environmental Justice

Hardin County census data, available online through U.S. Census Bureau, is summarized in Table 3-6. The most recent 10-year census data (2010) was utilized for population statistics. Intermittent estimates conducted after the formal 2010 census are available, but the base year of 2010 was used for analysis (U.S. Census Bureau 2016b).

Table 3-6. Demographics Data for Hardin County

Statistic	Hardin County	State of Tennessee	National
2010 population	26,026	6,346,105	308,745,538
Median household income*	$34,084	$44,621	$53,482
Percent minorities, 2010 Census	8.0%	22.4%	27.6%
Percent below poverty level*	22.2%	17.8%	15.6%
Unemployment rate**	6.8%	6.0%	5.0%

*2014 American Community Survey 5-Year Estimates
**2016 Tennessee Department of Labor and Workforce Development

Hardin County's median household income is $34,084, or 23.7 percent lower than the state's median income of $44,621 and 36.3 percent lower than the national median income of $53,482. Hardin County also experiences a lower percentage of minorities and higher poverty and unemployment rates as compared to state and national rates.

3.13 Cultural Resources

Cultural resources include prehistoric and historic archaeological sites, districts, buildings, structures, and objects, as well as locations of important historic events that lack material evidence of those events. Cultural resources that are listed, or considered eligible for listing, on the National Register of Historic Places (NRHP) are called historic properties. Cultural resources become historic properties when they possess both integrity and significance. A historic property's integrity is based on its location, design, setting, materials, workmanship, feeling, and association. The significance is established when historic properties meet at least one of the following criteria: (a) are associated with important historical events or are associated

with the lives of significant historic persons; (b) embody distinctive characteristics of a type, period, or method of construction; (c) represent the work of a master or have high artistic value; or (d) have yielded or may yield information important in history or prehistory. The Pickwick Landing Dam is an NRHP-listed architectural resource.

3.13.1 Historical Resources

Section 106 of the NHPA requires federal agencies to consider the effects of their proposed undertakings on historic properties and provide the Advisory Council on Historic Preservation an opportunity to comment on those effects. TVA determined that the Proposed Action Alternatives are an "undertaking" as defined by the regulations under NHPA. Once an action is determined to be an undertaking, the regulations require agencies to consider whether the proposed activity has the potential to impact historic properties. If the undertaking is such an activity, then the agencies must complete the following steps: (1) involve the appropriate consulting parties; (2) define the area of potential effects (APE); (3) identify historic properties in the APE; (4) evaluate possible effects of the undertaking on historic properties in the APE; and (5) resolve adverse effects (36 CFR § 800.4 through 800.13). An APE is defined as the "geographic area or areas within which the undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR § 800.16). TVA defined the APE for this undertaking as the entire Study Area, which includes the permanent easement for FUDHC. Since the majority of construction activities would be below ground or under water, the proposed project would have no visual effect to historic properties, including Pickwick Landing Dam.

Section 106 of the NHPA also requires federal agencies to consult with the respective State Historic Preservation Office (SHPO) when proposed federal actions could affect historic and cultural resources, including archaeological resources, which are also protected under the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act, in addition to the NHPA.

The Tennessee Valley region has been an area of human occupation for the last 12,000 years. This includes five broad cultural periods: Paleo-Indian (11,000-8,000 BC), Archaic (8000-1600 BC), Woodland (1600 BC-AD 1000), Mississippian (AD 1000-1700), and Historic (AD 1700-present). Prehistoric land use and settlement patterns vary during each period, but short- and long-term habitation sites are generally located on floodplains and alluvial terraces along rivers and tributaries. Specialized campsites tend to be located on older alluvial terraces and in the uplands. In the early historic period, this location was largely populated by members of the Cherokee and Chickasaw tribes. The influx of European settlers into the region forced the cession of Cherokee and Chickasaw lands in the Treaty of 1816. Hardin County was founded in November 1819.

Hardin County was mostly rural throughout its history and commerce was centered on agriculture or mills along the county's many waterways. During the Civil War, allegiances were divided and the county saw several battles and skirmishes, including the 1862 Battle of Shiloh. Construction of the Pickwick Landing Dam by TVA began in in March 1935 and was completed in 1938. Labor was drawn from a pool of skilled workers from central and western Tennessee, Alabama, and Mississippi. To house these workers, an employee camp was constructed approximately 0.1 mile south of the 1935 construction site and the current Study Area. The camp was racially segregated, with separate areas referred to as the "White Village" and the "Negro Village". The White Village was comprised of 15 permanent and 85 temporary houses, four men's dormitories, a cafeteria, hospital, community building, general store, school, and office buildings. The Negro Village included 25 temporary houses, a dormitory, a community

building/cafeteria, and a school. Within the Pickwick Landing Dam Reservation, the Civilian Conservation Corps (CCC) constructed a public park with associated facilities.

3.13.2 Archaeological Resources

TVA Cultural Compliance staff conducted a desktop study of available documents pertaining to the APE's potential to contain archaeological sites. This desktop study included TVA's engineering reports on the construction of Pickwick Landing Dam, historic photographs, historic aerial photography, and existing archaeological and natural data. Most of the construction for this project would be below pool elevations of the reservoir. Lesser areas above pool are also part of the APE. None of the APE has been systematically surveyed for cultural resources. One site has been previously recorded in the APE, but the site boundaries appear to have been drawn overly large. Archaeological deposits for this site are unlikely to occur in the APE. Furthermore, most or all of the APE has been heavily disturbed during and after the construction of Pickwick Landing Dam. The area immediately adjacent to the dam, and most of the APE below water, was likely terraformed during dam construction. Since the dam was constructed, two water intake lines have been installed within the APE. Above pool, the APE has been altered by creation of a beach and swimming area associated with the Pickwick Landing State Park Lodge as well as by support structures for the two intake lines. Based on this analysis, there appears to be little or no potential for the presence of intact Holocene soils or sediments in the APE. Furthermore, the APE's location in a drainage at the edge of the reservoir is an unlikely location for archaeological deposits.

3.14 Noise Levels

Noise is defined as an unwanted sound that is undesired or causes disturbance. Loud noise is disruptive to hearing and often considered unpleasant when caused by human activities and added to the natural acoustic setting of a locale. It is further defined as sounds that disrupt normal activities and diminish the quality of the environment. Community response to noise is dependent on the intensity of the sound sources, its duration, the proximity of noise-sensitive land uses, and the time of day the noise occurs (i.e., higher sensitivities would be expected during the overnight periods). Noise sources relevant to the activities proposed by FUDHC would include noise from construction and relocation of the raw water intake line. Primary noise would include noise from equipment to support construction activities.

No private residents occupy the Study Area or areas immediately adjacent to the area. To the west of the Study Area, the area is bordered by additional TVA dam reservation lands; to the south are the State Park golf course and an office property; and to the north are the dam, navigation locks, and river. To the east is the Pickwick Landing State Park. The State Park's hotel, conference center, and restaurant are approximately 600 feet from the eastern Study Area. Ambient noise surrounding Pickwick Reservoir consists mainly of mild industrial noise (e.g., hydroelectric power operations, inducing sluice release, and activities in the immediate vicinity of the dam), moderate vehicle use on the local road network, personal watercraft use associated with power boats, rural and community noises (e.g., children playing, outdoor lawn equipment), and natural sounds (e.g., wind, wildlife, and similar sounds). Overall, the area surrounding the Study Area is primarily forested and undeveloped land with recreational facilities.

Generally, noise levels in these types of areas range from 45 to 55 dBA, which are levels below USEPA (1974) recommendations for outdoor residential areas. Similarly, the U.S. Department of Housing and Urban Development considers 65 dBA or less to be compatible with residential areas (24 CFR 51.103). According to the USEPA, typical background day/night noise levels for

rural areas range between 35 and 50 dBA, whereas higher-density residential and urban areas background noise levels range from 43 dBA to 72 dBA (USEPA 1974). Background noise levels greater than 65 dBA can interfere with normal conversation, watching television, using a telephone, listening to the radio, and sleeping.

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CHAPTER 4 – ENVIRONMENTAL CONSEQUENCES

The anticipated potential effects of implementing the No Action Alternative and the Action Alternatives are described below for each resource area. Under the No Action Alternative, no action would be taken to relocate the FUDHC's raw water intake line. TVA would continue with the Pickwick Landing Dam Seismic Upgrade project and potential construction-related issues could impact FUDHC's existing raw water intake. The risk to the raw water intake jeopardizes the water supply for those served by the FUDHC. The No Action Alternative is analyzed in the EA to establish a baseline for analyzing the environmental impacts of Proposed Action Alternatives in accordance with NEPA regulations.

4.1 Physical Environment

4.1.1 Geology and Soils

4.1.1.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to geology and soils would occur.

4.1.1.2 Alternative B and Alternative C

Minimal impacts on geologic resources are anticipated due to placement of the pipe for the raw water intake. It is not currently known whether geologic resources would impact the installation methods described for Alternative B and Alternative C. Should geological issues arise that do not allow directional boring, then Alternative C may be chosen as the Preferred Alternative. At this time, Alternative B is preferred due to minimal impacts to soils and potential turbidity from the construction methods described for Alternative C.

Under either Proposed Action Alternative, FUDHC would relocate the existing raw water intake. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. This would result in a direct impact on soil resources within the project footprint. Approximately 0.86 acres of land would be disturbed as clearing and grubbing of the forest occurs prior to installation of the pipe, either through directional drilling or by trenching and using piles. To mitigate impacts due to the soil disturbance, FUDHC would employ appropriate erosion and sediment control devices, as required by TDEC, during construction to limit soil loss, erosion, and the possibility of sedimentation or turbidity to receiving streams. To prevent future erosion, disturbed soils would also be stabilized with seed mixes appropriate for the existing conditions after construction is completed.

Minimal impacts to soil resources would occur within the Pickwick Reservoir as a result of the pipe installation. Temporary turbidity may result from installation of the air burst pipe with either Action Alternative. Alternative B utilizes directional drilling and should result in negligible turbidity due to sediment movement during construction. Alternative C utilizes trenching and piles, which could result in minimal temporary turbidity. BMPs such as silt curtains would be used to minimize impacts related to turbidity.

Sequatchie fine sandy loam (ScB2) and Waynesboro fine sandy loam (WfC) are classified by the NRCS as prime farmland within the Study Area. Waynesboro soils are located within the contractor staging area and Sequatchie soils are not anticipated to be disturbed by the proposed construction activities. Currently, these areas are not used as farmland and it is

unlikely they would be used for farmland in the future, thus no impacts to prime farmland are expected for either Action Alternative.

4.1.2 Floodplains

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

4.1.2.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to floodplains would occur.

4.1.2.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. Consistent with EO 11988 (Floodplain Management), a fixed water intake, access port to the water line, and underground water line are considered to be repetitive actions in the 100-year floodplain that should result in minor impacts (TVA 1981). The 30-inch raw water intake would be located within the floodway of the Tennessee River. Hardin County participates in the National Flood Insurance Program (NFIP), and any development within the floodplain must be consistent with its floodplain ordinance. Because the intake would be located on the bottom of the reservoir, and because the floodway is over one mile wide at this location, the 30-inch-diameter intake would result in no increase in flood elevations, and thus not create an obstruction in the floodway, which would comply with the NFIP.

The project would comply with the TVA Flood Storage Loss Guideline because water intakes, access ports, and underground water lines are repetitive actions in the Flood Storage Zone. The Flood Storage Zone is that portion of the reservoir that is reserved for storing flood water. The Flood Storage Zone at this location extends from elevations 408.0 to 419.0 ft. MSL. Mitigation measures to minimize adverse impacts are listed below. By implementing these mitigation measures, the proposed Section 26a Permit and permanent easement for a fixed water intake, access port to the water line, and underground water line would be consistent with EO 11988 and result in no significant impact to floodplains and their natural and beneficial values.

Easement Conditions

- Any future facilities or equipment subject to flood damage would be located above or flood-proofed to elevation 421.0 ft. MSL (TVA Flood Risk Profile elevation plus 2 vertical feet).

- Any future development proposed within the limits of the 100-year floodplain (elevation 419.0 ft. MSL) would be consistent with the requirements of EO 11988.

- TVA retains the right to flood this area and TVA will not be liable for damages resulting from flooding.

- All future development would be consistent with the requirements of the TVA Flood Storage Loss Guideline.

4.2 Water Resources

4.2.1 Groundwater

4.2.1.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to groundwater would occur.

4.2.1.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. The Proposed Action Alternatives would not impact groundwater quantity as there would be no groundwater withdrawal.

The Proposed Action Alternatives are anticipated to have little to no impact on water quality as there should be no injection of chemicals or hazardous materials from construction activities. Any hazardous materials (such as fuels and lubricants) stored onsite during construction would be stored appropriately in secondary containment, and site personnel would be trained in both spill prevention and response. Because of the small amounts of materials and implementation of BMPs, it is unlikely that the quality of groundwater would be affected by a spill or hazardous materials during construction.

4.2.2 Water Supply

4.2.2.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be relocated, a permanent easement would not be granted, and a Section 26a permit would not be issued. The existing raw water intake owned by the FUDHC supplies water to the community of Counce and residents of the southwestern corner of Hardin County. Potential impacts due to construction of the Pickwick Landing Dam seismic upgrades could occur and impact the water source for these areas. Relocation of the raw water intake would eliminate the potential public health risks associated with lack of a reliable water source.

4.2.2.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. However, this would have minimal impacts to existing water supplies. The construction of the upgrades should have no impacts to the amount of water available for either water supply. The only change would be the location of withdrawal of the raw water from Pickwick Reservoir for FUDHC. The PCA intake would remain in its current location. The PCA existing water supply intake would receive minimal if any impacts with BMPs installed for turbidity during construction. The FUDHC intake would be relocated. Phasing of the project

would allow the existing intake to remain in operation until the new intake line is constructed, tested, and deemed operational. Then the existing FUDHC intake would be decommissioned. The existing line would be left in place to minimize turbidity and other impacts from potential removal. There could be temporary impacts in water quality due to turbidity from construction; however, BMPs would be used to minimize turbidity.

TVA will coordinate with the FUDHC on the construction schedule and again during crucial staging events in order to minimize potential risks to the water supply. It is anticipated that FUDHC will evaluate their emergency response plan prior to construction to account for times where the water supply will be switched from one intake to the other and other occasions where the water supply may be interrupted during construction.

4.2.3 Wetlands

4.2.3.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to wetlands would occur.

4.2.3.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. There are no wetlands present within the proposed project footprint; therefore, there would be no impacts (direct, indirect, or cumulative) to wetlands associated with either Proposed Action Alternative.

4.2.4 Surface Water

4.2.4.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to surface waters would occur. However, this alternative may cause risks to FUDHC's current raw water intake operations and its use and functional ability as a domestic water source, with the potential for the Pickwick Landing Dam improvements project to cause a direct impact to FUDHC and its customers.

