



**Continuing Authorities Program, Section 14** 

U.S. Army Corps of Engineers, Memphis District December 2024

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## **Executive Summary**

The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division (MVD), Regional Planning and Environment Division South (RPEDS) and Memphis District (MVM) prepared this Draft Integrated Feasibility Report and Environmental Assessment (DIFREA) for the Continuing Authorities Program (CAP), Section 14, Emergency Streambank and Shoreline Erosion Feasibility Study for the Memphis Light, Gas and Water (MLGW) Tower #1613 located in Memphis, Shelby County, Tennessee. The DIFREA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality's (CEQ) Regulations (40 C.F.R. §§ 1500-1508), and USACE Engineering Regulation (ER) 200-2-2, to evaluate the environmental impacts associated with the Alternatives and the Tentatively Selected Plan (TSP).

The non-Federal Sponsor (NFS) is Memphis Light, Gas and Water (MLGW), a municipal public works utility provider in Memphis, Tennessee. The Study was conducted pursuant to CAP authority, Section 14 of the Flood Control Act (FCA) of 1946, as amended, 33 U.SC. § 701r. A CAP Section 14 study must evaluate whether it would be more cost effective to relocate the threatened public facility so that the facility would no longer be at risk from the streambank erosion or stabilize the shoreline to reduce the risk to the facility where it is currently located.

The Wolf River is experiencing bank erosion at river mile 9.1, which is threatening the structural integrity of MLGW Tower #1613, an essential component of the Memphis utility services grid. MLGW Tower #1613 is integral to the Memphis power grid as it provides power to an area of 19.76 square miles, impacting 30,000 Memphis and Shelby County residents. The tower's area of impact contains a large part of downtown Memphis which includes multiple businesses, 10 public safety facilities, a water treatment plant, and a hospital. Portions of highly traveled roads and highways such as Interstate 40 (I-40), Jackson Avenue (Tennessee State Highway 14), and North Parkway (Tennessee State Highway 1) would also be affected by the loss of MLGW Tower #1613 due to the tower supplying power to the lighting along these thoroughfares.

Alternatives were developed to address the identified problems and opportunities. The plan formulation, screening process, and selection of the TSP are documented in this Report.

The Tentatively Selected Plan consists of:

- 300 linear feet of R200 riprap along the streambank with a 3.5H:1V slope
- 6-inch-deep layer of bedding stone under riprap
- Type-E end protection (detailed in Figure 6-3)
- Self-healing properties (described in Section 6.1.2).

The estimated Fiscal Year (FY) 2025 Project First Cost of Construction of the TSP is \$1,698,000. There is no interest during construction because construction will be completed within one year. The estimated operation, maintenance, repair, rehabilitation, and replacement costs of the Project are \$0 (zero dollars) due to the riprap design's self-healing properties which would not require maintenance or replacement in the 50-year period of analysis.

The TSP is the least-cost Alternative. The TSP is economically justified because the total cost of the TSP is less than the cost to relocate the threatened facility (MLGW Tower #1613) per EP 1105-2-58, Ch. 3, para. 29(d).

The Table 6-2 Design and Implementation (D&I) Cost for this study, including both Federal and non-Federal costs, is \$1,788,000. Cost sharing provisions for the Preconstruction, Engineering and Design (PED) phase, the Construction Management phase and the Construction phase has been determined to also be 65% Federal and 35% non-Federal.

Implementing the TSP is expected to have only minor impacts on wildlife, air quality, and hydrology. Impacts to wildlife and air quality would be temporary and would be expected to return to existing conditions after completion of the project action. The proposed project would have little to no impacts upon freshwater marshes, freshwater lakes, state designated scenic streams, prime and unique farmlands, cultural resources, municipal facilities, municipal utilities, roadways, recreation, aesthetics, socio-economic, or environmental justice. Also, no significant adverse impacts would occur to wetlands, aquatic resources/fisheries, wildlife, threatened and endangered species, hydrology/water quality, air quality, or the human environment. For other potential impacts both negative and beneficial, see Section 4 - Environmental Effects and Consequences.

The NFS is in support of the TSP and is willing and financially capable to enter into a model CAP 14 Project Partnership Agreement for the construction on the project.

## Section 1

## Introduction

The USACE MVD RPEDS MVM prepared this Report for the CAP, Section 14, Study for MLGW Tower #1613 in Memphis, Tennessee. A DIFREA has been prepared by MVM in accordance with NEPA and the CEQ's Regulations (40 C.F.R. §§ 1500-1508), as reflected in the USACE ER 200-2-2, to evaluate the environmental impacts associated with the Alternatives and the TSP.

#### **1.1. USACE PLANNING PROCESS**

Throughout the feasibility study, the Project Design Team (PDT) followed the USACE sixstep planning process as set forth in ER 1105-2-103, Chapter 2, Section 2. This planning process is a structured approach to problem solving and is required for all planning studies conducted by USACE.

The six-step process is a structured, systematic, and repeatable planning approach for quantitatively and qualitatively assessing water resource-related problems and opportunities and resulting in recommendations to address those problems and opportunities. The planning steps occurred iteratively and concurrently. This iterative planning process, conceptualized in Figure 1-1, allowed the PDT to formulate and evaluate an efficient, effective, and reasonable array of alternative plans. The plan formulation for this study is further described in Section 3, *Plan Formulation and Evaluation*.

This Report documents the technical analysis conducted by USACE, MLGW as the NFS, and other governmental entities and interested parties to formulate and evaluate solutions to the streambank erosion that imminently threatens the stability of MLGW Tower #1613, an integral component of the Memphis power grid. The streambank erosion occurs at River Mile 9.1 on the Wolf River in Memphis, Tennessee. The severity of this erosion risks damage and/or failure to the bank adjacent to MLGW Tower #1613.

MLGW Tower #1613 is integral to the Memphis power grid as it provides power to an area of 19.76 square miles, impacting 30,000 Memphis and Shelby County residents. The tower's area of impact contains a large part of downtown Memphis including multiple businesses, 10 public safety facilities, a water treatment plant and a hospital. Portions of highly traveled roads and highways such as I-40, Jackson Avenue (Tennessee State Highway 14), and North Parkway (Tennessee State Highway 1) would also be affected by the loss of MLGW Tower #1613 due to the tower supplying power to the lighting along these thoroughfares.

The Study was conducted by a multi-disciplinary PDT composed of professionals with relevant technical expertise to make a recommendation on the TSP. In accordance with Engineer Pamphlet (EP) 1105-2-58, the plan recommended for approval must be



Figure 1-1. USACE Planning Process

complete in itself and not obligate the Federal government to future work (except in those cases in which maintenance by the Federal government is specified by law or allowed by policy); must have a cost share sponsor who is willing and capable of meeting their responsibilities; must not require Congressional authorization; and be within the established Federal cost limits.

The MVM conducted this Study to identify and evaluate an array of alternative plans and make a recommendation for action or no action with input from the NFS, agencies and the public. This Report documents the plan formulation process and recommends a plan to reduce future erosion and risk to the bank located at MLGW Tower #1613. The description of the TSP includes a discussion and evaluation of the economic benefits and costs associated with the TSP and alternatives.

#### **1.2. STUDY AUTHORITY**

The CAP program consists of a group of nine legislative authorities under which the Secretary of the Army, acting through the Chief of Engineers, is authorized to plan, design and implement certain types of water resources projects without additional project specific congressional authorization. The Study was authorized under Section 14 of the FCA of 1946, Public Law 79-526, as amended.

The CAP Section 14 authority allows USACE to study, design and construct emergency shoreline and streambank protection works in the interest of protecting public facilities such as utilities, bridges, roads, public buildings, sewage treatment plants, water wells, and non-profit public facilities such as churches, hospitals, and schools. Privately owned property and facilities are not eligible for protection under this authority.

The maximum Federal expenditure at any single locality expanded to \$10 million in any one fiscal year within Water Resources Development Act (WRDA) 2022, Sec. 8138. The project must also be economically justified and environmentally sound.

This study will recommend a plan to stabilize the eroding bank to protect the essential utility services provided by this tower, thus meeting the intention of the CAP Section 14 authority.

#### **1.3. FEDERAL INTEREST**

This study meets Federal interest by protecting the essential services of the threatened public infrastructure. This study also provides the opportunity to avoid a high-cost imminent failure by implementing low-cost stabilization.

Preceding this Study, a Federal Interest Determination (FID) was conducted in March 2022. The MVM recommended that this project has Federal interest based on the PDT's preliminary analysis of the problem. The PDT proposed a potential least-cost alternative to address the problem. Alternatives considered in the FID included:

- Alternative 1 "No Action/Relocate the Facility" This alternative would require the relocation of the MLGW Tower #1613 by the MLGW. No action would be taken by USACE to stabilize the streambank and erosion would continue.
- Alternative 2 "Riprap Armor of the Bank" This alternative would require the
  protection of approximately 300 linear feet of the right descending bank of the Wolf
  River with riprap to protect the MLGW Tower #1613. This alternative would arrest
  the erosion causing imminent risk of Tower failure and maintain the existing tower
  location.

In EP 1105-2-58, Continuing Authorities Program, para. 29.d., it states: "The least cost alternative plan is considered to be justified if the total cost of the proposed alternative is less than the cost to relocate the threatened facility." During this period of preliminary analysis, the PDT found that the cost of Alternative 2, Riprap Armor of the Bank, was less than the cost of Alternative 1, No Action/Relocate the Facility. In the initial FID, the least-cost alternative prevents the need for a costly facility relocation.

#### **1.4. NON-FEDERAL SPONSOR**

The NFS, MLGW, is a municipal public works utility provider located in Memphis, Tennessee. A Feasibility Cost Share Agreement (FCSA) was executed by the NFS and Department of the Army on September 15, 2023. The Feasibility Phase is 100% federally funded up to the first \$100,000. Any remaining feasibility phase costs are shared equally (50/50) with the NFS pursuant to the terms of the FCSA. (see Table 6-2, Total Project Cost - Federal and Non-Federal Cost Share).

#### **1.5. STUDY AND PROJECT AREA**

The MLGW Tower #1613 is located on the right descending bank of the Wolf River northeast of the City of Memphis, Tennessee. The Wolf River is a tributary to the Mississippi River with a confluence at Mississippi River Mile 739. The location of Tower #1613 relative to the Wolf River, the City of Memphis and the Mississippi River is shown below in Figure 1-2.



Figure 1-2. Study Area

The tower is situated at Wolf River Mile 9.1 between North Highland Street to the west, Jackson Avenue to the east, and I-40 to the south. The tower is located on the right descending bank as shown in Figure 1-3 below. The project area is a 300-foot-long reach along the Wolf River at this location, directly in front of Tower #1613.

The study area is under the purview of Tennessee Congressional delegation TN-09.

Figure 1-3. Study Area located in Memphis, TN

#### 1.6. STUDY BACKGROUND AND HISTORY

The NFS, MLGW, is a municipal public works utility provider in Memphis, Tennessee. The MLGW requested emergency assistance to protect major transmission lines that provide electrical service to a large portion of the City of Memphis and northern Shelby County through a Letter of Intent dated 21 April 2023.

The MLGW Tower #1613 is located at Wolf River Mile 9.1 on the right descending bank of the Wolf River. This location along an outer bend makes the bank prone to natural streambank erosion. Based on a survey in February 2022, the top bank is approximately

15 feet of the foundation support for Tower #1613 causing imminent danger of collapse into the Wolf River.

The MLGW Transmission Tower #1613 was installed in the late 1950's and has been maintained since. With proper maintenance, the structure has an unlimited design life.

The majority of the soils in the area are dominated by glacial silts (loess) and are known to be highly erosive. Like many tributaries in west Tennessee, this location is still being impacted by geomorphic adjustments resulting from the USACE 1930's and 1940's cutoff program in the Mississippi River for the purposes of flood risk management and navigation. From 1932 to 1946, USACE executed 15 manmade cutoffs and other improvements on the Mississippi River, shortening its length by roughly 25% between Memphis, Tennessee, and Baton Rouge, Louisiana. This reduced flood heights from 7 to 13 ft (2.1–3.9 m) on the Arkansas City, AR, and Vicksburg, MS gages and shortened the travel distance for vessels.

These Mississippi River cutoffs triggered head cuts in many tributaries, which continue to adjust to the long-term slope changes of the Mississippi River due to a shortened course. This ongoing geomorphic adjustment of the Wolf River tributary has compounded the natural dynamic processes of erosion.

House Document No. 76, 85th Congress, authorized USACE, Memphis District to enlarge and realign the Wolf River from its mouth to Gray's Creek (38 miles), to construct a diversion across Mud Island, to close the existing channel, to realign and cleanout the lower 3 miles of Fletcher Creek, and to construct an interceptor sanitary sewer line across the Wolf River below the Wolf River closure. Channelization of 21.9 miles of the Wolf River and 2.8 miles of Fletcher Creek, including an erosion control structure at the mouth of Fletcher Creek, was completed on September 21, 1964. The project increased the flood control capacity of the Wolf River and allowed for an increase in development without the risk of devastating floods. Past channelization activities and the highly developed basin and changes in the bottom grade of the Wolf River are the major factors causing the current instabilities. Section 4 below details the past, present and future actions on this reach of the Wolf River.

Failure of the tower would weaken the MLGW system, impacting approximately 30,000 residents. The geographic impact area includes the northern part of downtown Memphis, a heavily populated residential and commercial area. The two transmission lines carried by Tower #1613 act as major power thoroughfares for the north portion of downtown Memphis that includes large customers such as St. Jude Children's Research Hospital, City of Memphis buildings, 201 Poplar (Jail & Courthouse) and the University of Tennessee Healthcare Campus. The MLGW substation feeding the Rhodes College area is also affected by the loss of these transmission lines. Additionally, 8 fire stations, 2 police stations, and 1 water treatment plant are located within the Tower #1613 impact area. The location of Tower #1613 and the affected area if it fell are shown in the following Figure 1-4.



Figure 1-4. Tower Location and Memphis Area Affected

The resulting failure of the two transmission lines carried by Tower #1613 could also impact the major transportation routes of North Highland Street and Jackson Avenue (Tennessee Highway 14) due to traffic signal failures causing congestion (Figure 1-5).



Figure 1-5. Tower Location in Relation to Interstate and Major Highways

#### **1.7. PRIOR REPORTS AND PROJECTS**

Table 1-1 below provides a list of prior reports and projects.

Table 1-1. Prior Reports and Projects

Year	Report Title	Document Type
1950	Appendix "F" Operation and Maintenance Manual for Section 8 (Includes Nonconnah Creek Pumping Station), Memphis Wolf River and Nonconnah Creek, Tenn Project	USACE O&M Manual
1959	Wolf River and Tributaries General Design Memorandum No.1	USACE Design Memorandum
1964	A Preliminary Engineering Study and Economic Analysis for a Reservoir and Recreation Area in the Wolf River, for the Shelby County Conservation Board	Economic Analysis by Bureau of Business Research Memphis State University
1971	Detailed Plan of Survey, Wolf and Loosahatchie Rivers and Noncinnah Creek, Tennessee and Mississippi	USACE Survey Plan
1975	Wolf and Loosahatchie Rivers Tennessee and Mississippi	USACE Study
1976	Analytical Systems for Floodplain Information Studies of River Basois Plan of Study for Wolf River	Waterways Experiment Station Environmental Study
1982	Wolf and Loosatchie Study TN & MS, Report on Findings to Date	USACE Report
1995	Wolf River Memphis Tennessee	USACE Reconnaissance Report
2000	Wolf River Memphis, Tennessee	USACE Final Environmental Impact Statement and Feasibility Report
2001	Nance, Benjamin C. 2001. The Trail of Tears in Tennessee: A Study of the Routes Used During the Cherokee Removal of 1838 (available online at: <u>https://www.tn.gov/environment/program- areas/arch-archaeology/archaeology- publications/division-of-archaeology- publications.html</u>	Archaeological Publication

#### **1.8. PURPOSE AND NEED\***

The purpose of this DIFREA is to formulate a plan to stabilize the right descending riverbank of the Wolf River at River Mile 9.1, and to evaluate the potential effects of such action. This Report provides planning, engineering and preliminary construction details of the TSP. Final design and construction will proceed after receipt of appropriated funds for design and construction phases.

Following the USACE 6-step SMART (Specific, Measurable, Attainable, Risk Informed, Timely) planning process, this Report uses documented existing conditions, future without project conditions, and future with project conditions; assesses the problem; provides and compares alternatives; and makes a recommendation to accomplish the emergency streambank protection (Policy and Procedure for Implementing NEPA) to protect the essential utility services provided by Tower #1613 to the City of Memphis, Tennessee.

Without bank stabilization, Tower #1613 could collapse into the Wolf River, disrupting utility services to the City of Memphis, Tennessee.

#### 1.9. PROBLEMS

The MLGW requested emergency assistance to protect electrical transmission lines connected to MLGW Tower #1613, which services a portion of the City of Memphis and northern Shelby County.

The MLGW Tower #1613's location on the right descending bank of the Wolf River along an outer bend makes it prone to natural streambank erosion. This erosion is exacerbated by the ongoing geomorphic changes of tributaries adjusting to the Mississippi River cutoff program implemented in the 1930s and 1940s by USACE. Figure 1-6 below shows the rapid progression of erosion towards the tower base between January 2006 and September 2021. This erosion encroached to approximately 15 feet of the tower's foundation causing imminent danger of collapse into the Wolf River. The top of bank's proximity to the Wolf River during a flood stage is shown in Figure 1-7. Figure 1-8 illustrates Tower #1613's proximity to the top bank.



Figure 1-6. Wolf River Top Bank Comparison at Tower #1613 between 31 January 2005 (blue) and 05 September 2021 (red).



Figure 1-7. Streambank Erosion Adjacent to Tower #1613 Closeup



Figure 1-8. Streambank Erosion Adjacent to Tower #1613

Failure of the tower would weaken the MLGW system, potentially impacting approximately 30,000 residents and businesses. The geographic impact area includes the northern part of downtown Memphis, which is a heavily populated residential and commercial area. The tower failure could also impact traffic on the major transportation routes of North Highland Street, and Jackson Avenue (Tennessee Highway 14). In the event of tower collapse, live power lines could fall onto roadways.

#### **1.10. OPPORTUNITIES**

The Project Design Team (PDT) identified several opportunities to address the problem of bank erosion at this location coupled with bank stabilization that could enhance the site for the environment and public. These opportunities included:

- Stabilize the streambank.
- Protect the essential utility services of Tower #1613, provided to 30,000 people in the Memphis area.
- Implement nature-based measures.
- Add habitat value to vicinity.
- Enhance recreational opportunities.
- Work with relevant resource agencies and non-governmental organizations (NGOs) to protect environmental resources.

#### 1.11. STUDY GOALS AND OBJECTIVES

#### 1.11.1. Study Goals

The goal of this study is to protect the essential services of a public utility that provides energy to 30,000 citizens around the Memphis area by reducing natural erosion along the Wolf River streambank.

#### 1.11.2. Planning Objectives

The two planning objectives of this study over the 50-year period of analysis (beginning in year 2027) include:

- OBJ-1- Reduce the risk of erosion and active scour on the streambank in the vicinity of the MLGW Tower #1613.
- OBJ-2 Reduce the risk of interruptions to the essential utility services provided by MLGW Tower #1613 that provides power to a portion of the City of Memphis and northern Shelby County.

#### **1.12. PLANNING CONSTRAINTS**

A planning constraint is a restriction that limits or impedes achieving planning objectives. Planning constraints that were considered for this analysis include:

- **CR-1** Meets requirements of authority
- **CR-2** Emergency timeline
- **CR-3** Avoid or minimize negative impacts to fish and wildlife including threatened and endangered species.
- **CR-4** Avoid or minimize negative impacts to cultural resources
- **CR-5** Avoid or minimize negative impacts to existing recreational users
- CR-6 Avoid or minimize negative impacts to local agriculture
- **CR-7** Avoid induced impacts elsewhere
- CR-8 Institutional constraint: \$10 Million Federal implementation CAP cost
- **CR-9** Is technically feasible

Although CR1, CR8 and CR9 are not necessarily hard planning constraints according to the USACE planning process, these criteria were used to screen measures and alternatives.

## Section 2 \*

# Existing and Future Without Project Conditions

#### 2.1. PERIOD OF ANALYSIS

The TSP was selected based on least-cost analysis. The comprehensive benefits of stabilizing the bank at MLGW Tower #1613 were based on a 50-year period of analysis. Economic analysis assumed that construction was completed in 1 year in the year 2026 with benefits beginning in the year 2027.

#### 2.2. GENERAL SETTINGS

The project study area is 7.5 miles northeast of the city of Memphis, Tennessee near the 1-40 and state highway 14 convergence. The project sites at Wolf River mile 9.1 below the MLGW Tower #1613 where the tower's foundations are threatened by the erosive action of the river along the streambank. This area is within the Wolf River Flood Plain, which consists of loess and clayey silty alluvium with clay deposits beneath. The river is part of the Mississippi River watershed, which makes the project subject to backwater influences from the Mississippi River.

Vegetation within the proposed project area consists primarily of grasses and shrubs. The MLGW utility easement is maintained annually by spraying or mowing to control nuisance vegetation. There are larger diameter trees located just outside the proposed project area. The Wolf River Greenway is in the adjacent vicinity and is the only management or refuge area in the vicinity.

#### 2.3. NATURAL AND PHYSICAL ENVIRONMENT

#### 2.3.1. Climate

The climate in the Memphis area is characterized by long, hot, humid summers and short moderate winters. The average annual temperature in the area is 62 degrees Fahrenheit with monthly normal fluctuations between 40 degrees Fahrenheit in January and 80 degrees Fahrenheit in July. Temperature extremes range from -13 degrees Fahrenheit to 108 degrees Fahrenheit. The frost-free period is approximately 210 days, with the first killing frost occurring around mid-October and the last around mid-April. The average annual precipitation is about 50 inches with January being the wettest month, averaging over five inches. October is the driest month, averaging approximately three inches. Approximately 58% of the annual rainfall occurs during April through November.

#### 2.3.2. Geology

The project is located in the Wolf River Flood Plain generally consisting of loess and clayey silty alluvium with clay deposits found underneath. At the project site, two 50-foot soil borings were taken just upstream and downstream of the tower. The borings have around 10 feet of clay with a 2-5 feet clayey sand seam followed by poorly graded sand with a stiff fat clay seam at around 40 feet.

#### 2.3.3. Watershed

The Wolf River rises near the western edge of Tippah County, Mississippi, and flows westward across Benton County, Mississippi, and then into Fayette and Shelby Counties, Tennessee, and finally through the City of Memphis to the Mississippi River. The drainage area of the Wolf River basin is approximately 816 square miles, of which approximately 210 square miles are in Shelby County, Tennessee. The primary tributaries of the Wolf River in Shelby County are Grays and Fletcher Creeks. Figure 2-1 below shows a map of the Wolf River watershed.



Figure 2-1. Map of the Wolf River Watershed Created by the Wolf River Conservancy

#### 2.3.4. Hydrology and Hydrologic Conditions

The Wolf River is part of the Mississippi River watershed and is identified by the 8-digit Hydrologic Unit Code (HUC) 08010210. The project site at river mile 9.1 is subject to backwater from the Mississippi River when the Mississippi River is in flood. The Federal Emergency Management Agency (FEMA) Flood Insurance Study for Shelby County,

Tennessee, revised 6 February 2016, lists the 10-, 50-, and 100-year frequency flows as 26320, 33298, and 36040 cubic feet per second (cfs), respectively. At the site, the depth of the channel from top of bank to bed is approximately 15 feet, but during the summer and fall the water can be less than five feet deep. During the 100-year flood the depth of water in the Wolf River floodplain can exceed five feet at the site.

#### 2.3.5. Wetland Resources

Wetlands within the Wolf River watershed are primarily Bottomland Hardwood wetlands. However, within the proposed project footprint there is a small, farmed wetland at the edge of the neighboring agricultural field. This wetland is not within the proposed work area and would not be negatively affected by project related activities.

#### 2.3.6. Aquatic Resources and Fisheries

Aquatic resources within the Wolf River are limited due to head-cutting proceeding upstream on the Wolf River and the altered hydraulic regime of the river. High flow velocities are experienced during storm events. The bank has scoured and slipped in this section of the river. As a typical western Tennessee tributary that has been channelized, this is a generally unstable system for aquatic resources. There is limited existing aquatic habitat, high turbidity, and high sediment load due to the general trend of ongoing erosion. Any impacts to this resource would be temporary in nature during construction.

#### 2.3.7. Terrestrial Resources and Wildlife

The Wolf River watershed corridor is relatively underdeveloped with intact habitat, mainly in the headwaters. Habitats downstream are generally fragmented by urbanization. The study/project area is urbanized and highly developed. Wildlife resources are limited within the project area because of the lack of available habitat due to the urban landscape.

#### 2.3.8. Threatened, Endangered and Protected Species

The U.S. Fish and Wildlife Service (USFWS), Tennessee Ecological Services Field Office and the Information for Planning and Consultation (IPaC) system were consulted in May 2022. Re-submittal of information with concurrence occurred in November 2024 (see Appendix A, Environmental, Attachment D, U.S. Fish and Wildlife Coordination). There are three threatened, endangered, or candidate species that could potentially be found within the proposed project area. These species are the proposed endangered tricolored bat (*Perimyotis subflavus*); proposed threatened alligator snapping turtle (*Macrochelys temminckii*); and proposed candidate Monarch Butterfly (*Danaus plexippus*). No evidence of bald eagles, or their nests, were observed within the project location. The bald eagle is no longer listed as a threatened species but is still protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. There are larger diameter trees (greater than 3-inch diameter at breast height (dbh)) located just outside the proposed property area that could potentially provide bat habitat. Smaller diameter trees/shrubs occur within the project area and would be cleared. Most of the trees identified within the proposed project footprint were cottonwood with buttonbush as the primary shrub layer. No trees with cavities or other trees that could provide bat retreats were identified. It is determined the actions would not cause jeopardy to the continued existence of tricolored bat, monarch butterfly, or alligator snapping turtle.

#### 2.3.9. Hydrology and Water Quality

The channel has little flow during dry periods of the year. High flow velocities are experienced during storm events. Head-cutting and extreme flows are expected to continue in the future.

#### 2.3.10. Air Quality/Greenhouse Gases

The proposed project area is in attainment with all air quality standards. Although air emissions would not require a permit, best management practices (BMP) shall be used throughout construction to minimize air pollution.

Carbon dioxide (CO<sub>2</sub>) is the primary greenhouse gas (GHG) emitted from human activities, chiefly through combustion of fossil fuels. Greenhouse gases absorb reflected energy from the sun and warm Earth's atmosphere. Increases in GHG have resulted in measurable warming of the Earth's surface and ultimately changes to some ecosystems. Additionally, carbon levels in soil used for agricultural purposes tend to decrease over time as carbon is oxidized and released into the atmosphere.

In contrast, forested lands reduce the amount of  $CO_2$  in the atmosphere through sequestration during photosynthesis, returning oxygen to the atmosphere as a byproduct. Increasing quantities of atmospheric GHG resulted in measurable changes to the Earth's surface and ecosystems. The  $CO_2$  equivalent is a unit that represents the warming effect of any given GHG on the global climate and is calculated by multiplying the mass of the gas by its warming potential, which describes the relative potency and residence time of the gas in the atmosphere. Thus, using a  $CO_2$  equivalent provides a common scale for measuring effects of different gases. The estimated existing and with-project  $CO_2$  equivalent conditions consist of the anticipated emissions produced by project area vehicular and construction emissions as well as anticipated carbon release from agricultural land soils.

The social cost of greenhouse gas emissions (SC-GHG) have been calculated for each project alternative by summing the individual emissions from the major GHG pollutants CO2, CH4, and N2O, and then multiplying by the social cost of each pollutant for the year in which they were generated using the tables from the Interagency Working Group on Social Cost of Greenhouse Gases (IWGSC) report as established by Executive Order 13990 to provide interim updated social costs values, with a 3 percent discount rate (IWG 2021). Social cost (SC) was estimated using the below formula to translate the climate impact to the

proposed metric of dollars. All calculations were completed using the EPA's NEAT v1.1 model.

$$SC - GHG = CO_2 * SC - CO_2 + CH_4 * SC - CH_4 + N_2O * SC - N_2O$$

Where:

SC - GHG = the social cost of greenhouse gas emissions in dollars =

 $= total carbon dioxide emissions in metric tons CO_2$ = total methane emissions in metric tons CH<sub>4</sub> = total nitrous oxide emissions in metric tons N<sub>2</sub>O = social cost of carbon dioxide SC - CO<sub>2</sub> = social cost methane SC - CH<sub>4</sub> = social cost of nitrous oxide SC - N<sub>2</sub>O

See Table 4-1. Alternative Comparison of GHG Emissions and Social Costs.

#### 2.3.11. Recreation and Aesthetics

The adjacent Wolf River Greenway is a paved hiking, walking, jogging and biking trail alongside the lower portion of the Wolf River. Kayaking along this stretch of the Wolf River is also popular during the warmer months.

#### 2.3.12. Hazardous, Toxic, and Radioactive Waste (HTRW)

Pursuant to ER 1165-2-132, USACE assumes responsibility for the reasonable identification and evaluation of all Hazardous, Toxic, and Radioactive Waste (HTRW) contamination within the vicinity of proposed actions. The ER 1165-2-132 identifies a policy to avoid the use of project funds for HTRW removal and remediation activities. A record search was conducted using the Environmental Protection Agency's (EPA) EnviroMapper for Envirofacts website (https://enviro.epa.gov/envirofacts/enviromapper/search). The website was checked for any superfund sites, toxic releases, or hazardous waste sites within the vicinity of the proposed project area. Additionally, a site inspection of the proposed project was conducted by USACE personnel during the summer of 2024. The environmental record search and site survey conducted did not identify the presence of any HTRW or suspected HTRW in the project area. As a result of these assessments, it was concluded that the probability of encountering HTRW is low. If any HTRW is encountered during construction activities, the proper handling and disposal of these materials would be coordinated with the EPA and applicable state agencies.

#### 2.4. BUILT ENVIRONMENT

#### 2.4.1. MLGW Tower #1613 Infrastructure and Grid

The MLGW Transmission Structure #1613 was installed in the late 1950's and has been maintained ever since. The tower has a total height of 131.25 feet and carries two 161 kV circuits with 3 phases per circuit. With proper maintenance, the structure has an unlimited

design life. The two transmission lines carried by Structure #1613 act as major power thoroughfares for the north portion of downtown Memphis which includes large customers as St. Jude's Children's Research Hospital, City of Memphis buildings including City Hall, 201 Poplar (Courts and Jail), the federal courts, the University of Tennessee (UT) Healthcare Campus, and the USACE MVM. The MLGW substation feeding the Rhodes College area also suffers affects by the loss of these transmission lines.

#### 2.5. CULTURAL AND SOCIOECONOMIC ENVIRONMENT

#### 2.5.1. Cultural Resources

Prior to fieldwork taking place, USACE conducted a literature and records review of pertinent publications and ethnographic data for archaeological and historical information regarding cultural resources within one mile of the study area. The Tennessee Division of Archaeology site files were consulted on February 18, 2022 and again in May 2024. The results of this literature and records review revealed no previously known archaeological sites or historic properties or surveys are within the study area. One survey, The Trail of Tears in Tennessee: A Study of the Routes Used During the Cherokee Removal of 1838 by Benjamin C. Nance (2001), falls within one mile of the study area. Two archaeological sites, 40SY18 and 40SY217 also fall within one mile of the study area. Site 40SY18 was an Archaic and Woodland site that was bulldozed to make way for Jackson School in 1958. Site 40SY217 was an open habitation site of an unknown period that was also destroyed most likely with the construction of I-40. A Phase I cultural resources survey was conducted in May 2024 and no historic properties or archaeological resources were located. Therefore, USACE determined there was no effect on any archaeological sites or historic properties and existing conditions or future without project would have no effect on cultural resources. The Tennessee State Historical Preservation Office (SHPO) concurred with this determination on 3 June 2024 (Project # SHPO0005105). Of the 23 tribes consulted, only the Quapaw Nation (2 July 2024) and the Choctaw Nation (30 July 2024) responded while agreeing with the no effect determination.

#### 2.5.2. Environmental Justice

The City of Memphis is an economically disadvantaged community (EDC) as defined in the Assistant Secretary of the Army (Civil Works) memorandum (Implementation Guidance for Section 160 of the Water Resources Development Act of 2020, Definition of Economically Disadvantaged Community), 14 March 2023. This data is based upon analysis of census tracks within the area. Approximately 417,638 of the 652,349 residents live within an EDC area, accounting for 64% of the population and 62.5% of the total land area (188 square miles  $(mi^2)$  of 301  $mi^2$ ). Protection of this tower would benefit citizens of Memphis, allowing for uninterrupted electrical service during an emergency.

The Climate and Economic Justice Screening Tool identifies this tract as disadvantaged because it meets more than one burden threshold and the associated socioeconomic threshold. Those items exceeding the threshold include climate change, energy, health,

housing, and workforce development. For further information visit <u>https://screeningtool.geoplatform.gov/en/#12.85/35.18807/-89.9294</u>.

In the immediate project area, approximately 69% of the population identifies as Black with the remaining portion as White or Some Other Race, with relative equal division in males (45%) and females (55%). The majority of the population is between 18 and 65 years in age (72%) with the same percentage reporting as renters. Half of the population are high school graduates. The majority of the population (63%) reported household income as \$50,000 per year or less.

#### 2.5.3. Population

The figure below shows the population trend of Memphis, TN and Shelby County, TN from 1990–2020 per the Decennial Census. The population of both are fairly consistent; however, Shelby County has a consistently growing population whereas the city of Memphis has a decreasing population. Between 2010 and 2020, the Memphis population experienced a 2.13% decrease in population while Shelby County increased by 0.23%.



Figure 2-2. Population 1990 - 2020

#### 2.5.3.1. Employment

Employment is important to identify when evaluating the effects of an emergency event on the area of interest. Individuals may be at risk for losing hours or pay when an emergency occurs, such as severe loss of electricity. In Shelby County, the unemployment rate was 7.4% according to the Decennial Census in 2020. Additionally, 22.8% of individuals are employed by educational services, health care and social assistance services. Transportation, warehousing, and utilities follow, employing 13.5% of individuals. In Memphis the unemployment rate is 8.6%. Educational services, health care and social assistance again employs the most individuals at 22.4% with transportation, warehousing and utilities following at 14.2%.

#### 2.5.3.2. Median Household Income

The median income of Shelby County and Memphis, TN for 2010, 2015, and 2020 is reported in Table 2-1 below according to the American Community Survey. The median income for both areas is steadily increasing year over year. The poverty rates per the 2020 American Community Survey for Shelby County and Memphis, TN were 19% and 24.6%, respectively.

Median Income (USD)						
	2010		2015		2020	
Memphis, TN	\$	36,473	\$	36,445	\$	41,864
Shelby County, TN	\$	44,705	\$	46,224	\$	52,092
Source: US Census Bu	reau					

Table 2-1. Median	Income	2010 -	2020
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#### 2.5.3.3. Race

Table 2-2 shows the racial composition according to the American Community Survey conducted in 2020. In comparison to the 2015 racial data by the American Community Survey, the African American/Black population increased by 1.57% whereas the White population decreased by 2.38%. Individuals that identify as Hispanic or Latino make up 7.4% of the Memphis, TN population and 6.4% of Shelby County.

Table 2-2. Racial/Ethnic Composition

Racial Composition			
		Shelby	County,
	Memphis, TN	TN	-
White	27.87%		38.14%
African American/Black	64.41%		53.85%
American Indian	0.20%		0.18%
Asian	1.76%		2.71%
Native Hawaiian/Pacific Islander	0.03%		0.04%
Some Other Race	3.52%		2.80%
Two or More Races	2.21%		2.28%
Source: US Census Bureau (ACS)			

#### 2.5.3.4. Age Distribution

The population of adults that are 65-years old and over in Shelby County and Memphis, TN are 13.6% and 13.4%, respectively. In addition, it is important to note that children under the

age of 5 will need to be cared for as well in the event of an electrical emergency. In Shelby County 7% of the population are children under 5-years old while Memphis has 7.5%.

#### 2.5.3.4. Education

Educational attainment has important social implications for the purposes of determining the social vulnerability of communities of interest. In the case of an emergency event, individuals that are more educated access information easier regarding immediate needs as well as long-term actions needed to recover from the event. Examples may be obtaining government assistance, completing insurance claims, etc. According to the 2020 American Community Survey, Shelby County, TN has the following levels of education among individuals that are 25 years or older: 27.3% hold only a high school degree or equivalent, 22.8% have some collegiate experience but do not hold a college degree, 6.5% have an associate's degree, 19.3% have a bachelor's degree, and 13% have a graduate or professional degree. In the city of Memphis, TN: 30.3% of people hold only a high school or equivalent degree, 23.7% attended some college without receiving a degree, 5.8% have an associate's degree, 16% have a bachelor's degree, and 10.7% hold a graduate or professional degree.

#### 2.6. FUTURE WITHOUT PROJECT CONDITIONS

In the Future Without Project (FWOP) condition (the "No Action" alternative), there would be no Federal action.

Streambank erosion would continue adjacent to Tower #1613. MLGW would likely relocate Tower #1613 approximately 100 feet to the west of the current location, in-line with the adjacent towers to avoid tower collapse.

In a worst-case scenario, Tower #1613 could collapse into the Wolf River prior to a scheduled relocation. In this scenario, power for 30,000 residents and businesses in Memphis, TN and Shelby County would be compromised in addition to eight fire stations, 2 police stations, 1 hospital, and 1 water treatment plant, though only for a short timeframe as the utility can be rerouted. Should Tower #1613 fall, the energy grid would be put in a precarious situation: redundancy would be removed from the system for over a year that it would take to rebuild the tower, thus increasing the risk to these critical facilities.

Local and major transportation routes could be impacted by the loss of power including Jackson Avenue (Tennessee State Highway 14), North Highland Street, North Parkway (Tennessee State Highway 1), and I-40.

The following sections estimate the environmental FWOP conditions for wetland resources, aquatic resources and fisheries, terrestrial resources and wildlife, threatened, endangered, and protected species, hydrology and water quality, recreation and aesthetics, cultural resources, environmental justice, and air quality and GHG.

#### 2.6.1. Wetland Resources FWOP

In a no-action scenario, wetland habitats within the project area are expected to remain as noted in Existing Conditions, provided that the adjacent channel and banks remain stable.

However, a major flood event could negatively impact project area flora and fauna through displacements, scour and excess deposition of sand and gravel.

#### 2.6.2. Aquatic Resources and Fisheries FWOP

In a no-action scenario, aquatic resources within the project area would be limited to the existing river as noted in Existing Conditions. Continued scouring and erosion would further reduce available habitat by increasing sediment load, turbidity and reducing food sources.

#### 2.6.3. Terrestrial Resources and Wildlife FWOP

In a no-action scenario, the wildlife resources within the project area are expected to remain as noted in Existing Conditions.

#### 2.6.4. Threatened, Endangered and Protected Species FWOP

In a no-action scenario, candidate, threatened and endangered species within the project area are expected to remain as noted in Existing Conditions as no habitat would be disturbed by federal actions.

#### 2.6.5. Hydrology and Water Quality FWOP

In a no-action scenario, hydrology and water quality within the project area would be as noted in Existing Conditions.

#### 2.6.6. Recreation and Aesthetics FWOP

In a no-action scenario, recreation and aesthetics are expected to remain as noted in Existing Conditions. However, should the transmission line fail, boating activities would be severely limited in this stretch of river until new transmission lines are constructed.

#### 2.6.7. Cultural Resources FWOP

In a no-action scenario, cultural resources are expected to remain as noted in Existing Conditions. However, continued seepage could lead to a bank failure during a major flood event and potentially impact cultural resources.

#### 2.6.8. Environmental Justice

In a no-action scenario, there would be no direct, indirect, or cumulative impacts to minority and/or low-income communities under this alternative. Quality of life for the minority population of the City of Memphis and Shelby County would likely remain in its current condition.

#### 2.6.9. Air Quality/Greenhouse Gases FWOP

In a no-action scenario, no change in air quality would occur. Consideration of effects of GHG emissions were conducted utilizing the recommendations of the CEQ guidance of January 2023 (88 FR 1196). These analyses quantify the projected GHG emissions from the burning

of fossil fuels by construction equipment. GHG emissions were calculated for the No-Action Alternative on the repairs that would be needed due to the indirect effects of the ongoing scour threatening the integrity of the MLGW Tower. Further detail on GHG emissions can be found in Table 4-1 in Section 4.1.9 of this report.

## Section 3 \*

## Plan Formulation

#### **3.1. PLAN FORMULATION FRAMEWORK**

The plan formulation process is the development of alternative plans that meet planning objectives, address identified problems, and avoid planning constraints. The PDT developed the alternatives for this study effort using the level of detail necessary to make an informed decision on efficiency, acceptability, completeness and effectiveness of the plan consistent with federal law and policy while remaining consistent with the goals of the NFS, to the extent that law and policy permit. Plan formulation was conducted in accordance with the CAP Section 14 authority, existing laws, regulations and policies that limit the study to streambank protection projects.

Section 14 of the FCA of 1946, as amended, specifically limits the federal contribution to the project to \$10 Million or less per WRDA 2022, Sec. 8138. Based on the problems, opportunities, objectives and constraints a series of alternatives have been developed. The report incorporates the EA of anticipated impacts these alternatives may have in compliance with NEPA.

Least cost analysis, risk and uncertainty, cost effectiveness, and incremental cost analyses were undertaken using procedures appropriate for the scope and complexity of the project.

As required by NEPA and other applicable statutes, when formulating measures and alternatives the PDT considered the opportunities to reasonably avoid or minimize adverse environmental impacts in addition to mitigation requirements.

Risk and uncertainty are intrinsic in water resources planning and design. Risk is a measure of the probability and consequence of uncertain future events— the chance of an undesirable outcome. Uncertainty refers to the likelihood an outcome results from a lack of knowledge about critical elements or processes contributing to risk or natural variability in the same elements or processes. Throughout the planning process, the PDT collaborated with the NFS and relevant stakeholders to identify risk and uncertainty in accordance with USACE policies related to risk such as ER 1105-2-103. Risk informed decisions were made regarding the reliability of estimated costs and benefits of alternative plans.

Alternatives include one or more management measures functioning together to address the planning objectives. Only alternatives that were practical in terms of the engineering, economic, environmental and social impacts were developed and included the measures carried forward in the planning process. The following sections describe the formulation and screening of the measures related to the initial array and the final array of alternatives considered to stabilize the bank at the Tower #1613 location.

#### **3.2. MANAGEMENT MEASURES**

A management measure is a feature or activity that can be implemented at a specific geographic site to address one or more planning objectives. This section summarizes the nonstructural, structural and nature-based measures developed to address the erosion, scour and resultant bank stability concerns along the Wolf River streambank adjacent to Tower #1613 and the rationale for their screening. These measures were coordinated amongst the PDT and the NFS and include the BMP determined to be suitable to address the stability concerns along the streambank.

#### 3.2.1. Nonstructural Measure

The non-structural measure evaluated in this study was the relocation of the MLGW Tower #1613. The relocation of the tower measure is synonymous with the No-Action Alternative in this study. Abandoning Tower #1613 is not a viable measure because it provides a critical utility service. As the NFS, MLGW would be responsible for the relocation of the tower. This measure would require replacements of utilities.

Table 3-1. Nonstructural M	<i>leasure</i> Considered
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Nonstructural Measure				
Measure Considered	Constraint	Status	Reason for Screening*	
MLGW Relocate Tower #1613	None	Retained	Measure retained; this measure becomes the No Action Alternative. Abandoning the tower is not a viable measure.	

\*Measures highlighted in blue indicate measure retained; non-highlighted measures were screened.

#### **3.2.2. Traditional Structural Measures**

The PDT evaluated structural measures that are commonly and successfully used by USACE for streambank stabilization. The traditional structural measures for bank stabilization evaluated in this study include riprap armoring of the streambank, installation of sheet pile, lining the streambank with concrete, installation of Gabion mattress, installation of Gabion retaining walls, and an articulated concrete mattress.

Later, the PDT added a trench revetment measure that would include a "u-shaped" ring of riprap installed around the backside of the tower to protect the tower even in the case of stream avulsion. This trench revetment measure is described further in the descriptions of the Initial Array of Alternatives (Section 3.3.3.). Table 3-2 shows the traditional structural measures considered and the reasons for their screening.
Traditional Structural Measures							
Measure Considered	Constraint	Status	Reason for Screening*				
Riprap Armor	None	Retained	Retained through the initial array of alternatives. Past work throughout the District has shown this to be an economical and effective option. Is appropriate for this location. Has potential to self-heal.				
Sheet Pile	Technical	Screened	Does not provide protection at toe and would eventually cause channel deepening along the sheet pile, which could destabilize sheet pile foundation in the sandy soils. Does not self-heal. Engineering a sheet pile foundation that could function would drive costs up.				
Concrete Lining	Technical	Screened	Less effective than sheet piles. Due to sandy composition of soils, foundation failure could occur suddenly.				
Gabion Mattresses	Technical	Screened	Requires a stable slope to work so the bank would need to be cut back to implement. Cutting back the bank is not possible due to the already close proximity between the eroded top bank and the Wolf River (only 9-14 feet remained in 2021).				
Gabion Retaining Wall	Technical	Screened	Similar foundation issues to sheet pile wall. The gabion retaining wall acts like a solid structure and does not provide protection at the toe. With sandy soils, the foundation could be suddenly destabilized. Lacks the ability to self-heal.				
Articulated Concrete Mattress	Technical	Screened	The slope is too steep. The slope would need to be laid back for this measure to work but only 9-14 feet between the top bank and the tower remain.				
Trench Revetment Surrounding Tower	None	Retained	Retained through the initial array of alternatives. The riprap trench revetment around the backside of the tower would be coupled with protection on the bank side of the slope. Collectively this system would protect the tower even in the event of river avulsion.				

Table 3-2. Trac	ditional Structura	I Measures	Considered
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\*Measures highlighted in blue indicate measure retained; non-highlighted measures were screened.

#### 3.2.3. Nature-Based Measures

In accordance with WRDA 2016, section 1184(b), "study teams must consider natural and nature-based features alone and in combination with other nonstructural and structural measures, as appropriate." The nature-based measures for bank stabilization evaluated in this study include seeded or vegetated riprap, brush mattresses with natural armor, vegetated geogrids, a live crib wall, the addition of a willow planting enhancement to any measure, engineered log jams, a coir fabric and structural earth wall with willow cuttings, and stream barbs also known as bendway weirs. Table 3-3 shows the nature-based measures considered and the reasons for their screening.

Nature-Based Measures							
Measure Considered	Constraint	Status	Reason for Screening*				
12" Seeded Topsoil on Riprap Armor using Native Grasses	None	Retained	Retained to Initial Array.				
Joint Planting (Vegetated Riprap)	Vegetation	Screened	Joint planting typically refers to planting stakes of small trees in riprap. The utility Right of Way (ROW) requirements under the Tower #1613 are not compatible with the small tree vegetative component of this measure.				
Brush Mattress Natural Armor with Rock Toe	Technical	Screened	The utility ROW requirements are not compatible with the vegetative component of this measure. The variability of the vegetation's success for structural enhancement is not appropriate for emergency protection of this critical utility. Estimated stream velocities exceed maximum tolerances for this measure in this area.				
Vegetated Geogrids	Technical	Screened	The slope at this location is too steep to lay geogrid. Excavation of the bank to lay the slope back further would endanger the tower foundation. The bank would need to instead be built out, which increases the risk of erosion on the geogrid, which would render it ineffective. The bank's eroded in a concave formation, which requires sufficient replacement of mass.				

#### Table 3-3. Nature-Based Measures Considered

Nature-Based Measures							
Measure Considered	Constraint	Status	Reason for Screening*				
Live Crib Wall	Technical	Screened	Live crib walls typically use small tree live branch cuttings. Utility ROW requirements not compatible with vegetative component of this measure; vegetation height clearances are a concern. This measure was also deemed too complex and too costly for the CAP cost limits.				
Willow Planting Enhancement to Any Measure	Technical	Screened	Utility ROW requirements not compatible with vegetative component of measure; height clearances are a concern.				
Engineered Log Jams	Technical	Screened	Burying logs in bank could reduce compaction and destabilize bank further. Sourcing log jam materials could be expensive and difficult considering proximity to dense urban area.				
Coir Fabric and Structural Earth Wall with Willow Cuttings	Cost	Screened	High expense would likely exceed CAP cost limits. Variability of vegetation's success for structural enhancement was deemed inappropriate for the needed emergency protection of this critical utility.				
Stream Barbs (Bendway Weir)	Technical	Screened	Stream barbs would require a stable bank slope. The bank appears to be too steep in this location to be stable. If this were a larger project, bendway weirs might be appropriate to place upstream several thousand feet in a series; the space needed for this measure exceeds the space provided in the study area. In addition, the slope on the bank would need to be laid back, but with only 9-14 linear feet remaining between the top bank and the tower, there is insufficient space to lay the slop back appropriately for this measure.				

# 3.2.4. Measure Screening

The PDT screened the above traditional and nature-based measures based on the constraints of technical feasibility at the MLGW Tower #1613 site and rough order of magnitude (ROM)

cost that would have far exceeded the CAP cost limit. Tables 3-1, 3-2 and 3-3 above detail the rationale for screening or retaining each measure.

The non-structural measure of MLGW relocating the tower was retained to the initial array of alternatives, as abandoning the tower is not a viable option due to the essential services provided by this utility.

During this preliminary screening, the PDT determined that the following erosion and bank stabilization measures were technically feasible and likely within CAP cost limits and therefore warranted further investigation as a part of the initial array of alternatives:

- Riprap armor of the bank
- Trench revetment surrounding the backside of the tower to protect the tower in the event of a river avulsion
- The nature-based riprap armor with 12-inch topsoil seeded with native vegetation.

# **3.3. INITIAL ARRAY OF ALTERNATIVES**

The PDT formulated an initial array of alternatives by combining the retained nonstructural, traditional structural and nature-based measures. The relocation of Tower #1613 became the No-Action Alternative.

These measures were combined into five alternatives to form the initial array of alternatives, which is summarized below in Table 3-4.

Table 3-4. Initial Array of Alternatives

	Alternative
1	No Action (MLGW Relocate the Tower)
2	Riprap Armor
3	Riprap Armor and Trench Revetment
4	Riprap Armor with 12" Seeded Topsoil
5	Riprap Armor with 12" Seeded Topsoil & Trench Revetment

The following sections describe each alternative in further detail.

# 3.3.1. Alternative 1 – No Action (MLGW Relocate the Tower)

No action would be taken by USACE to stabilize the streambank and erosion would continue. This alternative would require the NFS (MLGW) to relocate the tower approximately 100 feet to the west of its current location, in-line with the adjacent existing towers. Expected actions would include the installation of four new concrete drilled pier foundations and obtaining approximately 1 acre in real estate easements since this tower sits at a line angle.

A rental crane and a 3740 linear feet long access road would also be required for this work .

#### 3.3.2. Alternative 2 – Riprap Armor

This alternative would require the installation of 300 linear feet for R200 riprap along the streambank to protect the bank from further eroding towards the tower.

Alternative 2 consists of placing a minimum of 6-inches of bedding stone and a minimum of 24-inch R-200 riprap to develop a 3.5H:1V slope from the existing top of bank (TOB). Riprap would extend beyond the TOB by 5-feet. Improved toe protection would be provided at 12-foot length and 4-foot depth (Figure 3-1).

Additionally, Type E end protection would be placed at the upstream and downstream ends of the bank stabilization to help prevent scour and flanking of the riprap.

The excess riprap and partially embedded toe protection create a riprap armor with selfhealing properties (Figure 3-3). This design is commonly used in this area and has been proven as a long-lasting armor with scour protection and virtually no maintenance needs.



Figure 3-1. Section View of Riprap Armor

Continuing Authorities Program, Section 14



Figure 23. Tower Very Close to Top of Bank (Plan)

Figure 3-2. Plan View Typical of Riprap Armor Design Near Tower



Figure 3-3. Partly Embedded Toe Protection

# 3.3.3. Alternative 3 – Riprap Armor with Trench Revetment

Building on Alternative 2, this risk-informed alternative includes the same riprap armor described above but would add a trench revetment in a "u-shape" behind the tower to mitigate the low risk of future riprap flanking or river avulsion.

As described in Alternative 2, the 300 linear feet of riprap would be placed on a 3.5H:1V slope with 6-inches of bedding stone, partially embedded toe protection, and Type-E end protection with self-healing properties to protect the bank from further eroding towards the tower.

The u-shaped trench revetment around the tower would launch during the unlikely event of riprap flanking or river avulsion (Figures 3-4 and 3-5). The riprap trench revetment is also designed with self-healing properties.



Figure 3-4. Riprap Armor of Bank and Trench Revetment Plan View



Figure 3-5. Riprap Armor of Bank and Trench Revetment Section Views

# 3.3.4. Alternative 4 – Riprap Armor with 12-inch Seeded Topsoil

Building on Alternative 2, this alternative includes the same riprap armor described above but Alternative 4 would also include 12-inches of topsoil seeded with native vegetation (Figure 3-6).

As described in Alternative 2, the 300 linear feet of riprap would be placed on a 3.5H:1V slope with 6-inches of bedding stone, partially embedded toe protection, and Type-E end protection with self-healing properties to protect the bank from further eroding towards the tower.

The voids on the riprap slope would be backfilled with local soils and low-growth native vegetation (Table 3-5). This nature-based feature is intended to mimic the local bank habitat conditions as closely as reasonable per the guidance of WRDA 2016, section 1184. A 12-inch-deep layer of local soil would begin 5 feet from the existing TOB and be placed down to the water surface elevation at the time of construction. In this case, water elevation will likely cause variation in soil quantity.



Figure 3-6. Riprap Armor with Seeded Topsoil Design View

Table 3-5. Native Seed Specification for Seeded Topsoil

PROPOSED SEED SPEC					
Planting Application Variety		Application Rate (LB/AC)			
	Redtop	1			
	Big Blue Stem	5			
STREAM BANK	Little Blue Stem	5			
STABILIZATION	Indian Grass	5			
	Virginia Wildrye	15			
	White Clover	2			
	Switchgrass	2			

# 3.3.5. Alternative 5 – Riprap Armor with 12-inch Seeded Topsoil and Trench Revetment

This alternative includes the same riprap armor described above in Alternative 2, the trench revetment described in Alternative 3, and the 12-inch seeded topsoil described in Alternative 4.

As described in Alternative 2, the 300 linear feet of riprap would be placed on a 3.5H:1V slope with 6-inches of bedding stone, partially embedded toe protection, and Type-E end protection with self-healing properties to protect the bank from further eroding towards the tower (Figure 3-7).

The voids on the riprap slope would be backfilled with 12-inch-deep local soils and seeded with low-growth native vegetation (Table 3-5).

The trench revetment would be placed in a u-shape around the back of the tower to mitigate the low risk of future riprap flanking or river avulsion (Figure 3-8).



Figure 3-7. Riprap with Seeded Topsoil Design Plan



Figure 3-8. Section View of Riprap Armor and Trench Revetment after Hypothetical Avulsion

# 3.4. SCREENING THE INITIAL ARRAY OF ALTERNATIVES

The initial array of alternatives was screened using study objectives, constraints, and the four planning and guidance (P&G) criteria of completeness, effectiveness, efficiency, and acceptability, as defined in P&G Section VI.1.6.2(c).

• Completeness is a determination of whether the plan includes all elements necessary to achieve the objectives. It is an indication of the degree to which the outputs of the plan are dependent upon the actions of others.

- Effectiveness is the extent to which an alternative plan alleviates the specified problems and achieves the specified opportunities. Alternative plans that do not contribute or minimally contribute to the planning objectives should be dropped from consideration.
- Efficiency is the extent to which an alternative plan is the most cost-effective means of alleviating the specified problems and realizing the specified opportunities, consistent with protecting the Nation's environment. Benefits can be both monetary and non-monetary. Alternative plans that provided little benefits relative to the cost should be removed from further consideration.
- Acceptability is the workability and viability of the alternative plan with respect to acceptance by State and local entities and the public and compatibility with existing laws, regulations, and public policies. Acceptability means a measure or alternative plan is technically, environmentally, economically and socially feasible. Alternative plans that are clearly not feasible should be dropped from further consideration.

Table 3-6 on the following page presents the Initial Array of Alternatives (Alternatives 1 - 5) with a brief description of each following the table.

# Table 3-6. Initial Array Screening

		Meets Objectives		Avoids Constraints			
	Alternative	OBJ-1	OBJ-2	CR-1*	CR-1* CR-2 CR-3		CR-4
1	No Action (MLGW Relocate Tower)	NO - relocating the tower would not reduce erosion or scour on the streambank.	YES	YES	YES	YES	YES
2	Riprap Armor of the Bank	YES	YES	YES	YES	YES	YES
3	Riprap Armor of the Bank & Trench Revetment	YES	YES	NO - Trench revetment cannot be justified under authority for emergency streambank repair. Protecting tower services from a possible unknown future event, such as flanking, does not meet authority intent		YES, but trench revetment could cause more negative impacts to terrestrial wildlife than other alternatives.	YES
4	Riprap Armor of the Bank with 12" Seeded Topsoil	YES	YES	YES	YES	YES	YES
5	Riprap Armor of the Bank with Plantings & Trench Revetment	YES	YES	NO - Trench revetment cannot be justified under authority for emergency streambank repair. Protecting tower services from a possible unknown future event, such as flanking, does not meet authority intent.	YES	YES, but trench revetment could cause more negative impacts to terrestrial wildlife than other alternatives.	YES

\*Blue highlight indicates that alternative carried forward. Non-blue highlight indicates that a measure was screened.

		Avoids Constraints						P&G	Criteria	
	Alternative	CR-5	CR-6	CR-7	CR-8	CR-9	Complete	Effective	Efficient	Acceptable
1	No Action (MLGW Relocate Tower)	YES, construction access to site is the same for all alternatives	YES	YES	YES	YES	YES	YES	YES	YES
2	Riprap Armor of the Bank	YES, construction access to site is the same for all alternatives	YES	YES	YES	YES	YES	YES	YES	YES
3	Riprap Armor of the Bank & Trench Revetment	YES, construction access to site is the same for all alternatives	YES	YES	YES	YES	YES	YES	NO-is not the least costly.	YES
4	Riprap Armor of the Bank with 12" Seeded Topsoil	YES, construction access to site is the same for all alternatives	YES	YES	YES	YES	YES	YES	YES	YES
5	Riprap Armor of the Bank with Plantings & Trench Revetment	YES, construction access to site is the same for all alternatives	YES	YES	YES	YES	YES	YES	NO – is not the least costly.	YES

\*Blue highlight indicates that alternative carried forward. Non-blue highlight indicates that a measure was screened.

The trench revetment Alternatives (Alternatives 3 and 5) were screened based on efficiency according to the P&G criteria. The trench revetment feature was intended to mitigate for a low-likelihood hypothetical riprap flanking or stream avulsion to an adjacent lake. Because there is no imminent evidence of an avulsion or the river changing course, there is no current threat to the back side of the tower from erosion or scour. Alternatives 3 and 5 do not meet the intent of the authority to address an imminent threat. Alternatives 3 and 5 are also not the least cost alternatives and not efficient according to P&G criteria. The trench revetment feature (Alternatives 3 and 5) was therefore screened out.

The alternatives that were carried forward include Alternative 1 – *MLGW Relocate Tower*, Alternative 2 – *Riprap Armor*, and Alternative 4 – *Riprap Armor with 12-inch Seeded Topsoil*.

# Section 4 \* Environmental Effects and Consequences

# 4.1. RELEVANT RESOURCES

#### 4.1.1. Wetlands

#### 4.1.1.1. Future Conditions with the Proposed Action

With implementation of the proposed action, there would be a temporary impact to wetland function in the middle of the transmission line right-of-way by the creation of the temporary access road. Wetland function should return after the roadway is removed and the site is restored to pre-existing conditions.

#### 4.1.1.2. Future Conditions with the Proposed Action and 12-inch Seeded Topsoil

With implementation of this action, the temporary action to wetland function would still occur. With the added time required to establish vegetation, these wetland functions would be of slightly longer duration. Wetland function should return after the roadway is removed and the site is restored to pre-existing conditions.

#### 4.1.2. Aquatic Resources and Fisheries

#### 4.1.2.1. Future Conditions with the Proposed Action

With implementation of the proposed action, erosion in this stretch would be arrested resulting in a more stable system during flood or high-water flow periods with the possibility of aquatic resources being able to utilize the system.

#### 4.1.2.2. Future Conditions with the Proposed Action and 12-inch Seeded Topsoil

With implementation of this action, similar conditions to the proposed action would occur.

#### 4.1.3. Terrestrial Resources and Wildlife

#### 4.1.3.1. Future Conditions with the Proposed Action

With implementation of the proposed action, minimal tree clearing of small diameter trees would occur. Larger diameter trees are primarily limited to outside of the construction zone. As such, impacts to wildlife resources would be limited to temporary dispersal and disturbance from the construction equipment and related noise. However, once the project is completed wildlife species would be expected to return to the project area. The loss of habitat and temporary disturbance would not adversely impact the general

populations of wildlife species within the region as extensive forested areas and suitable habitat is readily available within the vicinity of the project area.

# 4.1.3.2. Future Conditions with the Proposed Action and 12-inch Seeded Topsoil

With implementation of this action, similar conditions to the proposed action would occur. However, wildlife and terrestrial resources may better utilize the planted areas over bare riprap. Any gains would be minimal as this option would only increase planted areas slightly compared to the rest of the project area.

#### 4.1.4. Threatened and Endangered Species

#### 4.1.4.1. Future Conditions with the Proposed Action

Pursuant to Section 7 of the Endangered Species Act, as amended, USACE determined that the recommended plan associated with the project area may affect, but is not likely to affect, the following federally listed species or their designated habitat: tricolored bat, monarch butterfly, or alligator snapping turtle. Additionally, no evidence of bald eagles, or their nests, were observed within the project location. The bald eagle is no longer listed as a threatened species but is still protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. The USFWS, Tennessee Ecological Services Field Office concurred with this determination in November 2024 (see Appendix A, Environmental, Attachment D, U. S. Fish and Wildlife Coordination).

### 4.1.4.2. Future Conditions with the Proposed Action and 12-inch Seeded Topsoil

With implementation of this action, similar conditions to the proposed action would occur. No additional habitat for these species would be created. With implementation of this action, similar conditions to the proposed action would occur. No additional habitat for these species would be created.

#### 4.1.5. Hydrology and Water Quality

#### 4.1.5.1. Future Conditions with the Proposed Action

With implementation of the proposed action, impacts to water quality within the Wolf River would be minimal or have no effect as the river normally carries a heavy sediment load and that the project action would be conducted during high water periods. Turbidity and suspended solids would be increased to minor degrees during construction; however, BMP (e.g., silt fences, temporary seeding) would be employed throughout construction to minimize impacts. Any temporary impacts to water quality would be anticipated to return to normal shortly after construction ceases. Thus, no significant impacts to water quality would occur as a result of project implementation. The proposed action meets conditions of Nationwide Permit 13 – Bank Stabilization. A state water quality certification has been received from the State of Tennessee, Department of Environment and Conservation (ARAP – NR2005.024). Extensions of this permit would continue to include all activities.

#### 4.1.5.2. Future Conditions with the Proposed Action and 12-inch Seeded Topsoil

With implementation of this action, similar conditions to the proposed action would occur. With the added time required to establish vegetation, this action could increase the length of disturbance slightly.

#### 4.1.6. Recreation and Aesthetics

#### 4.1.6.1. Future Conditions with the Proposed Action

With implementation of the proposed action impacts would be minimal, temporary, or have no affect as individuals would have to trespass to visit the site or access the site via boat.

#### 4.1.6.2. Future Conditions with the Proposed Action and 12-inch Seeded Topsoil

With implementation of this action, similar conditions to the proposed action would occur. Aesthetics would be improved as the site would have established vegetation instead of bare riprap.

#### 4.7.1. Cultural Resources

#### 4.1.7.1. Future Conditions with the Proposed Action

With implementation of the proposed action no historic properties are anticipated to be affected. Additionally, there are no historic properties listed in or determined eligible for inclusion in the National Register of Historic Places in the project's area of potential effects (APE). No additional cultural resources investigations are recommended prior to project implementation. However, should an inadvertent discovery be made during construction the resource would be evaluated, assessed for effects, avoided if possible, and mitigated in accordance with federal statutes and regulations (36 CFR, Part 800).

#### 4.1.7.2. Future Conditions with the Proposed Action and 12-inch Seeded Topsoil

With implementation of this action similar conditions to the proposed action would occur.

A literature review and cultural resources survey within the project's APE were completed by the MVM archaeologist in the summer of 2024. The investigation revealed no significant cultural resources within the scour repair APE.