4.2.4.2 Alternative B and Alternative C

Surface Runoff

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. Construction activities have the potential to affect surface water via storm water runoff. Soil erosion and sedimentation can clog small streams and threaten aquatic life. FUDHC would comply with all appropriate state and federal permit requirements. Appropriate BMPs would be followed, and all proposed project activities would be conducted in a manner to ensure that waste materials are contained, and the introduction of pollutants to the receiving waters would be minimized.

A TDEC Construction General Stormwater Permit would be needed if more than one acre is disturbed. This permit also requires the development and implementation of an SWPPP. Additionally, an ARAP, which includes the Section 401 Water Quality Certifications and a

USACE Section 404 nationwide permit or an individual permit, would be required for work in waters of the State and waters of the U.S. The SWPPP would identify specific BMPs to address construction-related activities that would be adopted to minimize storm water impacts. Additional protective measures may be required due to the exceptional water designation of stream(s) in the project vicinity. Refer to the TDEC Construction General Stormwater Permit (TDEC 2016b) and the Tennessee Erosion and Sediment Control Handbook (TDEC 2012) for BMP guidance and details. It is recommended, while working in State and U.S. waters, that the project utilize BMPs to minimize the suspension and mobilization of sediment by utilizing floating silt curtains or other effective measures.

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.

Hydrostatic Testing

These discharges would be handled in accordance with TDEC's General National Pollutant Discharge Elimination System (NPDES) Permit for Discharges of Hydrostatic Test Water (TN670000).

Trash Handling

All trash and construction debris would be disposed of properly so that it does not contribute to trash pollutants in water ways.

Chemical Handling

All chemicals would be properly handled, labeled, and stored. Equipment would be checked for leaks to ensure it is in good working condition. Leaks and spills would be cleaned up and reported per regulatory requirements, utilizing proper handling and disposal techniques.

Summary of Surface Water Impacts

Direct impacts would be expected to water resources; however, with proper implementation and maintenance of controls, only temporary, minor impacts to surface water quality would be expected.

No additional operational impacts would be expected to surface waters from this project.

4.3 Aquatic Ecology

4.3.1.1 No Action Alternative

Due to past disturbance in the Study Area, such as construction of Pickwick Landing Dam, and adjacent recreational facilities, impacts to aquatic resources would not be expected with the No Action Alternative. There would be no measurable direct, indirect, or cumulative impacts to Pickwick Reservoir on the Tennessee River; however, changes to aquatic ecology in Pickwick

Reservoir would likely occur within the watershed over the long term due to factors such as the continuation of recreation, agricultural activities, and population growth.

4.3.1.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. Under either Proposed Action Alternative, there would be no measurable impacts to Pickwick Reservoir; however, changes to aquatic ecology would likely occur within the watershed over the long term due to factors such as the continuation of recreation, agricultural activities, and population growth.

Under Alternative B, a new intake would be installed via directional boring underground from a point on land above the summer pool elevation and into the lake near the north boundary of the proposed easement west of PCA's intake structure. A flanged access connection assembly would occur at each end of the directionally bored pipe. Direct impacts to aquatic ecology in Pickwick Reservoir are not anticipated, but some temporary indirect impacts such as increased suspended sediment and runoff from construction activities associated with the directional boring and flanged access connection assembly are possible. Industry-approved BMPs would be implemented during construction to prevent silt and sediment from entering Pickwick Reservoir and adjacent waterways, and reduce the potential for cumulative impacts to aquatic ecology.

Under Alternative C, the new intake would be installed via conventional excavation and supporting the remaining pipe segments on structural steel cross members supported by H-piles or micro piles driven into the overburden of the lake bottom. All earth and sediment displaced from the lake bottom by construction activities, including the directional boring, would be redistributed under the influence of gravity within the confines of the lake and not removed from the lake. Direct impacts to the lake bottom would occur from the excavated trench and supporting piles. A temporary increase in suspended solids would occur from the construction activities within the reservoir. BMPs, such as floating silt screens, would be implemented during construction to minimize the effect of siltation. Due to the proximity of recreational facilities, and an existing water intake pipe, impacts to the aquatic ecology within the Study Area would be temporary and expected to return to pre-work activities once the project is complete.

4.4 Terrestrial Ecology

4.4.1 Terrestrial Vegetation

4.4.1.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to terrestrial vegetation would occur.

4.4.1.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. Disturbance of existing plant communities would occur within the approximately 0.86-acre contractor staging area and proposed 1.21-acre FUDHC easement. Minimal impacts to upland vegetation are anticipated because no uncommon terrestrial upland

plant communities are known to occur in the lands to be disturbed. Clearing associated with the contractor staging area and FUDHC easement is anticipated to impact approximately 0.35 acres of the oak-hickory-pine forest. No high-quality forested wetlands will be impacted by the project.

4.4.2 Invasive Species

4.4.2.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to invasive species would occur.

4.4.2.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. Many invasive species are opportunistic and may utilize the vegetation clearing associated within the contractor staging area and proposed FUDHC easement. The construction activities and soil disturbances could potentially enable the introduction of invasive species or could facilitate the movement of regulated noxious weeds listed for Hardin County. To comply with EO 13112 (Invasive Species), disturbed areas would be vegetated with native or non-native, non-invasive plant species to avoid the introduction or spread of invasive species.

4.4.3 Terrestrial Wildlife

4.4.3.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to terrestrial wildlife and their habitats would occur.

4.4.3.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would relocate the raw water line and intake. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. Approximately 0.86 acres of land would be disturbed and approximately 0.35 acres of forest would be removed. The reservoir would either be impacted by directional boring or a combination of construction techniques including excavation and installation of pipe support systems. Impacts to wildlife habitat would be the same regardless of which Proposed Action Alternative was selected.

Removal of the forested section would result in the displacement of any wildlife (primarily common, habituated species) currently using the area. 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 (e.g., eggs, babies, nestlings). Habitat removal likely would disperse mobile wildlife into surrounding areas in an attempt to find new food sources, shelter sources, and to reestablish territories. Due to the relatively small amount of habitat proposed for removal and the amount of similarly suitable habitat in areas immediately adjacent to the Study Area, populations of common wildlife species are not likely to be impacted by the Proposed Action Alternatives.

4.4.4 Migratory Birds

4.4.4.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to migratory birds would occur.

4.4.4.2 Alternative B and Alternative C

The Study Area lies within the general boundaries of the Mississippi Flyway, a migratory bird route that extends from the Gulf of Mexico region to central Canada following the Mississippi River. Migratory birds are attracted to a variety of habitats including flooded fields, sandbars, large lakes, higher quality wetlands, riparian areas, and closed-canopy, mature forests. In this case, the Study Area includes several of these habitat types (lake, wetlands, riparian areas, and mature forest); however, the impacted area does not include most of the high quality habitat preferred by these migratory birds. In addition, lower quality habitat similar to the lower quality habitat proposed for removal is abundant in the surrounding area. The highest quality sections of the tupelo gum and cypress wetland and the majority of the areas with large diameter, mature trees in upland and riparian areas would not be impacted by the Proposed Action Alternatives. Although disturbance due to noise and ground disturbance would occur during the Proposed Action Alternatives, these disturbances would be temporary. High quality, suitable, nesting habitat and stopover areas within the Study Area would not be significantly impacted such that the requirements of the Migratory Bird Treaty Act would be met.

Some migratory birds of conservation concern identified by the USFWS may be impacted by the Proposed Action Alternatives. Potential impacts to bald eagle are addressed in Section 3.5 of this EA. Eastern whip-poor-will, prairie warbler, prothonotary warbler, red-headed woodpecker, and wood thrush may forage and nest in the Study Area. Direct effects to individuals of these species could occur as tree/vegetation removal is proposed when these species may be present and/or nesting in the Study Area. However, no suitable crevices or holes that may be used by nesting prothonotary warbler or red-headed woodpecker were observed during field reviews. It is expected that individuals of these species as well as mobile (adult/juvenile) eastern whip-poor-will, prairie warbler, and wood thrush would successfully flush to adjacent habitats if disturbed by vegetation removal. This forested habitat would be permanently removed and unavailable in future years to these species. Red-throated loon may use Pickwick Reservoir as stop-over habitat during migration. The Proposed Action Alternatives would not remove any of this habitat. BMPs would be used to ensure impacts are minimized to Pickwick Reservoir and in turn to aquatic life on which loons may feed.

TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. Due to the small area of habitat proposed for removal (0.35 acres of forest), the lower quality of the habitat proposed for removal, and the relative abundance of similarly suitable habitat immediately adjacent to the Study Area, the Proposed Action Alternatives are not expected to impact populations of these migratory bird species.

4.5 Threatened and Endangered Species

4.5.1 Plants

4.5.1.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to protected plant species would occur.

4.5.1.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. Both state and federal lists of protected plant species were reviewed as part of this EA, and habitats were evaluated within the Study Area. No state- or federally listed plant species or habitat for such species were determined to be located in the Study Area; therefore, no impacts are anticipated to threatened or endangered plant species.

4.5.2 Aquatic Species

4.5.2.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to aquatic species and their habitats would occur.

4.5.2.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. The new intake would be installed via directional boring or via conventional excavation and supporting the remaining pipe segments on structural steel cross members supported by H-piles or micro piles driven into the overburden of the lake bottom. It was determined that no suitable habitat for any of the species listed in Table 3-3 occurs within the footprint of the proposed water intake pipe. BMPs would be implemented during construction to prevent suspended solids from drifting off the project site and into suitable habitat that may occur within the vicinity.

4.5.3 Terrestrial Animals

4.5.3.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to protected terrestrial animal species and their habitats would occur.

4.5.3.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. Approximately 0.86 acres of land would be disturbed and approximately 0.35 acres of forest would be removed. The reservoir would either be impacted by directional boring or a combination of construction techniques including excavation and installation of pipe support systems. Impacts to threatened and endangered terrestrial animal species would be the same regardless of which Proposed Action Alternative was selected.

Six species were identified based on the potential for their occurrence in the Study Area, as listed in Table 3-4. All of the species have the potential to utilize the Study Area. No bald eagle nests would be impacted by the Proposed Action Alternatives, as the closest extant nest is approximately 2.6 miles away from the Study Area. Bald eagle foraging habitat exists in the Study Area over Pickwick Reservoir. BMPs would be implemented during construction to minimize impacts (e.g., sedimentation) in the reservoir. Both Proposed Action Alternatives would be performed in compliance with the National Bald Eagle Management Guidelines. With

the use of BMPs, bald eagles would not be significantly impacted by the Proposed Action Alternatives.

The presence of hellbender in impounded sections of the Tennessee River, including Pickwick Landing Dam, is unlikely. BMPs would be implemented during construction to minimize impacts (e.g., sedimentation) in the reservoir. Due to the low likelihood of the occurrence of this species in the Study Area and the use of BMPs, populations of hellbender are not expected to be significantly impacted by the Proposed Action Alternatives.

Western pygmy rattlesnake may occur in the terrestrial portion of the Study Area. 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 inactive/hibernation or reproductive/birthing seasons. Current vegetation removal is likely to occur in spring/early summer. At this time of year, the species should be mobile (babies are born in August or September), although mating may be occurring at this time. Habitat removal likely would disperse mobile individuals into surrounding areas in an attempt to find new food sources, shelter sources, and to reestablish territories. Due to the timing of the proposed vegetation removal when individuals are mobile, and the subsequent decreased potential for mortality events, the relative abundance of similarly suitable habitat nearby, and the small amount of habitat removal, the Proposed Action Alternatives are not expected to significantly impact populations of western pygmy rattlesnake.

No caves or other hibernacula for gray bat, Indiana bat, or northern long-eared bat exist in the Study Area and are not expected to be impacted by the Proposed Action Alternatives. No suitable summer roosting habitat for Indiana bat and northern long-eared bat occurs in the Study Area. However, the forested section does offer foraging habitat for Indiana and northern long-eared bat. Pickwick Reservoir offers foraging habitat and sources of drinking water for all three bat species within and adjacent to the Study Area.

A number of activities associated with the proposed Study Area were addressed in TVA's programmatic consultation with the USFWS on routine actions and federally listed bats in accordance with ESA Section 7(a)(2) and completed in April 2018. For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. These activities and associated conservation measures are identified on page 5 of the TVA Bat Strategy Project Screening Form (Appendix B) and would be reviewed/implemented as part of the proposed project.

4.6 Natural Areas, Parks, and Recreation

4.6.1.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to natural areas, parks, and recreational resources would occur.

4.6.1.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. Construction activities will occur directly adjacent to Pickwick Landing State Park. These activities would include directional boring of the water line or installation of the water line by conventional construction techniques. While there would be no direct impacts to

the state park as the construction footprint lies outside the state park, there is potential for indirect impacts associated with construction. These impacts would include disruption of traffic patterns and an increase in dust and noise emissions. However, the portion of the park that is closest to the Study Area is undeveloped woodland with over 300 feet of buffer between the construction area and the park. This distance, coupled with BMPs, will serve to mitigate indirect impacts.

Under either Proposed Action Alternative, the establishment of a project construction staging area would require temporary closure of the road that passes through the State Park. This would temporarily restrict public access to the dam. However, because this area receives light use and other locations such as the right bank below Pickwick Landing Dam are available for bank fishing, impacts would be minor. Closure of this road would also temporarily restrict vehicular access to Pickwick Landing State Park. With the exception of summer season special events such as festivities held on July 4, this road does not represent a significant means of access to and egress from the park. Therefore, depending on the project schedule, impacts to park users are likely to be minor.

For all remaining natural areas, parks, and recreation facilities, there would be no direct or indirect impacts from the proposed project activities given the distance between these resources and the Study Area.

Overall, impacts to natural areas resulting from either Proposed Action Alternative are anticipated to be minor and insignificant. Indirect impacts from construction activities would be minimized through the use of BMPs implemented during construction to minimize dust emissions. In addition, work activities would generally be restricted to weekdays during normal working hours and would only occur for the duration of construction activities.

4.7 Air Quality

4.7.1.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to air quality would occur.

4.7.1.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. This would result in temporary impacts and localized impacts to air quality from the use of construction equipment. Operation of vehicles and equipment could lead to increases in criteria pollutant emissions, but air quality impacts from construction activities and transportation of materials to the construction areas would be temporary and manageable through adjustment of the intensity of activity and implementation of control measures such as dust suppression. In addition, contractors completing the construction will be required to ensure the gasoline and diesel fueled trucks and other construction equipment being used complies with USEPA standards for emissions. Construction equipment emissions are expected to be minimized through the use of proper maintenance, new emissions control technologies, and fuel standards along with the minimization of unnecessary heavy duty vehicle idling. Natural factors, such as wind speed, wind direction, soil moisture, and localized landforms would also influence the impacts to air quality; however, even under unusually adverse conditions (i.e., thunderstorms, tornados, high wind events), these emissions would cause a minor and short-

term impact on air quality and would not appreciably contribute to applicable ambient air quality standards. Overall, the direct air emissions impact of either Proposed Action Alternative would not be significant to local or regional air quality.

4.8 Transportation

4.8.1.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to transportation would occur.