#### 4.1.8. Environmental Justice

#### 4.1.8.1. Future Conditions with the Proposed Action

With implementation of the proposed action unemployment, household income, age distribution and education levels would likely remain in their current condition. Quality of life for the minority population of the City of Memphis and Shelby County would likely remain in its current condition.

# 4.1.8.2. Future Conditions with the Proposed Action and 12-inch Seeded Topsoil

With implementation of this action similar conditions to the proposed action would occur.

# 4.1.9. Air Quality/Greenhouse Gasses

Project construction would result in release of some GHG as equipment burns fossil fuels. Table 4-1 shows the comparison in these GHG emissions and the social costs for the proposed action to the no action alternative. Overall, minor short-term adverse effects would occur due to the GHG emissions from the construction equipment; however, these effects are expected to be less than those from the repairs needed from indirect effects of the no action alternative.

For the recommended alternative calculations were based upon the estimated use of the following construction equipment: survey boat to monitor and adjust the slope of the riprap repair, a hydraulic excavator to place riprap, and trucks to haul riprap into the site. For the topsoil alternative, additional time was estimated for the use of the hydraulic excavator to place topsoil originally removed prior to construction activities.

Total GHG Emissions by Project Alternative (total metric tons; 2020 Dollars)							
	СО	CO <sub>2</sub>	CH₄	N <sub>2</sub> O	*CO2eq		
No-Action Alternative	0.31	97.67	0.01	0.84	348.83		
GHG Emissions From Recommended Alternative	0.03	9.63	0.001	0.08	34.42		
GHG Emissions From Recommended Alternative and 12-inch Seeded Topsoil	0.03	10.50	0.001	0.09	37.78		
Total Social Costs of Greenhouse Gases (2020 Dollars)							
	СО	CO <sub>2</sub>	CH₄	N <sub>2</sub> O	Total		
No-Action Alternative	17.20	5469.45	13.75	17663.71	23164.10		
GHG Emissions From Recommended Alternative	1.71	539.12	1.36	1743.29	2285.47		
GHG Emissions From Recommended Alternative and 12-inch Seeded	1 93	587.89	1.53	1918.59	2500.02		

 $* \operatorname{CO2eq} = X*CO + X*CO2 + Y*N2O + Z*CH4$ 

Where X = 100 Year Global Warming Potential for Carbon Monoxide and Carbon Dioxide = 1

Where Y = 100 Year Global Warming Potential for Nitrous Oxide = 298

Where Z = 100 Year Global Warming Potential for Methane = 25

CFR Title 40 Chapter I Subchapter C Part 98: Table A-1 Global Warming Potentials

#### 4.2. HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

Pursuant to ER 1165-2-132, USACE assumes responsibility for the reasonable identification and evaluation of all HTRW contamination within the vicinity of proposed actions. The ER 1165-2-132 identifies that HTRW policy is to avoid the use of project funds for HTRW removal and remediation activities. A record search has been conducted of the EPA EnviroMapper for Envirofacts website

(https://enviro.epa.gov/envirofacts/enviromapper/search). The website was checked for any superfund sites, toxic releases, or hazardous waste sites within the vicinity of the proposed project area. Additionally, a site inspection of the proposed project was conducted by USACE personnel during the summer of 2024. The environmental record search and site survey conducted did not identify the presence of any HTRW in the project area. As a result of these assessments, it was concluded that the probability of encountering HTRW is low. If any HTRW is encountered during construction activities, the proper handling and disposal of these materials would be coordinated with the EPA and applicable state agencies.

#### 4.3. CUMULATIVE IMPACTS

The CEQ regulations (40 CFR §§ 1500-1508) implementing the procedural provisions of NEPA, as amended (42 U.S.C. § 4321 et seq.) define cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR § 1508.1). Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. The cumulative effect analysis for this proposed study includes actions that take place from beginning of known channelization (1964) until 50 years post-project construction. The immediate geographic boundary is limited to Shelby County, TN with the larger boundary limited to the entire Wolf River basin.

Development and channelization have been the primary impact within the Wolf River basin starting in the 1960's and continuing through the present day. Various headcutting arresting projects and channelization have occurred within the Wolf River channel and associated tributaries with potential headcutting arresting projects possible in the near future. In the early 2000's hiking, biking and river access became more prominent after the creation of the nonprofit Wolf River Conservancy. The Wolf River Conservancy continues to develop recreational opportunities within the entire Wolf River basin that could curb some of the development and its associated effects. Development continues to be a concern within the basin as more people move to the suburbs.

Within the immediate geographical location of Shelby County, TN, cumulative impacts of the proposed action would be similar to previous and past actions in efforts to protect critical infrastructure, businesses and residences. Future impacts (continued protection of critical infrastructure, businesses and residences) would result in similar environmental effects as the proposed action. This portion of the Wolf River basin is already heavily impacted by urbanization and stream control measures and any additional actions similar to that proposed by this project would be minimal in nature compared to past actions. With the proposed action the bank will be stabilized along with some limited decrease in turbidity from bank erosion. Temporary decreases in air quality would occur during construction activities but would return to pre-construction levels

soon after construction ends. Cumulative impacts would be limited to those previous impacts and from impacts related to future construction activities.

Within the larger watershed of the Wolf River basin cumulative impacts would be similar to the immediate project location except for portions of the upper Wolf River basin that are protected from development. However, over the expected life of the project, as development occurs within the non-protected areas of the Wolf River basin land use would change with the concurrent effects on air and water quality, wildlife and its resources, and possible changes in the sociocultural resources. Future bank stabilization projects similar to the proposed action may be expected on other critical infrastructure in the Wolf River basin inducing similar impacts.

#### 4.3.1. Past Actions

Several past actions occurred within the Wolf River basin that have significantly influenced the existing environment conditions. These actions include past projects by USACE, projects by local cities and organizations, and local urbanization.

#### Wolf River Channelization

House Document No. 76, 85th Congress, authorized USACE to enlarge and realign the Wolf River from its mouth to Gray's Creek (38 miles), to construct a diversion across Mud Island, to close the existing channel, to realign and cleanout the lower 3 miles of Fletcher Creek, and to construct an interceptor sanitary sewer line across the Wolf River below the Wolf River closure. Channelization of 21.9 miles of the Wolf River and 2.8 miles of Fletcher Creek, including an erosion control structure at the mouth of Fletcher Creek, was completed on 21 September 1964. The project increased the flood control capacity of the Wolf River and allowed for an increase in development without the risk of devastating floods. The change in the bottom grade of the Wolf River by past channelization activities and the highly developed basin are the major factors that have caused the current instabilities in the Wolf River. The TSP would not impact the flood carrying capacity of the Wolf River.

#### 4.3.1.1. Development

The majority of land within the Wolf River basin was agriculture and forest prior to 1958. Development started in the upper reaches of the basin towards Poplar Avenue by 1976. Residential development increased substantially since 1976.

#### 4.3.1.2. Present Actions

The TSP would add to the overall amount of grade control and bank protection measures being undertaken in the Wolf River. Past actions and highly developed watersheds led to streams with severe stability problems and altered hydraulic regimes. Actions are currently being conducted to restore some of the environmental degradation of past projects and preserve remaining habitat in the area.

#### 4.3.1.3. Residential Development

Residential development is beginning to take place within the Wolf River floodplain. Development consists of placing fill above the FEMA regulated 100-year floodplain elevation (USACE 1995 and 2000). Downstream flooding of older neighborhoods built at lower elevations is expected to occur as development in the floodplain increases. The TSP would benefit some local development by decreasing erosion rates and stabilizing conditions within the Wolf River. The plan is not expected to promote future development within the Wolf River floodplain.

#### 4.3.1.4. Wolf River Greenway

The Wolf River Conservancy is a local nonprofit organization with a goal of establishing a protected public greenway along the entire 90-mile length of the Wolf River from its headwaters in north Mississippi to its confluence with the Mississippi River in Memphis. The Wolf River Conservancy, the State of Tennessee and local municipalities have been active in preserving land along the river. The TSP would not impact activities taken to acquire land for the Wolf River Greenway.

#### 4.3.1.5. Wolf River Restoration

The Memphis District completed a feasibility study and environmental impact statement (U.S. Army Corps of Engineers, 2000) on the Wolf River. Section 101(b)(25) of WRDA 2000 authorized the TSP. The Record of Decision was signed on 28 April 2003. The authorized plan consists of the following features:

- Construction of six rock weirs to stabilize the grade of the main channel
- Construction of eighteen weirs to stabilize the grade of tributaries
- Construction of two earthen berms on the main channel to control erosion
- Construction of 7.8 miles of hiking trails
- Construction of three boat ramps
- Establishment of a 2,088-acre wildlife corridor

The project is substantially complete. To date, all main channel stabilization weirs, six tributary weirs, erosion prevention berm, and associated access roads have been constructed completing the ecosystem restoration features of the project. Approximately two miles of trail and lateral crossings and two boat ramps have also been constructed. The TSP would not impact the authorized Wolf River Restoration Project.

#### 4.3.2. Future Actions

#### 4.3.2.1. Environmental Degradation

Continued headcutting and bank instabilities are expected on all tributaries to the Wolf River that do not have adequate grade control. Increases in population and continued development would most likely cause flood damages throughout the basin. It is expected that there would be future federal actions taken to address the ecosystem restoration and flood damage reduction needs of the area.

#### 4.4. MITIGATION

The proposed project and all alternatives considered would have no lasting impacts to wetlands or woodlands. Also, no significant impacts to aquatic or terrestrial resources would occur. Approximately 0.3 acres of wetlands are located along the access road and can be avoided with careful placement of the access road. (Mitigation costs are included in the construction cost estimate in the event the wetlands are disturbed. Further detail is described in Appendix C, Cost Engineering.) It is anticipated no mitigation would be required for the proposed project; however, according to the Shelby County, TN Zoning Atlas this area is zoned Floodway. No construction will be a temporary activity and the property will return to existing condition because of the self-healing properties of the project, thus no mitigation measures are required. The NFS will notify Shelby County regarding the project and zoning restriction identified prior to construction start.

# Section 5 \*

# Plan Comparison and Selection of Final Array of Alternatives

The USACE "No Action" alternative (MLGW relocate Tower #1613) and two action Alternatives (Alternatives 2 and 4) were carried forward for further evaluation in the Final Array of Alternatives.

Table 5-1. Final Array of Alternatives

Alt . 1	No Action (MLGW Relocate Tower)
Alt. 2	Riprap Armor
Alt. 4	Riprap Armor with 12-inch Seeded Topsoil

The Final Array of Alternatives was evaluated based on least cost analysis per (EP 1105-2-58, sec. 29. d.). In this case, the least cost alternative was that which would cost less than relocating the tower while maintaining a minimal impact to cultural and environmental resources and requiring a minimal implementation time.

#### 5.1.1 Final Array Project First Costs

Tables 5-2, 5-3, and 5-4 show Project First Costs for the three alternatives in the Final Array. Additional detail on the cost analysis can be found in Appendix C, *Cost Engineering*.

Table 5-2. Alternative	1 – MLGW Relocate	<b>Tower Project First</b>	Cost Estimate
------------------------	-------------------	----------------------------	---------------

ltem		Cost	Contingenc		Project First Cost	
				У		
Construction (MLGW Relocate Tower)	\$	2,670,000	\$	665,000	\$	3,335,000
TOTAL	\$	2,670,000	\$	665,000	\$	3,335,000

\*FY 25 dollars, NFS would be responsible for all Alternative 1 costs

\*\*Alternative 1 is the "No Action" alternative.

\*\*\*Values rounded to the nearest thousand.

\*\*\*\*Relocation of Tower costs provided by NFS.

			Contingenc		Project First	
Item	Cost		у		Cost	
Construction	\$	779,000	\$	288,000	\$	1,067,000
PED	\$	319,000	\$	34,000	\$	353,000
<b>Construction Management</b>	\$	106,000	\$	12,000	\$	118,000
LERRDs	\$	146,000	\$	14,000	\$	160,000
TOTAL	\$	1,350,000	\$	349,000	\$	1,698,000

#### Table 5-3. Alternative 2 – Riprap Armor Project First Cost Estimate

\*FY 25 dollars, Federal and non-Federal costs

\*\*Construction cost includes mob & demob, storm water pollution prevention, stripping, temp access road, bank stabilization 300', 30" CMP, and environmental mitigation.

\*\*\*Values rounded to the nearest thousand.

Table 5-4. Alternative 4 – Riprap Armor and 12-inch Seeded Topsoil Project First Cost Estimate

Item	Cost		Contingency			Project First Cost	
Construction	\$	793,000	\$	290,000	\$	1,083,000	
PED	\$	319,000	\$	34,000	\$	353,000	
Construction Management	\$	106,000	\$	12,000	\$	118,000	
LERRDs	\$	146,000	\$	14,000	\$	160,000	
TOTAL	\$	1,364,000	\$	351,000	\$	1,715,000	

\*FY 25 dollars, Federal and non-Federal costs.

\*\*Construction cost includes mob & demob, storm water pollution prevention, stripping, temp access road, bank stabilization 300', fill, 30" CMP, and environmental mitigation.

\*\*\*Values rounded to the nearest thousand.

According to this analysis, Alternative 2 – *Riprap Armor of the Bank* has the lowest total Project First Cost of \$1,698,000. While the nature-based Alternative 4 – *Riprap Armor and 12-inch Seeded Topsoil* was only estimated to be \$17,000 more than Alternative 2, the PDT discussed potential long-term bank observation and maintenance difficulties that could arise if the riprap is covered by soil and vegetation.

#### 5.2. Evaluation and Comparison Using the System of Accounts

Plan formulation and selection considers all effects, beneficial or adverse, to each evaluation account identified in the *1983 Economic and Environmental Principles and Guidelines for Water and Related Land Resource Implementation Studies* (Principles and Guidelines). The accounts include Regional Economic Development (RED), Other Social Effects (OSE), and Environmental Quality (EQ). A qualitative evaluation of the accounts is included below:

RED: The RED account recognizes changes in the distribution of regional economic activity resulting from implementation of the TSP.

OSE: The OSE account ensures that the beneficial and adverse social effects of a USACE project are evaluated in the planning process. This account identifies communities that are highly socially vulnerable as well as impacts to health, safety, social connectedness, and recreation. OSE effects are discussed in detail in Appendix E, *Economic and Social Considerations*.

EQ: The EQ account recognizes the ecological, cultural and aesthetic effects.

No NED analysis was done based on ER 1105-2-103 since the TSP is justified based on least cost per EP 1105-2-58, sec. d.

Accounts	Metrics	Alt. 1 - No Action (MLGW Relocate Tower)	Alt. 2 - Riprap Armor	Alt. 4 - Riprap Armor w. 12-in. Seeded Topsoil			
RED	Assessment	RED impacts are anticipated to be the same across all alternatives a did not play a significant role in the evaluation of alternatives and select of the TSP. Implementation of the TSP would have a positive impact regional economic activity during construction. There will be tempor increases in employment and income into the region which will have multiplier effect on the local economy. Under the no action alternat there could be short-term negative impacts to RED during tower relocat if there are disturbances to power that impact jobs in the area.					
	Benefits Rank	2nd	1st	1st			

#### Table 5-5. Accounts

Accounts	Metrics	Alt. 1 - No Action (MLGW Relocate Tower)	Alt. 2 - Riprap Armor	Alt. 4 - Riprap Armor w. 12-in. Seeded Topsoil						
	Benefits Assessment	Alternative 4 - Riprap Armor with 12-inch Seeded Topsoil would have a more natural appearance and would be less visually intrusive than a structural treatment alone. This measure would provide some riparian cover and wildlife habitat benefits. There is no preferential ranking for aesthetics or habitat benefits for Alternative 1 (no action) and Alternative 2 (Riprap Armor of the Bank).								
	Rank	2nd	2nd	1st						
EQ	Impacts Assessment	s have similar const me impacts on envi ould be minimal or to oproximately 0.3 act ith careful placemer The environmental tion 4, <i>Environment</i>	milar construction project footprints cts on environmental quality. ninimal or temporary during itely 0.3 acres of wetlands near the ul placement of the access road these rironmental benefits and impacts are <i>nvironmental Effects and</i>							
	Impacts Rank	Equal Impacts								
OSE		<ul> <li>The CEQ's Climate and Economic Justice Tool (CEJST) was used per Executive Order (EO) 14008. This tool identifies communities that are disadvantaged in one or more categories of criteria if the census tract is above the threshold for one or more environmental or climate indicators and if the census tract is above the threshold for socioeconomic indicators. The two census tracts surrounding the MLGW tower #1613 exceeded the socioeconomic, climate change, energy, health, housing, and workforce development thresholds. Further documentation on socia vulnerability, social benefits and impacts are further detailed in Appendix E, <i>Economics</i>.</li> <li>Protection of the main transmission tower for a large section of northern Memphis and Shelby County would benefit numerous residential and commercial properties by continuing services to public infrastructure. Under the no action alternative, relocating the MI GW tower could have</li> </ul>								
	Assessment Benefits	suffer from power loss du	ring relocation.	1 ot						
	Nallik	2110	151	151						

\*Dollar values rounded to the nearest thousand.

# Section 6 Tentatively Selected Plan

After selection of Alternative 2 - *Riprap Armor* as the TSP, costs were further refined. The least-cost alternative is Alternative 2, which is also less than the cost of relocating the threatened facility and is the TSP. Alternative 2 is also the sponsor supported plan.

#### 6.1. Plan Accomplishments

The 300 linear feet of riprap along the bank of the Wolf River would stabilize the bank and protect against further erosion towards the MLGW Tower #1613. The additional bedding stone volume at the slope toe ensures the channel side slope is not over steepened by erosion at the slope toe and allows any scour that may develop to be replenished by the additional stone volume, thus creating a self-healing quality to the design, and eliminating the need for maintenance.

#### 6.2. TSP Plan Components

The TSP would require riprap armoring along the bank for 300 linear feet along the bank to protect the bank from further erosion. A minimum of 6 inches of bedding stone is required beneath a minimum of 24 inches of R-200 riprap to develop a 3.5H:1V slope from the existing TOB. Riprap would extend beyond the TOB by 5 feet to provide additional protection for the top of bank as shown in Figure 6-2; this is a standard practice of MVM design to prevent normal runoff from scouring at the top of the riprap protection. Improved toe protection would be provided at 12 feet in length and at a 4-foot depth. Type E end protection would be placed at the downstream end of the stabilization to help prevent scouring.

Operations, maintenance, repair, replacement and rehabilitation (OMRR&R) needs for the TSP are negligible due to the additional volume of stone at the slope toe which creates self-healing properties negating the need for stone replacement. This additional volume ensures the channel side slope is not over steepened by erosion at the slope toe. Providing sufficient stone at the slope toe to fill potential scour holes eliminates the need for periodic replenishment of riprap, thus providing a self-healing riprap property. Should erosion create gaps beneath the riprap and bedding stone, the rocks would fall into place to fill in the gaps, thus protecting the site from further erosion. Figures 6-2, 6-3, 6-4, and 6-5 illustrate typical designs for the TSP's proposed riprap armament.

A plan view illustrating the riprap armor placement based on a typical design is shown below in Figure 6-1. Though this image does not represent the final design, it provides an idea of general riprap placement. The actual TSP design will be finalized in PED.

The riprap and other materials would be trucked in via an access road described further in Section 6.5. *Site Access*.



Figure 23. Tower Very Close to Top of Bank (Plan)

Figure 6-1. Typical Riprap Placement Plan View



Figure 6-2. USACE Standard Riprap Design Details



Figure 6-3. Riprap Type E End Protection Typical Detail Plan View



Figure-25. Partly Embedded Toe Protection

Figure 6-4. Embedded Riprap Toe Typical Design Section View



Figure 22. Tower a Safe Distance From Top of Bank (Section)

Figure 6-5. Tower Riprap Laid on Existing Bank Typical Detail Section View

# 6.3. TSP Cost Estimate

The TSP is the least-cost alternative and provides the greatest annual net benefits. The estimated FY25 Project First Cost of construction of the TSP is \$1,698,000 including contingency costs. The project has cost for Lands, Easements, Rights-of-Way, Relocations, and Disposal Sites (LERRDS) in the estimated amount of \$160,000.

Because TSP utilizes a self-healing riprap design, the OMRR&R costs of the TSP would be negligible. The additional volume of stone at the slope toe ensures the channel side slope is not over steepened by erosion at the slope toe. Providing sufficient stone at the slope toe to fill erosion that may occur eliminates the need for periodic replenishment of riprap. The MLGW utility company would apply the typical vegetation control measures already used onsite. There are no estimated costs for OMRR&R.

The TSP meets each of the P&G criteria of completeness, effectiveness, efficiency and acceptability. The TSP shows completeness as it can function on its own; effectiveness due to this plan meeting the planning objectives and taking care of the erosion; efficiency in that the plan is cost effective with benefits exceeding costs; and acceptability as the TSP is compliant with laws and regulations.

# 6.4. Site Access and Construction Activities

It is anticipated that the site will be accessed from N. Highland St. A 12' gravel access road will be constructed through MLGW's utility easement near the existing towers. Discussion with the field owner and MLGW determined that access should remain inside of MLGW's utility easement. The access will continue to the vicinity of tower #1613 within the existing MLGW easement. A laydown area is shown near the tower to provide the contractor room to perform the work, make turning movements and store material (Figure 6-6).



Figure 6-6. Preliminary Overall Plan Sheet C-100

There is potential that the access to the tower could become impacted during adverse weather.

Additionally, high water may make it difficult for the contractor to perform work along the bank.

Determined by the voltage, the contractor will have to remain a certain safe distance away from the power lines. This is according to Occupational Safety and Health Administration (OSHA) regulations. This will likely limit the contractor on the type of equipment to be used. Access from the east side of Wolf River was discussed; it was determined by the PDT to be less favorable than access from the west due to real estate challenges.

#### 6.5. Environmental Mitigation

Environmental impacts would be temporary and include disturbance to the site for terrestrial wildlife from noise and activity and increased turbidity for aquatic wildlife. No permanent significant impacts to aquatic or terrestrial resources are expected.

The 0.3 acres of wetlands located along the access road can be avoided with careful placement of the access road. The PDT included mitigation costs in the construction cost estimate if these 0.3 acres of wetlands are disturbed. Further detail is described in Appendix C, Cost Engineering.

# 6.6. Lands, Easements, Rights-of-Way, Relocations, and Disposal Sites for the TSP

A Real Estate Plan (REP) describing the real estate requirements and costs for the LERRDs to construct the TSP is included in Appendix D, *Real Estate Plan*. The NFS will have the responsibility of acquiring all necessary real estate interests for the TSP.

The estimated cost of \$160,000 for the LERRD required for construction of the TSP reflects real estate interest acquisition costs as well as other costs associated with acquiring LERRD including the cost of acquiring real property interest, damages, appraisals, surveys, title work, NFS oversite, other administrative costs and contingencies.

The TSP does not require the acquisition of residences, businesses, or farms, and therefore relocations assistance benefits (P.L. 91-646) would not be required. The project area for construction and OMRR&R for the TSP is approximately 2.67 acres and requires acquisitions from 4 landowners: the Wolf River Conservancy (2 Tracts) and a joint ownership by the City of Memphis and Shelby County.

A more detailed description of the LERRD required for the project is included in Appendix D, *Real Estate Plan*.

Real Estate conducted meetings with the NFS, explained the need to assess the NFS' capabilities and executed the Real Estate Capability Assessment. The PDT recently received authorities and statues that the NFS requires in order to assess their abilities to acquire LERRDs.

# 6.7. OMRR&R for the TSP

The MLGW utility company's current typical vegetation control measures would also apply to the TSP features. The OMRR&R was deemed negligible and was estimated to be zero dollars (\$0) over the 50-year period of analysis and is excluded from Project First Costs.

The TSP does not need to include OMRR&R due to the use of additional volume of bedding stone at the slope toe. This ensures the channel side slope is not over steepened by erosion at the slope toe. Providing sufficient bedding stone at the slope toe to fill erosion that may occur eliminates the need for periodic replenishment of riprap, thus creating a self-healing quality to the design. This self-healing design has been used successfully to stabilize streambanks in the area. The MLGW utility company would apply the typical vegetation control measures already used onsite.

#### 6.8. Climate Change Analysis

The guidance in ER 1100-2-8162 requires sea level change (SLC) to be considered in planning and design; it mandates the range of reasonably plausible future sea level conditions that are evaluated on studies for three scenarios, low, intermediate, and high. The USACE Engineering and Construction Bulletin (ECB) 2018-14, *Guidance for Incorporating Climate Change Impacts to Inland Hydrology in Civil Works Studies*, also provides guidance for use in assessing impacts of climate change in the hydrologic

analysis completed for typical USACE studies. Consideration of SLC is critical and required to accurately assess alternatives and subsequent selection of the TSP.

The criteria outlined above does not apply to this study because the project is in an inland area not subject to tides or possible SLC.

The cited ECB 2018-14 illustrates steps to assess impacts of climate change in the hydrologic analysis. Therefore, no hydrologic analysis was completed for this study. Best available data was used to approximate water surface elevations in the channel in absence of models.

Because the project is not a flood risk management study and the alternatives are not based on constructing proposed features to various elevations to mitigate existing or future predicted water levels, the SLC information is not a critical study element. SLC estimates will not change the TSP and a detailed analysis was not completed as the rate of change is unknown.

#### 6.9. Risk and Consequence Evaluation

Risk and uncertainty are intrinsic in water resources planning and design. This section describes various risks that could later impact project performance, construction schedule, or costs. These risks were accounted for in cost and schedule contingency estimates and have been factored into the total cost of the TSP. All risks described below are low. None of the risks identified below are serious risks that would deter the PDT's recommendation to move forward with the TSP.

According to the Omnibus Appropriations Act, 2009 Energy and Water Development and Related Agencies Appropriations Conference Report: "Section 14 funds shall be allocated to the projects that address the most significant risks and adverse consequences, irrespective of phase or previous funding history." The risk level for this project is "B". This is based on the worst-case undesirable event (bank failure and subsequent tower collapse) likely occurring in coming years. This consequence rating is due to the adverse impacts to facilities critical to public health, safety and security as the tower supplies power to a hospital, 8 fire stations, 2 police stations, and 1 water treatment plant. Collapse of the tower would also negatively impact local and major thoroughfares including I-40 supporting an average daily traffic value of over 50,000.

#### Data Uncertainties: Low Risk

The PDT assessed that there are minimal data uncertainties. The PDT has high confidence in the flow values used because of the FEMA report and an 87-year period of record for the Raleigh gage (Wolf River at Raleigh WT111). The Raleigh gage is located only 8/10 of a mile upstream of Tower #1613. All terrain data is from surveys. Survey grades are within standard construction tolerances.

#### Cost and Construction Schedule: Low Risk

There is a low risk associated with cost due to the possibility of an increase in construction materials and labor costs along with increasing inflation.

Winter tree clearing to avoid a bat survey could add time and cost due to muddy conditions, but the PDT adjusted for these potential cost variations in the contingency costs.

#### Project Performance: Low Risk

The TSP riprap has a self-healing design, which has been commonly and successfully used in the area for decades.

While the PDT determined that there is no immediate or conclusive evidence that the river will avulse, the future behavior of Wolf River unknown. The risk of river avulsion is considered to be low.

During a sustained high headwater water event the Wolf River could establish shorter path through adjacent lake, though there is no conclusive evidence that avulsion would occur in the near future. If the river avulsed the performance of the TSP could be rendered obsolete.

Avulsion is the process of rapid abandonment of a river channel and the formation of a new river channel. This abandonment of the original river channel is due to the concentration of scour and erosion along the outside of the bends and curves in the river. Figure 6-7 below shows three possible avulsion paths that Wolf River could take near the tower (red, yellow, and blue). The tower is circled in red near the center of the figure. One path would be through the sandy meander cutoff south of the tower (blue). A second path would be through the pond north and west of the tower (red). Either of these avulsions might leave the tower intact, but if the northern path (red) quickly shifted to the path shown by the yellow dashed line, then the tower could be damaged before emergency protection could be installed.



Figure 6-7. Possible Avulsion Paths of Wolf River at Site

# 6.10. Cost Sharing

The MLGW is the NFS for the project. The NFS would be required to execute formal assurances in the form of a Project Partnership Agreement (PPA) with the Federal government. The PPA would define the roles and responsibilities of both agencies in the cost sharing and execution of work.

For CAP, Section 14, the NFS is responsible for 35% of the implementation costs. The NFS required share is 35% up to 50% (based on cost of LERRDs), plus 5% of the construction cost must be in cash.

The Total Feasibility cost was \$500,000. The total project cost is estimated to be \$1,788,000. Cost sharing provisions for the PED phase, the construction management phase and the construction phase has been determined to also be 65% Federal and 35% non-Federal.

Table 6-1 below shows the Total Project Cost (Fully Funded) cost sharing responsibilities.
Item	Cost		Contingency		Project First Cost	
PED		\$319,000		\$34,000		\$353,000
LERRDs		\$146,000		\$14,000		\$160,000
Construction		\$779,000		\$288,000		\$1,067,000
Construction Management		\$106,000		\$12,000		\$118,000
TOTAL	\$	1,350,000	\$	348,000	\$	1,698,000

Table 6-1. Alternative 2 –	Riprap Armol	r Project First	Cost Estimate

Table 6-2. Federal and Non-Federal Cost Share of Total Design and Implementation (D&I) Project First Costs

TOTAL PROJECT FIRST COSTS	\$1,698,000
Federal Share of Project First Costs (65%)	\$1,103,700
Non-Fed Sponsor Share of Project First Costs (35%)	\$594,300
5% cash of Total Project First Cost (included in NFS share)	\$84,900
LERRDs	\$160,000
Additional funds required to meet the minimum 35% cost share (35% - 5% - creditable LERRDs)	\$349,400
OMRR&R	0
Betterments	0

\*FY 25 price levels, Sponsor to provide all required LERRD and OMRR&R; costs include contingencies. \*\*Dollars rounded to the nearest hundreds.

\*\*\*The total Project First Cost excludes the 5% (of construction) mandatory cash.

### 6.11. Design and Construction Schedule

The estimated design and construction schedule for the TSP (Alternative 2) selected for MLGW Tower #1613 is described below.

Potential limitations to the project that could impact schedule include the following:

- High water conditions in the Wolf River
- Adverse weather making access difficult.

Following the successful submission of this Feasibility Report and its acceptance, the PDT estimates the following timeline:

Table 6-3. Project Schedule

Task	Date
DQC	26-Jun-2024
ATR	19-Aug-2024
TSP Pre-Brief	24-Sep-2024
MSC Decision Meeting - TSP	26-Sep-2024
Legal Review	27-Nov-2024
Public Review of EA and Main Report	17-Dec-2024
Policy & Legal Compliance Review	19-Feb-2025
Receive Report Approval	18-Apr-2025
Initiate Design and Implementation phase	21-Apr-2025
Execute PPA	20-Aug-2025
LERRD Acquisition (14 months) & PED continuing	21-Aug-2025
Solicit Bids (1 month)	21-Oct-2026
Contract Award	04-Dec-2026
Construction Contract Complete	07-Sep-2027
Fiscally Completion & Closeout	28-Dec-2027

The USFWS confirmed that the project is not likely to affect tricolor bats. The project may affect, but is not likely to adversely affect, Northern Long-eared bats. Bat surveys and winter tree clearing are therefore not required for construction; however, the PDT strongly recommends that winter tree clearing still takes place to avoid and minimize potential adverse impacts to bats and other wildlife. Winter tree clearing (November through March) would be conducted where practicable to avoid and minimize impacts to wildlife. Removal of felled trees can be conducted during any season.

#### 6.12. Items for PED

The PED phase will include progressing the initial design developed while determining the TSP. Additional minimal survey may be needed. Plans will be progressed to 35%, 65% and 95%. It is anticipated that the plan set will include existing conditions sheets, plan and profile sheets, cross sections at the bank and details. Specifications will be developed in a presentable package.

Undetermined items include water service elevations at the time of construction and powerline elevations and clearances required for equipment. It is assumed that the contractor will be able to perform the work with no issues during stone placement. It will need to be determined whether 2-way haul is a better option or if the turn around area will provide enough room for the contractor to perform the work easily. Quantities will need to progress through the reviews during PED.

### 6.13. Environmental Commitments

In November 2024 the USFWS confirmed that the project may affect, but is not likely to affect, tricolor bats (see Appendix A, Environmental, Attachment D, U. S. Fish and Wildlife Coordination). Bat surveys and winter tree clearing are therefore not required for construction; however, the PDT strongly recommends that winter tree clearing still takes place to avoid and minimize potential adverse impacts to bats and other wildlife. Winter tree clearing (October 1 through March 31) would be conducted where practicable to avoid and minimize impacts to wildlife. Removal of felled trees can be conducted during any season.