4.8.1.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. Approximately 0.10 miles of roadways would be temporarily impacted by a minor increase in traffic volume from construction vehicles or employees commuting to and from the project area. Construction traffic would impact Playground Loop and the State Park Road due to access. State Highway 128 is a through route to the project and would likely be used for hauling materials and equipment to the site. FUDHC's flagger would let truck and equipment operators know when they can access the highway without endangering motorists or causing a stop condition. Signage would also be placed to alert drivers that they are entering a construction area. Any impacts to transportation from project activities would be temporary and minimized with the use of signage and flagging.

4.9 Utilities

4.9.1.1 No Action Alternative

Under the No Action Alternative, relocation of the existing raw water intake line would not occur. Construction of the upstream berm footprint for the Pickwick Landing Dam improvements project may potentially damage the existing raw water intake line and screen. Damage to the existing intake line could impact FUDHC's ability to supply water to its customers.

4.9.1.2 Alternative B and Alternative C

Under the Proposed Action Alternatives, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. Relocating the raw water intake would have minimal impacts to existing utilities in the area. No impacts would occur to hydroelectric power generation from the Proposed Action. The two existing water supply intakes would be temporarily minimally impacted. A potential increase in turbidity at intakes from construction of the proposed relocated FUDHC intake line is possible, but those impacts would be minimized through BMPs such as turbidity curtains. Coordination will occur with electric utilities in the study area should lines need to be temporarily moved or marked for construction equipment access or use.

4.10 Solid Waste

4.10.1.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to solid waste management would occur.

4.10.1.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. Construction associated with either Proposed Action Alternative would generate nonhazardous solid waste. BMPs such as secondary containment for oils/lubricants/fuels, on-site spill containment and remediation supplies, and recurring personnel training would be implemented throughout construction to minimize the possibility of spills and to dictate appropriate mitigation measures in the event of a spill.

Overall, adverse direct and indirect impacts on solid waste management would be minor and temporary because of the nonhazardous nature of the fill materials associated with the Proposed Action Alternatives. Implementation of BMPs and employee/construction contractor training for spill avoidance and spill response/clean-up as a component of the construction work plan would further reduce adverse impacts on solid waste management associated with the Proposed Action. In addition, any waste generated will be managed in accordance with the Solid and Hazardous Waste Rules and Regulation of the State of Tennessee (TDEC DSWM Rule 0400 Chapters 11 and 12, respectively).

4.11 Socioeconomic Conditions and Environmental Justice

4.11.1.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to socioeconomic conditions or environmental justice would occur.

4.11.1.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. This action would have no impact to socioeconomic conditions or environmental justice. Temporary increases in employment may occur as a result of job opportunities during construction, but these are not likely to contribute significantly toward the economy of the region. Because of the nature and location of the proposed project, there would be no potential for disproportionate health or environmental effects on minorities or low-income populations or communities.

4.12 Cultural Resources

4.12.1.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to cultural resources would occur.

4.12.1.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. This would allow the new intake line to be placed into service and operation before the existing line is abandoned, thereby minimizing risk of loss of water supply to the FUDHC and its customers. Prior to the construction of Pickwick Landing Dam, the APE setting

was in a drainage, an unlikely location for archaeological deposits. Furthermore, available data shows that the APE has been disturbed by multiple construction projects.

TVA consulted with the Tennessee SHPO via letter dated June 14, 2019. In a letter dated June 25, 2019, the Tennessee SHPO concurred with TVA's finding of no effect (Appendix C). Pursuant to 36 CFR § 800.3(f)(2), in a letter dated June 18, 2019, TVA consulted with federally recognized Indian tribes regarding historic properties within the APE that may be of religious and cultural significance and are eligible for the NRHP. TVA received responses from the Chicksaw Nation, the Jena Band of Choctaw Indians, and the Shawnee Tribe. None of the tribes objected to the project (Appendix C).

4.13 Noise Levels

4.13.1.1 No Action Alternative

Under the No Action Alternative, the proposed raw water intake would not be built and no direct or indirect impacts to noise levels would occur.

4.13.1.2 Alternative B and Alternative C

Under either Proposed Action Alternative, FUDHC would install a new raw water intake line from the existing pump station. TVA would grant FUDHC a permanent easement, issue a Section 26a permit, and issue a temporary construction license within Pickwick Reservoir for the relocated intake. Elevated noise levels would occur during clearing and grubbing activities associated with removal of trees and vegetation for construction access. Additional noise sources would occur with construction equipment delivering materials to the site and equipment necessary for placement of the materials. The noise levels associated with the activities would periodically increase or decrease in intensity as the construction activities vary. The noise from some construction activities and truck/equipment usage would be similar to the noise currently generated from roadway traffic along State Highway 128 and/or from motorized watercraft on the reservoir. Either Proposed Action Alternative would increase the duration and frequency of such noise during project activities.

As shown in Table 4-1, typical noise levels from construction equipment are expected to be 85 dBA or less at a distance of 50 feet from the construction area. Construction noise would cause temporary and short-term adverse impacts on the ambient sound environment in the vicinity of the Study Area. These noise levels would typically diminish with distance from the project site at a rate of approximately 6 dBA per each doubling of distance.

Therefore, noise would be expected to attenuate to the recommended HUD noise guideline of 65 dBA at approximately 500 feet; however, the levels at this distance would be greater than the USEPA guideline of 55 dBA.

Table 4-1. Maximum Noise Levels at 50 feet for Common Construction Equipment

Equipment Type	Maximum Noise Level at 50 feet (dBA)
Air compressor	80
Auger drill	85
Backhoe	80
Boring jack power unit	80
Compactor (ground)	80
Concrete truck	85
Crane – boom truck	85

Source: USDOT 2006

The elevations in noise levels beyond the ambient noise levels in the area would be intermittent and temporary and cease when construction is complete. TVA anticipates that the construction and activities associated with implementing the Proposed Action would occur during daylight hours (about 10 hours a day) of the 5-day work week. Activities may occur on weekend days and within nighttime hours if determined that work is necessary to meet time-critical construction activities. It is estimated that it will take less than 1 year to complete the project construction. TVA and its contractors have discretion to establish the start, end, and duration of work days.

Although the area surrounding the Study Area is primarily forested and undeveloped land with no residential properties, there are several noise receptors including recreational facilities at Pickwick Landing State Park that would be temporarily affected by construction noise. The State Park picnic area and swim beach are located in the east-central portion of the Study Area and expand further outside the Study Area to the east and northeast. The Pickwick Landing State Park Inn and Conference Center is located approximately 600 feet east of the Study Area. Intermittent and temporary noise levels at the swim area may exceed the HUD guidelines for a residential area (65 dBA). However, levels at the inn (at 600 feet distance) would be below the HUD guideline of 65 dBA. While noticeable, these levels are expected to be minor given that they would be temporary, intermittent, and primarily occur only during the daytime.

The great distance from the construction area to the nearest residences, other park facilities, and other noise receptors would reduce the minor and temporary adverse impacts on noise levels. The expanse of the reservoir, fencing, and existing land coverage would serve as a buffer to most noise receptors adjacent to the Study Area. Restricting construction activities primarily to daylight hours further reduces the potential impacts to park visitors.

Upon completion of construction activities under the Proposed Action, noise levels associated with construction would cease and the ambient sound environment is expected to return to pre-construction levels. Therefore, the Proposed Action would not affect noise levels after construction is complete.

4.14 Cumulative Impacts

Cumulative effects are environmental effects that, on their own, may not be significant, but when combined with similar effects over time, result in significant effects. Cumulative impacts are an important part of the environmental analysis because they allow decision makers to evaluate not only the impacts of an individual proposed project, but the overall impacts on a specific resource, ecosystem, or human community over time from several different projects. TVA is not aware of any other projects occurring in the vicinity of the proposed raw water intake line relocation with the potential to contribute to cumulative impacts other than the currently underway seismic upgrade project.

There are no other actions proposed that would result in additional direct or cumulative impacts when combined with the Proposed Action Alternatives. Therefore, relocation of the FUDHC's raw water intake project including obtaining a permanent easement, Section 26a permit, and temporary construction license within Pickwick Reservoir for FUDHC raw water intake line relocation is anticipated to have only minor cumulative impacts, when considering the foreseeable actions proposed in the project's vicinity. The previous sections of this EA detail the direct impacts of the Proposed Action Alternatives and are summarized in Table 2-1.

4.15 Unavoidable Adverse Environmental Impacts

Unavoidable impacts constitute a substantial adverse change to existing environmental conditions that cannot be fully mitigated by implementing mitigation measures. FUDHC would be committed to implementing BMPs to minimize or eliminate potential impacts from

constructing the proposed project. If additional impacts are identified through other federal, state, or county permitting processes, FUDHC would develop appropriate mitigation measures in consultation with the requesting agency (i.e., USFWS and USACE).

Some biological resources would be lost due to the construction of the FUDHC's raw water intake line relocation project. Construction of the project would result in the permanent loss of a relatively small amount of native vegetation and wildlife habitat. As noted, mitigation in the form of BMPs would be provided for potential temporary adverse impacts to environmental resources. No mitigation is proposed for impacts to the small area of native vegetation or wildlife habitat.

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

The proposed project would require clearing and a permanent maintenance corridor for the proposed raw water intake line relocation within the approximate 1.21-acre FUDHC easement. There would be short-term impacts from the temporary use of the construction access area for material/equipment storage.

Surface disturbance would produce short-term disruption of the ecosystem and soils. Ecological productivity would be reduced temporarily during construction staging activities, but such impacts would not continue in the long term. There could be some short-term alteration of surface-water drainage patterns, but natural drainage patterns would be restored following construction. Some temporary mobile-source emissions would be produced in the short term from construction activities, but there would be no long-term effects.

4.17 Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources include the use or consumption of non-renewable resources as a result of a decision or implementing a proposed action. The use of fuel and electric energy to operate the equipment necessary for construction of the Proposed Action Alternatives represents an irreversible use of resources.

Irretrievable resource commitments involve the use or commitment of resources for a period of time, even a long period. Regarding the proposed project, the conversion of existing forested areas to open herbaceous areas maintained for access would represent an irretrievable resource commitment in the loss of potential timber production in a previously forested area or the loss of habitat for wildlife species including those which are or may be federally listed.

CHAPTER 5 – LIST OF PREPARERS

Table 5-1 summarizes the expertise and contribution made to the EA by the Project Team.

Table 5-1. Environmental Assessment Project Team

Name/Education	Experience	Project Role
TVA		
J. Taylor Cates M.S., Environmental Science B.S., Biochemistry	4 years NEPA compliance and document preparation	NEPA Project Manager
Caitlin Fitzpatrick B.S and M.S., Environmental Policy	9 Years ecological, biological, and NEPA Documentation preparation	NEPA Project Manager
Elizabeth B. Hamrick *M.S., Wildlife,* *B.S., Biology*	11 years in biological surveys and environmental reviews	Threatened and Endangered Species (terrestrial animals), ecological resources (wildlife)
Michaelyn Harle *Ph.D., Anthropology*	19 years in archaeology and cultural resource management	Archaeology and Cultural Resources
Robert Marker *B.S., Recreation Resources Management*	45 years in recreation planning and management	Recreation
Craig L. Philips *M.S. and B.S Wildlife and Fisheries Science*	10 years Sampling and Hydrologic Determinations for Streams and Wet-Weather Conveyances; 9 years in Environmental Reviews	Aquatic Ecology
Kim Pilarski-Hall *M.S. Geography, Minor Ecology*	21 years in Wetlands Assessment and Delineation	Natural Areas and Wetlands
Gary Springston *M.S. and B.S. Civil Engineering*	33 years in water resource management	Water Supply Specialist
Chevales Williams *B.S., Environmental Engineering*	14 years in water quality monitoring and compliance; 12 years in NEPA planning and environmental services	Surface Water and Water Quality
Lori Whitehorse *B.S., Plant and Soil Science*	16 years in environmental regulatory compliance	NEPA Compliance, Waste
Julie Reed	Attorney, TVA Office of General Counsel	Editorial review and legal council
HDR		
Mark Filardi, PG *M.S. and B.S., Geology*	20+ years in geological and hydrogeological assessments	Geology and Groundwater
Carey Fraser *B.A., English*	19+ years in technical editing	Technical editor
Cheryl Hannah *B.A., Political Science*	20+ years in NEPA planning	NEPA compliance and document preparation
Vickie Miller, AICP, PWS *B.S., Environmental Science, M.S., Natural Resources*	20+ years in NEPA planning and environmental services	NEPA compliance and document preparation

Name/Education	Experience	Project Role
Eric Mularski, PWS *B.S., Biology*	17+ years in NEPA planning and environmental services	NEPA compliance and document preparation
Jacob Ruffing, PG *B.S., Geology*	10+ years in geologic, hydrogeologic, geotechnical, and environmental assessments	Geology and Groundwater
Shane Womack, P.E. *B.S. Civil Engineering*	25+ years in project management and engineering services	Project management and coordination

CHAPTER 6 – ENVIRONMENTAL ASSESSMENT RECIPIENTS

6.1 Federal Agencies

- U.S. Army Corps of Engineers, Nashville and/or Memphis District
- U.S. Army Corps of Engineers, Nashville Regulatory Branch
- U.S Coast Guard
- U.S. Department of Agriculture, Natural Resources Conservation Service
- U.S. Fish and Wildlife Service, Cookeville, Tennessee
- U.S. National Park Service, Shiloh National Military Park

6.2 Federally Recognized Tribes

- Absentee Shawnee Tribe of Indians of Oklahoma
- Cherokee Nation
- Eastern Band of Cherokee Indians
- Eastern Shawnee Tribe of Oklahoma
- Jena Band of Choctaw Indians
- The Chickasaw Nation
- The Muscogee (Creek) Nation
- Shawnee Tribe
- United Keetoowah Band of Cherokee

6.3 State Agencies

- Southwest Tennessee Development District
- Tennessee Department of Agriculture
- Tennessee Department of Economic and Community Development
- Tennessee Department of Environment and Conservation
  - Bureau of Parks and Conservation
  - Division of Environment
  - Division of Natural Areas
  - Division of Natural Heritage
  - Pickwick Landing State Park
  - State Parks
- Tennessee Department of Transportation
- Tennessee Emergency Management Agency
- Tennessee Historical Commission
- Tennessee Wildlife Resources Agency

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CHAPTER 7 – LITERATURE CITED

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APPENDIX A – FIGURES

APPENDIX B – TVA'S BAT STRATEGY PROJECT SCREENING FORM

Project Review Form - TVA Bat Strategy *(06/2019)*

*This form should **only** be completed if project includes activities in Tables 2 or 3 (STEP 2 below). This form is not required if project activities are limited to Table 1 (STEP 2) or otherwise determined to have no effect on federally listed bats. If so, include the following statement in your environmental compliance document (e.g., add as a comment in the project CEC): "Project activities limited to Bat Strategy Table 1 or otherwise determined to have no effect on federally listed bats. Bat Strategy Project Review Form NOT required." This form is to assist in determining required conservation measures per TVA's ESA Section 7 programmatic consultation for routine actions and federally listed bats.*[1]

Project Name: Pickwick Landing Dam FUDHC Raw Water Intake Line Relocation **Date:** Jul 26, 2019

Contact(s): Taylor Cates **CEC#:** **Project ID:** 34637

Project Location (City, County, State): Hardin County, TN

Project Description:

The proposed project is to install a new raw water line from the existing pump station to a new intake. The First Utility District of Hardin County (FUDHC) has an existing raw water intake line and screen within the construction limits of the upstream berm footprint of the proposed dam improvements. In order to mitigate any risk of damage to the line or intake, FUDHC proposes to relocate raw water line.