### 6.14. Environmental Operating Principles (EOP)

The USACE EOPs were developed to ensure that USACE missions include totally integrated sustainable environmental practices. The EOPs provide corporate direction to ensure the workforce recognizes USACE's role in, and responsibility for, sustainable use, stewardship and restoration of natural resources across the nation.

The re-energized EOP include:

- Foster sustainability as a way of life throughout the organization.
- Proactively consider environmental consequences of all USACE activities and act accordingly.
- Create mutually supporting economic and environmentally sustainable solutions.
- Continue to meet our corporate responsibility and accountability under the law for activities undertaken by USACE, which may impact human and natural environments.
- Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.
- Leverage scientific, economic, and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.
- Employ an open, transparent process that respects views of individuals and groups interested in USACE activities.

The concepts embedded in the original EOPs remain vital to the success of USACE and its missions.

In this study, the PDT considered USACE EOPs throughout the planning process. For example, this study considered several nature-based measures to enhance environmental sustainability. The nature-based measures evaluated for use in this study included vegetative riprap, brush mattress, live crib wall, willow planting enhancement to any measure, engineered log jams, coir fabric and structural earth wall and stream barbs. The PDT ensured NEPA compliance and collaborated with SHPO, USFWS, 23 Native American Tribes, and other environmental and cultural resources partners. The PDT investigated potential HTRW concerns, and the PDT considered environmental risks when conducting risk assessments such as the Abbreviated Risk Analysis.

The PDT made every effort to ensure the proposed project is economically sustainable. The costs of the TSP are well below the CAP cost limit. The OMRR&R costs are \$0 during the 50-year period of analysis. The PDT leveraged scientific, economic, and social knowledge to understand the environmental context and effects of USACE actions in a collaborative manner.

### 6.15. Views of Non-Federal Sponsor

The NFS is in support of the TSP and is willing and financially capable of cost sharing in the project's design and implementation. The NFS' Letter of Intent and the Self-Certification of Financial Capability for Decision Documents are contained in Appendix F, *Non-Federal Sponsor's Letter of Intent and signed Self Certification of Financial Capability for Decision Documents*.

## Section 7 \*

# **Environmental Compliance**

The PDT anticipates that a Finding of No Significant Impact (FONSI) will be the likely outcome of the Integrated Feasibility Report and Environmental Assessment for CAP, Section 14, Emergency Streambank and Shoreline Erosion Study for MLGW Tower #1613. The PDT anticipates that the FONSI will be signed by the Memphis District Commander at that time.

Related environmental compliance correspondence and other supporting documentation is contained in Appendix A, *Environmental\*.* 

### 7.1 ENVIRONMENTAL COMPLIANCE TABLE

Environmental compliance for the proposed action would be achieved based upon coordination of this integrated EA, feasibility report and FONSI with all appropriate agencies, organizations and individuals for their review and comments. The FONSI would not be signed until the proposed action achieves environmental compliance with applicable laws and regulations.

This section contains a description of relevant resources that could be impacted by the project. The important resources described are those recognized by laws, executive orders, regulations and other standards of national, state and regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the public. Table 7-1 provides summary information of the institutional, technical and public importance of these resources.

The following resources have been considered and found unaffected by the alternatives under consideration: aesthetics; agricultural lands; wetlands; bottomland hardwood forests; aquatic resources/fisheries; coastal zone; air quality; public use; prime or unique farmland; unique or rare wildlife habitat; Indian trust resources; and soundscapes/noise.

This office assessed the environmental impacts of the proposed action and determined that the proposed work is expected to have only minor impacts on wildlife, air quality and hydrology. Impacts to wildlife and air guality would be temporary and would be expected to return to existing conditions after completion of the project action. The proposed project would have little to no impacts upon freshwater marshes, freshwater lakes, state designated scenic streams, prime and unique farmlands, cultural resources, municipal facilities, municipal utilities, roadways, recreation, aesthetics, socio-economic, and environmental justice. Also, no significant adverse impacts would occur to wetlands, resources/fisheries, wildlife. threatened and endangered aquatic species. hydrology/water quality, air quality, and the human environment. Therefore, a supplemental EIS is not required.

Table 7-1. Relevant Resources and Their Institutional, Technical, and Public Importance (next two pages)

Table 7-1. Relevant Resources					
Resource	Institutionally Important	Technically Important	Publicly Important		
Wetland Resources	Clean Water Act of 1977, as amended; Executive Order 11990 of 1977; Protection of Wetlands, Coastal Zone Management Act of 1972, as amended; and the Estuary Protection Act of 1968, as amended	They provide necessary habitat for various species of plants, fish, and wildlife; they serve as ground water recharge areas; they proved storage areas for storm and flood waters; they provide protection from wave action, erosion, and storm damage; and they provide various consumptive and non- consumptive recreational opportunities.	The high value the public places on the functions and values that wetlands provide. Environmental organizations and the public support the preservation of wetlands.		
Aquatic Resources and Fisheries	Fish and Wildlife Coordination Act of 1985, as amended	They are a critical element of many valuable freshwater and marine habitats; they are an indicator of the health of the various freshwater and marine habitats; and many species are important commercial resources.	The high priority that the public places on their esthetic, recreational, and commercial value.		
Terrestrial Resources and Wildlife	FWCA of 1958, as amended and the Migratory Bird Treaty Act of 1918.	Wildlife is a critical element of many valuable aquatic and terrestrial habitats; are an indicator of the health of various aquatic and terrestrial habitats; and many species are important commercial resources.	The high priority that the public places on their esthetic, recreational, and commercial value.		
Threatened and Endangered Species	The Endangered Species Act of 1973, as amended; the Marine Mammal Protection Act of 1972; and the Bald and Golden Eagle Protection Act of 1940.	USACE; USFWS; National Marine Fisheries Service; NRCS; EPA; Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP); and the Louisiana Department of Wildlife and Fisheries cooperate to protect these species. The status of such species provides an indication of the overall health of an ecosystem.	The public supports the preservation of rare or declining species and their habitats.		
Hydrology and Water Quality	Clean Water Act of 1977, Fish and Wildlife Coordination Act, Coastal Zone Management Act of 1972, and MS and LA State & Local Coastal Resources Act of 1978.	USACE, USFWS, National Marine Fisheries Service, Natural Resources Conservation Service, EPA, the Mississippi Department of Environmental Quality, the Louisiana Department of Environmental Quality, and wildlife/fishery offices recognize value of fisheries and good water quality. The national and state standards established to assess water quality.	Environmental organizations and the public support the preservation of water quality and fishery resources and the desire for clean drinking water.		

Table 7-1. Relevant Resources					
Recreation and Aesthetics	Federal Water Project Recreation Act of 1965 as amended and Land and Water Conservation Fund Act of 1965 as amended USACE ER 1105-2-100, and National Environmental Policy Act of 1969, the Coastal Barrier Resources Act of 1990, Louisiana's National and Scenic River's Act of 1988, and the National and Local Scenic Byway Program.	Provide high economic value of to local, state, and national economies Visual accessibility to unique combinations of geological, botanical, and cultural features that may be an asset to a study area. State and Federal agencies recognize the value of beaches and shore dunes.	Public makes high demands on recreational areas. There is a high value that the public places on fishing, hunting, and boating, as measured by the large number of fishing and hunting licenses sold; and the large per-capita number of recreational boat registrations.		
Cultural Resources	National Historic Preservation Act (NHPA) of 1966, as amended; the Native American Graves Protection and Repatriation Act of 1990; and the Archeological Resources Protection Act of 1979.	State and Federal agencies document and protect sites. Their association or linkage to past events, historically important persons, and design and construction values and for their ability to yield important information about prehistory and history.	Preservation groups, Native American tribes, and private individuals support protection and enhancement of historical resources.		
Environmental Justice	Executive Orders 12898 & 14008, Federal Actions to Address Environmental Justice in Communities of Color and People Experiencing Poverty, and the Department of Defense's Strategy on Environmental Justice of 1995, & Tackling the climate crisis at home and abroad 2021.	The social and economic welfare of communities of color and people experiencing poverty may be positively or disproportionately impacted by the preferred plan.	Public concerns about the fair and equitable treatment (fair treatment and meaningful involvement) of all people with respects to environmental and human health consequences of federal laws, regulations, policies, and actions.		
Air Quality and Greenhouse Gas Emissions	Clean Air Act of 1963, as amended, Executive Order 13990.	Need to use science to reduce greenhouse gas emissions and bolster resilience to the impacts of climate change.	Virtually all citizens express a desire for clean air.		

### 7.2 AGENCY AND TRIBAL COORDINATION

This DIFREA and draft FONSI are being coordinated with appropriate congressional, federal, state and local interests, as well as environmental groups and other interested parties, including:

United States Department of Interior, U.S. Fish and Wildlife Service, Cookeville, TN Environmental Protection Agency, Region IV, Atlanta, GA

Natural Resources Conservation Service, Nashville, TN

Tennessee Historical Commission, Department of Environment and Conservation, Nashville, TN

Tennessee Department of Environment and Conservation (TDEC), Nashville, TN Tennessee Wildlife Resources Agency, Nashville, Tennessee.

The NFS, MLGW, received a State water quality certification and aquatic resource alteration permit (ARAP – NR 2005.024) from TDEC.

As a federal agency, USACE is required to assume responsibility for the preservation of historic properties or resources that fall under USACE jurisdiction and that such properties are maintained and managed in a way that considers the preservation of the historic, archeological, architectural and cultural values (EO 13175, NEPA, as amended (42 U.S.C. §§ 4321 et seq.), Sections 106 and 110 of the NHPA, as amended (54 U.S.C. § 306108) and its implementing regulations, (38 C.F.R. Part 800). The NHPA Section 106 process, implemented by regulations of the Advisory Council on Historic Preservation (ACHP), 36 CFR § 800, requires agencies to define a project's APE, identify historic properties in that area that may be directly or indirectly affected by the project, assess the potential for adverse effects, resolve those adverse effects, and provide the ACHP a reasonable opportunity to comment on the undertaking.

The consideration of impacts to historic and cultural resources is mandated under § 101(b)(4) of NEPA as implemented by 40 C.F.R. Parts 1501-1508. The statute calls for the consideration of a broad range of historic and cultural resources, including sites of religious and cultural importance to federally recognized Tribal governments. Cultural resources include historic properties, archeological resources, and Native American resources including sacred sites and traditional cultural properties. Common cultural resource sites include prehistoric Native American archeological sites, historic archeological sites, shipwrecks, and structures such as bridges and buildings. Historic properties have a narrower meaning and are defined in § 101(a)(1)(A) of the NHPA; they include districts, sites (archeological and religious/cultural), buildings, structures, and objects that are listed in or determined eligible for listing in the National Register of Historic Places (NRHP). Historic properties are identified by qualified agency representatives in consultation with the SHPO and Tribes. Executive Order 13175 requires all federal agencies to formulate "an accountable process to ensure meaningful and timely input by tribal officials in the development of the regulatory policies that have tribal Implications." The USACE Civil Works Tribal Consultation Policy provides guidance to USACE Civil Works on consultation, coordination, and consensus building when working with Tribal Nations; USACE applies the Tribal Consultation Policy to its Civil Works programs.

Specifically, USACE incorporates the following six Tribal Policy Principles into its planning processes:

- 1. Tribal Sovereignty;
- 2. Trust Responsibility;
- 3. Government-to-Government and Nation-to-Nation Relations;
- 4. Consultation Elements;

5. Supporting Tribal self-determination, self-reliance, and capacity building to the fullest extent permitted by law and policy; and

6. Protection of natural and cultural resources.

Each Tribe has a Tribal Historic Preservation Officer (THPO) who assumes the responsibilities of the SHPO for cultural resources within their Tribal lands and consults with federal agencies on activities that may impact archaeological sites of interest on or off Tribal lands [as defined in 36 CFR § 800.16(x)].

Each district provided a Tribal Liaison (TL) to assist the Tribal Liaison Lead in complying with the updated USACE Tribal Consultation Policy. A database of resident/removed Tribes with interests in the study area was developed with primary, secondary, and tertiary points of contact (POCs), preferred method of communication, and the Tribal designated decision maker POC. The Tribes listed below were consulted on the determination based upon the Phase I cultural resources survey. All consultations will also be entered into the USACE Tribal Consultation Database record.

#### TN SHPO and Tribes Consultation

In compliance with NHPA Section 106, MVM initiated Section 106 consultation for a No Historic Properties Affected determination for the Proposed Action (Proposed Undertaking) as described in the MVM correspondence dated 22 May 2023, to the TN SHPO and the following Tribes:

Absentee-Shawnee Tribe of Indians of Oklahoma Alabama-Quassarte Tribal Town Cherokee Nation Chickasaw Nation Choctaw Nation of Oklahoma Coushatta Tribe of Louisiana Eastern Band of Cherokee Indians Eastern Shawnee Tribe of Oklahoma Jena Band of Choctaw Indians Kialegee Tribal Town Kickapoo Tribe of Oklahoma Mississippi Band of Choctaw Indians Muscogee (Creek) Nation Poarch Band of Creek Indians Ponca Tribe of Indians of Oklahoma Quapaw Nation Seminole Nation of Oklahoma Seminole Tribe of Florida Shawnee Tribe of Oklahoma Thlopthlocco Tribal Town Tunica-Biloxi Tribe of Louisiana United Keetoowah Band of Cherokee

Concurrence responses to USACE's determination of No Historic Properties Affected were received from the following consulting parties to date: the Tennessee SHPO on 3 June 2024, the Quapaw Nation on 2 July 2024, and the Choctaw Nation on 30 July 2024. Upon receipt of these responses, USACE considers the Section 106 consultation process complete.

### 7.3 SPONSOR AND PUBLIC INVOLVEMENT

The NFS has been engaged throughout the feasibility study process. The NFS was included in the initial charrette. All alternatives were formulated based on input from the NFS and feedback from stakeholders such as the Wolf River Conservancy.

A public notice will be issued that describes the proposed action and states that the Draft integrated EA and feasibility report would be made available for a 30-day review and comment period. Comments will be responded to and will be used by USACE in deciding the level of significance for the proposed action.

# Section 8 Recommendation and Approval

The Wolf River is experiencing bank erosion at river mile 9.1, which is threatening the structural integrity of MLGW Tower #1613, an essential component of the Memphis utility services grid. Tower #1613 is integral to the Memphis power grid as it provides power to an area of 19.76 square miles, impacting 30,000 Memphis and Shelby County residents. The tower's area of impact contains a large part of downtown Memphis which includes multiple businesses, 10 public safety facilities, a water treatment plant, and a hospital. Portions of highly traveled roads and highways such as I-40, Jackson Avenue (Tennessee State Highway 14), and North Parkway (Tennessee State Highway 1) would also be affected by the loss of MLGW Tower #1613 due to the tower supplying power to the lighting along these thoroughfares. A 50-year period of analysis was used for this study from 2027 to 2077 with benefits beginning in the year 2027. The estimated FY2025 Project First Cost of Construction of the TSP is \$1,698,000. There is no interest during construction because construction will be completed within one year. The estimated OMRR&R costs of the Project are \$0 (zero dollars) due to the riprap design's self-healing properties that would not require maintenance or replacement in the 50-year period of analysis.

Implementing the TSP is expected to have only minor impacts on wildlife, air quality and hydrology. Impacts to wildlife and air guality would be temporary and would be expected to return to existing conditions after completion of the project action. The proposed project would have little to no impacts upon freshwater marshes, freshwater lakes, state designated scenic streams, prime and unique farmlands, cultural resources, municipal facilities, municipal utilities, roadways, recreation, aesthetics, socio-economic and environmental justice. Also, no significant adverse impacts would occur to wetlands, aquatic resources/fisheries, wildlife, threatened and endangered species, hydrology/water quality, air quality and the human environment. The NFS is in support of the TSP and is willing and financially capable to enter into a model CAP 14 Project Partnership Agreement (with no deviations) for the construction on the project.

After considering the engineering, economic, environmental and social aspects relative to the construction of the proposed emergency bank stabilization project in Memphis, TN along approximately 300 linear feet of the Wolf River at MLGW Tower#1613, I approve this report and recommend that the selected plan be authorized and constructed as a Federal project under the authority of Section 14 of the FCA of 1946 (79 P.L. 526, 33 U.S.C. § 701r), as amended.

The total project cost (excluding the Feasibility phase) is \$1,788,000 (FY25 price level). Feasibility Cost was \$500,000 of which \$300,000 was federal expense and \$200,000 was non-federal. Federal cost of implementation is 65 percent estimated at \$1,162,000 and non-Federal costs is 35 percent estimated at \$626,000. Annual non-Federal operation and maintenance (O&M) costs are estimated at \$0. I further recommend that the project be funded and constructed subject to cost-sharing and financing arrangements

acceptable to the Chief of Engineers and the Secretary of the Army. The Federal funding limit for a CAP Section 14 is \$10,000,000; this project will be within the limits of this authority.

The recommendations contained herein reflect the information available at this time and current USACE policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the national Civil Works construction program nor the perspective higher review levels within the Executive Branch. Consequently, these recommendations may be modified before implementation. However, the NFS, the State, interested Federal agencies and other parties would be advised of any modifications and would be afforded an opportunity to comment further.

COL Brian D. Sawser Colonel, U.S. Army District Commander

# **Section 9**

# **List of Preparers**

The List of Preparers for this Final Feasibility Report is provided in Table 8-1.

Name	Office	Position
Jason Allmon	USACE Project Management	Project Manager
Robert Gambill	USACE E&C	Tech Lead
Demetria Christo	USACE RPEDS	Lead Planner
Kenneth Presley	USACE E&C	Geotechnical Engineer
Logan Stanko	USACE E&C	Civil Design Engineer
Kevin Keller	USACE E&C	Cost Engineer
Madeline Konopinski	USACE E&C	GIS
Bill Snapp	USACE E&C	Survey Manager
Brian Johnson	USACE Real Estate	Real Estate
Torick Frison	USACE Real Estate	Realty Specialist
Stacey Carlson	USACE Project Management	Program Analysist
Carolyn Abreu	USACE Project Management	P2 Scheduler
Kevin Pigott / Joshua Koontz	USACE RPEDS	Environmental
Pamela Lieb	USACE RPEDS	Cultural Resources
Neal Newman	USACE E&C	VE Officer
Shannon Wheeler	USACE RPEDS	Economist
James Barkei	USACE Office of Counsel	Office of Counsel

Table 8-1. List of Preparers

## Section 10

# **References and Resources**

- U.S. Army Corps of Engineers, 1993, *Engineering and Design Cost Engineering Policy and General Requirements*, Engineering Regulation 1110-1-1300, Department of the Army, Washington D.C., 26 March 1993.
- U.S. Army Corps of Engineers, 1999, *Engineering and Design for Civil Works Projects*, Engineering Regulation 1110-2-1150, Department of the Army, Washington D.C., 31 August 1999.
- U.S. Army Corps of Engineers, 2000, *Planning Guidance Notebook*, Engineering Regulation 1105-2-100, Department of the Army, Washington D.C., 22 April 2000.
- U.S. Army Corps of Engineers, 2016, *Civil Works Cost Engineering*, Engineering Regulation 1110-2-1302, Department of the Army, Washington D.C., 30 June 2016.
- U.S. Army Corps of Engineers, 2019, *Continuing Authorities Program*, Engineering Pamphlet 1105-2-58, Department of the Army, Washington D.C., 01 March 2019.
- U.S. Water Resources Council, 1983, Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies, 10 March 1983.
- Section 14 of the Flood Control Act of 1946, as amended, by Section 1030 of the Water Resources Reform and Development Act of 2014;
- National Environmental Policy Act of 1969, as amended, P.L 91-190, 42 U.S.C. §§ 4321-4347, January 1, 1970, as amended by P. L. 94-52, July 3, 1975, P. L. 94-83, August 9, 1975, and P. L. 97-258, § 4(b), Sept. 13, 1982);

Council on Environmental Quality's Regulations (40 CFR §§ 1500-1508);

- MEMORANDUM FOR MSC PROGRAMS DIRECTORS, dated 9 April 2021, SUBJECT: Guidance: Capturing Cost and Time Impacts, Comprehensive Documentation of Benefits in Decision Documents;
- MEMORANDUM FOR MAJOR SUBORDINATE COMMANDS (MSC), dated 6 March 2021, SUBJECT: Comprehensive Documentation of Benefits in Decision Documents;

- MEMORANDUM FOR COMMANDING GENERAL, U.S. ARMY CORPS OF ENGINEERS, dated 5 January 2021, SUBJECT: Policy Directive – Comprehensive Documentation of Benefits in Decision Document;
- MEMORANDUM FOR THE COMMANDING GENERAL, U.S. ARMY CORPS OF ENGINEERS, dated 1 April 2020, SUBJECT: Delegation of Authority - Approval Levels for Section 14 Decision Documents, Locally Preferred Plans, and Costs in Excess of Federal Project Limit;
- MEMORANDUM, ASSISTANT SECRETARY OF THE ARMY FOR CIVIL WORKS, 3 April 2020, SUBJECT: Comprehensive Documentation of Benefits in Feasibility Studies;
- DIRECTOR'S POLICY MEMORANDUM FY2020, dated 3 September 2020, SUBJECT: Continuing Authorities Program (CAP), Feasibility Phase Process Changes;
- DIRECTOR'S POLICY MEMORANDUM FY2020, dated 6 May 2020, SUBJECT: Risk-Informed Decision Making (RIDM) for Program and Project Delivery;
- DIRECTOR'S POLICY MEMORANDUM FY2019, dated 2 July 2019, SUBJECT: Operationalizing Risk-Informed Decision Making in Project Management (Planning Process);
- DIRECTOR'S POLICY MEMORANDUM FY2019, dated 9 Jan 2019, SUBJECT: Policy & Legal Compliance Review;
- DIRECTOR'S POLICY MEMORANDUM Civil Works Programs 2018-05, Improving Efficiency and Effectiveness in USACE Civil Works Project Delivery (Planning Phase and Planning Activities);
- CECG MEMORANDUM FOR MSC COMMANDERS, dated 24 August 2020, SUBJECT: Continuing Authorities Program (CAP) -Approval Level for Section 14, Section 103, Section 107, Section 204, Section 205, Section 206, and Section 1135 Decision Documents;
- MEMORANDUM dated 5 Feb. 2018, SUBJECT: Continuing Authorities Program (CAP), requirements for MSC Decision Milestone (MDM) and Final Report Submittal;
- MEMORANDUM FOR PLANNING COMMUNITY OF PRACTICE, dated 20 Oct 2021, SUBJECT: Economic Guidance Memorandum 22-01, Federal Interest Rates for Corps of Engineers Projects for Fiscal Year 2022;
- MEMORANDUM FOR COMMANDING GENERAL U.S. ARMY CORPS OF ENGINEERS, dated 23 April 2019, SUBJECT: National Environmental Policy Act Decision Documents;
- CEMVD-PD-L MEMORANDUM TO ALL DISTRICTS, dated 22 August 2018, SUBJECT: Continuing Authorities Program (CAP) and Agency Decision Milestone (MDM) and Final Report Submittal;

- ECB 2019-03, Risk Informed Decision Making for Engineering Work During Planning Studies (15 Jan. 2021);
- Engineer Regulation 1105-2-100 Planning Guidance Notebook, Appendix H, Amendment #1, POLICY COMPLIANCE REVIEW AND APPROVAL OF DECISION DOCUMENTS, (20 Nov 2007);
- Engineer Regulation 1105-2-100 Planning Guidance Notebook, Appendix G, Amendment #1, PLANNING REPORTS AND PROGRAMS, (30 Nov 2004);
- Engineer Regulation 1105-2-101, Risk Assessment for Flood Risk Management Studies (15 July 2019);
- Engineer Regulation 1110-2-8162, Incorporating Sea Level Change in Civil Works Programs (15 June 2019);
- Engineer Regulation 1165-2-26, Implementation of Executive Order 11988 of Flood Plain Management (30 March 1984);
- Engineer Regulation 200-1-5: Policy for Implementation and Integrated Application of the U.S. Army Corps of Engineers (USACE) Environmental Operating Principles (EOP) and Doctrine (30 Oct 2003);
- Engineer Regulation 200-2-2: Procedures for Implementing NEPA;
- Engineer Circular 1165-2-217: Review Policy for Civil Works;
- Engineering Manual 1110-2-1320, Engineering & Design, Civil Works Cost Engineering (2016);
- Policy Guidance Letter 52, Floodplain Management Plans (8 Dec 1997);
- Planning Bulletin 2019-01, dated 17 Jan 2019, Subject: Watershed Studies;
- Planning Bulletin 2019-03, dated 13 Dec 2018, Subject: Further Clarification of Existing Policy for USACE Participation in Nonstructural Flood Risk Management and Coastal Storm Risk Management Measures;
- Planning Bulletin 2018-01S, dated 2 June 2019, Subject: Feasibility Study Milestones Supplemental Guidance;
- Planning Bulletin 2018-01, dated 26 Sept. 2018, Subject: Feasibility Study Milestones;

# Section 11 List of Acronyms and Abbreviations

ACHP	Advisory Council on Historic Properties
APE	Area of Potential Effect
BCR	Benefit to Cost Ratio
BMP	Best Management Practices
САР	Continuing Authorities Program
CEJST	Climate and Economic Justice Tool
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CWA	Clean Water Act of 1972
CZMA	Coastal Zone Management Act of 1972
D&I	Design and Implementation
DCAR	Draft Coordination Act Report
EA	Environmental Assessment
ECB	Engineering and Construction Bulletin
EDC	Economically Disadvantaged Community
EO	Executive Orders
EOP	Environmental Operating Principles
EP	Engineering Pamphlet
EPA	Environmental Protection Agency
EQ	Environmental Quality
ER	Engineer Regulation
ERDC	U.S. Army Engineer Research and Development Center

ESA	Environmental Site Assessment
FCSA	Feasibility Cost Share Agreement
FID	Federal Interest Determination
FONSI	Finding of No Significant Impact
FWCA	Fish and Wildlife Coordination Act
FWOP	Future Without Project Condition
FY	Fiscal Year
GHG	Greenhouse Gases
GIWW	Gulf Intracoastal Waterway
H&H	Hydrology and Hydrologic
HTRW	Hazardous, Toxic, and Radioactive Waste
HUC	Hydrologic Unit Code
kV	Kilovolt
LA	Louisiana
LERRD	Lands, Easements, Rights-of-Way, Relocations, and Dredged or Excavated Material Disposal Areas
LOI	Letter of Intent
MDWFP	Mississippi Department of Wildlife, Fisheries, and Parks
MLGW	Memphis Light, Gas and Water
MVD	Mississippi Valley Division
MVM	Memphis District
NED	National Economic Development
NEPA	National Environmental Policy Act
NFS	Non-federal Sponsor
NGO	Non-governmental Organization
NHPA	National Historic Preservation Act
NRCS	Natural Resource Conservation Service

NRHP	National Register of Historic Places
OC	Office of Counsel
O&M	Operations & Maintenance
OMRR&R	Operations, Maintenance, Repair, Replacement and Rehabilitation
OSE	Other Social Effects
OSHA	Occupational Safety and Health Administration
PPA	Project Partnership Agreement
PDT	Project Delivery Team
P&G	Planning and Guidance
POC	Point of Contact
PED	Preconstruction Engineering and Design
RECs	Recognized Environmental Conditions
RED	Regional Economic Development
REP	Real Estate Plan
ROM	Rough Order of Magnitude
ROW	Right of Way
RPEDS	Regional Planning and Environment Division South
SC-GHG	Social Cost of Greenhouse Gas
SHPO	State Historic Preservation Office
SLC	Sea Level Change
SMART	Specific, Measurable, Attainable, Risk Informed, Timely
SSP	Sponsor Supported Plan
TDEC	Tennessee, Department of Environment and Conservation
THPO	Tribal Historic Preservation Officer
TL	Tribal Liaison
TN	State of Tennessee

ТОВ	Top of Bank
TPCS	Total Project Cost Summary
TSP	Tentatively Selected Plan
USACE	United States Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
UT	University of Tennessee
WRDA	Water Resources Development Act





# Appendix A: Environmental\*

# Wolf River Basin **MLGW Tower #1613**

# **CAP Section 14**

Project Number: 487478



# MEMPHIS DISTRICT **U.S. ARMY CORPS OF ENGINEERS DECEMBER 2024**

**Continuing Authorities Program** Shelby County, Tennessee

U.S. Army Corps of Engineers Memphis Light, Gas, and Water Tower #1613 Regional Planning and Environment Division South Memphis District

#### ATTACHMENTS

Attachment A – DRAFT Finding of No Significant Impact (FONSI)

Attachment B – State of Tennessee Aquatic Resources Alteration General Permit for Bank Armoring and Vegetative Stabilization (ARAP – NR 2005.024).

Attachment C – Cultural Resources Coordination

Attachment D – U.S. Fish and Wildlife Coordination

Attachment E – Public Comments Received During Public Review

DRAFT Finding of No Significant Impact (FONSI)

# Continuing Authorities Program, Section 14 – Memphis Light, Gas, and Water Tower #1613 Wolf River Basin, Shelby County, Tennessee



DRAFT Finding of No Significant Impact **DECEMBER 2024** 

#### DRAFT FINDING OF NO SIGNIFICANT IMPACT

#### MEMPHIS LIGHT, GAS, AND WATER (MLGW) TOWER #1613 WOLF RIVER BASIN, SHELBY COUNTY, TENNESSEE INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT

The U.S. Army Corps of Engineers (USACE), Memphis District (Corps) conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The final Integrated Feasibility Report and Environmental Assessment (IFR/EA) dated TBD, for the Memphis Light, Gas, and Water (MLGW) Tower #1613 addresses natural erosional processes that may cause imminent collapse of the tower into the Wolf River.

The Final IFR/EA, incorporated herein by reference, evaluated various alternatives that would achieve ecosystem restoration benefits in the study area. The Tentatively Selected (TSP) Plan includes:

- Placing R-200 rap and bedding stone 300 linear feet along the right descending bank to protect the bank from further eroding toward the river at a 3.5H:1V slope;
- Placing a 6-inch-deep layer of bedding stone under the riprap layer;
- Type-E end protection of the riprap protection; and
- Self-healing properties of the riprap protection.

In addition to a "no action" plan, four other alternatives were evaluated. The alternatives include a No Action Alternative (MLGW Relocate the tower) and four different combinations of bank armoring and construction methods. Section 3 of the IFR/EA describes the alternative formulation process, and Section 5 describes the alternative comparison and selection process.

For all alternatives the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the recommended plan are listed in Table 1:

	Less than significant effects	Less than significant effects as a result of mitigation*	Resource unaffected by action
Land Use	$\boxtimes$		
Wetlands	$\boxtimes$		
Aquatic resources/Fisheries	$\boxtimes$		
Wildlife	$\boxtimes$		
Threatened/Endangered species/critical habitat	$\boxtimes$		
Invasive Species	$\boxtimes$		
Recreation	$\boxtimes$		

Table 1: Summary of Potential Effects of the Recommended Plan

**Continuing Authorities Program** Shelby County, Tennessee

U.S. Army Corps of Engineers Memphis Light, Gas, and Water Tower #1613 Regional Planning and Environment Division South Memphis District

	Less than significant effects	Less than significant effects as a result of mitigation*	Resource unaffected by action
Aesthetics	$\boxtimes$		
Greenhouse Gases	$\boxtimes$		
Hazardous, toxic & radioactive waste	$\boxtimes$		
Water Quality	$\boxtimes$		
Historic properties	$\boxtimes$		
Other cultural resources	$\boxtimes$		
Tribal trust resources	$\boxtimes$		
Air Quality	$\boxtimes$		
Socio-economics	$\boxtimes$		
Environmental justice	$\boxtimes$		

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the recommended plan. Best management practices (BMPs) as detailed in the IFR/EA will be implemented, if appropriate, to minimize impacts. These BMPs are detailed in Sections 2, 3, and 4 of the IFR/EA and include:

- The use of existing roads and location of staging areas in previously disturbed areas to the extent practical.
- Implementation of BMPs for nonpoint pollution at construction sites. A stormwater pollution prevention plan (SWPPP) would be prepared in compliance with EPA and associated State regulations with each construction contract. The SWPPP would outline temporary erosion control measures such as silt fences, retention ponds, and dikes. The construction contract would include permanent erosion control measures, such as turfing and placement of riprap and filter material.
- Any measures that pose a safety concern to navigation would be added to the navigation charts.

Public review of the draft IFR/EA and FONSI was completed on TBD. All comments submitted during the public review period were responded to in the Final IFR/EA and FONSI.

Pursuant to section 7 of the Endangered Species Act of 1973, as amended, the USACE determined that the recommended plan may affect but is not likely to adversely affect the following

federally listed and candidate species or their designated critical habitat: northern long-eared bat, tricolored bat, monarch butterfly, and alligator snapping turtle. There is no designated critical habitat in the project locations. The U.S. Fish and Wildlife Service (FWS) concurred with the Corps' determinations on 19 November 2024.

Pursuant to section 106 of the NHPA USACE determined that no historic properties are anticipated to be affected by the recommended plan. The Corps received concurrence form the Tennessee State Historic Preservation Office on 3 June 2024. Concurrence was also received by the Absentee Shawnee Tribe of Oklahoma (22 May 2024), the Quapaw Nation (2 July 2024), and the Choctaw Nation of Oklahoma (30 July 2024). All terms and conditions resulting from the agreements shall be implemented in order to minimize adverse impacts to historic properties.

An Aquatic Resources Alteration Permit Water quality certification was obtained from the Tennessee Department of Environment and Conservation (ARAP – NR 2005.024). All conditions of the water quality certification will be implemented in order to minimize adverse impacts to water quality. The proposed action is also in compliance with Nation-wide Permit, Section 13 - Bank Stabilization.

All applicable environmental laws have been considered and coordination with appropriate agencies and officials has been completed.

Technical, environmental and cost effectiveness criteria used in the formulation of alternative plans were those specified in the Water Resources Council's 1983 *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*. All applicable laws, executive orders, regulations and local government plans were considered in evaluation of alternatives. Based on this report, the reviews by other Federal, State and local agencies, Tribes, public input, and the review by my staff, it is my determination that the recommended plan would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

Date

Brian D. Sawser Colonel, Corps of Engineers District Commander State of Tennessee Aquatic Resources Alteration General Permit for Bank Armoring and Vegetative Stabilization (ARAP – NR 2005.024)



#### Under the Aquatic Resource Alteration General Permit for Bank Armoring and Vegetative Stabilization

Tennessee Department of Environment and Conservation Division of Water Resources William R. Snodgrass Tennessee Tower 312 Rosa L. Parks Avenue, 11th Floor Nashville TN 37243

#### ARAP - NR2005.024

Under authority of the Tennessee Water Quality Control Act of 1977 (TWQCA, T.C.A. 69-3-101 et seq.) the Division of Water Resources has determined the activity described below would not violate applicable water quality standards.

This activity is governed by the General Permit for Bank Armoring and Vegetative Stabilization issued pursuant to the TWQCA. The work must be accomplished in conformance with accepted plans, specifications, data and other information submitted in support of application NR2005.024 and the terms and conditions set forth in the above referenced general permit.

PERMITTEE:	Memphis Light Gas & Water	
AUTHORIZED WORK:	Stabilization of <300 linear feet of one bank of Wolf River with rip-rap to protect electrical transmission tower integrity	
LOCATION:	East of Highland and south of James Road, Shelby County	
	Latitude: 35.196598 Longitude: -89.932887	
WATERBODY NAME:	Wolf River	
EFFECTIVE DATE: 16-JUN-20	EXPIRATION DATE: 07-APR-25	

This does not preclude requirements of other federal, state or local laws. In particular, work shall not commence until the applicant has received the federal §404 permit from the U. S. Army Corps of Engineers, a §26a permit from the Tennessee Valley Authority or authorization under a Tennessee NPDES Storm Water Construction Permit where necessary. This permit may also serve as a federal §401 water quality certification (pursuant to 33 U.S.C. §1341) since the planned activity was reviewed and the division has reasonable assurance that the activity will be conducted in a manner that will not violate applicable water quality standards (T.C.A. § 69-3-101 et seq. or of § § 301, 302, 303, 306 or 307 of *The Clean Water Act*).

The state of Tennessee may modify, suspend or revoke this authorization should the state determine that the activity results in more than an insignificant degradation of applicable water quality standards or violation of the TWQCA. Failure to comply with permit terms may result in penalties in accordance with T.C.A. §69-3-115.

#### RDA 1017



STATE OF TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION DIVISION OF WATER RESOURCES MEMPHIS Environmental Field Office 8383 WOLF LAKE DRIVE MEMPHIS, Tn 38133

June 16, 2020

Mr. Nick Newman Vice President Memphis Light, Gas, and Water Division 220 S. Main St. Construction and Maintenance Memphis, TN 38103

Subject: General Permit for Bank Armoring and Vegetative Stabilization Aquatic Resource Alteration Permit (ARAP) NR2005.024 MLGW Transmission Structure 1613 Memphis, Shelby County, Tennessee

Dear Mr. Newman:

We have reviewed your application for the proposed stabilization of <300 linear feet of one bank of Wolf River with rip-rap to protect electrical transmission tower integrity. Pursuant to the *Tennessee Water Quality Control Act of 1977* (T.C.A. § 69-3-101 et seq.) and supporting regulations the Division of Water Resources is required to determine whether the activity described in the attached notice of coverage will violate applicable water quality standards. This permit may also serve as a federal §401 water quality certification (pursuant to 33 U.S.C. §1341).

This activity is governed by the General Permit for Bank Armoring and Vegetative Stabilization. The work must be accomplished in conformance with accepted plans and information submitted in support of application NR2005.024 and the limitations and conditions set forth in the General Permit for Bank Armoring and Vegetative Stabilization (enclosed). It is the responsibility of the permittee to ensure that all contractors involved with this project have read and understand the permit conditions before the project begins.

Please note that unnecessary vegetation removal is prohibited. Adequate erosion controls must be installed prior to construction and maintained during project construction. All disturbed areas must be revegetated or otherwise stabilized upon completion of construction.

#### Annual Maintenance and Coverage Termination

Permittees will be assessed an annual maintenance fee of \$350 for coverages that exceed one year. Please note that this maintenance fee does not grant the right to extend coverage past the expiration date of the General Permit.

Permittees may terminate coverage prior to the expiration date by submitting a completed notice of termination form (NOT), which is available on the division's webpage at <a href="http://tdec.tn.gov/etdec/DownloadFile.aspx?row\_id=CN-1450">http://tdec.tn.gov/etdec/DownloadFile.aspx?row\_id=CN-1450</a>. A complete NOT should include photodocumentation of the finished project area. The division will notify the permittee that either the

NOT was received and accepted, or that the permit coverage is not eligible for termination (due to existing deficiencies) and has not been terminated.

We appreciate your attention to the terms and conditions of this general permit for aquatic resource alteration. If you have any questions, please contact Mr. Lew Hoffman at (901) 371-3019 or by e-mail at Lew.Hoffman@tn.gov.

Sincerely,

Joelly Brangle

Joellyn Brazile Environmental Program Manager

Encl: NOC and copy of general permit

CC;

Memphis EFO Permit File Ms. Monica Darby, P.E., Lead Environmental Engineer, Memphis Light, Gas, and Water Division

Cultural Resources Coordination



DEPARTMENT OF THE ARMY U.S. ARMY CORPS OF ENGINEERS MEMPHIS DISTRICT 167 NORTH MAIN STREET B-202 MEMPHIS, TN 38103-1894

May 22, 2024

Environmental Compliance Branch Regional Planning and Environmental Division South

Mr. E. Patrick McIntyre, Jr. Executive Director/ State Historic Preservation Officer State Historic Preservation Office 2941 Lebanon Pike Nashville, TN 37214

Dear Mr. McIntyre:

On May 2, 2024, the United States Army Corps of Engineers (USACE), Memphis District (MVM) conducted a Phase I cultural resources survey on a Continuing Authorities Program (CAP) Section 14 Feasibility Study for Memphis Light, Gas, and Water (MLGW) Tower #1613 under the Emergency Streambank and Shoreline Projection of the Flood Control Act of 1946. USACE MVM is the lead federal agency for the undertaking and, as such, is responsible for complying with the National Historic Preservation Act (NHPA), Public Law 89-665, as amended, and its implementing regulations, 36 CFR Part 800. The objective of the cultural resources survey was to locate cultural resources within the study's area of potential of effects (APE), determine whether those resources qualify for inclusion in the National Register of Historic Places (NRHP), and access the effect of the study on those resources that do qualify for inclusion in the NRHP. USACE MVM determined the area of potential effects to include the temporary road and 300 feet wide riprap bank protection equaling 1.09 acres.

MLGW, a municipal public works utility provider in Memphis, Tennessee requested emergency assistance to protect major transmission lines that provide electrical service to a large portion of the City of Memphis and northern Shelby County. The MLGW Tower #1613's location on the right descending bank of the Wolf River along an outer bend makes it prone to natural streambank erosion. This erosion has encroached to within approximately 14 feet of the foundation support for the tower causing imminent danger of collapse into the Wolf River.

USACE MVM proposes using riprap to protect the right descending bank of the Wolf River in order to protect the MLGW Tower #1613, with a riprap structure less than 300 linear feet in length. This plan would arrest the erosion causing imminent risk of Tower failure and maintain the existing tower location. Access to Tower #1613 is obtained off of North Highland Street, through an existing agricultural field road and along an existing power line corridor, approximately 3,500 feet. A temporary road will be established on top of this existing dirt field road. Gravel will be brought in and placed on top of the existing ROW of the power line corridor for the length of the access road (3,500 feet) by 12 feet wide to allow for construction vehicles. This gravel will be removed, and the area returned to its previously existing condition after the bank stabilization work is complete. USACE Memphis District completed a pedestrian survey and inventory of the 1.09 study area. During the survey, USACE did not locate any cultural resources. Since no cultural resources were discovered, USACE Memphis District reached a determination of *No Historic Properties Affected* by the proposed undertaking. Enclosed is a copy of the Phase I cultural resources survey performed by our District Archaeologist. Pursuant to 36 CFR 800.4, we request your concurrence with this no effect determination within thirty days.

Should you need further information, please contact our District Archaeologist, Pamela Lieb at (901) 544-0710, or by email at Pamela.D.Lieb@usace.army.mil.

Sincerely,

Wal B.Sm

Mark R. Smith Chief Environmental Compliance Branch Regional Planning and Environmental Division South

Enclosure

Cc: Absentee-Shawnee Tribe of Oklahoma Alabama-Quassarte Tribal Town Cherokee Nation of Oklahoma Chickasaw Nation Coushatta Tribe of Louisiana Eastern Band of Cherokee Indians Eastern Shawnee Tribe of Oklahoma Jena Band of Choctaw Indians Kialegee Tribal Town Kickapoo Tribe of Oklahoma Mississippi Band of Choctaw Indians Poarch Band of Creek Indians Ponca Nation of Oklahoma Quapaw Tribe of Oklahoma Sac and Fox Nation of Oklahoma Seminole Tribe of Florida Seminole Nation of Oklahoma Shawnee Tribe of Oklahoma Thlopthlocco Tribal Town Tunica-Biloxi Tribe of Louisiana United Keetoowah Band of Cherokee

From: To: Subject: Date; Attachments: TM Help Lisb, Pamisis D. CTV USARMY CEMVM (USA) [Non-DcD Source] Bank Stabilization for MLGW Tower #16.13 - Project # SHPC0005105 Monday, June 3, 2024 12:07:56 PM image image



TENNESSEE HISTORICAL COMMISSION STATE HISTORIC PRESERVATION OFFICE 2941 LEBANON PIKE NASHVILLE, TENNESSEE 37243-0442 OFFICE: (6745) 532-4550 www.thistorical.commission.org

06-03-2024 12:05:09 CDT

Pamela Lieb USACE, Memphis District Pamela.D.Lieb@usace.army.mil

RE: Corps of Engineers/Memphis District (COE-M), Bank Stabilization for MLGW Tower #1613, Project#: SHPO0005105, Shelby County, TN

Dear Pamela Lieb:

In response to your request, we have reviewed the archaeological resources survey report and accompanying documentation submitted by you regarding the abovereferenced 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).

Please note: Future reports submitted for review must include all of the elements detailed as required in the Tennessee State Historic Preservation Office Standards and Guidelines for Archaeological Resource Studies. (2024)

Considering the information provided, we concur that no historic properties eligible for listing in the National Register of Historic Places will be affected by this undertaking. If project plans are changed or archaeological remains are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Please provide your Project # when submitting any additional information regarding this undertaking. Questions or comments may be directed to Jennifer Barnett, who

drafted this response, at Jennifer.Barnett@tn.gov, +16156874780.

Sincerely,

E. Patrick MELatyre, Jr.

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

Ref:MSG14049185\_IvUVsCN0cMYJT53D7Ce


DEPARTMENT OF THE ARMY U.S. ARMY CORPS OF ENGINEERS MEMPHIS DISTRICT 167 NORTH MAIN STREET B-202 MEMPHIS, TN 38103-1894

May 22, 2024

Environmental Compliance Branch Regional Planning and Environmental Division South

Dr. Ian Thompson Tribal Historic Preservation Officer Choctaw Nation of Oklahoma P. O. Box 1210 Durant, OK 74702

Dear Dr. Thompson:

On May 2, 2024, the United States Army Corps of Engineers (USACE), Memphis District (MVM) conducted a Phase I cultural resources survey on a Continuing Authorities Program (CAP) Section 14 Feasibility Study for Memphis Light, Gas, and Water (MLGW) Tower #1613 under the Emergency Streambank and Shoreline Projection of the Flood Control Act of 1946. USACE MVM is the lead federal agency for the undertaking and, as such, is responsible for complying with the National Historic Preservation Act (NHPA), Public Law 89-665, as amended, and its implementing regulations, 36 CFR Part 800. The objective of the cultural resources survey was to locate cultural resources within the study's area of potential of effects (APE), determine whether those resources qualify for inclusion in the National Register of Historic Places (NRHP), and access the effect of the study on those resources that do qualify for inclusion in the NRHP. USACE MVM determined the area of potential effects to include the temporary road and 300 feet wide riprap bank protection equaling 1.09 acres.

MLGW, a municipal public works utility provider in Memphis, Tennessee requested emergency assistance to protect major transmission lines that provide electrical service to a large portion of the City of Memphis and northern Shelby County. The MLGW Tower #1613's location on the right descending bank of the Wolf River along an outer bend makes it prone to natural streambank erosion. This erosion has encroached to within approximately 14 feet of the foundation support for the tower causing imminent danger of collapse into the Wolf River.

USACE MVM proposes using riprap to protect the right descending bank of the Wolf River in order to protect the MLGW Tower #1613, with a riprap structure less than 300 linear feet in length. This plan would arrest the erosion causing imminent risk of Tower failure and maintain the existing tower location. Access to Tower #1613 is obtained off of North Highland Street, through an existing agricultural field road and along an existing power line corridor, approximately 3,500 feet. A temporary road will be established on top of this existing dirt field road. Gravel will be brought in and placed on top of the existing ROW of the power line corridor for the length of the access road (3,500 feet) by 12 feet wide to allow for construction vehicles. This gravel will be removed, and the area returned to its previously existing condition after the bank stabilization work is complete. USACE Memphis District completed a pedestrian survey and inventory of the 1.09 study area. During the survey, USACE did not locate any cultural resources. Since no cultural resources were discovered, USACE Memphis District reached a determination of *No Historic Properties Affected* by the proposed undertaking. Enclosed is a copy of the Phase I cultural resources survey performed by our District Archaeologist. Pursuant to 36 CFR 800.4, we request your concurrence with this no effect determination within thirty days.

Should you need further information, please contact our District Archaeologist, Pamela Lieb at (901) 544-0710, or by email at Pamela.D.Lieb@usace.army.mil.

Sincerely,

MalBism

Mark R. Smith Chief Environmental Compliance Branch Regional Planning and Environmental Division South

Enclosure

Cc: Absentee Shawnee Tribe of Oklahoma Alabama-Quassarte Tribal Town Cherokee Nation Chickasaw Nation Coushatta Tribe of Louisiana Eastern Band of Cherokee Indians Eastern Shawnee Tribe of Oklahoma Jena Band of Choctaw Indians Kialegee Tribal Town Kickapoo Tribe of Oklahoma Mississippi Band of Choctaw Indians Muscogee (Creek) Nation Poarch Band of Creek Indians Ponca Nation of Oklahoma Quapaw Tribe of Oklahoma Sac and Fox Nation of Oklahoma Seminole Tribe of Florida Seminole Nation of Oklahoma Shawnee Tribe of Oklahoma Tennessee State Historic Preservation Office Thlopthlocco Tribal Town Tunica-Biloxi Tribe of Louisiana United Keetoowah Band of Cherokee

From:	Madison D. Curris
To:	Lieb, Pamela D CIV USARMY CEMVM (USA)
Cc:	Lindsev Bil yeu
Subject:	[Non-DeD Source] Continuing Authorities Program (CAP) Section 14 Feasibility Study for Memphis Light, Gas, and Water (MLGW) Tower #1613
Date:	Tuesday, July 30, 2024 4:53:43 PM
Attachments:	,Outloak-vihilusd.ang

Halito Pamela Lieb,

The Choctaw Nation of Oklahoma thanks you for the correspondence regarding the above referenced project. Shelby County, Tennessee lies within our area of historic interest. The Choctaw Nation Historic Preservation Department concurs with the findinof "no effect". However, we ask that work be stopped and our office contacted immediately in the event that Native American artifacts or human remains are encountered.

If you have any questions, please contact me.

Yakoke,

Maddie Danielle Currie NHPA Compliance Review Specialist Historic Preservation Department Choctaw Nation of Oklahoma P.O. Box 1210 Durant, OK 74702 Office: 580-642-8467 Cell: 580-740-9537



This message is intended only for the use of the individual or entity to which it is addressed and may contain information that is privileged, confidential and exempt from disclosure. If you have received this message in error, you are hereby notified that we do not consent to any reading, dissemination, distribution or copying of this message. If you have received this communication in error, please notify the sender immediately and destroy the transmitted information. Please note that any view or opinions presented in this email are solely those of the author and do not necessarily represent those of the Choctaw Nation.



DEPARTMENT OF THE ARMY U.S. ARMY CORPS OF ENGINEERS MEMPHIS DISTRICT 167 NORTH MAIN STREET B-202 MEMPHIS, TN 38103-1894

May 22, 2024

Environmental Compliance Branch Regional Planning and Environmental Division South

Ms. Billie Burtrum Tribal Historic Preservation Officer Quapaw Tribe of Oklahoma P. O. Box 765 Quapaw, OK 74363

Dear Ms. Burtrum:

On May 2, 2024, the United States Army Corps of Engineers (USACE), Memphis District (MVM) conducted a Phase I cultural resources survey on a Continuing Authorities Program (CAP) Section 14 Feasibility Study for Memphis Light, Gas, and Water (MLGW) Tower #1613 under the Emergency Streambank and Shoreline Projection of the Flood Control Act of 1946. USACE MVM is the lead federal agency for the undertaking and, as such, is responsible for complying with the National Historic Preservation Act (NHPA), Public Law 89-665, as amended, and its implementing regulations, 36 CFR Part 800. The objective of the cultural resources survey was to locate cultural resources within the study's area of potential of effects (APE), determine whether those resources qualify for inclusion in the National Register of Historic Places (NRHP), and access the effect of the study on those resources that do qualify for inclusion in the NRHP. USACE MVM determined the area of potential effects to include the temporary road and 300 feet wide riprap bank protection equaling 1.09 acres.

MLGW, a municipal public works utility provider in Memphis, Tennessee requested emergency assistance to protect major transmission lines that provide electrical service to a large portion of the City of Memphis and northern Shelby County. The MLGW Tower #1613's location on the right descending bank of the Wolf River along an outer bend makes it prone to natural streambank erosion. This erosion has encroached to within approximately 14 feet of the foundation support for the tower causing imminent danger of collapse into the Wolf River.

USACE MVM proposes using riprap to protect the right descending bank of the Wolf River in order to protect the MLGW Tower #1613, with a riprap structure less than 300 linear feet in length. This plan would arrest the erosion causing imminent risk of Tower failure and maintain the existing tower location. Access to Tower #1613 is obtained off of North Highland Street, through an existing agricultural field road and along an existing power line corridor, approximately 3,500 feet. A temporary road will be established on top of this existing dirt field road. Gravel will be brought in and placed on top of the existing ROW of the power line corridor for the length of the access road (3,500 feet) by 12 feet wide to allow for construction vehicles. This gravel will be removed, and the area returned to its previously existing condition after the bank stabilization work is complete. USACE Memphis District completed a pedestrian survey and inventory of the 1.09 study area. During the survey, USACE did not locate any cultural resources. Since no cultural resources were discovered, USACE Memphis District reached a determination of *No Historic Properties Affected* by the proposed undertaking. Enclosed is a copy of the Phase I cultural resources survey performed by our District Archaeologist. Pursuant to 36 CFR 800.4, we request your concurrence with this no effect determination within thirty days.

Should you need further information, please contact our District Archaeologist, Pamela Lieb at (901) 544-0710, or by email at Pamela.D.Lieb@usace.army.mil.

Sincerely,

MalBism

Mark R. Smith Chief Environmental Compliance Branch Regional Planning and Environmental Division South

Enclosure

Cc: Absentee Shawnee Tribe of Oklahoma Alabama-Quassarte Tribal Town Cherokee Nation Chickasaw Nation Choctaw Nation of Oklahoma Coushatta Tribe of Louisiana Eastern Band of Cherokee Indians East Shawnee Tribe of Oklahoma Jena Band of Choctaw Indians Kialegee Tribal Town Kickapoo Tribe of Oklahoma Mississippi Band of Choctaw Indians Muscogee (Creek) Nation Poarch Band of Creek Indians Ponca Nation of Oklahoma Sac and Fox Nation of Oklahoma Seminole Tribe of Florida Seminole Nation of Oklahoma Shawnee Tribe of Oklahoma Tennessee State Historic Preservation Office Thlopthlocco Tribal Town Tunica-Biloxi Tribe of Louisiana United Keetoowah Band of Cherokee

From:	Eric Eby
To:	Lieb, Pamela D. CIV USARMY CEMVM (USA)
Cc:	section 106
Subject:	[Non-DoD Source] Continuing Authorities Program (CAP) Section 14 Feasibility Study for Memphis Light, Gas, and Water (MLGW) Tower #1613
Date:	Tuesday, July 2, 2024 8:56:59 AM

To whom it may concern,

The Quapaw Nation Historic Preservation Program (QNHPP) has received and reviewed the information you have provided. Based upon the information you provided we believe that the Continuing Authorities Program (CAP) Section 14 Feasibility Study for Memphis Light, Gas, and Water (MLGW) Tower #1613 In Shelby Co. TN will have no effect on known properties of cultural or sacred significance to the Quapaw Nation.

In accordance with the National Historic Preservation Act, (NHPA) [16 U.S C. 470 §§ 470-470w-6] 1966, undertakings subject to the review process are referred to in S101 (d) (6) (A), which clarifies that historic properties may have religious and cultural significance to Indian tribes. Additionally, Section 106 of NHPA requires Federal agencies to consider the effects of their actions on historic properties (36 CFR Part 800) as does the National Environmental Policy Act (43 U.S.C. 4321 and 4331-35 and 40 CFR 1501.7(a) of 1969).

The Quapaw Nation has vital interests in protecting its historic and ancestral cultural resources. We do not anticipate that this project will adversely impact any cultural resources or human remains protected under the NHPA, NEPA, or the Native American Graves Protection and Repatriation Act. If, however, artifacts or human remains are discovered during project construction, we ask that work cease immediately and that you contact the Quapaw Nation Historic Preservation Office.

Should you have any questions or need any additional information, please feel free to contact Eric Eby at eric.eby@quapawnation.com please copy section106@quapawnation.com to ensure additional information requests are reviewed in a timely manner. Thank you for consulting with the Quapaw Nation on this matter.

Sincerely, Eric Eby

On behalf of -Billie Burtrum Preservation Officer/ QNHPP Director Quapaw Nation P.O. Box 765 Quapaw, OK 74363 (w) 918-238-3100 (f) 918-674-2456

#### U.S. Fish and Wildlife Coordination

# U.S. Fish and Wildlife Service Species List for MLG&W Tower 1613 CAP

## United States Department of the Interior

FISH AND WILDLIFE SERVICE

Tennessee Ecological Services Field Office 446 Neal Street Cookeville, TN 38501-4027 Phone: (931) 528-6481 Fax: (931) 528-7075

In Reply Refer To: Project Code: 2024-0099340 Project Name: MLG&W Tower #1613 CAP

11/19/2024 16:14:56 UTC

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and

implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultationhandbook.pdf

**Migratory Birds**: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see <a href="https://www.fws.gov/program/migratory-bird-permit/what-we-do.">https://www.fws.gov/program/migratory-bird-permit/what-we-do.</a>

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan

(when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see <a href="https://www.fws.gov/library/collections/threats-birds">https://www.fws.gov/library/collections/threats-birds</a>.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <u>https://www.fws.gov/partner/councilconservation-</u> migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

## **OFFICIAL SPECIES LIST**

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Tennessee Ecological Services Field Office

446 Neal Street Cookeville, TN 38501-4027 (931) 528-6481

PROJECT SUMMARY Project Code: 2024-0099340

Project Name:	MLG&W Tower #1613 CAP
Project Type:	Transmission Line - Maintenance/Modification - Below Ground
Project Description approximate	n: The U.S. Army Corps of Engineers plans to construct an
	<ul> <li>4,000 yard temporary access road and then place R-200 riprap bedding stone along 300 feet of the right descending bank of the Wolf River to protect Tower #1613 of a main transmission line for Memphis Light, Gas, and Water. The tower is danger of being eroded by the immediately adjacent Wolf River. The temporary access road would be constructed underneath the existing powerline Right-of-Way. Impacts of ~0.1 acres and ~ 0.4 temporary acres impacted with ~0.5 acres total impacts (~0.4 temporary).</li> </ul>
Project Location:	
The approxim	nate location of the project can be viewed in Google Maps:

The approximate location of the project can be viewed in Google Maps: <u>https://www.google.com/maps/@35.19496715,-89.93880835731284,14z</u>

Counties: Shelby County, Tennessee

#### **ENDANGERED SPECIES ACT SPECIES**

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

1. <u>NOAA Fisheries</u>, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

#### MAMMALS

NAME STATUS

#### Tricolored Bat *Perimyotis subflavus*

No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515

Proposed Endangered

REPTILES NAME STATUS

#### Alligator Snapping Turtle Macrochelys temminckii

No critical habitat has been designated for this species. Species profile: <u>https://ecos.fws.gov/ecp/species/4658</u>

Proposed Threatened

INSECTS NAME STATUS

#### Monarch Butterfly Danaus plexippus

No critical habitat has been designated for this species. Species profile: <u>https://ecos.fws.gov/ecp/species/9743</u>

Candidate

#### **CRITICAL HABITATS**

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

## **BALD & GOLDEN EAGLES**

Bald and golden eagles are protected under the Bald and Golden Eagle Protection  $Act^1$  and the Migratory Bird Treaty  $Act^2$ .

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats<sup>3</sup>, should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the <u>"Supplemental Information on Migratory Birds and Eagles"</u>.

- 1. The <u>Bald and Golden Eagle Protection Act</u> of 1940.
- 2. The Migratory Birds Treaty Act of 1918.
- 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are likely bald eagles present in your project area. For additional information on bald eagles, refer to <u>Bald Eagle Nesting and Sensitivity to Human Activity</u>

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME SEASON BREEDING

#### Bald Eagle Haliaeetus leucocephalus

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626

#### **PROBABILITY OF PRESENCE SUMMARY**

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read <u>"Supplemental Information on Migratory Birds and Eagles"</u>, specifically the FAQ section titled "Proper

Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence ()

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season ()

Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

#### Survey Effort ()

Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()

A week is marked as having no data if there were no survey events for that week.

probability of presence

breeding season

survey effort

no data

SPECIES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC Bald Eagle Non-BCC Vulnerable

Additional information can be found using the following links:

- Eagle Management <u>https://www.fws.gov/program/eagle-management</u>
- Measures for avoiding and minimizing impacts to birds <u>https://www.fws.gov/library/ collections/avoiding-and-minimizing-incidental-take-migratory-birds</u>

- Nationwide conservation measures for birds <u>https://www.fws.gov/sites/default/files/ documents/nationwide-standard-conservation-measures.pdf</u>
- Supplemental Information for Migratory Birds and Eagles in IPaC <u>https://www.fws.gov/ media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur- project-action</u>

### **MIGRATORY BIRDS**

Certain birds are protected under the Migratory Bird Treaty Act<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats<sup>3</sup> should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the <u>"Supplemental Information on Migratory Birds and Eagles"</u>.

- 1. The Migratory Birds Treaty Act of 1918.
- 2. The <u>Bald and Golden Eagle Protection Act</u> of 1940.
- 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

#### NAME

American Kestrel Falco sparverius paulus

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

https://ecos.fws.gov/ecp/species/9587

#### Bald Eagle Haliaeetus leucocephalus

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. <u>https://ecos.fws.gov/ecp/species/1626</u>

BREEDING SEASON

Breeds Apr 1 to Aug 31

#### Breeds Sep 1 to Jul 31

#### NAME

#### Cerulean Warbler Setophaga cerulea

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974

#### Chimney Swift Chaetura pelagica

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406

# Coastal (waynes) Black-throated Green Warbler *Setophaga virens waynei* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/11879

#### Grasshopper Sparrow Ammodramus savannarum perpallidus

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

https://ecos.fws.gov/ecp/species/8329

#### Henslow's Sparrow Centronyx henslowii

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3941

#### Kentucky Warbler Geothlypis formosa

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9443

#### Lesser Yellowlegs Tringa flavipes

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. <u>https://ecos.fws.gov/ecp/species/9679</u>

#### Pectoral Sandpiper Calidris melanotos

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9561

#### Prairie Warbler Setophaga discolor

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9513

#### Prothonotary Warbler Protonotaria citrea

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. <u>https://ecos.fws.gov/ecp/species/9439</u> BREEDING SEASON

Breeds Apr 26 to Jul 20

Breeds Mar 15 to Aug 25

Breeds May 1 to Aug 15

Breeds Jun 1 to Aug 20

Breeds elsewhere

Breeds Apr 20 to Aug 20

Breeds elsewhere

Breeds elsewhere

Breeds May 1 to Jul 31

Breeds Apr 1 to Jul 31

NAME

#### Red-headed Woodpecker Melanerpes erythrocephalus

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398

#### Rusty Blackbird Euphagus carolinus

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

https://ecos.fws.gov/ecp/species/9478

#### Swallow-tailed Kite Elanoides forficatus

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8938

#### Wood Thrush Hylocichla mustelina

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431

#### BREEDING SEASON

Breeds May 10 to Sep 10

Breeds elsewhere

Breeds Mar 10 to Jun 30

Breeds May 10 to Aug 31

#### **PROBABILITY OF PRESENCE SUMMARY**

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read <u>"Supplemental</u> Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper

Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence ()

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season ()

Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

#### Survey Effort ()

Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

#### No Data ()

A week is marked as having no data if there were no survey events for that week.

										proba	bility of <sub>J</sub>	presence
breeding season												
survey effort												
no data												
SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
American Kestrel BCC - BCR												
Bald Eagle Non-BCC Vulnerable												
Cerulean Warbler BCC Rangewide (CON)												
Chimney Swift BCC Rangewide (CON)												
Coastal (waynes)												

Black-throated Green Warbler BCC - BCR												
Grasshopper Sparrov	v BCC - E	SCR										
Henslow's Sparrow BCC Rangewide (CON)												
Kentucky Warbler BCC Rangewide (CON)												
Lesser Yellowlegs BCC Rangewide (CON)												
Pectoral Sandpiper BCC Rangewide (CON)												
Prairie Warbler BCC Rangewide (CON)												
Prothonotary Warbler BCC Rangewide (CON)												
SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Red-headed Woodpecker Rangewide (CON)	BCC											
Rusty Blackbird BCC - BCR												
Swallow-tailed Kite												
BCC Rangewide (CON)												
Wood Thrush BCC Rangewide (CON)												

Additional information can be found using the following links:

- Eagle Management <u>https://www.fws.gov/program/eagle-management</u>
- Measures for avoiding and minimizing impacts to birds <u>https://www.fws.gov/library/ collections/avoiding-and-minimizing-incidental-take-migratory-birds</u>
- Nationwide conservation measures for birds <u>https://www.fws.gov/sites/default/files/ documents/nationwide-standard-conservation-measures.pdf</u>
- Supplemental Information for Migratory Birds and Eagles in IPaC <u>https://www.fws.gov/ media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur- project-action</u>

### **WETLANDS**

Impacts to <u>NWI wetlands</u> and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local <u>U.S. Army Corps of Engineers District</u>.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

RIVERINE

- R5UBH
- R2UBH

LAKE

• L1UBH

FRESHWATER POND

PUBHh

#### IPAC USER CONTACT INFORMATION

Agency: Army Corps of Engineers Name: Kevin Pigott Address: 167 North Main Street B-202 City: Memphis State: TN Zip: 38103-1894 Email: <u>kevin.r.pigott@usace.army.mil</u> Phone: 901-544-4309

## U.S. Fish and Wildlife Service Concurrence with "may affect, but not likely to adversely affect" determination for MLG&W Tower 1613 CAP

## United States Department of the Interior

FISH AND WILDLIFE SERVICE

Tennessee Ecological Services Field Office 446 Neal Street Cookeville, TN 38501-4027 Phone: (931) 528-6481 Fax: (931) 528-7075

In Reply Refer To: Project code: 2024-0099340 Project Name: MLG&W Tower #1613 CAP

Federal Nexus: yes Federal Action Agency (if applicable): Army Corps of Engineers

11/19/2024 16:27:49 UTC

Subject: Federal agency coordination under the Endangered Species Act, Section 7 for 'MLG&W Tower #1613 CAP'

Dear Kevin Pigott:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on November 19, 2024, for 'MLG&W Tower #1613 CAP' (here forward, Project). This project has been assigned Project Code 2024-0099340 and all future correspondence should clearly reference

this number. Please carefully review this letter. Your Endangered Species Act (Act) requirements may not be complete.