SECTION 1: PROJECT INFORMATION - ACTION AND ACTIVITIES

STEP 1) Select TVA Action. If none are applicable, contact environmental support staff, Environmental Project Lead, or Terrestrial Zoologist to discuss whether form (i.e., application of Bat Programmatic Consultation) is appropriate for project:

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

STEP 2) Select all activities from Tables 1, 2, and 3 below that are included in the proposed project.

TABLE 1. Activities with no effect to bats. Conservation measures & completion of bat strategy project review form NOT required.

☐ 1. Loans and/or grant awards	☐ 8. Sale of TVA property	☐ 19. Site-specific enhancements in streams and reservoirs for aquatic animals
☐ 2. Purchase of property	☐ 9. Lease of TVA property	☐ 20. Nesting platforms
☐ 3. Purchase of equipment for industrial facilities	☐ 10. Deed modification associated with TVA rights or TVA property	☐ 41. Minor water-based structures (this does not include boat docks, boat slips or piers)
☐ 4. Environmental education	☐ 11. Abandonment of TVA retained rights	☐ 42. Internal renovation or internal expansion of an existing facility
☐ 5. Transfer of ROW easement and/or ROW equipment	☐ 12. Sufferance agreement	☐ 43. Replacement or removal of TL poles
☐ 6. Property and/or equipment transfer	☐ 13. Engineering or environmental planning or studies	☐ 44. Conductor and overhead ground wire installation and replacement
☑ 7. Easement on TVA property	☐ 14. Harbor limits delineation	☐ 49. Non-navigable houseboats

TABLE 2. Activities not likely to adversely affect bats with implementation of conservation measures. Conservation measures and completion of bat strategy project review form REQUIRED; review of bat records in proximity to project NOT required.		
☐ 18. Erosion control, minor	☐ 57. Water intake - non-industrial	☐ 79. Swimming pools/associated equipment
☐ 24. Tree planting	☐ 58. Wastewater outfalls	■ 81. Water intakes – industrial
☐ 30. Dredging and excavation; recessed harbor areas	☐ 59. Marine fueling facilities	☐ 84. On-site/off-site public utility relocation or construction or extension
☐ 39. Berm development	☐ 60. Commercial water-use facilities (e.g., marinas)	☐ 85. Playground equipment - land-based
☐ 40. Closed loop heat exchangers (heat pumps)	☐ 61. Septic fields	☐ 87. Aboveground storage tanks
☐ 45. Stream monitoring equipment - placement and use	☐ 66. Private, residential docks, piers, boathouses	☐ 88. Underground storage tanks
☐ 46. Floating boat slips within approved harbor limits	☐ 67. Siting of temporary office trailers	☐ 90. Pond closure
■ 48. Laydown areas	☐ 68. Financing for speculative building construction	☐ 93. Standard License
☐ 50. Minor land based structures	☐ 72. Ferry landings/service operations	☐ 94. Special Use License
☐ 51. Signage installation	☐ 74. Recreational vehicle campsites	☐ 95. Recreation License
☐ 53. Mooring buoys or posts	☐ 75. Utility lines/light poles	☐ 96. Land Use Permit
☐ 56. Culverts	☐ 76. Concrete sidewalks	

Table 3: Activities that may adversely affect federally listed bats. Conservation measures AND completion of bat strategy project review form REQUIRED; review of bat records in proximity of project REQUIRED by OSAR/Heritage eMap reviewer or Terrestrial Zoologist.		
☐ 15. Windshield and ground surveys for archaeological resources	■ 34. Mechanical vegetation removal, includes trees or tree branches > 3 inches in diameter	☐ 69. Renovation of existing structures
☐ 16. Drilling	☐ 35. Stabilization (major erosion control)	☐ 70. Lock maintenance/ construction
■ 17. Mechanical vegetation removal, does not include trees or branches > 3" in diameter (in Table 3 due to potential for woody burn piles)	☐ 36. Grading	☐ 71. Concrete dam modification
☐ 21. Herbicide use	☐ 37. Installation of soil improvements	☐ 73. Boat launching ramps
☐ 22. Grubbing	☐ 38. Drain installations for ponds	☐ 77. Construction or expansion of land-based buildings
☐ 23. Prescribed burns	☐ 47. Conduit installation	☐ 78. Wastewater treatment plants
☐ 25. Maintenance, improvement or construction of pedestrian or vehicular access corridors	☐ 52. Floating buildings	☐ 80. Barge fleeting areas
☐ 26. Maintenance/construction of access control measures	☐ 54. Maintenance of water control structures (dewatering units, spillways, levees)	☐ 82. Construction of dam/weirs/ levees
☐ 27. Restoration of sites following human use and abuse	☐ 55. Solar panels	■ 83. Submarine pipeline, directional boring operations
☐ 28. Removal of debris (e.g., dump sites, hazardous material, unauthorized structures)	☐ 62. Blasting	☐ 86. Landfill construction
☐ 29. Acquisition and use of fill/borrow material	☐ 63. Foundation installation for transmission support	☐ 89. Structure demolition
☐ 31. Stream/wetland crossings	☐ 64. Installation of steel structure, overhead bus, equipment, etc.	☐ 91. Bridge replacement
☐ 32. Clean-up following storm damage	☐ 65. Pole and/or tower installation and/or extension	☐ 92. Return of archaeological remains to former burial sites
☐ 33. Removal of hazardous trees/tree branches		

STEP 3) Project includes one or more activities in Table 3? ◉ **YES (Go to Step 4)** ○ **NO (Go to Step 13)**

Project Review Form - TVA Bat Strategy *(06/2019)*

STEP 4) Answer questions *a* through *e* below (applies to projects with activities from Table 3 ONLY)

a) Will project involve continuous noise (i.e., ≥ 24 hrs) that is greater than 75 decibels measured on the A scale (e.g., loud machinery)?
- (●) **NO** (NV2 does not apply)
- ( ) **YES** (NV2 applies, subject to records review)

b) Will project involve entry into/survey of cave?
- (●) **NO** (HP1/HP2 do not apply)
- ( ) **YES** (HP1/HP2 applies, subject to review of bat records)

c) If conducting **prescribed burning** (**activity 23**), estimated acreage**:** [ ] and timeframe(s) below; [■] **N/A**

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

d) Will the project involve vegetation piling/burning?
- (●) **NO** (SSPC4/ SHF7/SHF8 do not apply)
- ( ) **YES** (SSPC4/SHF7/SHF8 applies, subject to review of bat records)

e) If **tree removal (activity 33 or 34)**, estimated amount: [0.2] (●) **ac** ( ) **trees** ( ) **N/A**

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

If warranted, does project have flexibility for bat surveys (May 15-Aug 15): ( ) **MAYBE** ( ) **YES** (●) **NO**

**** For **PROJECT LEADS** whose projects will be reviewed by a Heritage Reviewer (Natural Resources Organization only), **STOP HERE**. Click File/ Save As, name form as "ProjectLead_BatForm_CEC-or-ProjectIDNo_Date", and submit with project information. Otherwise continue to Step 5. ****

SECTION 2: REVIEW OF BAT RECORDS (applies to projects with activities from Table 3 ONLY)

STEP 5) Review of bat/cave records conducted by Heritage/OSAR reviewer?

(●) **YES** ( ) **NO** (Go to Step 13)

Info below completed by:
- ☐ **Heritage Reviewer** (name) [ ] Date [ ]
- ☐ **OSAR Reviewer** (name) [ ] Date [ ]
- [■] **Terrestrial Zoologist** (name) [Elizabeth Hamrick] Date [Sep 4, 2019]

Gray bat records: ☐ None ☐ Within 3 miles* ☐ Within a cave* ☒ Within the County

Indiana bat records: ☒ None ☐ Within 10 miles* ☐ Within a cave* ☐ Capture/roost tree* ☐ Within the County

Northern long-eared bat records: ☐ None ☐ Within 5 miles* ☐ Within a cave* ☒ Capture/roost tree* ☒ Within the County

Virginia big-eared bat records: ☒ None ☐ Within 6 miles* ☐ Within the County

Caves: ☒ None within 3 mi ☐ Within 3 miles but > 0.5 mi ☐ Within 0.5 mi but > 0.25 mi* ☐ Within 0.25 mi but > 200 feet* ☐ Within 200 feet*

Bat Habitat Inspection Sheet completed? (●) **NO** ( ) **YES**

Amount of SUITABLE habitat to be removed/burned (may differ from STEP 4e): [0] (●) **ac** ( ) **trees)*** ( ) **N/A**

Project Review Form - TVA Bat Strategy *(06/2019)*

STEP 4) Answer questions *a* through *e* below (applies to projects with activities from Table 3 ONLY)

a) Will project involve continuous noise (i.e., ≥ 24 hrs) that is greater than 75 decibels measured on the A scale (e.g., loud machinery)?
- (●) **NO** (NV2 does not apply)
- ( ) **YES** (NV2 applies, subject to records review)

b) Will project involve entry into/survey of cave?
- (●) **NO** (HP1/HP2 do not apply)
- ( ) **YES** (HP1/HP2 applies, subject to review of bat records)

c) If conducting **prescribed burning (activity 23)**, estimated acreage: [ ] and timeframe(s) below; ■ **N/A**

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

d) Will the project involve vegetation piling/burning?
- (●) **NO** (SSPC4/ SHF7/SHF8 do not apply)
- ( ) **YES** (SSPC4/SHF7/SHF8 applies, subject to review of bat records)

e) If **tree removal (activity 33 or 34)**, estimated amount: [0.35] (●) **ac** ( ) **trees** ( ) **N/A**

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

If warranted, does project have flexibility for bat surveys (May 15-Aug 15): ( ) **MAYBE** ( ) **YES** (●) **NO**

**** For **PROJECT LEADS** whose projects will be reviewed by a Heritage Reviewer (Natural Resources Organization only), **STOP HERE**. Click File/ Save As, name form as "ProjectLead_BatForm_CEC-or-ProjectIDNo_Date", and submit with project information. Otherwise continue to Step 5. ****

SECTION 2: REVIEW OF BAT RECORDS (applies to projects with activities from Table 3 ONLY)

STEP 5) Review of bat/cave records conducted by Heritage/OSAR reviewer?

(●) **YES** ( ) **NO** (Go to Step 13)

Info below completed by:				
☐ **Heritage Reviewer**	(name)		Date	
☐ **OSAR Reviewer**	(name)		Date	
■ **Terrestrial Zoologist**	(name)	Elizabeth Hamrick	Date	Sep 4, 2019

Gray bat records: ☐ None ☐ Within 3 miles* ☐ Within a cave* ☒ Within the County

Indiana bat records: ☒ None ☐ Within 10 miles* ☐ Within a cave* ☐ Capture/roost tree* ☐ Within the County

Northern long-eared bat records: ☐ None ☐ Within 5 miles* ☐ Within a cave* ☒ Capture/roost tree* ☒ Within the County

Virginia big-eared bat records: ☒ None ☐ Within 6 miles* ☐ Within the County

Caves: ☒ None within 3 mi ☐ Within 3 miles but > 0.5 mi ☐ Within 0.5 mi but > 0.25 mi* ☐ Within 0.25 mi but > 200 feet* ☐ Within 200 feet*

Bat Habitat Inspection Sheet completed? (●) **NO** ( ) **YES**

Amount of SUITABLE habitat to be removed/burned (may differ from STEP 4e): [0] (●) **ac** ( ) **trees)*** ( ) **N/A**

Project Review Form - TVA Bat Strategy *(06/2019)*

STEP 6) Provide any additional notes resulting from Heritage Reviewer records review in Notes box below then . . . . . Go to Step 13

Notes from Bat Records Review (e.g., historic record; bats not on landscape during action; DOT bridge survey with negative results):

STEPS 7-12 To be Completed by Terrestrial Zoologist (if warranted):

STEP 7) Project will involve:

- ☐ Removal of suitable trees within 0.5 mile of P1-P2 Indiana bat hibernacula or 0.25 mile of P3-P4 Indiana bat hibernacula or any NLEB hibernacula.
- ☐ Removal of suitable trees within 10 miles of documented Indiana bat (or within 5 miles of NLEB) hibernacula.
- ☐ Removal of suitable trees > 10 miles from documented Indiana bat (> 5 miles from NLEB) hibernacula.
- ☐ Removal of trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity roost tree.
- ☐ Removal of suitable trees within 2.5 miles of Indiana bat roost trees or within 5 miles of Indiana bat capture sites.
- ☐ Removal of suitable trees > 2.5 miles from Indiana bat roost trees or > 5 miles from Indiana bat capture sites.
- ☐ Removal of documented Indiana bat or NLEB roost tree, if still suitable.
- ☒ N/A

STEP 8) Presence/absence surveys were/will be conducted: ○ **YES** ◉ **NO** ○ **TBD**

STEP 9) Presence/absence survey results, on _____ ○ **NEGATIVE** ○ **POSITIVE** ◉ **N/A**

STEP 10) Project ○ **WILL** ◉ **WILL NOT** require use of Incidental Take in the amount of _____ ○ **acres or** ○ **trees** proposed to be used during the ○ **WINTER** ○ **VOLANT SEASON** ○ **NON-VOLANT SEASON** ■ **N/A**

STEP 11) Available Incidental Take (prior to accounting for this project) as of _____

TVA Action	Total 20-year	Winter	Volant Season	Non-Volant Season
3 Manage Land Use and Disposal of TVA-Retained Land				

STEP 12) Amount contributed to TVA's Bat Conservation Fund upon activity completion: $ _____ OR ◉ **N/A**

TERRESTRIAL ZOOLOGISTS, after completing SECTION 2, review Table 4, modify as needed, and then complete section for Terrestrial Zoologists at end of form.

SECTION 3: REQUIRED CONSERVATION MEASURES

STEP 13) Review Conservation Measures in Table 4 and ensure those selected are relevant to the project. If not, manually override and uncheck irrelevant measures, and explain why in ADDITIONAL NOTES below Table 4.

Did review of Table 4 result in ANY remaining Conservation Measures in **RED**?

- ○ **NO** (Go to Step 14)
- ◉ **YES** (STOP HERE; Submit for Terrestrial Zoology Review. Click File/Save As, name form as "ProjectLead_BatForm_CEC-or-ProjectIDNo_Date", and submit with project information).