#### **Ensuring Accurate Determinations When Using IPaC**

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into IPaC must accurately represent the full scope and details of the Project.

Failure to accurately represent or implement the Project as detailed in IPaC or the Northern Long-eared Bat and Tricolored Bat Range-wide Determination Key (DKey), invalidates this letter. Answers to certain questions in the DKey commit the project proponent to implementation of conservation measures that must be followed for the ESA determination to remain valid. Note that conservation measures for northern long-eared bat and tricolored bat may differ. If both bat species are present in the action area and the key suggests more conservative measures for one of the species for your Project, the Project may need to apply

the most conservative measures in order to avoid adverse effects. If unsure which conservation measures should be applied, please contact the appropriate Ecological Services Field Office.

**Determination for the Northern Long-Eared Bat and Tricolored Bat** 

Based on your IPaC submission and a standing analysis completed by the Service, you determined the proposed Project will have the following effect determinations:

Species	Listing Status	Determination
Tricolored Bat (Perimyotis subflavus)	Proposed Endange	red

NLAA

Federal agencies must consult with U.S. Fish and Wildlife Service under section 7(a)(2) of the Endangered Species Act (ESA) when an action *may affect* a listed species. Tricolored bat is proposed for listing as endangered under the ESA, but not yet listed. For actions that may affect a proposed species, agencies cannot consult, but they can *confer* under the authority of section 7(a)

(4) of the ESA. Such conferences can follow the procedures for a consultation and be adopted as such if and when the proposed species is listed. Should the tricolored bat be listed, agencies must review projects that are not yet complete, or projects with ongoing effects within the tricolored bat range that previously received a NE or NLAA determination from the key to confirm that the determination is still accurate. Unless the Service advises you within 15 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that consultation on the Action is <u>complete</u> for northern long-eared bat and/or tricolored bat and no further action is necessary unless either of the following occurs:

- new information reveals effects of the action that may affect the northern long-eared bat or tricolored bat in a manner or to an extent not previously considered; or,
- the identified action is subsequently modified in a manner that causes an effect to the northern long-eared bat or tricolored bat that was not considered when completing the determination key.

#### **15-Day Review Period**

As indicated above, the Service will notify you within 15 calendar days if we determine that this proposed Action does not meet the criteria for a "may affect, not likely to adversely affect" (NLAA) determination for the northern long-eared bat and/or tricolored bat. If we do not notify you within that timeframe, you may proceed with the Action under the terms of the NLAA concurrence provided here. This verification period allows the identified Ecological Services Field Office to apply local knowledge to evaluation of the Action, as we may identify a small subset of actions having impacts that we did not anticipate when developing the key. In such cases, the identified Ecological Services Field Office may request additional information to verify the effects determination reached through the Northern Long-eared Bat and Tricolored Bat DKey.

#### Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination key for the northern long-eared bat and tricolored bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Alligator Snapping Turtle Macrochelys temminckii Proposed Threatened
- Monarch Butterfly Danaus plexippus Candidate

You may coordinate with our Office to determine whether the Action may affect the species and/ or critical habitat listed above. Note that reinitiation of consultation would be necessary if a new species is listed or critical habitat designated that may be affected by the identified action before it is complete.

If you have any questions regarding this letter or need further assistance, please contact the Tennessee Ecological Services Field Office and reference Project Code 2024-0099340 associated with this Project.

#### **Action Description**

You provided to IPaC the following name and description for the subject Action.

#### 1. Name

#### MLG&W Tower #1613 CAP

#### 2. Description

The following description was provided for the project 'MLG&W Tower #1613 CAP':

The U.S. Army Corps of Engineers plans to construct an approximate 4,000 yard temporary access road and then place R-200 riprap bedding stone along 300 feet of the right descending bank of the Wolf River to protect Tower #1613 of a main transmission line for Memphis Light, Gas, and Water. The tower is danger of being eroded by the immediately adjacent Wolf River. The temporary access road would be constructed underneath the existing powerline Right-of-Way. Impacts of

~0.1 acres and ~ 0.4 temporary acres impacted with ~0.5 acres total impacts (~0.4 temporary).

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@35.19496715,-89.93880835731284,14z

## **DETERMINATION KEY RESULT**

Based on the answers provided, the proposed Action is consistent with a determination of "may affect, but not likely to adversely affect" for a least one species covered by this determination key.

## **QUALIFICATION INTERVIEW**

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of listed bats or any other listed species?

**Note:** Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

No

2. Is the action area wholly within Zone 2 of the year-round active area for northern long- eared bat and/or tricolored bat?

Automatically answered

No

3. Does the action area intersect Zone 1 of the year-round active area for northern longeared bat and/or tricolored bat?

#### Automatically answered

No

4. Does any component of the action involve leasing, construction or operation of wind turbines? Answer 'yes' if the activities considered are conducted with the intention of gathering survey information to inform the leasing, construction, or operation of wind turbines.

**Note:** For federal actions, answer 'yes' if the construction or operation of wind power facilities is either (1) part of the federal action or (2) would not occur but for a federal agency action (federal permit, funding, etc.). *No* 

5. Is the proposed action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

Yes

6. Is the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), or Federal Transit Administration (FTA) funding or authorizing the proposed action, in whole or in part?

No

7. Are you an employee of the federal action agency or have you been officially designated in writing by the agency as its designated non-federal representative for the purposes of Endangered Species Act Section 7 informal consultation per 50 CFR § 402.08?

**Note:** This key may be used for federal actions and for non-federal actions to facilitate section 7 consultation and to help determine whether an incidental take permit may be needed, respectively. This question is for information purposes only.

Yes

8. Is the lead federal action agency the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC)? Is the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC) funding or authorizing the proposed action, in whole or in part?

No

- 9. Is the lead federal action agency the Federal Energy Regulatory Commission (FERC)? *No*
- 10. [Semantic] Is the action area located within 0.5 miles of a known bat hibernaculum?

**Note:** The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency.

## Automatically answered No

- 11. Does the action area contain any winter roosts or caves (or associated sinkholes, fissures, or other karst features), mines, rocky outcroppings, or tunnels that could provide habitat for hibernating bats?
  - No
- 12. Will the action cause effects to a bridge?

Note: Covered bridges should be considered as bridges in this question.

No

13. Will the action result in effects to a culvert or tunnel at any time of year?

No

14. Are trees present within 1000 feet of the action area?

**Note:** If there are trees within the action area that are of a sufficient size to be potential roosts for bats answer "Yes". If unsure, additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: <u>https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines.</u>

Yes

#### 15. Does the action include the intentional exclusion of bats from a building or structure?

**Note:** Exclusion is conducted to deny bats' entry or reentry into a building. To be effective and to avoid harming bats, it should be done according to established standards. If your action includes bat exclusion and you are unsure whether northern long-eared bats or tricolored bats are present, answer "Yes." Answer "No" if there are no signs of bat use in the building/structure. If unsure, contact your local Ecological Services Field Office to help assess whether northern long-eared bats or tricolored bats may be present. Contact a Nuisance Wildlife Control Operator (NWCO) for help in how to exclude bats from a structure safely without causing harm to the bats (to find a NWCO certified in bat standards, search the Internet using the search term "National Wildlife Control Operators Association bats"). Also see the White-Nose Syndrome Response Team's guide for bat control in structures.

No

16. Does the action involve removal, modification, or maintenance of a human-made structure (barn, house, or other building) known or suspected to contain roosting bats?

No

17. Will the action cause construction of one or more new roads open to the public?

For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

No

18. Will the action include or cause any construction or other activity that is reasonably certain to increase average daily traffic permanently or temporarily on one or more existing roads?

**Note:** For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

No

19. Will the action include or cause any construction or other activity that is reasonably certain to increase the number of travel lanes on an existing thoroughfare?

For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

No

20. Will the proposed Action involve the creation of a new water-borne contaminant source (e.g., leachate pond, pits containing chemicals that are not NSF/ANSI 60 compliant)?

**Note:** For information regarding NSF/ANSI 60 please visit <u>https://www.nsf.org/knowledge-library/nsf-ansi-standard-60-drinking-water-treatment-chemicals-health-effects</u>

No

- 21. Will the proposed action involve the creation of a new point source discharge from a facility other than a water treatment plant or storm water system? *No*
- 22. Will the action include drilling or blasting?

No

23. Will the action involve military training (e.g., smoke operations, obscurant operations, exploding munitions, artillery fire, range use, helicopter or fixed wing aircraft use)?

No

24. Will the proposed action involve the use of herbicides or other pesticides other than herbicides (e.g., fungicides, insecticides, or rodenticides)?

No

25. Will the action include or cause activities that are reasonably certain to cause chronic or intense nighttime noise (above current levels of ambient noise in the area) in suitable summer habitat for the northern long-eared bat or tricolored bat during the active season?

Chronic noise is noise that is continuous or occurs repeatedly again and again for a long time. Sources of chronic or intense noise that could cause adverse effects to bats may include, but are not limited to: road traffic; trains; aircraft; industrial activities; gas compressor stations; loud music; crowds; oil and gas extraction; construction; and mining.

**Note:** Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: <u>https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines.</u>

No

26. Does the action include, or is it reasonably certain to cause, the use of permanent or temporary artificial lighting within 1000 feet of suitable northern long-eared bat or tricolored bat roosting habitat?

**Note:** Additional information defining suitable summer habitat for the northern long-eared bat and tricolored bat can be found in Appendix A of the USFWS' Range-wide Indiana Bat and Northern long-eared bat Survey Guidelines at: <u>https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines.</u>

No

27. Will the action include tree cutting or other means of knocking down or bringing down trees, tree topping, or tree trimming?

Yes

28. Will the proposed action occur exclusively in an already established and currently maintained utility right-of-way?

Yes

29. Will the proposed action result in the cutting of entire trees outside of the currently maintained utility right-of-way?

No

30. Will tree trimming, limbing, or cutting be used to expand the footprint of any currently maintained utility rights-of-way?

No

31. Will tree trimming, limbing, or cutting in currently maintained utility rights-of-way occur during the pup season?

**Note:** Bat activity periods for your state can be found in Appendix L of the Service's Range-wide Indiana Bat and Northern long-eared Bat Survey <u>Guidelines</u>.

No

32. Will the proposed action result in the use of prescribed fire?

**Note:** If the prescribed fire action includes other activities than application of fire (e.g., tree cutting, fire line preparation) please consider impacts from those activities within the previous representative questions in the key. This set of questions only considers impacts from flame and smoke.

No

33. Does the action area intersect the tricolored bat species list area?

Automatically answered

Yes

34. [Semantic] Is the action area located within 0.25 miles of a culvert that is known to be occupied by northern long-eared or tricolored bats?

**Note:** The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency.

## Automatically answered No

35. Has a presence/probable absence bat survey targeting the <u>tricolored bat and following</u> <u>the Service's Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines</u> been conducted within the project area?

Yes

- 36. Was the presence/probable absence survey conducted within the last 5 years? *Yes*
- 37. Did you coordinate with your Ecological Services Field Office (ESFO) and receive approval of the results? If NO, please contact the appropriate local ESFO before completing this determination key you may change your answer to 'yes' only after coordinating with the ESFO and uploading survey results. *Yes*
- 38. Did survey results demonstrate the probable absence of tricolored bats?

Yes

39. Do you have any documents that you want to include with this submission? No

### **PROJECT QUESTIONNAIRE**

Enter the extent of the action area (in acres) from which trees will be removed - round up to the nearest tenth of an acre. For this question, include the entire area where tree removal will take place, even if some live or dead trees will be left standing.

0.5

## **IPAC USER CONTACT INFORMATION**

Agency: Army Corps of Engineers Name: Kevin Pigott Address: 167 North Main Street B-202 City: Memphis State: TN Zip: 38103-1894 Email: <u>kevin.r.pigott@usace.army.mil</u> Phone: 901-544-4309 Attachment E – Public Comments Received During Public Review

# Appendix B1: Hydrology and Hydraulics

Wolf River Basin MLGW Tower #1613

**CAP Section 14** 

Project Number: 487478



MEMPHIS DISTRICT U.S. ARMY CORPS OF ENGINEERS

14-MARCH-2024

#### **B1.1 Recommendation**

The H&H Branch recommends that the tower be protected by placing R200 riprap from the bed of the river to top of bank. The recommendation for R200 is based on the slope of the riprap being no steeper than 3.5H:1V. The R200 riprap should be placed at least 24 inches thick and should be underlain by a layer of bedding stone at least 6 inches thick unless the Geotechnical Branch recommends otherwise. The riprap protection should include toe protection and Type-E end protection. The riprap protection should extend upstream and downstream of the tower. The PDT members should determine the exact locations of the ends of the protection based on the dimensions of the scoured area at the time plans are finalized, and on consideration of accessibility, land rights, and constructability.

#### **B1.2 Existing Conditions**

The MLGW tower is located at Wolf River Mile 9.1 (see red arrow in figure B1.1). The drainage area of the Wolf River at the site is 770 square miles. The site is approximately 0.8 miles upstream of section P in the Shelby County Flood Insurance Study (FIS), Revised 6 February 2013. The right descending bank of the Wolf River at the MLGW tower is scoured enough to threaten the foundation of the tower and no adequate protection exists. Based on the project survey the bed of the river and the top of bank are at approximate elevations 213 and 228 feet, respectively. The FIS profile shows that the 10- and 100-year flowlines are only slightly affected by Mississippi River backwater at the site. Table B1.1 lists the MVM survey elevations and the approximate FIS flowline elevations and slopes.



Figure B1.1 FEMA-FIS Profile

Item	Bed	Floodplain	10-Year	50-Year	100-Year
Freq Flow, KCFS	n/a	n/a	26320	33298	36040
Elev, ft	213*	228*	231	233	234
Slope, ft/mile	1.8	n/a	4.1	3.0	2.4
Slope, ft/ft	0.00034	n/a	0.00078	0.00057	0.00045
Depth,	n/a	15	18	20	21

Table B1.1 Site Data

\*MVM survey.

The 100-year flow at the site was modeled using a normal depth calculator as if all effective flow were in the channel. A trapezoidal section with a bottom width of 160 feet, side slopes of 2H:1V, a Manning n value of 0.03, and a flow depth of 21 feet, resulted in an average velocity of 8.6 ft/sec and a flow of 36 KCFS. The input slope associated with the calculated 36 KCFS flow was 0.0007 ft/ft, which is quite steep but is also comparable to the 10-year flowline slope of 0.00078 ft/ft plotted in the FIS. The combination of the 36KCS flow and the water surface slope of 0.0007 ft/ft reflects severe attack at the site and is conservative.

#### **B1.3 With-Project Conditions**

Under with-project conditions the flows and velocities will be essentially the same as under existing conditions.

The stability analysis of the riprap protection was based on the Isbash equation and is summarized below:

```
Normal Depth Flow in Trapezoid
         Q=AV
         V = (1.49/n) R<sup>2/3</sup> S<sup>1/2</sup>
         B = 160 ft
         Z = 2H:1V
         S<sub>w</sub> = 0.0007 ft/ft (low Miss. Rv.)
         d = 21 ft
         n = 0.03
         V_{avg 100} = 8.6 \text{ ft/sec}
         Q<sub>100</sub> = 36 KCFS
Isbash Riprap Stability
         V = C \left[ 2g((\gamma_{s} - \gamma_{w})/\gamma_{w})) \right]^{1/2} (D_{50}^{1/2})
                                                   (HDC Chart 712-1 sheet 2 of 2)
         unit weight water, \gamma_w = 62.4 \text{ pcf}
         LMVD unit weight stone, y_s = 155 \text{ pcf}
         Turbulence constant, C = 1.20 (low)
         Diameter S_f = 1.1 (adapted from EM 1110-2-1601 Eqt 3-3)
         Z=3.5 H:1V
         T = 250 ft, R = 1000 ft, R/T = 4, C_v = 1.16 (adapted from EM 1110-2-1601 Eqt 3-5)
          @ Z=3.5 H:1V, K<sub>1</sub>= 0.90 (adapted from EM 1110-2-1601 Eqt 3-3)
          Required W_{50min} = 35.4 lb (on side slope at outside of bend)
```

Available R200 W<sub>50min</sub> = 40 lb <u>OK</u>

#### **B1.4 Climate Change**

Section 14 of the Continuing Authorities Program is intended to provide emergency protection to infrastructure. In the Memphis District, the scour at Section 14 project sites can be caused by:

- 1. Normal channel migration.
- 2. Continued geomorphic response to historic channelization.
- 3. Increased runoff volume and peak flow caused by development.

At most Memphis District Section 14 sites the causes of scour persist after protection is installed, resulting in a continued attack on the protection itself and on the earth at the ends and edges of the protection. Given the decision to protect a site, the difficulty of installing survivable short-term protection precludes consideration of climate change in developing a feasible design.

Nevertheless, USACE requires the issue of climate change be addressed in the design of a Section 14 project. Therefore, the H&H Branch addressed climate change as required by: 1)
reviewing a detailed MVD climate change document for the adjacent river basin; and 2) by using the USACE CHAT Tool to synthesize information for the Wolf River basin.

A detailed climate change assessment reported in August 2023 by MVD for the Hatchie/Loosahatchie Rivers and the Mississippi River from Mile 775-736 did not reveal any expected climate change that would affect the design of any similar Section 14 project located in the Hatchie or Loosahatchie River basins. The results of the study should be applicable to this Section 14 project because the Wolf River basin is in the same 8-digit HUC as the Hatchie and Loosahatchie basins, is adjacent to the Loosahatchie basin, and will experience the same West Tennessee climate trends and Mississippi River backwater trends. The CHAT output was applicable to the site but not relevant to the hydraulic proportioning of the protection.

The H&H Branch ran the USACE CHAT Tool for the project basin. Figure B1.2 was generated by the USACE CHAT Tool and is a location map of the Wolf River Basin. The site is located in the red circle. The CHAT Tool produced statistical results of simulations. Figure B1.3 is an example of the CHAT output, being a plot of the simulated annual maximum of mean monthly streamflow through the year 2100. The CHAT output was applicable to the site but not relevant to the hydraulic proportioning of the protection.



Figure B1.2 USACE CHAT Tool Location Map



Figure B1.3 USACE CHAT Tool Streamflow Vs Time

#### **B1.5 References**

USACE, CHAT Tool, on-line, accessed May 2024.

USACE, EM-1110-2-1601, Hydraulic Design of Flood Control Channels, 1991, revised 1994.

USACE-MVD, Mississippi River Hatchie/Loosahatchie Mississippi River Mile 775-736, Tennessee and Arkansas, Appendix 10—Impacts to Inland Hydrology Climate Change Assessment, August 2023.

US-FEMA, Shelby County Tennessee Flood Insurance Study, revised 6 February 2013.





# Appendix B2: Geotechnical

Wolf River Basin

# MLGW Tower #1613

**CAP Section 14** 

Project Number: 487478



MEMPHIS DISTRICT U.S. ARMY CORPS OF ENGINEERS

16-Oct-24

#### 1. PROJECT DESCRIPTION

Riverbank erosion along the right descending bank of the Wolf River in Shelby County, TN is threatening an electric line tower. These lines provide power to the surrounding communities so failure would be detrimental. The tower is located around 9 ft - 14 ft. away from the riverbank top. High water and construction along the Wolf River caused degradation of the existing slope. A riprap revetment is proposed to stabilize the slope and protect the MLGW Tower.

#### 2. REGIONAL GEOLOGY AND PHYSIOGRAPHY

The project is in the Wolf River Flood Plain in Southwest Tennessee and north of the Memphis area. It is just north of a section of I-40. The area is primarily made up of loess and clayey silty alluvium with clay deposits found underneath. The area is mostly flat and grassy with a wooded area just outside of tower easements.

**2.1 Topography.** The Wolf River flows towards the Mississippi River meandering through Memphis, TN. The Wolf River is protected with riprap just upstream of the site. The tower is in an outward bend of the Wolf River. A survey was performed in February of 2022 with cross sections interpreted using the survey data.



Figure 1: MLGW Tower 1613 Aerial

# MLGW Tower 1613, Shelby County, Tennessee Stream Bank Erosion Protection

**2.2 Geology.** Two 50-foot soil borings were taken just upstream and downstream of the tower. The borings have around 10 feet of clay with a 2-5 feet clayey sand seam followed by poorly graded sand with a stiff fat clay seam at around 40 feet. Boring 1-TWRU-23 was taken at elevation 228.65' and is located north of the project site. The first 10 feet of this boring are made up of a lean clay layer and then 5 feet of clayey sand. The next 20 feet are made up of a sand with gravel layer. At 40 feet, a 2 feet fat clay layer is found. The layer afterwards until the end of the boring is made up of sand. Boring 02-TWRU-23 was taken at elevation 229.11' and is south of the project site. The first 10 feet of the boring shows that this part of the soil is lean clay. The soil then transitions to a clayey sand and then sand. At 37.5' down from the top elevation a 6-foot fat clay seam is present. After this seam, the rest of the boring showed a clayey sand.



Figure 2: Boring Locations

- **2.3 Site Hydrogeology.** 1-TWRU-23 had a 24-hour water level of elevation 216.64'. 2-TWRU-23 had a 24-hour water level of elevation 215.86'. Groundwater does not appear to be causing migration of material downslope and is not likely a main contributor of erosion or bank instability at the site.
- **2.4 Seismic Risk and Earthquake History.** The project site is located within the New Madrid Seismic Zone and due to the makeup of the soil puts it at risk of movement if there is seismic activity. This project is to stabilize the channel side slopes so seismic analyses are not being performed on the tower itself.

#### 3. SUBSURFACE INVESTIGATION

Subsurface investigation is limited to existing data (as described in Section 2.2). With the existing borings, it is not anticipated that more subsurface information will be needed.

#### 4. GEOTECHNICAL DESIGN

- **4.1 Design Section.** Design is not part of the feasibility study. More details will be provided during the design phase of this project.
- **4.2 Foundation.** As stated previously, the foundation materials likely to be encountered along the river channel are clays, sands, and clayey sands. Clearing of topsoil, vegetation, and downed trees/debris along the bank may be necessary prior to placement of rock.
- **4.3 Seepage.** Soils in the project area are predominantly impermeable fine-grained materials and permeable coarse-grained materials that are conducive to seepage; however, the main concern with seepage is the migration of foundation materials through the riprap section. A well graded stone gradation with appropriately sized bedding stone will be used to prevent the migration of foundation soils through the riprap.
- **4.4 Slope Stability.** Slope stability has not been performed for the job. 3.5H:1V slope is being proposed for feasibility design and will be adjusted upon performing slope stability analyses. This recommended slope is based on another project with a tower next to a river. Additional riprap material and bedding stone will help prevent erosion at the site.

#### 5. EROSION PROTECTION

**5.1 Riprap.** R-200 is the anticipated size of riprap. The riprap should be placed at a minimum thickness of 24" with bedding stone placed at a minimum of 6". As noted above, the project site will consist of a 3.5H:1V slope.









SURFICIAL GEOLOGIC MAP OF THE NORTHEAST MEMPHIS QUADRANGLE, SHELBY COUNTY, TENNESSEE By Randy Cox 2004





	DRILLING LOG DIVISION Mississippi Valley							Boring Designation									1-TWRU-23			
DRILI	RILLING LOG DIVISION Mississippi Valley								INSTALLATION									Sheet 1 of 2		
PROJECT MLGW Memph	T Town	er 16 N	13				<u>.</u>	10. COORDINATE SYSTEM NAD83 / UTM zone 16N LOCATION COORDINATES									LO	VERTICAL NAVD88 CATION METHOD:		
HOLE NU	IMBEF	2		3. DF	RILLI	NG AGENCY		N	1: 389	8804	1.69		<u>E: 2329</u> STARTE	9 <u>59.</u> ED	.38		COMPLETED			
1-	-TWF	RU-23	}					11. DATE BORING Feb 07 2024									Feb 08 2024			
NAME OF Heath N	- DRIL McDa	LER aniel						12. HAMMER TYPE										EFFICIENCY (%)		
EQUIPME Diedrich	ENT h D-7	70						13. S	IZE AN 625"	ID TYI HSA	PEOF	BIT								
DIRECTIC	ON OF	BORI	NG		DEG FROM VERTICAL BEARING				14. ELEVATION SURFACE							229.2'				
Vertic	Vertical				15. E	LEVAT		ROUN	ID WATI	ER	2	216.	7'							
THICKNESS OF OVERBURDEN			50.0	16. TO 17. S	IGNAT	URE A	ER CC	TLE OF	KES INSPEC	TOR	2									
OTAL DE	EPTH	OF BO	RING			50.0	Mick	ey K	auffn	nan										
		LE ER	'S'		Ð					LABC	RATO	RY								
LEV DE	PTH	SAMP NUMB	BLOW 0.5fl	N	LEGEI	FIELD CLASSIFICA (Desc	ription)	Gravel	Sand	Fines	D10 ASTM	ASTM Class	Dry Unit Weight (pcf)		MC PL & I	(%) _L (%)		REMARKS		
8.65 0.	.50				mm	Topsoil, brown	own moist medium									ΤΤ	PP	= 3.58 tsf		
					////	stiff, trace silt, few s	and								+	$\uparrow$	$\neg$	- 4. IU IST		
		T-1			/////					85				P		+	$\neg$			
					1////										+	+		'= 2.87 tsf		
$\vdash$					V////									+	+	+		= 0.00  tsf		
$\vdash$		T-2			V////					87				-•	┥┤╴	+		= 1.35 tsf = 4.35 tsf		
$\vdash$														+	+	+		- >6 11 tof		
_					1////										_	+		= >6.11 tsr = 0.00 tsf		
_		T-3											-		_	+		= 1.02 tsf		
											-		_	+						
8.85-10	0 30 T-4														PP	= 5.63 tsf				
		SP-1	6	11		CLAYEY SAND (So medium dense	C) fine sand; brown,			49								= 4.30 tst		
			5		餇	medium dense				10										
							-													
	ŀ		3		鰗															
		SP-2	3 5	8										•						
3.65 15	5.50					POORLY GRADED	SAND WITH CLAY	_												
		SP-3	7 Q	10	旧的	(SP-SC) medium sa	and; brown and gray,			10					╞	$\uparrow \uparrow$				
	3 00	5, -0	10		目的	medidin dellac				10			ļ		+	$\uparrow \uparrow$	$\neg$			
			6			POORLY GRADED	SAND WITH	-						+	+	+	$\neg$			
$\vdash$		SP-4	ь 15	37		Medium dense, few	um sano; gray, wet, clay								▶	+	$\neg$			
$\vdash$	-		22												+	+	$\neg$			
$\vdash$	ŀ		13												+	+	$\neg$			
-		SP-5	20 18	38				32	62	6	0.161			+	+	+	$\neg$			
$\vdash$				1		Тп	-								+	+	_			
$\vdash$	ľ	SP.6	8	20											+					
	ļ	00	14	20											_					
			-																	
		SP-7	7 10	24				20	77	3	0.270									
	ŀ		14																	
	ŀ		7										$\left  \right $	T	Τ		7			
		SP-8	15 17	32																
				1	13333	(acational)	n novt north													
						(continued c	n next page)	-												