Project Review Form - TVA Bat Strategy *(06/2019)*

Table 4. TVA's ESA Section 7 Programmatic Bat Consultation Required Conservation Measures

The Conservation Measures in Table 4 are automatically selected based on your choices in Tables 2 and 3 but can be manually overridden, if necessary. To Manually override, press the button and enter your name.

Manual Override

Name: Elizabeth Hamrick

Check if Applies to Project	Activities Subject To Conservation Measure	Conservation Measure Description
☑	15, 16, 17, 18, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 45, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 90, 91, 92, 93, 94, 95, 96	**NV1** - Noise will be short-term, transient, and not significantly different from urban interface or natural events (i.e., thunderstorms) that bats are frequently exposed to when present on the landscape.
☑	16, 17, 18, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 48, 50, 51, 52, 53, 54, 55, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 70, 71, 73, 76, 77, 78, 80, 81, 82, 83, 86, 87, 88, 89, 90	**SSPC2** - Operations involving chemical/fuel storage or resupply and vehicle servicing will be handled outside of riparian zones (streamside management zones) in a manner to prevent these items from reaching a watercourse. Earthen berms or other effective means are installed to protect stream channel from direct surface runoff. Servicing will be done with care to avoid leakage, spillage, and subsequent stream, wetland, or ground water contamination. Oil waste, filters, other litter will be collected and disposed of properly. Equipment servicing and chemical/fuel storage will be limited to locations greater than 300-ft from sinkholes, fissures, or areas draining into known sinkholes, fissures, or other karst features.

☑	16, 17, 18, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 61, 62, 63, 64, 65, 66, 67, 69, 70, 71, 73, 76, 77, 80, 81, 82, 83, 84, 86, 87, 88, 89, 90, 91	**SSPC3** (**Power Plants only**) - Power Plant actions and activities will continue to implement standard environmental practices. These include: ○ Best Management Practices (BMPs) in accordance with regulations: • Ensure proper disposal of waste, ex: used rags, used oil, empty containers, general trash, dependent on plant policy • Maintain every site with well-equipped spill response kits, included in some heavy equipment • Conduct Quarterly Internal Environmental Field Assessments at each sight • Every project must have an approved work package that contains an environmental checklist that is approved by sight Environmental Health & Safety consultant. • When refueling, vehicle is positioned as close to pump as possible to prevent drips, and overfilling of tank. Hose and nozzle are held in a vertical position to prevent spillage ○ Construction Site Protection Methods • Sediment basin for runoff - used to trap sediments and temporarily detain runoff on larger construction sites • Storm drain protection device • Check dam to help slow down silt flow • Silt fencing to reduce sediment movement ○ Storm Water Pollution Prevention (SWPP) Pollution Control Strategies • Minimize storm water contact with disturbed soils at construction site • Protect disturbed soil areas from erosion • Minimize sediment in storm water before discharge • Prevent storm water contact with other pollutants • Construction sites also may be required to have a storm water permit, depending on size of land disturbance (>1ac) ○ Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to • Minimize fuel and chemical use Ensure proper disposal of waste, ex: used rags, used oil, empty containers, general trash, dependent on plant policy • Maintain every site with well-equipped spill response kits, included in some heavy equipment • Conduct Quarterly Internal Environmental Field Assessments at each sight • Every project must have an approved work package that contains an environmental checklist that is approved by sight Environmental Health & Safety consultant. • When refueling, vehicle is positioned as close to pump as possible to prevent drips, and overfilling of tank. Hose and nozzle are held in a vertical position to prevent spillage ○ Construction Site Protection Methods • Sediment basin for runoff - used to trap sediments and temporarily detain runoff on larger construction sites • Storm drain protection device • Check dam to help slow down silt flow • Silt fencing to reduce sediment movement ○ Storm Water Pollution Prevention (SWPP) Pollution Control Strategies • Minimize storm water contact with disturbed soils at construction site • Protect disturbed soil areas from erosion • Minimize sediment in storm water before discharge • Prevent storm water contact with other pollutants • Construction sites also may be required to have a storm water permit, depending on size of land disturbance (>1ac) ○ Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to minimize fuel and chemical use
☑	16, 26, 36, 37, 38, 39, 48, 50, 52, 59, 60, 62, 66, 67, 69, 72, 75, 77, 78, 79, 86	**L2** - Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution when installing new or replacing existing permanent lights by angling lights downward or via other light minimization measures (e.g., dimming, directed lighting, motion-sensitive lighting).

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

Hide All Unchecked Conservation Measures

◉ HIDE

Project Review Form - TVA Bat Strategy *(06/2019)*

STEP 14) Save completed form (Click File/Save As, name form as "ProjectLead_BatForm_CEC-or-ProjectIDNo_Date") in project environmental documentation (e.g. CEC, Appendix to EA) AND send a copy of form to batstrategy@tva.gov
Submission of this form indicates that Project Lead/Applicant:

_____ (name) is (or will be made) aware of the requirements below.

- Implementation of conservation measures identified in Table 4 is required to comply with TVA's Endangered Species Act programmatic bat consultation.
- TVA may conduct post-project monitoring to determine if conservation measures were effective in minimizing or avoiding impacts to federally listed bats.

For Use by Terrestrial Zoologist Only

☒ Terrestrial Zoologist acknowledges that Project Lead/Contact (name) Lawanda Hayes has been informed of any relevant conservation measures and/or provided a copy of this form.

☐ For projects that require use of Take and/or contribution to TVA's Bat Conservation Fund, Terrestrial Zoologist acknowledges that Project Lead/Contact has been informed that project will result in use of Incidental Take _____ ○ ac ○ trees and that use of Take will require $ _____ contribution to TVA's Conservation Fund upon completion of activity (amount entered should be $0 if cleared in winter).

For Terrestrial Zoology Use Only. Finalize and Print to Noneditable PDF.

APPENDIX C – CULTURAL RESOURCES CONSULTATION DOCUMENTATION

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

June 14, 2019

Mr. E. Patrick McIntyre, Jr.
Executive Director
and State Historic Preservation Officer
Tennessee Historical Commission
2941 Lebanon Pike
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA), PROPOSED RAW WATER INTAKE LINE UTILITY RELOCATION, PICKWICK DAM RESERVATION, HARDIN COUNTY, TENNESSEE (-88.241676, 35.056316)

A project for TVA is currently under way at Pickwick Landing Dam to improve performance of the south embankment during and following a potential large earthquake event. TVA has consulted with your office in regard to this project on multiple occasions (February 25, 2016; June 21, 2016; May 23, 2018) stating that activities would result in no effect, or no adverse effect on historic properties. Your office has concurred on all activities (March 7, 2016; June 28, 2016; May 15, 2018).

The First Utility District of Hardin County (FUDHC) has an existing raw water intake line, and screen assembly immediately upstream of the south embankment and within the construction limits of the upstream berm footprint of the dam improvements. In order to mitigate any risk of damage to the line or intake, FUDHC proposes to relocate both the raw water line and intake screen to a location outside the construction limits of the project (Figures 1 and 2).

Multiple alternatives were considered. A “do nothing” alternative was discarded since damage to the intake facilities was possible during work on the dam. The second alternative considered was connecting the existing line to a new intake line and relocated screen assembly location. Due to the potential for construction-related problems or delays during connection, limiting the FUDHC’s ability to supply water to its customers, this alternative was also rejected. The third and preferred alternative is to install an entirely new raw water line from the existing pump station. This allows the new intake line to be placed into service and operation before the existing line is abandoned, thereby minimizing risk of loss of water supply to the FUDHC and its customers.

The intake line would be installed by directional boring methods. The bore would be a

30-inch intake line underground from a point on land above the summer pool elevation and exiting into the lake. A stainless-steel intake screen and associated piping would be connected to the end of the 30-inch intake line. The intake screen and piping assembly would be supported on a structural steel assembly supported by H-piles or micro piles driven into the overburden of the lake bottom.

A 3-inch airline would be laid from the pump station to the intake screen assembly to provide means for removing sediment and debris from the intake screen slots using an air burst cleaning system. The airline would be installed in a shallow trench along the bottom of the lake and weighted down with suitable collars to prevent floatation. The intake screen, support system, and 3-inch airline would be constructed using divers and applicable construction equipment on portable barges.

Following completion of the underwater construction activities, the remaining section of the 30-inch intake piping between the existing pump station and the portion installed by the directional bore would be completed. A butterfly valve would also be installed in this line segment outside the pump station to shutoff flow to the pump station for maintenance purposes. This short section of pipe would be installed by conventional excavation possibly requiring a small sheet pile cofferdam along the lake edge to dewater the excavation in this area.

A flanged access connection assembly is also proposed at each end of the directionally bored pipe. The access point on the land would be located above the summer pool water elevation. This access feature would provide the District the ability to insert a polypropylene “pig” into the pipe that can be hydraulically propelled by water being pumped from the lake into the pipe from the land side to the intake screen location to clean the proposed pipe by removing sediment that may enter the screen and be deposited in the 30-inch raw water intake line.

The existing intake line and screen assembly would be abandoned in place following completion of new intake line and screen assembly.

It is not anticipated, but if the directional boring method of installation is not feasible due to unforeseen construction circumstances, then the intake line would be installed using a combination of construction techniques including both conventional excavation and supporting the remaining pipe segments on structural steel cross members supported by H-piles or micro piles driven into the overburden of the lake bottom.

All earth and sediment excavated from the lake bottom by construction activities would be redistributed within the confines of the lake and not removed from the lake.

TVA finds that that proposed activity constitutes an undertaking (as defined at 36 CFR § 800.16(y)) that has the potential to cause effects to historic properties. We are initiating consultation under Section 106 of the National Historic Preservation Act for this undertaking.

TVA determined the area of potential effects (APE) to be all areas of ground disturbance. A permanent easement would also be issued to FUDHC (Figure 2).
Since activities would all be below ground or under water, the project would have no visual effect.

Sites have been recorded in the area, including site 40HR119, mapped partly within the APE. Site 40HR119 was recorded in 1983 and includes the Pickwick Dam Village where over 1,000 people lived during construction of Pickwick Dam (Froeschauer, et al. 1983:4-21; state site files). The original site boundary was drawn very broadly to include all possible aspects of the village, but a TVA-produced map more clearly shows the extent of the village (Figure 3). No structures are mapped in or near the APE. Site 40HR142 is also mapped nearby, but east of the APE. Recorded in 1990, the site was described as a potentially eligible lithic scatter (Meyer 1995:131). The site was identified on a higher terrace remnant, above the APE which follows a drainage inundated by the reservoir.

Portions of the APE have been previously reviewed as part of the aforementioned seismic updates to Pickwick Dam. These areas lie adjacent to the dam itself. The APE also includes areas immediately east of the previously reviewed area. Given the proximity of the APE to Pickwick Dam itself, the area was very likely heavily terraformed during construction (Figures 4 and 5). Investigation of a comparable setting below the dam has verified this disturbance (see laydown area #1 in TVA letter to TN-SHPO dated June 21, 2016).

Since dam construction, the APE has been further modified. As Figure 2 shows, the original FUDHC line and a 48-inch water intake line are already in the APE. The newly proposed FUDHC line would be located between the two existing lines. Additionally, the east edge of the APE above pool has been modified by creation of a beach and swimming area associated with the Pickwick Landing State Park Lodge and support structures for the two existing intake lines (Figures 6 and 7) . Based on this analysis, there appears to be little or no potential for the presence of intact Holocene soils or sediments in the APE. Furthermore, the APE's location in a drainage at the edge of the reservoir is an unlikely location for archaeological deposits. Therefore, TVA finds that the proposed undertaking would have no effects on archaeological sites that may be eligible for inclusion in the National Register of Historic Places (NRHP).

Background research also indicates that this stretch of the Tennessee River was a water route for the Trail of Tears. The original river channel, however, is over 1100 meters north of the APE and would not be effected by the proposed activity.

As planned, TVA finds that the proposed activities at the Pickwick Dam would not have an adverse effect on historic properties. Pursuant to 36 CFR Part 800.5(b)), TVA seeks your concurrence with these findings and recommendations.

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

If you have any questions or comments, please contact Michael Angst by email, mgangst@tva.gov or by phone, (865) 632-6257.

Sincerely,

Michaelyn Harle on Behalf of Clinton E. Jones
Manager
Cultural Compliance

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

References Cited

Froeschauer, John D., Peggy S. Froeschauer, and Charles P. Stripling
1986 *Archaeological Survey of State-Owned Lands*. Report of Investigations No. 3. Tennessee Department of Conservation, Division of Archaeology, Nashville.

Meyer, Catherine C.
1995 *Cultural Resources in the Pickwick Reservoir*. Submitted to the Tennessee Valley Authority by Office of Archaeological Services, University of Alabama Museums, Moundville, Alabama.

Tennessee Valley Authority
1941 *The Pickwick Landing Project: A Comprehensive Report on the Planning, Design, Construction, and Initial Operations of the Pickwick Landing Project*. Technical Report No. 3. United States Government Printing Office, Washington, D.C.

INTERNAL COPIES NOT TO BE INCLUDED WITH OUTGOING LETTER:

Michael G. Angst, WT 11C-K
Lana D. Bean, WT 10C-K David L. Bowling, WT
11A-K J. Taylor Cates, BR 2C-C Michael C. Easley,
BR 2C-C
Patricia B. Ezzell, WT 7D-K Susan R. Jacks, WT 11C-
K Paul J. Pearman, BR 4A-C
M. Susan Smelley, BR 2C-C

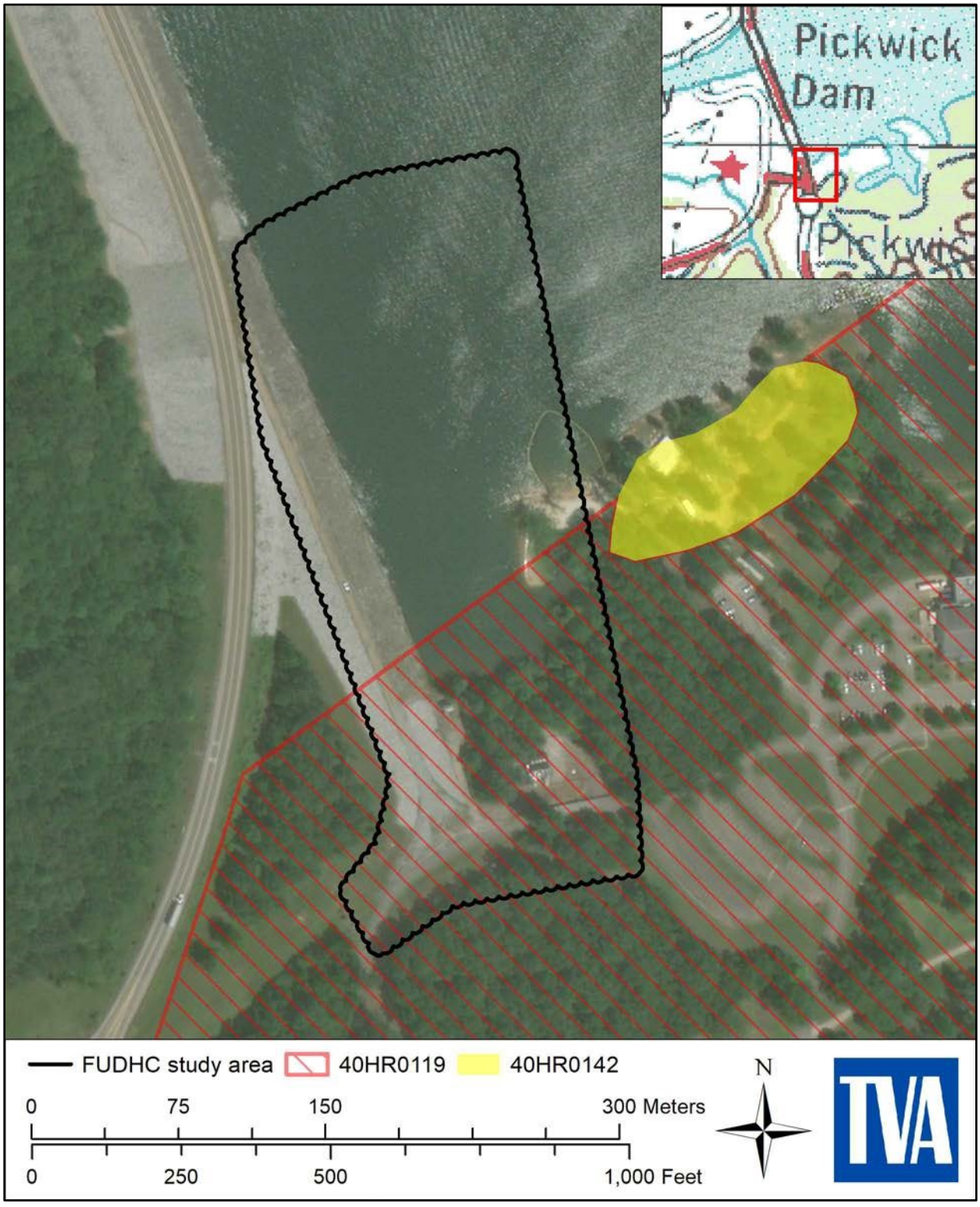

Figure 1. Aerial view of APE at the south end of Pickwick Dam.