	DRILLING LOG (Cont Sheet)							INSTALLATION								1-TWRU-23			
DR	LLIN	IG I	_00	G (C	Cor	nt Sheet)									Sheet 2 of 2				
MLC MEC Men	CT GW Tow nphis, 1	/er 16 ſN	13					RDINA 1083 / 1110N 1: 389	TE S UTM : COOF 9880	YSTEM zone 1 RDINA 4.69	6N TES	E: 232	295	59.38	3	VERTICAL NAVD88 LOCATION METHOD:			
ELEV	DEPTH	SAMPLE NUMBER	BLOWS/ 0.5ft	N	LEGEND	FIELD CLASSIFICATION OF MATERIALS (Description)	Gravel	Sand	LABO	DRATO	ASTM Class	Dry Unit Weight (pcf)		• M(	C (%) LL (%)	REMARKS			
						POORLY GRADED SAND WITH GRAVEL (SP) medium sand; gray, wet, medium dense, few clay							2	0 40	60 80	-			
			11			Fine to medium, very dense										_			
	_	SP-9	25 28	53			18	77	5	0.174						-			
	_															-			
1.15	38.00	-	-			CLAYEY SAND WITH GRAVEL (SC) medium sand; gray										UNC Results @ 38.5 ft: Su=3870 psf			
9.15	40.00	T-5				FAT CLAY (CH) brown and gray, hard, stratified	- 17	45	36				-+	•		UNC Results @ 38.5 ft: Su=4385 psf			
37.15	42.00	-	-			POORLY GRADED SAND (SP) fine sand; tan, moist, very dense, few clay,										PP= 5.63 tsf TV= >10.24 tsf			
		SP-1 0	9 23 50	73		roots	4	86	9	0.078						-			
	_															-			
	_															-			
79.15		SP-1 1	25 20 23	43		<b>D</b>			14							-			
						Borenole finished at 50.0										-			
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DRILLING LOG			0	NVISION		INCT				2-TWRU-23							
					lev	INSTALLATION									Sheet 1 of 2		
PROJECT MLGW Tower 1613							OORD	INATE		VERTICAL							
er 16 <sup>-</sup>	13					NA	D83 / I	JTM z	one 16	N					NAVD88		
'N						LOCA				res I	=	05 4	7	LO	CATION METHOD:		
२		3. DF	RILLII	NG AGENCY		N. 3696750.91 E. 232995.47 STARTED								COMPLETED			
RU-23	6					11. DATE BORING         Feb 08 2024         Feb 08 2024									Feb 08 2024		
LER aniol						12. HAMMER TYPE EFFICIENCY (%)											
aniei						13. SI	ZE AN	ID TYI	PE OF	BIT							
70						6.625" HSA											
BORI	١G		DEG	FROM VERTICAL	BEARING	14. El	LEVAT	ION S	SURFA	CE				229.6'			
						15. El	LEVAT	ION C	GROUN	ID WAT	ER	21	6.6'				
		EN		50.0	)'	16. TO						TOR					
		<b>`</b>		50 (	יו	Mick	ev K	auffn	nan			TOIL					
					)					RV							
				FIELD CLASSIFICA	TION OF MATERIALS						12 H				DEMADIZO		
NM NUM	3LO'		В	(Desc	cription)	rave	Sand	ines	D10	STM	y Un (eigh	●   —Pl	MC (%)	<u> </u>	REMARKS		
v,∠	-			Topool brown		0		ш.		ΨU	ŏ٢Ŭ	20 4	0 60 8	ó –			
			ЩП.	LEAN CLAY WITH	SAND (CL) brown,										r= 0.82 tst V= 1.54 tsf		
			V////	moist, soft, roots										``			
T-1			V////											$\vdash$			
			/////										-	$\vdash$			
			/////										-		r – ∠.15 tst V= 3.58 tsf		
тр								82						PI	P= 1.13 tsf		
1-2								02						יד	V= 0.00 tsf		
														Пр	P= 4 30 tsf		
			[]////											רד   יד	V= 2.56 tsf		
T-3			[]]]]]					79				_		PI	P= 1.02 tsf		
			(/////														
			<u>     </u>		) brown maint												
	3		樹的	CLAYEY SAND (SC	) drown, moist												
SP-1	3	6	開始														
	0	1	開訪														
			1111	POORLY GRADED	SAND (SP) fine												
	· ·			sand; tan, moist, me	edium dense, trace	<b></b>					[						
SP-2	3	8		сау		-								$\vdash$			
	4													$\left  - \right $			
SP-3	5 7	13				0	95	4	0.159								
	6							· ·									
				Gr, tr. organics	_	L								$\vdash$			
SP_4	3	12															
-4	9	12															
				POORLY GRADED	SAND WITH						]						
0.0	10			GRAVEL (SP) medi	um sand; tan, wet,	4-		~	0.175								
SP-5	<u>16</u> 17	33		dense		17	77	6	U.158					$\vdash$			
	7																
SP-6	12	29															
	17													$\vdash$			
	8													$\left  - \right $			
SP-7	12	26				13	84	3	0.221								
	14										$\left  \right $						
	4.0																
SP-8	12 18	35												$\vdash$			
	17																
		1	production of the	(continued o	on next page)	I	1	1			1						
	≷ <b>QU-23</b> LER         aniel         70         BORIN         FOVEF         DINTCOF         OF BO         Janual         T-1         T-2         T-3         SP-1         SP-2         SP-3         SP-4         SP-5         SP-6         SP-7         SP-8	Image: Second state in the second	Image: Section 100 million       3. DF         Image: Section 100 million       3. DF         Image: Section 100 million       1         FOVERBURDEN       1         DINTO ROCK       0         OF BORING       1         Image: Section 100 million       N         T-1       1         T-2       1         T-3       3         SP-1       3         SP-2       4         4       1         SP-2       4         4       1         SP-3       7         6       12         SP-4       3         SP-5       10         SP-6       12         17       29         SP-8       18         SP-7       12         10       12         SP-8       12         17       29         SP-8       12         18       12         10       12         11       12         12       13         13       12         14       12         15       13         17	3. DRILLI         RU-23         LER         aniel         70         BORING       DEG         FOVERBURDEN         D INTO ROCK         OF BORING         T-1         I         T-1         I         T-2         T-3         SP-1         3         SP-2         4         5         SP-3         7         SP-4         3         SP-4         3         SP-5         10         SP-6         17         SP-7         12         3         SP-7         12         13         SP-6         12         13         SP-7         12         13         14         15         16         17         18         10         110         12         13         14         17	3. DRILLING AGENCY         RU-23         LER         aniel         70         BORING       DEG FROM VERTICAL         -       -         CVERBURDEN       50.0         D INTO ROCK       OF BORING         OVERBURDEN       50.0         D INTO ROCK       OF BORING         OVERBURDEN       50.0         Main Mark       N         Wain Mark       Of Striggen         VERBURDEN       Striggen         Topsoil, brown       LEAN CLAY WITH moist, soft, roots         T-1       Imagen         T-2       Imagen         T-3       Imagen         SP-1       3         SP-2       4         SP-3       6         SP-4       12         SP-5       16         SP-4       12         SP-5       16         SP-7       12         SP-8       18         T7       29         SP-8       18         SP-7       12         SP-8       18         T7       17         SP-8       18         T7 <td< td=""><td>Image: Second state of the second s</td><td>N       N       N         RU-23       3. DRILLING AGENCY       11. DL         Aniel       12. H.         aniel       12. H.         Aniel       13. SI         70       6         BORING       DEG FROM VERTICAL       BEARING       14. EI         0       15. EI       15. EI       15. EI         0 FBORING       50.0'       Mick       16. TC         0 FBORING       50.0'       Mick       16. TC         0 FBORING       50.0'       Mick       16. TC         0 FBORING       50.0'       Mick       17. SI         1 UITO ROCK       Topsoil, brown       16. TC       17. SI         1 UEAN CLAY WITH SAND (CL) brown, moist       9       11. EEAN CLAY WITH SAND (CL) brown, moist       11. DL         T-1       1       10. TOpsoil, brown       11. EEAN CLAY WITH SAND (SC) brown, moist       11. EEAN CLAY WITH SAND (SC) b</td><td>N:: 385       N:: 385         RU-23       3. DRILLING AGENCY       11. DATE B         ILER       12. HAMME         Iniel       13. SIZE AN         6.625"       13. SIZE AN         OVERBURDEN       50.0'         DINTO ROCK       15. ELEVAT         OF BORING       50.0'         DINTO ROCK       17. SIGNAT         OF BORING       50.0'         Mickey K       10. SIZE AND         T-1       T-2         T-3       FIELD CLASSIFICATION OF MATERIALS (Description)       10. SIZE AND         SP-1       3       6         SP-2       3       6       10. SIZE AND         SP-3       7       13         SP-4       3       12         Gr. tr. organics       10. SIZE AND         SP-3       13       14         SP-4       3       12         SP-4       12       29         SP-5       16</td><td>N: 389875         RU-23       3. DRILLING AGENCY       11. DATE BORING         LER       12. HAMMER TY         niel       13. SIZE AND TY         BORING       DEG FROM VERTICAL       BEARING       14. ELEVATION C         COVERBURDEN       50.0°       16. TOTAL NUME       17. SIGNATURE:         D INTO ROCK       TO       50.0°       Mickey Kauffer         D INTO ROCK       TO       50.0°       Mickey Kauffer         T.3       FIELD CLASSIFICATION OF MATERIALS (Description)       Topsoil, brown, moist, soft, roots       4       4         T-1       Topsoil, brown, moist, soft, roots       CLAYEY SAND (SC) brown, moist       8       8         SP-1       3 3       6       CLAYEY SAND (SC) brown, moist       9       9         SP-1       3 3       6       CLAYEY SAND (SC) brown, moist       9       9         SP-1       3 3       6       CLAYEY SAND (SC) brown, moist       9       9         SP-1       3 3       6       CLAYEY SAND (SC) brown, moist       9       9         SP-1       3 4       10       9       4       9       9         SP-1       3 7       10       9       4       9       9       10</td><td>N: 3898750.91         RU-23       3. DRILLING AGENCY       11. DATE BORING         LER       12. HAMMER TYPE OF         niel       13. SIZE AND TYPE OF         70       13. SIZE AND TYPE OF         100       15. ELEVATION SOURA         200RING       DEG FROM VERTICAL       BEARING       14. ELEVATION SOURA         101       15. ELEVATION GROUN       15. ELEVATION SOURA       16. TOTAL NUMBER CO         11.000 CV       17. SIGNATURE AND TYPE OF       10.000       10.000       10.000       10.000         0 VERBURDEN       50.0'       Mickey Kauffman       10.000&lt;</td><td>N::3898750.91       I         RU-23       3. DRILLING AGENCY       11. DATE BORING       Fr.         RU-23       12. HAMMER TYPE       13. SIZE AND TYPE OF BIT       6.625" HSA         BORING       DEG FROM VERTICAL       BEARING       14. ELEVATION SQUERACE         BORING       DEG FROM VERTICAL       BEARING       14. ELEVATION SQUERACE         IONTO ROCK       TO TAL NUMBER CORE BODIND WATI       15. ELEVATION SQUERACE       17. SIGNATURE RAD TIFLE OF DIT         COVERDUROEN       50.0'       16. TOTAL NUMBER CORE BODIND WATI       16. TOTAL NUMBER CORE BODIND WATI         I'deg group       TOPSOIL brown       75. BICATION OF MATERIALS       I.ABORATORY         I'deg group       Topsoil, brown       I.ABORATORY       I.ABORATORY         I'deg group       Topsoil, brown       I.ABORATORY       I.ABORATORY         I'deg group       I.ELAN CLAY WITH SAND (CL) brown, moist       I.ABORATORY         I'deg group       I.ELAN CLAY WITH SAND (SC) brown, moist       I.ABORATORY         SP-1       3       6       I.EAN CLAY WITH SAND (SC) brown, moist       I.ABORATORY         SP-2       4       6       I.EAN CLAY WITH SAND (SC) brown, moist       I.ABORATORY       I.ABORATORY         SP-3       6       I.EAN CLAY WITH SAND (SC) brown, moist</td><td>N: 3399750.91     E: 239       RU-23     3. DRILLING AGENCY     11. DATE BORING     START       RU-23     3. DRILLING AGENCY     11. DATE BORING     START       Aniel     11. DATE BORING     START       BORING     DEG FROM VERTICAL     BEARING     14. ELEVATION SURFACE       BORING     DEG FROM VERTICAL     BEARING     14. ELEVATION GROUND WATER       10 INTO ROCK     77. SIGATURE AND TYPE OF INSEC     15. SIZE AND TYPE OF INSEC       OVERBUNDEN     50.0'     Mickey Kauffman       11. DATE BORING     10. TO ROCK     77. SIGATURE AND TITLE OF INSPEC       OF BORING     50.0'     Mickey Kauffman       11. DATE BORING     10. TO ROCK     11. EXACLE WITH SAND (CL) brown, moist       11. DATE BORING     11. DATE BORING     11. DATE BORING       11. DATE BORING     11. DATE BORING     11. DATE BORING       11. DATE BORING     11. DATE BORING     11. DATE BORING       11. DATE BORING     11. DATE BORING     11. DATE BORING       11. DATE BORING     11. DATE BORING     11. DATE BORING       11. T1.     11. DEVAL     11. DATE BORING</td><td>N::3898750.91     E: 232954.1       RU-23     3. DRILLING AGENCY     11. DATE BORING     Feb 08 2024       LER     11. DATE BORING     Feb 08 2024       aniel     11. DATE BORING     Feb 08 2024       BORING     DEG FROM VERTICAL     BEARING     14. ELEVATION SURFACE       15. ELEVATION SURFACE     15. ELEVATION ORDUND WATER     21       OVERBURDEN     50.0'     Mickey Kauffman     14. ELEVATION SURFACE       DITO ROCK     73. GRATTER AND THE CF INSPECTOR     14. ELEVATION SURFACE     15. ELEVATION SURFACE       DITO ROCK     50.0'     Mickey Kauffman     14. ELEVATION SURFACE     16. ELEVATION SURFACE       DITO ROCK     50.0'     Mickey Kauffman     14. ELEVATION SURFACE     16. ELEVATION SURFACE       T-1     Toged Internation     14. ELEVATION SURFACE     16. ELEVATION SURFACE     16. ELEVATION SURFACE       T-1     Toged Internation     10. Toged Internation     14. ELEVATION SURFACE     16. ELEVATION SURFACE       T-1     Toged Internation     10. ELEVATION SURFACE     16. ELEVATION SURFACE     16. ELEVATION SURFACE       T-1     Toged Internation     10. ELEVATION SURFACE     16. ELEVATION SURFACE     16. ELEVATION SURFACE       T-1     Toged Internation     10. ELEVATION SURFACE     16. ELEVATION SURFACE     16. ELEVATION SURFACE       T-2</td><td>N: 3898750.91     E: 23299.47       VL-23     D.RULING AGENCY     11. DATE BORING     SIMPLED       VL-24     13. SIZE AND TYPE OF BIT     6.625" HSA       SORING     DEG FROM VERTICAL     BEARING     14. Elevation Superace       VI-100     DEG FROM VERTICAL     DEG FROM VERTICAL     16. Charlow Reace       VI-100     DINTO ROCK     TOTA NUMER FOR EORE BOXES     216.0°       VI-100     DINTO ROCK     TORONO TO MATERIALS     LABORATORY       VI-100     DINTO ROCK     Toppol, brown     VI-100       SP-1     S     S     S     S       SP-2     H     S     <td< td=""><td>N: 3892750.91     E: 23295.47       VL-23     SPRILLING AGENCY       11. DATE BORING     STATED Feb 08 2024       LER     11. DATE BORING       13. SIZE AND TYPE 0F BIT 6.625' HSA       DORING     DEG FROM VERTICAL       14. ELEVATION SUPFACE     216.6'       OVERBURCEN     50.0'       15. ELEVATION SUPFACE     216.6'       OVERBURCEN     50.0'       17. SIGNATURE AND TITLE OF INSPECTOR       0 PORCK     50.0'       0 PORCK     50.0'       17. SIGNATURE AND TITLE OF INSPECTOR       18. ELEVATION SUPFACE     216.6'       19. DECK     50.0'       10. DECK     CLAYENY MITH SAND (CL) brown, moist       11. DEAK LICKNOT     14. ELEVATION SUPFACE       11. DEAK LICKNOT     14. ELEVATION SUPFACE       11. DEAK LICKNOT     14. ELEVATION SUPFACE       12. DEAK LICKNOT     14. ELEVATION SUPFACE       13. B4     14. ELEVATION SUPFACE       14. ELEVATION SUPFACE     14. ELEVATION SUPFACE       15. ELEVATION GROUND WATER     15. ELEVATION SUPFACE       17. T7     6. ELEVATION SUPFACE       18. ELEVA</td></td<></td></td<>	Image: Second state of the second s	N       N       N         RU-23       3. DRILLING AGENCY       11. DL         Aniel       12. H.         aniel       12. H.         Aniel       13. SI         70       6         BORING       DEG FROM VERTICAL       BEARING       14. EI         0       15. EI       15. EI       15. EI         0 FBORING       50.0'       Mick       16. TC         0 FBORING       50.0'       Mick       16. TC         0 FBORING       50.0'       Mick       16. TC         0 FBORING       50.0'       Mick       17. SI         1 UITO ROCK       Topsoil, brown       16. TC       17. SI         1 UEAN CLAY WITH SAND (CL) brown, moist       9       11. EEAN CLAY WITH SAND (CL) brown, moist       11. DL         T-1       1       10. TOpsoil, brown       11. EEAN CLAY WITH SAND (SC) brown, moist       11. EEAN CLAY WITH SAND (SC) b	N:: 385       N:: 385         RU-23       3. DRILLING AGENCY       11. DATE B         ILER       12. HAMME         Iniel       13. SIZE AN         6.625"       13. SIZE AN         OVERBURDEN       50.0'         DINTO ROCK       15. ELEVAT         OF BORING       50.0'         DINTO ROCK       17. SIGNAT         OF BORING       50.0'         Mickey K       10. SIZE AND         T-1       T-2         T-3       FIELD CLASSIFICATION OF MATERIALS (Description)       10. SIZE AND         SP-1       3       6         SP-2       3       6       10. SIZE AND         SP-3       7       13         SP-4       3       12         Gr. tr. organics       10. SIZE AND         SP-3       13       14         SP-4       3       12         SP-4       12       29         SP-5       16	N: 389875         RU-23       3. DRILLING AGENCY       11. DATE BORING         LER       12. HAMMER TY         niel       13. SIZE AND TY         BORING       DEG FROM VERTICAL       BEARING       14. ELEVATION C         COVERBURDEN       50.0°       16. TOTAL NUME       17. SIGNATURE:         D INTO ROCK       TO       50.0°       Mickey Kauffer         D INTO ROCK       TO       50.0°       Mickey Kauffer         T.3       FIELD CLASSIFICATION OF MATERIALS (Description)       Topsoil, brown, moist, soft, roots       4       4         T-1       Topsoil, brown, moist, soft, roots       CLAYEY SAND (SC) brown, moist       8       8         SP-1       3 3       6       CLAYEY SAND (SC) brown, moist       9       9         SP-1       3 3       6       CLAYEY SAND (SC) brown, moist       9       9         SP-1       3 3       6       CLAYEY SAND (SC) brown, moist       9       9         SP-1       3 3       6       CLAYEY SAND (SC) brown, moist       9       9         SP-1       3 4       10       9       4       9       9         SP-1       3 7       10       9       4       9       9       10	N: 3898750.91         RU-23       3. DRILLING AGENCY       11. DATE BORING         LER       12. HAMMER TYPE OF         niel       13. SIZE AND TYPE OF         70       13. SIZE AND TYPE OF         100       15. ELEVATION SOURA         200RING       DEG FROM VERTICAL       BEARING       14. ELEVATION SOURA         101       15. ELEVATION GROUN       15. ELEVATION SOURA       16. TOTAL NUMBER CO         11.000 CV       17. SIGNATURE AND TYPE OF       10.000       10.000       10.000       10.000         0 VERBURDEN       50.0'       Mickey Kauffman       10.000<	N::3898750.91       I         RU-23       3. DRILLING AGENCY       11. DATE BORING       Fr.         RU-23       12. HAMMER TYPE       13. SIZE AND TYPE OF BIT       6.625" HSA         BORING       DEG FROM VERTICAL       BEARING       14. ELEVATION SQUERACE         BORING       DEG FROM VERTICAL       BEARING       14. ELEVATION SQUERACE         IONTO ROCK       TO TAL NUMBER CORE BODIND WATI       15. ELEVATION SQUERACE       17. SIGNATURE RAD TIFLE OF DIT         COVERDUROEN       50.0'       16. TOTAL NUMBER CORE BODIND WATI       16. TOTAL NUMBER CORE BODIND WATI         I'deg group       TOPSOIL brown       75. BICATION OF MATERIALS       I.ABORATORY         I'deg group       Topsoil, brown       I.ABORATORY       I.ABORATORY         I'deg group       Topsoil, brown       I.ABORATORY       I.ABORATORY         I'deg group       I.ELAN CLAY WITH SAND (CL) brown, moist       I.ABORATORY         I'deg group       I.ELAN CLAY WITH SAND (SC) brown, moist       I.ABORATORY         SP-1       3       6       I.EAN CLAY WITH SAND (SC) brown, moist       I.ABORATORY         SP-2       4       6       I.EAN CLAY WITH SAND (SC) brown, moist       I.ABORATORY       I.ABORATORY         SP-3       6       I.EAN CLAY WITH SAND (SC) brown, moist	N: 3399750.91     E: 239       RU-23     3. DRILLING AGENCY     11. DATE BORING     START       RU-23     3. DRILLING AGENCY     11. DATE BORING     START       Aniel     11. DATE BORING     START       BORING     DEG FROM VERTICAL     BEARING     14. 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DATE BORING     Feb 08 2024       BORING     DEG FROM VERTICAL     BEARING     14. ELEVATION SURFACE       15. ELEVATION SURFACE     15. ELEVATION ORDUND WATER     21       OVERBURDEN     50.0'     Mickey Kauffman     14. ELEVATION SURFACE       DITO ROCK     73. GRATTER AND THE CF INSPECTOR     14. ELEVATION SURFACE     15. ELEVATION SURFACE       DITO ROCK     50.0'     Mickey Kauffman     14. ELEVATION SURFACE     16. ELEVATION SURFACE       DITO ROCK     50.0'     Mickey Kauffman     14. ELEVATION SURFACE     16. ELEVATION SURFACE       T-1     Toged Internation     14. ELEVATION SURFACE     16. ELEVATION SURFACE     16. ELEVATION SURFACE       T-1     Toged Internation     10. Toged Internation     14. ELEVATION SURFACE     16. ELEVATION SURFACE       T-1     Toged Internation     10. ELEVATION SURFACE     16. ELEVATION SURFACE     16. ELEVATION SURFACE       T-1     Toged Internation     10. ELEVATION SURFACE     16. ELEVATION SURFACE     16. 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ELEVATION SUPFACE     216.6'       OVERBURCEN     50.0'       17. SIGNATURE AND TITLE OF INSPECTOR       0 PORCK     50.0'       0 PORCK     50.0'       17. SIGNATURE AND TITLE OF INSPECTOR       18. ELEVATION SUPFACE     216.6'       19. DECK     50.0'       10. DECK     CLAYENY MITH SAND (CL) brown, moist       11. DEAK LICKNOT     14. ELEVATION SUPFACE       11. DEAK LICKNOT     14. ELEVATION SUPFACE       11. DEAK LICKNOT     14. ELEVATION SUPFACE       12. DEAK LICKNOT     14. ELEVATION SUPFACE       13. B4     14. ELEVATION SUPFACE       14. ELEVATION SUPFACE     14. ELEVATION SUPFACE       15. ELEVATION GROUND WATER     15. ELEVATION SUPFACE       17. T7     6. ELEVATION SUPFACE       18. ELEVA</td></td<>	N: 3892750.91     E: 23295.47       VL-23     SPRILLING AGENCY       11. DATE BORING     STATED Feb 08 2024       LER     11. DATE BORING       13. SIZE AND TYPE 0F BIT 6.625' HSA       DORING     DEG FROM VERTICAL       14. ELEVATION SUPFACE     216.6'       OVERBURCEN     50.0'       15. ELEVATION SUPFACE     216.6'       OVERBURCEN     50.0'       17. SIGNATURE AND TITLE OF INSPECTOR       0 PORCK     50.0'       0 PORCK     50.0'       17. SIGNATURE AND TITLE OF INSPECTOR       18. ELEVATION SUPFACE     216.6'       19. DECK     50.0'       10. DECK     CLAYENY MITH SAND (CL) brown, moist       11. DEAK LICKNOT     14. ELEVATION SUPFACE       11. DEAK LICKNOT     14. ELEVATION SUPFACE       11. DEAK LICKNOT     14. ELEVATION SUPFACE       12. DEAK LICKNOT     14. ELEVATION SUPFACE       13. B4     14. ELEVATION SUPFACE       14. ELEVATION SUPFACE     14. ELEVATION SUPFACE       15. ELEVATION GROUND WATER     15. ELEVATION SUPFACE       17. T7     6. ELEVATION SUPFACE       18. ELEVA		

						Boring Designation 2									-TWRU-23			
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	_	02				POORLY GRADED SAND WITH GRAVEL (SP) medium sand; tan, wet, dense	Ø	0)			A O	<u> </u>	20	40 60	80			
96.11	33.50		6		N N N													
	_	SP-9	7 9	16		medium sand; gray, wet, medium dense			26									
92.11	37.50	-				FAT CLAY (CH) brown, moist, hard	_											
	_	SP-1 0	6 7 8	15									H-					
86.11	43.50	T-4				CLAYEY SAND (SC) fine sand; brown, wet, dense												
												-						
	_																	
79.61		SP-1 1	14 18 21	39		Borehole finished at 50.0			15									
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### **Appendix C: Cost Engineering**

### Wolf River, Shelby County Tennessee CAP Section 14 Emergency Streambank Protection

### MLGW Tower #1613

**Feasibility Phase** 

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#### **1. INTRODUCTION**

This appendix contains a Total Project Cost Summary prepared for the CAP Section 14 Project. The Memphis Light, Gas, and Water (MLGW) Tower #1613, which runs along the right descending riverbank of the Wolf River, is within the City of Memphis in Shelby County, TN. The Local Sponsor, MLGW is concerned that the continued erosion of the right bank would result in the failure of the transmission tower #1613 that provides critical infrastructure for Memphis.

#### **2. PROJECT DESCRIPTION**

The objective of the feasibility study is to review and analyze data to develop a plan to protect MLGW Tower #1613 from failure due to erosion of the right descending bank on the Wolf River. The Project consists of Alternative (ALT)-1 moving the MLGW #1613 Tower to a new location, ALT-2 placing riprap and stone bedding along the bank line, ALT-3 Placing riprap and stone bedding along the bank line, ALT-3 Placing riprap and stone bedding along the bank line, ALT-3 Placing riprap and stone bedding along the bank line, ALT-3 Placing riprap and stone bedding along the bank line, ALT-3 Placing riprap and stone bedding along the bank line, ALT-3 Placing riprap and stone bedding along the bank line with 12" of topsoil and seeding.

#### 2.1. MLGW #1613 Tower relocation (ALT-1)

This alternative involves contracting with MLGW to relocate Tower 1613 to a new location. This process would potentially create risks itself which could impact the service of a large portion of customers power source and would not guarantee that the bank would not continue to erode and thereby continue to put the tower at risk.

#### 2.2. Bedding Stone and Riprap (ALT-2)

The bedding tone and riprap would be placed on the bank that is experiencing erosion. The stone will be placed along the bank from the top of the bank to the toe.

#### 2.3. Bedding Stone and Riprap with 12" Soil with Seeding (ALT-3)

The bedding stone and riprap would be placed on the bank that is experiencing erosion. The stone will be placed along the bank from the top to the toe of the bank and a 12" blanket of soil with seeding will be placed on top of the stone.

#### **3. COST METHODOLOGY**

**3.1. General.** This fully funded estimate (FFE) has been prepared using March 2024 price levels. The costs are considered to be fair and reasonable to a well-equipped and capable contractor and include overhead and profit. The preparation of this FFE was created in accordance with Engineering Regulation (ER) 1110-1-1300, *Cost Engineering Policy and General Requirements* (26 March 1993) and ER 1110-2-1302, *Civil Works Cost Engineering* (30 June 2016). The FFE was completed in accordance with Engineering Manual 1110-2-1304, *Civil Works Construction Cost Index System (CWCCIS)*, revised 30 September 2021.

The estimate was developed using Micro Computer Aided Cost Estimate System MII v4.4 cost estimating software. Applicable crews and equipment were applied to the estimate to correspond with the work being performed. Material prices were developed using the MII Cost Book, R.S. Means references, and quotes obtained from suppliers. The midpoint of construction (not including the submittal period) is anticipated to be the 3rd quarter of FY 2025, which was used to determine the FFE.

This Project is assumed to be an unrestricted competitive bid, although the possibility of this being a restricted Small Business type contract is possible.

**3.2. Direct Cost.** Direct costs are based on the anticipated material, equipment, and labor necessary to construct the project based on the current scope of work. A material price quote was obtained for both the bedding stone and riprap. Direct costs were calculated independent of the contractor assigned to perform the work. Contractor assignments were determined after the formulation of the direct costs. The majority of the work is assumed to be done by a Prime Contractor, with the remaining specialized work being performed by a subcontractor. It is assumed the Prime Contractor will perform the project coordination and oversight with construction work.

**3.2.1. Labor-Rate Determination.** Labor Rates are based on 2024 Davis-Bacon Wage Rates 03-09-2024 Shelby County, TN.

**3.2.2. Equipment Rates.** All equipment costs are from MII Equipment Region 3 2022 and MII English Cost Book.

**3.2.3. Fuel Rates.** Rates have been updated as of March 2024. Current fuel prices are based on Midwest averages from www.eia.gov/petroleum/gasdiesel. This includes gasoline, on-road diesel, and off-road diesel.

**3.2.4. Overtime Considerations.** Overtime was considered for the project.

**3.2.5. Sales Tax.** Sales tax has been included for material costs.

**3.2.6. Productivity.** Production rates were created based on historical rates used in the Memphis District Cost Engineering Section and on what was determined reasonable by the Cost Estimator. In addition, user crews were created using the estimator's judgment.

**3.3. Indirect Costs.** Contractor assignments were determined after the formulation of the direct costs. The contract assigned includes a Prime Contractor with a subcontractor:

*Prime Contractor:* Will perform tree clearing on shore. Will arrange purchase, delivery and placement of the bedding stone and riprap.

#### 3.3.1. Prime Contractor

**a. Job Office Overhead.** Overhead rate for Job Office Overhead (JOOH) was determined based on the developed construction schedule and each contract's scope of work. In this case, a value of 11.9% was calculated for the Prime Contractor.

**b.** Home Office Overhead. Overhead rate for Home Office Overhead (HOOH) was applied as a running percentage. In this case, a value of 7% was applied for the Prime Contractor. Home Office Overhead includes such items as office rental/ownership costs, utilities, office equipment ownership/maintenance, office staff (managers, accountants, clerical, etc.), insurance, and miscellaneous costs. The range of HOOH depends largely on the contractor's annual volume of work and the type of work that is generally performed by the contractor (own work and subcontracted work).

**c. Profit.** Profit has been included. In this case, a value of 8.0% was calculated for the Prime Contractor (own work and subcontracted work).

**d. Bond.** Bond was included based on the Bond Table as class B. In this case, a value of just over 1.38% was calculated for the Prime Contractor (own work and subcontracted work).

#### 3.3.2. Subcontractors

**a. Job Office Overhead.** Overhead rates for JOOH were applied as a running percentage. In this case, a value of 10% was applied to the subcontractors.

**b.** Home Office Overhead. Overhead rates for HOOH were applied as a running percentage. In this case, a value of 7% was applied to the subcontractors.

**c. Profit.** Profit has been included and was applied as a running percentage. In this case, a value of 9% was assumed for the subcontractors.

**3.4. Contingency.** After review of project documents and discussion with members of the Project Development Team involved in the design of the project, an informal risk analysis was conducted resulting in the development of a contingency. The average contingency for all Project construction features is 27%. This contingency was developed reflecting the uncertainty associated with the work features. This includes the development of the contingencies applied to Planning, Engineering and Design (PED) as well as Construction Management feature accounts.

#### 3.5. Other Assumptions

**3.5.1. Mobilization.** Equipment needs were identified from work items in the MII estimate. Equipment was assumed to be mobilized within 120 miles.

**3.5.2. Government Furnished Materials.** The estimate is based on no government furnished materials.

**3.5.3. Site Access.** It is assumed that the site can be accessible all year, except in the event of high-water conditions.

**3.5.4. Waste Disposal**. Trees and brush debris cleared on the site can be chipped, burned, buried, or hauled offsite. Disposal fees are not necessary.

**3.5.5. Construction Restraints.** To avoid direct impacts to Federally listed bat species that could potentially occur in the project vicinity, where practicable clearing of trees in the repair area will be conducted during the period of October 1 through March 31, when bats are unlikely to be present.

#### **4. PROJECT FEATURE ACCOUNTS**

**4.1. (01) Lands and Damages.** The estimated lands and damages are \$73,606, which represents the Sponsor's cost for necessary real restate interest. It does not include the incidental acquisition costs associated with acquiring the interest (survey, title, appraisal, negotiations, etc.). These real estate acquisition costs amount to \$25,000 (without contingency).

The total estimated real estate costs, rounded to the nearest thousand, is \$145,606 for the Total Project Cost Summary (TPCS) Project First Cost. The \$160,006 real estate cost is broken down in the TPCS (and Risk Contingency Determination file) as follows: \$145,606 in real estate costs are located with the acquisition are placed in the LERRDs and multiplied by a contingency of 9.9% for a total of \$160,006 (Table F-2, F-4).

**4.2. (16)** Bank Stabilization. The items included in this account are tree clearing, bedding stone and riprap.

**4.3. (30) Planning, Engineering, and Design.** The work covered under this account includes the project management and the PED costs spent to date as well as the remaining estimated costs that will be associated with the engineering and design for this Project. The Project Engineer and Project Manager determined the percentages for PED.

**4.4. (31) Construction Management.** The work covered under this account includes the expected costs for contract supervision, contract and construction administration, technical management activities, district office supervision and administration costs. The Project Engineer and Project Manager determined the percentages for construction management.

**4.5. (32 01) Mob., Demob. & Preparatory Work.** The work covered under this account includes the expected costs for mobilization and demobilization of all necessary equipment.

#### 5. PROJECT SCHEDULE

The estimated duration of the project for ALT-1 is 6.5 months; the estimated duration for ALT-2 and ALT-4 is 46 construction days, which is based on the notice to proceed starting in FY 26. The schedule was created following the durations for crews and equipment in the MII estimate. Any clearing or construction dates consider the restrictions to construction activity because of the potential impacts on Federally listed bat species that potentially use the Project area or vicinity.

#### 6. TOTAL PROJECT COST SUMMARY

**6.1. Project First Cost.** Tables F-1, F-2 and F-4 show the Project First Cost for the three alternatives.

Table F-1. Project First Cost (Federal and Non-Federal) Estimate for Alternative 1 Fiscal Year 2024

Item	Cost	Contingency	Project First Cost
Relocation of Tower	\$2,670,000	\$664,756	\$3,334,756
TOTAL	Ş2,670,000	Ş664,756	ş3,334,756

Item	Cost	Contingency	Project First Cost
Mob & Demobilization	\$142,820	\$13,384	\$156,204
Storm Water Pollution Prevention	\$17,939	\$2,023	\$19,962
Stripping	\$3,690	\$258	\$3,948
Temp Access Road	\$87,235	\$9,707	\$96,942
Bank Stabilization 300'	\$481,416	\$254,437	\$735,853
30" CMP (Corrugated Metal Pipe)	\$8,101	\$869	\$8,969
Environmental Mitigation	\$38,000	\$7,295	\$45,295
PLANNING, ENGINEERING, AND DESIGN	\$319,000	\$34,210	\$353,210
Construction Management	\$106,000	\$11,952	\$117,952
LERRDs	\$145,606	\$14,400	\$160,006
TOTAL	\$1,349,807	\$348,535	\$1,698,341

Table F-2. Project First Cost (Federal and Non-Federal) Estimate for Alternative 2 Fiscal Year 2024

Table F-4. Project First Cost (Federal and Non-Federal) Estimate for Alternative 4 Fiscal Year 202
--

Item	Cost	Contingency	Project First Cost
Mob & Demobilization	\$142,866	\$13,389	\$156,255
Storm Water Pollution Prevention	\$17,945	\$2,023	\$19,969
Stripping	\$3,591	\$258	\$3,949
Temp Access Road	\$87,261	\$9,710	\$96,970
Bank Stabilization 300'	\$481,573	\$254,520	\$736,094
Fill (12" Topsoil)	\$13,867	\$2,059	\$15,926
30" CMP (Corrugated Metal Pipe)	\$8,103	\$880	\$8,983
Environmental Mitigation	\$38,000	\$7,295	\$45,295
PLANNING, ENGINEERING, AND DESIGN	\$319,000	\$34,210	\$353,210
Construction Management	\$106,000	\$11,952	\$117,951
LERRDs	\$145,606	\$14,400	\$160,006
TOTAL	\$1,363,812	\$350,696	\$1,714,608

### 6.2 Total Project Cost (Fully Funded)

See Table F-5 Sheets 1 & 2 below for Total Project Costs.