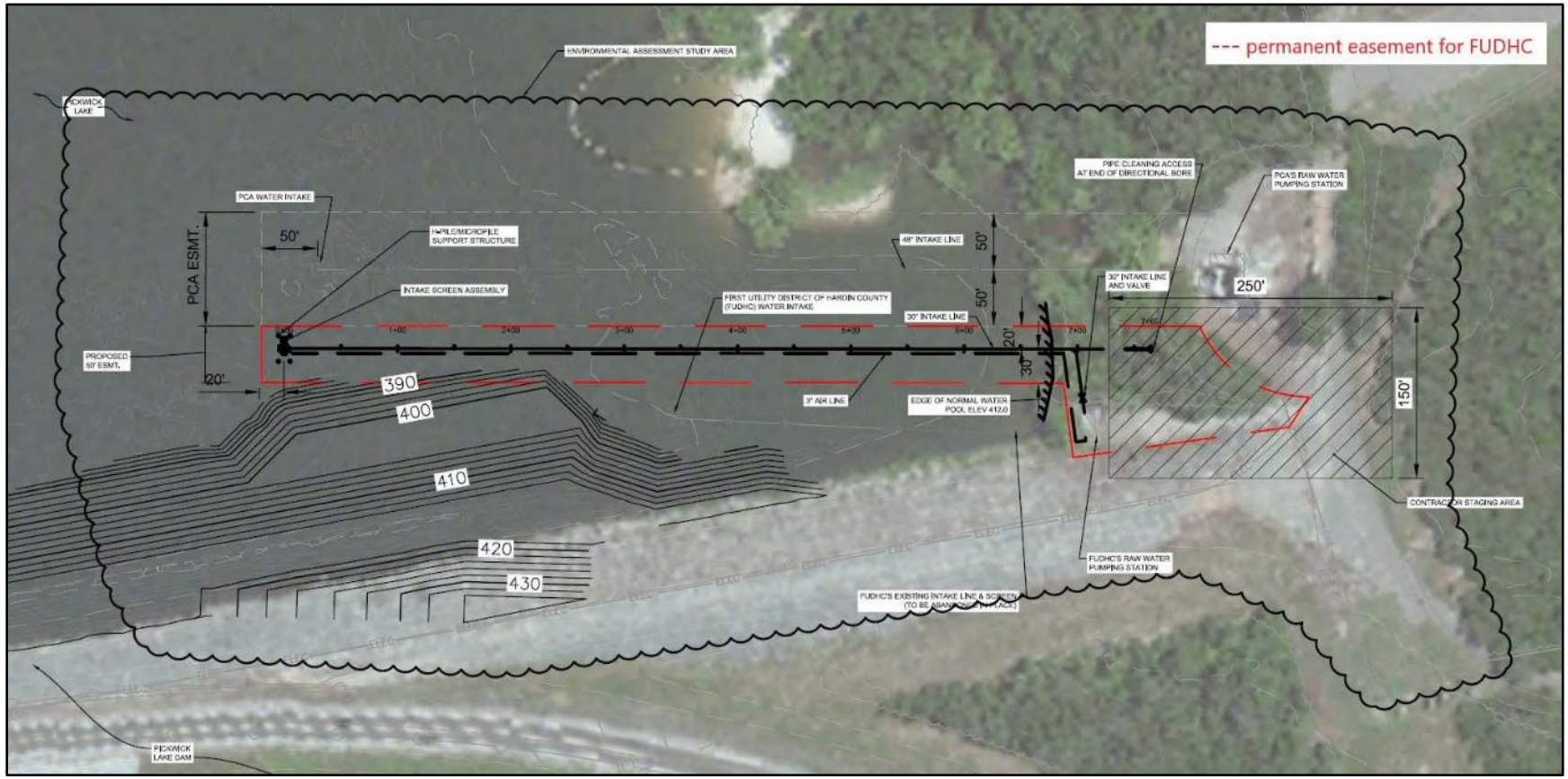

Figure 2. Aerial view of APE. Note proposed intake line between existing lines to the north and south.

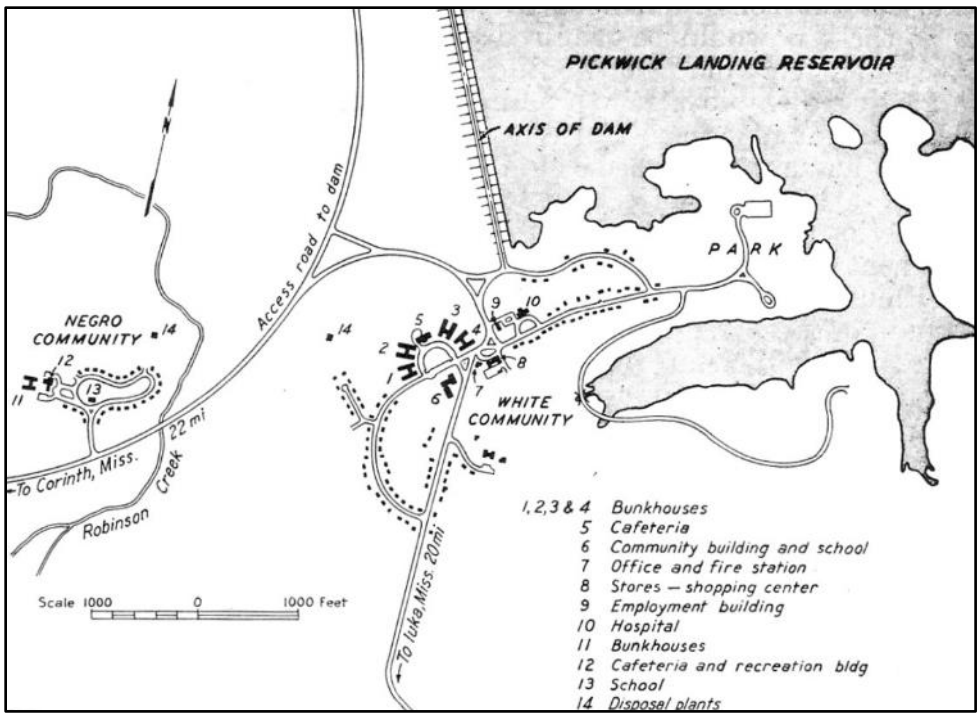

Figure 3. Pickwick Dam Village (40HR119; TVA 1941:132).

Figure 4. Early view of construction (5/1/1935) looking north along axis of the dam. The current APE is on the right edge (upriver) and out of the frame.

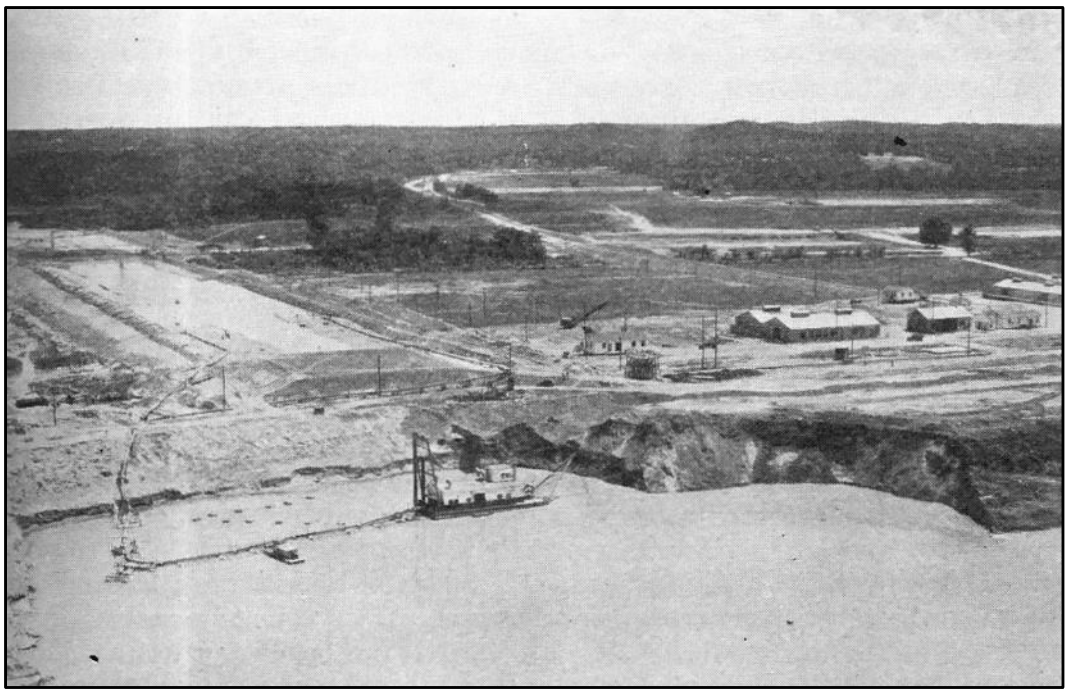

Figure 5. Dredging on the left bank, view to the south. The current APE is to the left of the base of the earthen dam in the background.

Figure 6. FUDHC intake structure. View to the southeast from the dam.

Figure 7. FUDHC intake structure. View to the northeast from the access road.

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

June 25, 2019

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

RE: TVA / Tennessee Valley Authority, Raw Water Intake Line Utility Relocation, Pickwick Dam Reservation, Hardin County, TN

Dear Mr. Jones:

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

Based on the information provided, we find that the project area contains the National Register eligible Pickwick Dam. We further find that the project as currently proposed will not adversely affect this historic property.

This office has no objection to the implementation of this project as currently planned. If project plans are changed or previously unevaluated archaeological resources are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Questions and comments may be directed to Jennifer M. Barnett (615) 687-4780. We appreciate your cooperation.

Sincerely,

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

EPM/jmb

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

June 18, 2019

Mr. Brett Barnes
Tribal Historic Preservation Officer
Eastern Shawnee Tribe of Oklahoma
127 West Oneida
Seneca, Missouri 64865

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

Ms. RaeLynn Butler
Manager
Historic & Cultural Preservation
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Tribal Historic Preservation Officer
Thlopthlocco Tribal Town
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Okemah, Oklahoma 74859

Mr. David Cook
Tribal Administrator
Kialegee Tribal Town
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Wetumka, Oklahoma 74883

Ms. Devon Frazier
Tribal Historic Preservation Officer
Absentee Shawnee Tribe of Indians
of Oklahoma
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Shawnee, Oklahoma 74801

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Cultural Preservation Assistant
Alabama-Quassarte Tribal Town
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Ms. Alina J. Shively
Tribal Historic Preservation Officer
Jena Band of Choctaw Indians
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Jena, Louisiana 71342

Ms. Erin Thompson
Interim Tribal Historic Preservation
Officer
United Keetoowah Band of Cherokee
Indians in Oklahoma
Post Office Box 1245
Tahlequah, Oklahoma 74465

Ms. Tonya Tipton
Shawnee Tribe
Post Office Box 189
Miami, Oklahoma 74355

Ms. Elizabeth Toombs
Cherokee Nation
Post Office Box 948
Tahlequah, Oklahoma 74465

Mr. Stephen Yerka (NHPA)
Tribal Historic Preservation Office
Eastern Band of Cherokee Indians
Post Office Box 455
Cherokee, North Carolina 28719

Dear Sir/Madam:

TENNESSEE VALLEY AUTHORITY (TVA), PROPOSED RAW WATER INTAKE LINE UTILITY RELOCATION, PICKWICK DAM RESERVATION, HARDIN COUNTY, TENNESSEE (-88.241676 35.056316)

A project for TVA is currently under way at Pickwick Landing Dam to improve performance of the south embankment during and following a potential large earthquake event. TVA has consulted with your office in regard to this project on multiple occasions (March 3, 2016; June 23, 2016; May 7, 2018), stating that activities would result in no effect or no adverse effect on historic properties.

The First Utility District of Hardin County (FUDHC) has an existing raw water intake line and screen assembly immediately upstream of the south embankment and within the construction limits of the upstream berm footprint of the dam improvements. In order to mitigate any risk of damage to the line or intake, FUDHC proposes to relocate both the raw water line and intake screen to a location outside the construction limits of the project (Figures 1 and 2).

Multiple alternatives were considered. A “do nothing” alternative was discarded since damage to the intake facilities was possible during work on the dam. The second alternative considered was connecting the existing line to a new intake line and relocated screen assembly location. Due to the potential for construction-related problems or delays during connection, limiting the FUDHC’s ability to supply water to its customers, this alternative was also rejected. The third and preferred alternative is to install an entirely new raw water line from the existing pump station. This allows the new intake line to be placed into service and operation before the existing line is abandoned, thereby minimizing risk of loss of water supply to the FUDHC and its customers.

The intake line would be installed by directional boring methods. The bore would be a 30-inch intake line underground from a point on land above the summer pool elevation and exiting into the lake. A stainless-steel intake screen and associated piping would be connected to the end of the 30-inch intake line. The intake screen and piping assembly would be supported on a structural steel assembly supported by H-piles or micro piles driven into the overburden of the lake bottom.

A 3-inch airline would be laid from the pump station to the intake screen assembly to provide means for removing sediment and debris from the intake screen slots using an air burst cleaning system. The airline would be installed in a shallow trench along the bottom of the lake and weighted down with suitable collars to prevent floatation. The intake screen, support system, and 3-inch airline would be constructed using divers and applicable construction equipment on portable barges.

Following completion of the underwater construction activities, the remaining section of the 30-inch intake piping between the existing pump station and the portion installed by the directional bore would be completed. A butterfly valve would also be installed in this line segment outside the pump station to shutoff flow to the pump station for

maintenance purposes. This short section of pipe would be installed by conventional
June 18, 2019

Excavation possibly requiring a small sheet pile cofferdam along the lake edge to dewater the excavation in this area. A flanged access connection assembly is also proposed at each end of the directionally bored pipe. The access point on the land would be located above the summer pool water elevation.

This access feature would provide the District the ability to insert a polypropylene “pig” into the pipe that can be hydraulically propelled by water being pumped from the lake into the pipe from the land side to the intake screen location to clean the proposed pipe by removing sediment that may enter the screen and be deposited in the 30-inch raw water intake line.

The existing intake line and screen assembly would be abandoned in place following completion of new intake line and screen assembly.

It is not anticipated, but if the directional boring method of installation is not feasible due to unforeseen construction circumstances, then the intake line would be installed using a combination of construction techniques including both conventional excavation and supporting the remaining pipe segments on structural steel cross members supported by H-piles or micro piles driven into the overburden of the lake bottom.

All earth and sediment excavated from the lake bottom by construction activities would be redistributed within the confines of the lake and not removed from the lake.

TVA finds that that proposed activity constitutes an undertaking (as defined at 36 CFR § 800.16(y)) that has the potential to cause effects to historic properties. We are initiating consultation under Section 106 of the National Historic Preservation Act for this undertaking. TVA determined the area of potential effects (APE) to be all areas of ground disturbance. A permanent easement would also be issued to FUDHC (Figure 2). Since activities would all be below ground or under water, the project would have no visual effect.

Sites have been recorded in the area, including site 40HR119, mapped partly within the APE. Site 40HR119 was recorded in 1983 and includes the Pickwick Dam Village where over 1,000 people lived during construction of Pickwick Dam (Froeschauer, et al. 1983:4-21; state site files). The original site boundary was drawn very broadly to include all possible aspects of the village, but a TVA-produced map more clearly shows the extent of the village (Figure 3). No structures are mapped in or near the APE. Site 40HR142 is also mapped nearby, but east of the APE. Recorded in 1990, the site was described as a potentially eligible lithic scatter (Meyer 1995:131). The site was identified on a higher terrace remnant, above the APE which follows a drainage inundated by the reservoir.

Portions of the APE have been previously reviewed as part of the aforementioned seismic updates to Pickwick Dam. These areas lie adjacent to the dam itself. The APE

also includes areas immediately east of the previously reviewed area. Given the proximity of the APE to Pickwick Dam itself, the area was very likely heavily terraformed during construction (Figures 4 and 5). Investigation of a comparable setting below the dam has verified this disturbance (see laydown area #1 in TVA letter dated June 23, 2016).

Since dam construction, the APE has been further modified. As Figure 2 shows, the original FUDHC line and a 48-inch water intake line are already in the APE. The newly proposed FUDHC line would be located between the two existing lines. Additionally, the east edge of the APE above pool has been modified by creation of a beach and swimming area associated with the Pickwick Landing State Park Lodge and support structures for the two existing intake lines (Figures 6 and 7) . Based on this analysis, there appears to be little or no potential for the presence of intact Holocene soils or sediments in the APE. Furthermore, the APE's location in a drainage at the edge of the reservoir is an unlikely location for archaeological deposits. Therefore, TVA finds that the proposed undertaking would have no effects on archaeological sites that may be eligible for inclusion in the NRHP.

Background research also indicates that this stretch of the Tennessee River was a water route for the Trail of Tears. The original river channel, however, is over 1100 meters north of the APE and would not be effected by the proposed activity.

As planned, TVA finds that the proposed activities at Pickwick Dam would not have an adverse effect on historic properties.

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

By this letter, TVA is providing notification of these findings and is seeking your comments regarding any properties that may be of religious and cultural significance and may be eligible for listing in the NRHP pursuant to 36CFR § 800.2 (c)(2)(ii), 800.3 (f)(2), and 800.4 (a)(4)(b).
June 14, 2019

Please respond by July 18, 2019 if you have any comments on the proposed undertaking. If you have any questions, please contact me by phone, (865) 632-2464, or by email, mmshuler@tva.gov. Sincerely,

Marianne Shuler
Senior Specialist, Archaeologist, and Tribal Liaison Cultural Compliance

MGA: ABM
Enclosures cc
(Enclosures):

Mr. Paul Barton
Assistant Director of Cultural Preservation
Eastern Shawnee Tribe of Oklahoma
127 West Oneida
Seneca, Missouri 64865

Ms. Corain Lowe-Zepeda
Tribal Historic Preservation Officer
Historic & Cultural Preservation Department
The Muscogee (Creek) Nation
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Okmulgee, Oklahoma 74447

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

Ms. Charlotte Wolfe
United Keetoowah Band of Cherokee Indians in Oklahoma
Post Office Box 1245
Tahlequah, Oklahoma 74465

References Cited

Froeschauer, John D., Peggy S. Froeschauer, and Charles P. Stripling
1986 *Archaeological Survey of State-Owned Lands*. Report of Investigations No. 3. Tennessee Department of Conservation, Division of Archaeology, Nashville.

Meyer, Catherine C.

1995 *Cultural Resources in the Pickwick Reservoir*. Submitted to the Tennessee Valley Authority by Office of Archaeological Services, University of Alabama Museums, Moundville, Alabama.

Tennessee Valley Authority
1941 *The Pickwick Landing Project: A Comprehensive Report on the Planning, Design, Construction, and Initial Operations of the Pickwick Landing Project*. Technical Report No. 3. United States Government Printing Office, Washington, D.C.

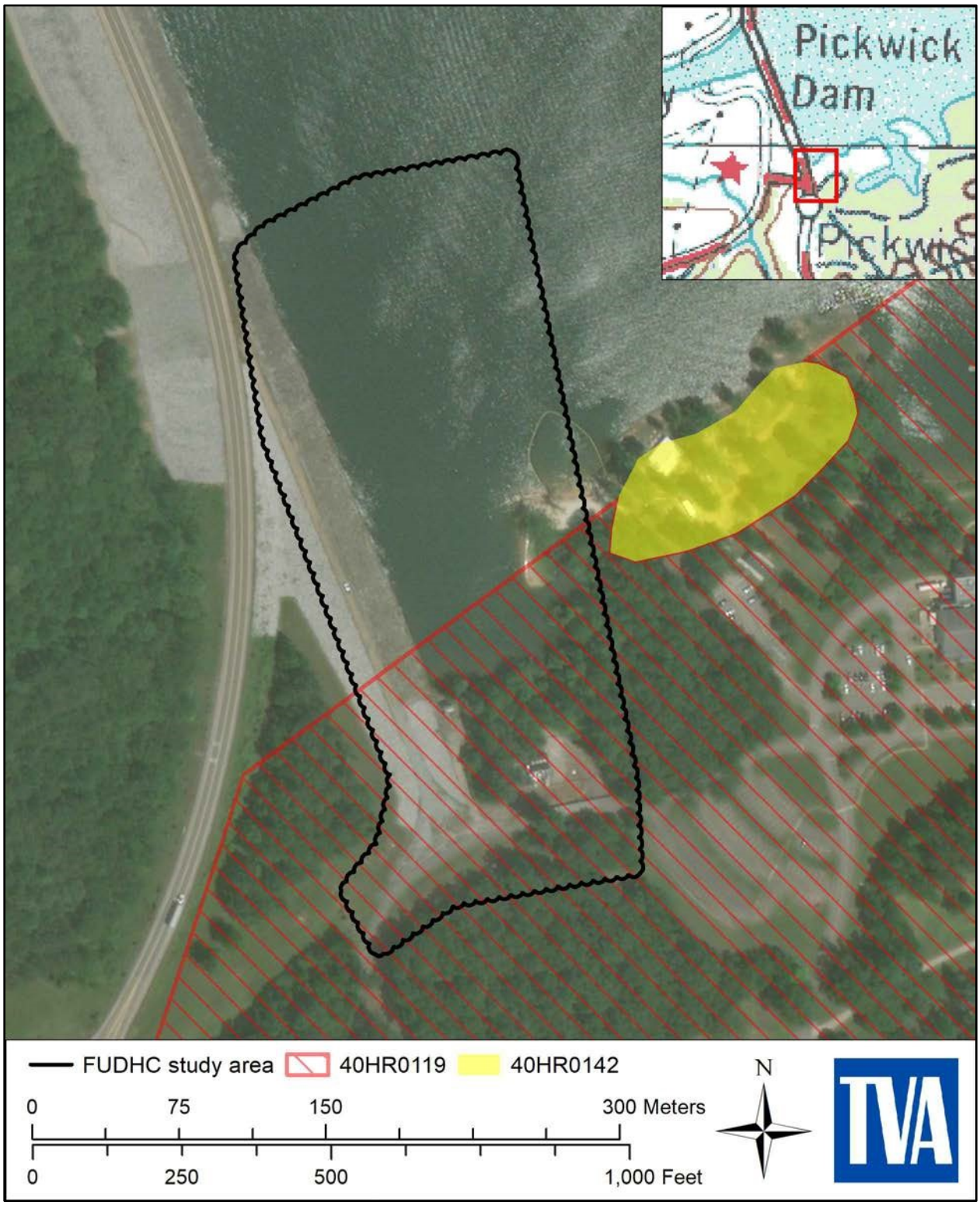

Figure 1. Aerial view of APE at the south end of Pickwick Dam.

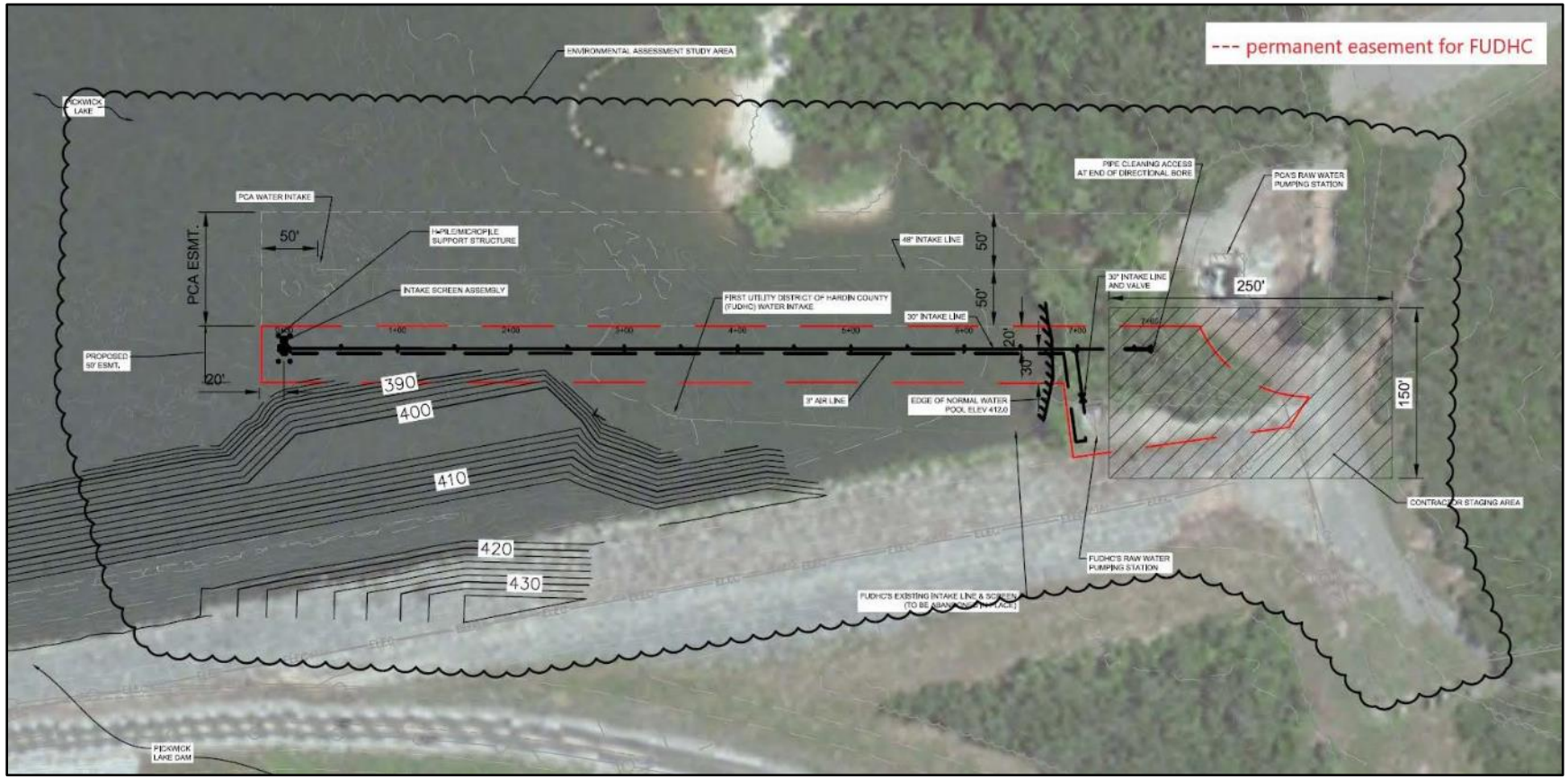

Figure 2. Aerial view of APE. Note proposed intake line between existing lines to the north and south.

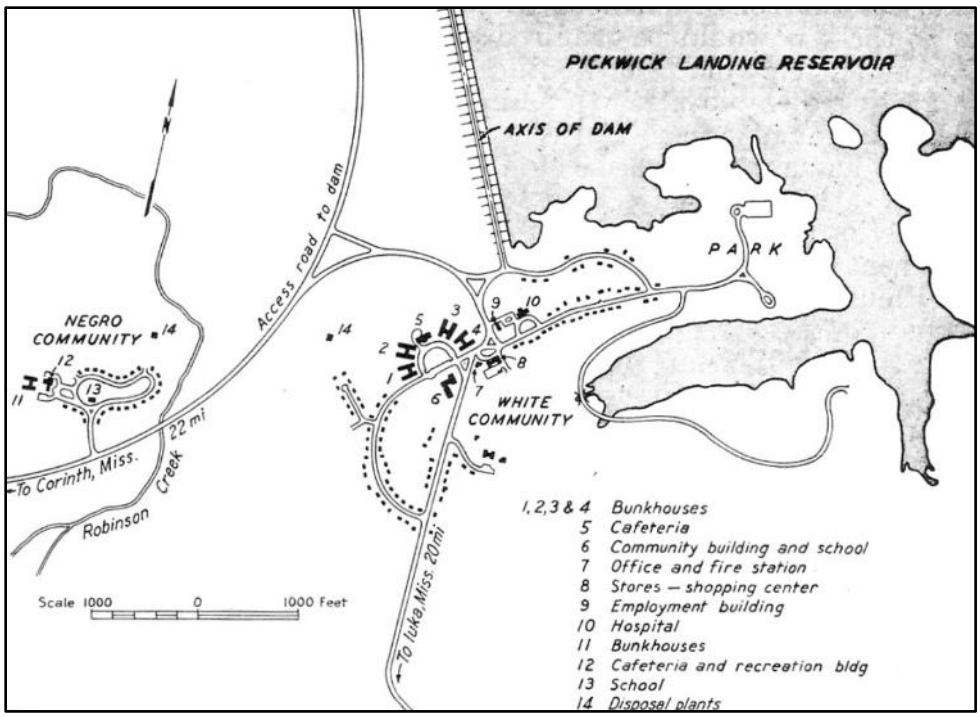

Figure 3. Pickwick Dam Village (40HR119; TVA 1941:132).

Figure 4. Early view of construction (5/1/1935) looking north along axis of the dam. The current APE is on the right edge (upriver) and out of the frame.

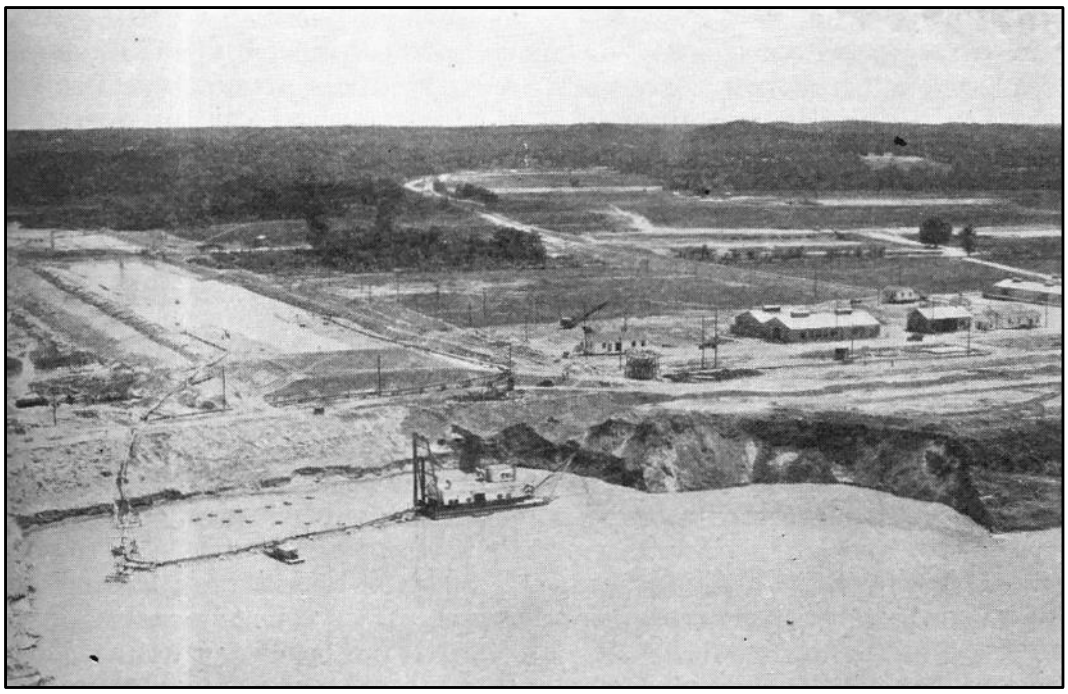

Figure 5. Dredging on the left bank, view to the south. The current APE is to the left of the base of the earthen dam in the background.

Figure 6. FUDHC intake structure. View to the southeast from the dam.

Figure 7. FUDHC intake structure. View to the northeast from the access road.

the Chickasaw Nation
DEPARTMENT OF CULTURE AND HUMANITIES
OFFICE OF THE SECRETARY | POST OFFICE BOX 1548 | ADA, OK 74821-1548 | (580) 436-7258

Bill Anoatubby
Governor
Jefferson Keel
Lt. Governor

July 30, 2019

Ms. Marianne Shuler, Senior Specialist,
Archaeologist and Tribal Liaison
Cultural Compliance
Tennessee Valley Authority
400 West Summit Hill Drive
460 WT 7D-K
Knoxville, TN 37902

Dear Ms. Shuler:

Thank you for the letters of notification of the proposed projects delineated in the attached table. We accept the invitation to consult under Section 106 of the National Historic Preservation Act.

The Chickasaw Nation supports the proposed undertakings and is not presently aware of any specific historic properties, including those of traditional religious and cultural significance, in the project areas. In the event the agency becomes aware of the need to enforce other statutes we request to be notified under ARPA, AIRFA, NEPA, NAGPRA, NHPA and Professional Standards.

Your efforts to preserve and protect significant historic properties are appreciated. If you have any questions, please contact Ms. Karen Brunso, tribal historic preservation officer, at (580) 272-1106, or at karen.brunso@chickasaw.net.

Sincerely,

Lisa John, Secretary
Department of Culture and Humanities

cc: mmshuler@tva.gov

Enclosure

Project Description	Location
Proposed financing through TVA InvestPrep to Maury County to purchase the Oakland Parkway Site for a proposed industrial park.	Maury County, Tennessee
Proposed replacement of Pickwick Dam Reservation Campground replacements.	Hardin County, Tennessee
Proposed installation of tower extensions, replacement of restructures, relocation of pole, re-tensioning the conductors and raising the cross arm on a structure to address North American Electric Reliability Corporation violations on the Johnsonville-Huntington-Milan Transmission Line.	Benton, Carroll, Gibson and Humphreys Counties, Tennessee
Proposed construction of 2.4 miles of a new transmission line and associated access roads that will connect to the Clayton Village-Midway Transmission Line to the 4-County Electric Power Association's new Blackjack substation.	Starkville, Oktibbeha County, Mississippi
Proposed replacement of ten single poles, steel transmission line structures and anchors to address North American Electric Reliability Corporation violations on the McMinnville-Manchester Transmission Line.	Coffee and Warren Counties, Tennessee
Proposed construction of additional seven segments of access roads for the Starkville Delivery Point project.	Starkville, Oktibbeha County, Mississippi
Proposed relocation of an existing raw water intake line and screen assembly immediately upstream of the south embankment and within the construction limits of the upstream berm footprint of the dam improvements.	Pickwick Dam Reservation, Hardin County, Tennessee
Proposed replacement to the tower lighting system at the Tennessee River crossing of the existing Kentucky HP – Gilbertsville and Kentucky – S. Calvert Transmission Lines.	Livingston and Marshall Counties, Kentucky
Proposed replacement of seven transmission line structures along the existing Weakley – Milan Transmission Line.	Weakley County, Teneessee

Angst, Michael G

From: Shuler, Marianne M
Sent: Friday, July 19, 2019 12:37 PM
To: McCampbell, Amy Boardman; Angst, Michael G
Subject: FW: TVA-Pickwick Dam-Raw Water Intake- HardinCoTN-TRIBAL-18Jun2019

From: Alina Shively <ashively@jenachoctaw.org>
Sent: Thursday, July 18, 2019 5:21 PM
To: Shuler, Marianne M <mmshuler@tva.gov>
Subject: RE: TVA-Pickwick Dam-Raw Water Intake- HardinCoTN-TRIBAL-18Jun2019

TVA External Message. Please use caution when opening.

Dear Marianne:

Regarding the above-mentioned project, the Jena Band of Choctaw Indians' hereby defers to the additional Tribes with
Interest in this area. This deference does not preclude future consultation with the Jena Band of Choctaw
Indians. Thank you.

Sincerely,

Alina J. Shively
Jena Band of Choctaw Indians
Tribal Historic Preservation Officer
P.O. Box 14
Jena, LA 71342
(318) 992-1205
ashively@jenachoctaw.org

From: Shuler, Marianne M [mailto:mmshuler@tva.gov]

Sent: Tuesday, June 18, 2019 10:53 AM
To: 106NAGPRA@astribe.com; jlowe@alabama-quassarte.org; Elizabeth Toombs <elizabeth-toombs@cherokee.org>;
'HPO@chickasaw.net' <HPO@chickasaw.net>; Stephen Yerka <syerka@nc-cherokee.com>;
'BBarnes@estoo.net'
<BBarnes@estoo.net>; Alina Shively <ashively@jenachoctaw.org>; 'dc13.dc4@gmail.com'
<dc13.dc4@gmail.com>;
'David.Cook@kialegeetribe.net' <David.Cook@kialegeetribe.net>; 'section106@mcn-nsn.gov'
<section106@mcn-

nsn.gov>; tonya@shawnee-tribe.com; THPO <thpo@tttown.org>; Erin Thompson <ethompson@ukb-nsn.gov>
Cc: pbarton@estoo.net; Corain Lowe <CLowe@mcn-nsn.gov>; cwolfe@ukb-nsn.gov **Subject:** TVA-Pickwick Dam-Raw Water Intake- HardinCoTN-TRIBAL-18Jun2019

Good Morning
By this email I am sending the attached letter regarding the proposed relocation of the existing raw water intake line upstream of the south embankment and within the construction limits of the upstream berm footprint of the dam improvements on the Pickwick Dam Reservation.

Please let me know by July 18, 2019 if you have any questions or comments on the proposed undertaking. Thanks
Marianne

Marianne Shuler
Senior Specialist, Archaeologist & Tribal Liaison
Cultural Compliance

Tennessee Valley Authority
400 W. Summit Hill Drive
Knoxville, TN 37902

865-632-2464 (w)
mmshuler@tva.gov

Angst, Michael G

From: Shuler, Marianne M
Sent: Tuesday, July 9, 2019 9:48 AM
To: McCampbell, Amy Boardman; Angst, Michael G
Subject: FW: TVA-Pickwick Dam-Raw Water Intake- HardinCoTN-TRIBAL-18Jun2019

From: Tonya Tipton <tonya@shawnee-tribe.com>
Sent: Monday, July 08, 2019 1:43 PM
To: Shuler, Marianne M <mmshuler@tva.gov>
Subject: RE: TVA-Pickwick Dam-Raw Water Intake- HardinCoTN-TRIBAL-18Jun2019

TVA External Message. Please use caution when opening.

This letter is in response to the above referenced project.

The Shawnee Tribe's Tribal Historic Preservation Department concurs that no known historic properties will be negatively impacted by this project.

We have no issues or concerns at this time, but in the event that archaeological materials are encountered during construction, use, or maintenance of this location, please re-notify us at that time as we would like to resume immediate consultation under such a circumstance.

If you have any questions, you may contact me via email at tonya@shawnee-tribe.com

Thank you for giving us the opportunity to comment on this project.

Sincerely,

Tonya Tipton

Shawnee Tribe-THPO

29 S Highway 69A
Miami, OK 74354
Phone:(918)542-2441 Fax: (918)542-2922
tonya@shawnee-tribe.com

From: Shuler, Marianne M <mmshuler@tva.gov>
Sent: Tuesday, June 18, 2019 10:53 AM
To: 106NAGPRA@astribe.com; jlowe@alabama-quassarte.org; Elizabeth Toombs <elizabeth-toombs@cherokee.org>;

'HPO@chickasaw.net' <HPO@chickasaw.net>; Stephen Yerka <syerka@nc-cherokee.com>; 'BBarnes@estoo.net' <BBarnes@estoo.net>; Alina Shively <ashively@jenachoctaw.org>; 'dc13.dc4@gmail.com' <dc13.dc4@gmail.com>; 'David.Cook@kialegeetribe.net' <David.Cook@kialegeetribe.net>; 'section106@mcn-nsn.gov' <section106@mcnnsn.gov>; Tonya Tipton <tonya@shawnee-tribe.com>; THPO <thpo@tttown.org>; Erin Thompson <ethompson@ukbnsn.gov>
Cc: pbarton@estoo.net; Corain Lowe <CLowe@mcn-nsn.gov>; cwolfe@ukb-nsn.gov **Subject:** TVA-Pickwick Dam-Raw Water Intake- HardinCoTN-TRIBAL-18Jun2019

Good Morning
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Please let me know by July 18, 2019 if you have any questions or comments on the proposed undertaking. Thanks
Marianne

Marianne Shuler
Senior Specialist, Archaeologist & Tribal Liaison
Cultural Compliance

Tennessee Valley Authority
400 W. Summit Hill Drive
Knoxville, TN 37902

865-632-2464 (w)
mmshuler@tva.gov

APPENDIX D – DRAFT EA COMMENTS AND RESPONSES

PICKWICK LANDING DAM
FIRST UTILITY DISTRICT OF HARDIN COUNTY
RAW WATER INTAKE LINE RELOCATION
Environmental Assessment
Hardin County, Tennessee

Responses to Public Comments

Comments received from Glenn Blevins Dated 16 January 2020 (email)

1. How many customers? Is Savannah included?
   Ref: The FUDHC provides drinking water to approximately customers of the southwestern corner of Hardin County, Tennessee.

   FUDCH serves approximately 2,500 customers as detailed on page 2 of the Environmental Assessment. The City of Savannah is not included within the service area of the FUDHC.

Comments received from TN Department of Environment and Conservation (Matthew Taylor) Dated 13 February 2020 (letter)

1. Cultural and Natural Resources - TDEC believes the Draft EA adequately addresses potential impacts to cultural and natural resources within the proposed project area.[2]

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

Comment Noted.

2. Air Resources - TDEC recommends that TVA provide discussion regarding how emissions from gasoline and diesel fueled trucks and construction equipment used on- and off-site are expected to be minimized through the use of proper maintenance, new emissions control technologies, and fuels along with the minimization of unnecessary heavy duty vehicle idling.

This recommendation has been incorporated in Section 4.7.1.2 of the Final EA.

3. Solid Waste - TDEC recommends that the Final EA consider and explicitly reflect that any wastes associated with such activities in Tennessee be managed in accordance with the Solid and Hazardous Waste Rules and Regulation of the State of Tennessee (TDEC DSWM Rule 0400 Chapters 11 and 12, respectively).

This recommendation has been incorporated in Section 4.10.1.2 of the Final EA.

4. Water Resources - FUDHC is a stand-alone system with no alternate source of water and is not connected to any other utility which could supply water. Protection of the FUDHC system during construction and transition will be extremely important. The Draft EA does point to floating silt barriers or turbidity curtains, which will be essential tools. At crucial staging events, TVA should work with FUDHC to ensure that they maintain full tank levels as much as possible in case the water plant would have to shut down. TDEC encourages TVA to work with FUDHC to update their emergency response plan to address potential threats/risks during construction and transition, and for TVA to include additional discussion relating to these considerations in the Final EA.

This recommendation has been incorporated in Section 4.2.2.2 of the Final EA