PROJECT:	MLGW TOWER 1613									DISTRICT		/M	Pf	REPARED:	11/1/2024
PROJECT NO LOCATION:	SHELBY COUNTY, TN									POC	CHIEF, COS	T ENGI	NEERING, J	eromy Ca	rpenter
This Estimate	e reflects the scope and schedule in report;	MLGW TOWE	ER 1613												
Civi	Works Work Breakdown Structure	ESTIMATED COST					PROJECT FIRST COST (Constant Dollar Basis)							. PROJECT (	COST D)
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST _(\$K)_	CNTG (\$K)	CNTG _(%)_	TOTAL _(\$K)_	ESC _(%)_	Pr E COST _(\$K)	ogram Year Effective Pric CNTG _(\$K)_	(Budget EC): :e Level Date: REMAINING COST _(\$K)_	2025 1-Oct- 24 Spent Thru: 1-Oct-15 _(\$K)_	TOTAL FIRST COST _(\$K)_	ESC _(%)_	COST _(\$K)	CNTG (\$K)	FULL (\$K)
02	RELOCATIONS	\$8	\$3	37%	\$11		\$8	\$3	\$11		\$11	5.4%	\$9	\$3	\$1
06	FISH & WILDLIFE FACILITIES	\$733	\$271	37%	\$1,004		\$733	\$271	\$1,004		\$1,004	6.1%	\$777	\$287	\$1,06
		\$38	\$14	37%	\$52	-	\$38	\$14	\$52		\$52	2.7%	\$39	\$14	\$5
	CONSTRUCTION ESTIMATE TOTALS:	\$779	\$288		\$1,067		\$779	\$288	\$1,067		\$1,067	5.9%	\$825	\$305	\$1,13
01	LANDS AND DAMAGES	\$146	\$14	10%	\$160		\$146	\$14	\$160		\$160	2.7%	\$150	<b>\$1</b> 5	\$16
30	PLANNING, ENGINEERING & DESIGN	\$319	\$34	11%	\$353		\$319	\$34	\$353		\$353	4.0%	\$332	\$36	\$36
31	CONSTRUCTION MANAGEMENT	\$106	\$12	11%	\$118		\$106	\$12	\$118		\$118	7.1%	\$114	\$13	\$12
	PROJECT COST TOTALS:	\$1,350	\$349	26%	\$1,698	-	\$1,350	\$349	\$1,698		\$1,698	5.3%	\$1,420	\$368	\$1,78
		CHIEF, COS	ST ENGINEE	RING, Jeror	my Carpenter										
		PROJECT N	IANAGER, J	Jason Allmo	n					ES	ESTIMATED TOT	ED FEDE	ECT COST: ERAL COST:	65%	<b>\$1,78</b> \$1,16
		CHIEF, REA	L ESTATE,	Mark Harkis	son						ESTIMATED N	ON-FEDE	ERAL COST:	35%	\$62
		CHIEF, PLA	NNING, Troy	/ Constance						22 -	FEASIBILITY S ESTIMAT	TUDY (C. ED FEDE	AP studies): ERAL COST:	50%	<b>\$50</b> \$30
		CHIEF, ENG	GINEERING,	Jon Korneli	ussen						ESTIMATED N	ON-FEDE	ERAL COST:	50%	\$20
		CHIEF, OPE	ERATIONS,	Andrea Willi	ams					ESTIMA	TED FEDERAL	COSTO	FPROJECT		\$1,46
		CHIEF, CON	ISTRUCTION	N, Damion M	IcNew										
		CHIEF, CON	ITRACTING,	Priscilla Sv	veeney										
		CHIEF, PM	-PB, Danny	Ward											
		CHIEF, DPN	CHIEF, DPM, Donny Davidson												

#### Table F-5. Total Project Cost for TSP Sheet 1

					**** CONTRAC	CT COST S	UMMARY ****							
PROJECT: LOCATION: This Estimate	MLGW TOWER 1613 SHELBY COUNTY, TN reflects the scope and schedule in report;	MLGW TOWE	ER 1613						DISTRICT: POC:	MEMPHIS MVN CHIEF, COST	1 ENGINEERING, Jeromy	PR Carpenter	EPARED:	11/1/2024
	WBS Structure		ESTIMATE	D COST		PROJECT	FIRST COST Dollar	Basis)	(Constant		TOTAL PROJECT	COST (FULLY FUN	DED)	
		Estin Estim	nate Prepare ate Price Lev	d: /el:	6-May-16 1-Oct-24	Progra Effect	am Year (Budge ive Price Level	t EC): Date:	2025 1 -Oct-24					
WBS <u>NUMBER</u> A	Civil Works Feature & Sub-Feature Description B PHASE 1 or CONTRACT 1	COST (SK) C	F CNTG <u>(\$K)</u> D	CNTG <u>(%)</u> <u>E</u>	TOTAL _ <u>(\$K)_</u> <i>F</i>	ESC _(%)_ 	COST _(\$K)_ H	CNTG (\$K) I	TOTAL (\$K) J	Mid-Point <u>Date</u> P	ESC _(%)_ _L	COST _ <u>(\$K)</u> 	CNTG (\$K)	FULL _(\$K) 0
15	FLOODWAY CONTROL & DIVERSION STR	\$8	\$3	37.0%	\$11		\$8	\$3	\$11	2027Q1	5.4%	\$9	\$3	\$12
16	BANK STABILIZATION	\$733	\$271	37.0%	\$1,004		\$733	\$271	\$1,004	2027Q2	6.1%	\$777	\$287	\$1,065
18	CULTURAL RESOURCE PRESERVATION	\$38	\$14	37.0%	\$52	-	\$38	\$14	\$52	2026Q1	2.7%	\$39	\$14	\$53
	-		- [	$\supset$							•			
	CONSTRUCTION ESTIMATE TOTALS:	\$779	\$288	37.0%	\$1,067		\$779	\$288	\$1,067			\$825	\$305	\$1,130
01	LANDS AND DAMAGES	\$146	\$14	9.9%	\$160		\$146	\$14	\$160	2026Q1	2.7%	\$150	\$15	\$164
30	PLANNING, ENGINEERING & DESIGN					t				L	-			
3.5%	Project Management	\$27	\$3	10.7%	\$30	Ĺ	\$27	\$3	\$30	2026Q1	3.1%	\$28	\$3	\$31
1.8%	Planning & Environmental Compliance	\$14	\$2	10.7%	\$16	Ľ	\$14	\$2	\$16	2026Q1	3.1%	\$14	\$2	\$16
20.0%	Engineering & Design	\$156	\$17	10.7%	\$173	[	\$156	\$17	\$173	2026Q1	3.1%	\$161	\$17	\$178
2.0%	<ul> <li>Reviews, ATRs, IEPRs, VE</li> <li>Life Cycle Updates (cost, schedule,</li> </ul>	\$16	\$2	10.7%	\$18	-	\$16	\$2	\$18	2026Q1	3.1%	\$16	\$2	\$18
2.0%	risks)	\$16	\$2	10.7%	\$18	L	\$16	\$2	\$18	2026Q1	3.1%	\$16	\$2	\$18
2.0%	Contracting & Reprographics	\$16	\$2	10.7%	\$18	[	\$16	\$2	\$18	2027Q2	7.1%	\$17	\$2	\$19
4.0%	Engineering During Construction	\$31	\$3	10.7%	\$34	Ĺ	\$31	\$3	\$34	2027Q2	7.1%	\$33	\$4	\$37
3.0%	Planning During Construction	\$23	\$2	10.7%	\$25	[	\$23	\$2	\$25	2026Q1	3.1%	\$24	\$3	\$26
1.3%	Adaptive Management & Monitoring	\$10	\$1	10.7%	\$11	[	\$10	\$1	\$11	2027Q3	7.9%	\$11	\$1	\$12
1.3%	Project Operations	\$10	\$1	10.7%	\$11	Ĺ	\$10	\$1	\$11	2027Q3	7.9%	\$11	\$1	\$12
	Real Estate (All Federal Labor)			25.0%		Ĺ				ſ				
31	CONSTRUCTION MANAGEMENT	ſ				-					- -			
10.0%	Construction Management	\$78	\$9	11.3%	\$87		\$78	\$9	\$87	2027Q2	7.1%	\$84	\$9	\$93
1.5%	Project Operation:	\$12	\$1	11.3%	\$13	r	\$12	\$1	\$13	2027Q2	7.1%	\$13	\$1	\$14
2.0%	Project Management	\$16	\$2	11.3%	\$18		\$16	\$2	\$18	2027Q2	7.1%	\$17	\$2	\$19
	CONTRACT COST TOTALS:	\$1,350	\$349		\$1,698	-	\$1,350	\$349	\$1,698			\$1,420	\$368	\$1,788

# **Appendix C: Cost Engineering**

Appendix C-A Construction

## Alternative C-1

MLGW #1613 1	OWER					Classic	Schedu	ule Layout						24-	Jul-24 13:24
Activity ID	Activity Name	Original	emaining	edule	Start	Finish	026			D	ecember 20	26		January	/ 2027
		Duration	Duration	% plete			15	22	29	06	13	20	27	03	10 7
MLGW	ALT-1 MLGW #	140	0	0%	18-Nov-26 A	01-Jun-27 A	V								
A1000	Relocate MLGW TO	140	0	0%	18-Nov-26		Ï								
						01-Jun-27									

| MLGW

### Alternative C-2

vity ID		Coldinaut D							and the second se					_										
1.2	Activity Name	Quator	Curation	echie %	Start	Finish	July 2025	A	s	0	N	D	3	F	March 2026	6 April 2026	May 2026	June 2026	July 2026	A	S	0	N	0
-		200	200	nleta	H MOS	08. Jan 27	2012	20112	3012	20112	0012	30122	0112	0012	0012	2011;	20112	3012	20112	0012	3012	2 0 1 1	2001	2 2 0 1 2
MLGW	ALT-2 MLGW	ogel	-392	9.m	n H-MH-Sh	00-03(4-21	2		5							1	1					200	2-11	1
A0900	PED	349	349	100%	01-301-25	30-00-26	-	-	_	-	7		-	2				_	-	_	_		PED	1.00
AU990	Award	12	12	10U%	02-NOV-20	17-NOV-20-																		Wart
A1000	SARD Sit Ferrore	5	0	0%	10-1404-20 30-5461-26*	20-Nov-20-																		SIMPERS
A1020	Stepping	10		0%	01.Dec.26*	01-Dec-26										()								1 Stinoing
A1020	Temp Access Road	5	5	0%	12-Dec-26*	08-Dec-26																		Temp
A1040	30" CMP	4	4	0%	03-Dec-26*	08-Dec-26																		30'0
A1050	Gearing	1	1	0%	09-Dec-26*	09-Dec-26																		1 Gea
A1060	Bank Stabilization	16	16	0%	10-Dec-26*	31-Dec-26	1.1																1.1	_
A1070	Establishment of Turf	1	1	0%	04-Jan-27*	04-Jan-27		1		-	1			p			(			-	÷			100.00
A1030	Demobilization	4	4	0%	05- lan-27*	08-Jan-27																	- E	
1000	Colliconstanti		-	10.00	or optimely	000001727			-						_	1					-	-		-

### **Alternative C-4**

MTY ID									_	-		Classic Sche	tule Layout										31	1-012-24 10
	Activity Name	Duration 2	Duration	William 1	Start	Finish	July 2025	A	S JOI 12	0	1200	1230	12201	1200	March 2	226 April 202	6 May 2026	June 2026	July 2026	A I	S C t O	0	N 1222	D
MLGW	ALT-4 MLGW #	400	400	D'W 4	01-J.425A	11-Jan-27					1-0-0		(Hala) A	1200	1								11-1-1-	
A0800	PED	347	347	100%	01-JUI-25	29-Oct-26	_			-	_	1	_	_	4	1	-		1	1	1	F	ED	
A0900	Award	13	13	100%	30-06-26	18-Nov-26			_	1		1				1	1	Ŷ		1	1		Awar	d
A1000	Mobilization	6	0	100%	18-Nov-26	25-Nov-26																1	M IN	oblization
A1010	Storm Water	2	0	100%	30-Nov-26	01-Dec-26																		Storm Wat
A1011	Clearing	2	0	100%	02-Dec-26	03-Dec-26																	-	Gearing
A1020	Stripping	1	0	100%	04-Dec-26	04-Dec-26																	- G	Stroping
01040	Temp Amage Road	ß	0	LOOPA I	07-Dec-26	14.000.04								1			1							Terror
A1050	30°CMP	5	0	100%	08-Dec-26	14-Dec-26																		300
A1060	Bank Stabilization	7	0	100%	18.Dec.26	20.000.25																		
A1080	Fil	A	0	100%	20.Dec.26	M. lan. 27																·····		-
A1081	Fetablish Torf	-4	0	100%	23-060-20	040dir27								1.0										
A 1001	Establish fun			17.58	04-08/1-27	11 Jan 27																		
Aluan	Demountation	1 4	1	17:00/1	00.0811-2/	115000527																		

**Appendix C: Cost Engineering** 

Appendix C-B PED

### MLGW 1613 TOWER STUDY Feasibility (Alternatives) Abbreviated Risk Analysis

Meeting Date: 15-Mar-24

Risk Level Very Lik Like Pos

Risk Element	Feature of Work	Concerns Pull Down Tab (ENABLE MACROS THRU TRUST CENTER) (Choose ALL that apply)	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Likelihood	Impact	Risk Leve
Project	Scope Growth				1		I
					Max Pol	ential Cost Growth	75
PS-1	Utilities (for Tower Relocation)	Project accomplish intent?	Potential for scope growth, added features and quantities?     Project accomplish intern?	MLOW moving the tower would likely cause MQLW to add design modifications or aquire ROW to increase span across the riverfrom other tower. The risk of the tower billing into the water will be removed and utility service will remain	Likely	Negligible	1
PS-2	Mob & Demob	Potential for scope growth, added features and quantities?	Potential for scope growth, added features and quantities?	Scope growth is possible but marginal. Risk is minimized by building mob and demok requirements into the contract, for example the contract would call on contractors to fix ruts. Due to current site contractions at time of contraction, may require construction of temporary cubert across drainage dich. PDT anticipates a gravel road that would be sufficient for construction material access. PDT committed to writter tree clearining in lieu of bat surveys.	Possible	Marginal	1
PS-3	Storm Water Polution Prevention	Water care and diversion fully understood, planned?	• Water care and diversion fully understood, planned?	Minimal risk to storm water pollution. Sit fence can be installed around primary construction area.	Possible	Marginal	1
PS-4	Stripping	Design confidence?	Design confidence?	No concerns with stripping for access road or construction footprint.	Unlikely	Negligible	0
PS-5	Temp Access Road	<ul> <li>Potential for scope growth, added features and quantities?</li> </ul>	Potential for scope growth, added features and quantities?	PDT has good working relationship with MLGW and Wolf River so there is little to no concern about access. USACE could save money if all or some of the access road was left in pirace.	Unlikely	Marginal	0
PS-6	Bank Stabilization 300'	Design confidence?	Project accomplish intent?     Ossign confidence?	Riprap armoring of the bank sufficiently stabilizes the bank (to protect the utility service). Though risk of bank failure is possible, at present, the PDT has confidence in the feasibility level of design. Riprap armor of bank is commonly used thank stabilization measure.	Possible	Crisis	4
PS-7	Fill (12" Topsoil)	<ul> <li>Potential for scope growth, added features and quantities?</li> </ul>	Potential for scope growth, added features and quantities?		Unlikely	Marginal	0
PS-8	30° CMP (Corrugated Meta Pipe)	I • Design confidence?	• Water care and diversion fully understood, planned? • Design contidence?	Corrugated metal pipe may be needed temporarily during mobilemeta/construction.	Unlikely	Marginal	0
PS-9	Environmental Mitigation	Potential for scope growth, added features and quantities?	Potential for scope growth, added features and quantities?	If winter tree clearing can not be done then a bat survey would need to be done and would add time to the project and the schedule would grow	Possible	Marginal	1
PS-10	0				Unlikely	Negligible	0
PS-11	0				Unlikely	Negligible	0
PS-12	Remaining Construction Items	Potential for scope growth, added features and quantities?			Unlikely	Marginal	0
PS-13	Planning, Engineering, & Design	Design confidence?	• Design confidence?	PDT using recent survey and existing HEC-RAS H8H model of stream flow. PDT is confident 35% design concept during feasibility phase. PDT has access to the data needed to create 95% design level needed for PED. Risk of PED cost and schedule expansion is unlikely.	Unlikely	Marginal	0
PS-14	Construction Management	Potential for scope growth, added features and quantities?			Unlikely	Marginal	0

Acquisit	on Strategy						
					Max Pot	ential Cost Growth	30%
AS-1	Utilities (for Tower Relocation)	High-risk acquisition limits competition, design/build?	• Requirement for subcontracting? • High-fielt acquisition limits competition, design/build?	The contract has to be done with MLGW which could lead to unlorseen scheduling and result in delayed completion.	Possible	Significant	2
AS-2	Mob & Demob	• Ba or small business likely?			Unlikely	Marginal	0
15.2	Storm Water Polution	• 9 oc email business likely?			Unlikely	Marginal	
45-4	Stripping	• Ra or small business likely?			Unlikely	Marginal	0
AS-5	Temp Access Road	• Ba or small business likely?			Unlikely	Marginal	0
AS-6	Bank Stabilization 300'	• 8a or small business likely?			Unlikely	Marginal	0
45-7	Fill (12° Toosoil)	• Ra or small husiness likely?			Unlikely	Marginal	0
AS-8	30° CMP (Corrugated Metal Pipe)	<ul> <li>High-risk acquisition limits competition, design/build?</li> </ul>	- High-fisk acquisition limits competition, design/build?	Due to past Could experience with limited availability of some construction items, PDT vanted to note that acquisition of this item could be a possible risk	Unlikely	Marginal	0
AS-9	Environmental Mitigation	Accelerated schedule or harsh weather schedule?	Accelerated schedule or hash weather schedule?	If Mitigation credits are not available then the USACE would need to purchase land for mitigation	Unlikely	Significant	1
AS-10	0				Unlikely	Negligible	0
AS-11	0				Unlikely	Negligible	0
AS-12	Remaining Construction	• 8a or small business likely?		No issues are anticipATED FOR ANY OTHER ITEMS	Unlikely	Marginal	0
AS-13	Planning, Engineering, & Design	• 8a or small business likely?			Unlikely	Marginal	0
AS-14	- Construction Management	• Sa or small business likely?			Unlikely	Marginal	0

Constr	uction Bements						1.00
_		1			Hax Poter	Hall Coll Growth	26%
684	Jiën de line Reference	-Specific approximation and a second se	-leigh Bir or congles contraction simplem, site acress, in-admit -congle construction methods ( -cSpecial-gaptiment or subcontraction needed)	NLCDS will be required in for the exception of the second binding the town what the challenging care to the comparativity of design ( ) where takes without any of control takes. This was done construction during the se- typically do not inte	CATRONY	Sphan	1
cs.e	Non & Carnon	- Nigh BA in Longias construition advanta, site access, to-sated	-righ for in conjunt contraction methods, the spaces, in-stract	Uncertainty with how the expensional will be reasoned (if excess used days, in case association without models construct the differency from a weight of solid if used is permanent where the dischar, character area where the delign)	Lationaly	tang Apitan	
SE4	Rom Nation Polation Polatisk	•W sey care and devices parts	-Water Care And Development	000 <sup>12</sup> should be typical to shore is done in other MMM proposit. Once disct constang is confirmed the likelihood and repart would be possible and wybecline	Presides	Margana	1
CE4	ansung	» Accelerated schedule of batch weather schedule		Stagenge with the typical to what is down in other Mintel property.	contrainy	News	
CEE	Teny Access State	sligh &k or torigie contuctor elevent, sin actus, to graft	Vi arream and display (see) right for an angular construction showing the grant in-array.	The empirical access much a selectly advest and in the best pathon complete constantion Wenne possible Air Condinating during birthing and harvesting.	Livendy	Tessigilie	
054	Gaves Stabilization 300'	<ul> <li>high isk av complex construction animeter, sile branks, hvandel?</li> </ul>	- Migh BA or Son god construction standards, into a const. In-later?	This construction will be received in a high willings grower law so exits care wit much so discrete shears placing a page. These is now a new of fooding or high worker instruming the construction.	Previde	Spline	2
(27	FBICT2 <sup>®</sup> Topole	- Chillips contraction institude?	- Langue construction methods ?	Ethinis is not arough restantial in the obst Oscon (storage under a night mode in the localized rengity also be under "Aropations Serings" :	Paulte	Marginal	+
csa	Dir CMP CosugeedMees	-W alex Care and Glevision plan?	-15 day care watched any fact	Term is sets? If the seal technical performant body and stop will be	Las Budy	Meginal	•
cze	Deretrifaces a Mitigadón	- Protected for Landow dates in with a terminal of cases of	e Promovinal. The science of the re-scientific address and science of the	Final skills to construct during the same than only notified addressed - semitianities excitent a collection.	Unitedy	Syntan	1
0640	0				General	<b>Negligite</b>	0
ce.41	0-				Chilling,	Neg gain	0
CE-42	Fem aiking Construction teme	• Accelerated schedule or batch weather schedule?		No. Alter construction here a second print	Christopy	Pagestin	0
CE45	Patring Engineering & Design	• Picture side for June togetion in indiffurence and counted	- Proversed for construction in Solification and control f	Terris In of decay to catry block-due with coat was it is	Passes	Magna	4
	Country from Management	- Unione Accests - State markhold 7		Construction around a high velocity lower and line may cause difficulties,	Paretas	Negea	

Quantit	es for Current Scope		-				_
	Т	1	1	1	Max Pot	ential Cost Growth	20%
Q-1	Utilities (for Tower Relocation)	Sufficient investigations to develop quantities?	Level of confidence based on design and assumptions?     Sufficient investigations to develop quantities?	MLGW hasn't considered the inflation cost to relocate the tower and the cost to relocate may be much higher than the provided estimate. Additional ROW would likely be required for this option. Adding disturbes area and increasing clearing and seeding quantities.	Likely	Marginal	2
Q-2	Mob & Demob	Level of confidence based on design and     assumptions?	Level of confidence based on design and assumptions?	No issues are anticipated at this time	Unlikely	Marginal	0
Q-3	Storm Water Polution	<ul> <li>Possibility for increased quantities due to loss, waste, or subsidence?</li> </ul>	Possibility for increased quantities due to loss, waste, or subsidence?	Additional clearing may require additional silt fencing	Possible	Negligible	0
Q-4	Stripping	Sufficient investigations to develop quantities?	Level of confidence based on design and assumptions?     Sufficient investigations to develop quantities?	Boring data may reveal more than 3" of top soil need to be removed. This would increase the stripping quantity for the temporary access road.	Possible	Negligible	0
Q-5	Temp Access Road	Level of confidence based on design and assumptions?	Level of confidence based on design and assumptions?	MLGW may request a different route, this could alter gantities.	Possible	Negligible	0
Q-6	Bank Stabilization 300	<ul> <li>Sufficient investigations to develop quantities?</li> </ul>	Possibility for increased quantities due to loss, waste, or subsidence?     Sufficient investigations to develop quantities?	There is potential for loss during placement. May depend on construction season. Updated survey obtained could show greater bank erosion causing increase in bedding stone and riprap quantities.	Possible	Marginal	1
Q-7	Fill (12" Topsoil)	Possibility for increased quantities due to loss, waste, or subsidence?	Possibility for increased quantities due to loss, waste, or subsidence?	Will largely depends on water surface elevation at the time of construction. Slope estimated for pre 35% plans estimate. At this time the amount of fill needed is difficult to quantify.	Likely	Negligible	1
Q-8	30" CMP (Corrugated Metal Pipe)	Level of confidence based on design and assumptions?	<ul> <li>Sufficient investigations to develop quantities?</li> <li>Level of confidence based on design and assumptions?</li> </ul>	Depending on future investigations and data a culvert may not be needed during construction. Gravel or aggregate could be used instead of a culvert.	Likely	Negligible	1
Q-9	Environmental Mitigation	<ul> <li>Sufficient investigations to develop quantities?</li> </ul>	Sufficient investigations to develop quantities?	There is a possibility for the scope to grow to different construction periods equiring modifications	Unlikely	Significant	1
Q-10	0				Unlikely	Negligible	0
Q-11	0				Unlikely	Negligible	0
Q-12	Remaining Construction Items	Sufficient investigations to develop quantities?	Sufficient investigations to develop quantities?	Updated survey could reveal greater erosion than assumed. May increase quantities	Possible	Negligible	0
Q-13	Planning, Engineering, & Design	<ul> <li>Sufficient investigations to develop quantities?</li> </ul>	Level of confidence based on design and assumptions?     Sufficient investigations to develop quantities?	Quantities could change as the design progresses. Due to H&H analysis, Geotech report and/or updated survey data.	Possible	Marginal	1
Q-14	Construction Management	Level of confidence based on design and assumptions?	Level of confidence based on design and assumptions?	Increase in quantities could move the schedule right. Major increase not	Possible	Negligible	0

Specialt	y Fabrication or Equip	oment					
					Max Pot	ential Cost Growth	75%
FE-1	Utilities (for Tower Relocation)	Confidence in contractor's ability to install?		No utilities are expected to impact alternatives 1 and 2	Unlikely	Negligible	0
FE-2	Mob & Demob	Confidence in contractor's ability to install?		No special equipment will be utilized for alt 1 and 2	Unlikely	Marginal	0
FE-3	Storm Water Polution Prevention	Confidence in contractor's ability to install?		No special equipment will be utilized for alt 1 and 2	Unlikely	Negligible	0
FE-4	Stripping	Confidence in suppliers' ability?		No special equipment will be utilized for alt 1 and 2	Unlikely	Negligible	0
FE-5	Temp Access Road	Confidence in contractor's ability to install?		No special equipment will be utilized for alt 1 and 2	Unlikely	Negligible	0
FE-6	Bank Stabilization 300'	Confidence in contractor's ability to install?	Confidence in contractor's ability to install?	The risk will be with the contractors competence in installing the stone correctly on the bank and toe.	Possible	Marginal	1
FE-7	Fill (12" Topsoil)	Confidence in contractor's ability to install?	Confidence in contractor's ability to install?	The risk will be with the contractors competence in installing the soil correctly on the bank and insuring that the seeding is growing properly.	Possible	Negligible	0
FE-8	30" CMP (Corrugated Metal Pipe)	Confidence in suppliers' ability?		No specialized equipment or fabrication is needed	Unlikely	Marginal	0
FE-9	Environmental Mitigation		None are expected for this job	No special construction is expected	Unlikely	Negligible	0
FE-10	0				Unlikely	Negligible	0
FE-11	0				Unlikely	Negligible	0
FE-12	Remaining Construction Items	Confidence in contractor's ability to install?		No other construction needs any specialized fabrication or equipment	Unlikely	Negligible	0
FE-13	Planning, Engineering, & Design	Confidence in contractor's ability to install?	Confidence in contractor's ability to install?		Unlikely	Marginal	0
FE-14	Construction Management	Confidence in contractor's ability to install?	Confidence in contractor's ability to install?	The placement of the 12° fill and the Rip Rap will be the only challenging fabrication but it is considered within the abilities of any well equiped competent general contractor	Unlikely	Significant	1

		a			Max Pot	tentia / Cost Growth	2
Q-1	Utilities for Towar Reactation)	Sufficient investigations to device quantities ?	Lake of conference based on design and assumptions?     Sufficient investigations to develop quantilies?	MLEXW naish's considered the inflation cost to resocate the tower and the cost to relocate may be much reporting the powledd definities. Additional RCW would finally be required to this option. Adding disturbes area and increasing dearing and seecing quantities.	Likely	Marginal	
0.2	Mab & Demab	Lovel of confluence based on design and assumptions?	Lave of confidence based on design and assumptions?	Noissuas are artiliopated at this time	Unitedy	Marginal	
2-3	Stam Water Pouser Prevention	Possibility for increased quart bias due to loss,     active, or subsidiance?	• Passibility for increased quartities que to loss, waster, or subsidence?	Additional dealing may require additional silt fanding	Possible	Negligble	
н.	Stroping	Sufficient investigations to develop quartities 7	Law of confidence based on design and assumptions?     Sufficient investigations to device ouanities?	Boting data may revisal more than 3° of top soil need to be temoved. This would increase the strigging quartity for the temporary access read.	Possible	Noglighte	
15	Tamo Accass Road	<ul> <li>Lavel of confidence basic on design and assumptions?</li> </ul>	Lavei of confidence based on design and assumptions?	MLGW may request a different route, this could after cartities.	Possible	Nogligble	
6	Bank Stabilization 300	Sufficient investigations to develop quantities 7	Passbilly for independ quartilies due to loss, waste, or subsidence?     Sufficient investigations to device quartities?	There is potential for loss during placement. May depend on construction season, Updated survey obtained could show greater bank ensilon causing increase in bedding stone and fiprap quantities.	Possible	Marginal	
4	Fil (12 Topsoil)	Possibility for increased quartities due to loss,     weake, or subsidence?	- Passbilly for indecsed quartities due to loss, weste, or subsidence?	Will singly depends on water surface severion at the time of construction. Side estimated by pre 30% plans estimate. At this time the amount of 51 nearood is officul to quartify.	Likely	Negligible	
8	30° CMP (Conjugated Mata) Pilot	Lavel of confluence based on design and assumptions?	Sufficient investigations to develop quantities?     Level of confidence based on design and assumptions?	Depending on future investigations and cate, a curvert may not be needed during construction. Gravel or appropriate could be used instead of a curvert.	Likely	Negligble	
0	Environmenta Mitication	Sufficient Investigations to develop quartities 7	Sufficient investigations to davage quantities?	There is a possibility for the scope to grow to different construction periods equiring modifications	Unitely	Significant	
10	0				Unlikely	Negligible	
H.	0				Unitely	Negligible	
12	Remaining Construction	Sufficient investigations to develop quantities 7	- Sufficient investigations to davidop quantities?	Updated survey could reveal greater encion then assumed. May increase outrities	Passible	Negligible	
-13	Piamino, Encincating & Dasion	Sufficient investigations to develop quartities 7	Laker of confidence based on design and assumptions?     Sufficient investigations to device quantities?	Quantities could change as the coston progresses. Que to H&H graysis, Gediach rabort and/or upgibed suney casts.	Possible	Marginal	
	Contactor Harmond	Lovel of confidence based on design and assumptions?	<ul> <li>Last of confidence bacagi on data in two and and and and</li> </ul>	increase in quartities cauld make the schedule right. Major increase not	Passible	Negigible	

Specia	ity Fabrication or Equip	oment			Max Po	tentia I Cost Growth	75
FE-1	Utilities (for Towar Relaciation)	• Confidence in contractions ability to install 7		Noutilities are expected to impact attemptives 1 and 2	Unitely	Nagligible	0
PE-2	Mab & Demab	• Confidence in contractor's ability to install?		No special equipment will be utilized for all Tanc 2	Unitely	Marginal	0
P6-3	Stam Wister Pousion Prevention	• Gorfdonce in contractor's quility to install?		No special equipment will be utilized for all 1 and 2	Unliefy	Negligble	0
FE4	Stroong	•Corfdence in suppliers' ability?		Nosbacial acubment will be utilized for alt 1 and 2	Unliefy	Nogligible	0
P6-5	Temo Access Road	• Confidence in contractor's ability to install?		No special reultiment will be utilized for alls 1 and 2	Uhildy	Negligble	ō
FE-6	Bank Stabilization 300	• Confidence in contractor's ability to install?	Configence in contractors ability to install?	The risk will be with the contractions competence in Installing the stone connectly on the bank anglos.	Passible	Marginal	1
FI5-7	Fil (12 Topsoit	•Confidence in contractor's delity to install?	Centremole in contractor's colify to instan?	The risk will be with the contractions compatence in installing the soll correctly on the tank and insuring that the seeding is growing property.	Possible	Negligible	0
F6-8	30° CMP (Corrugated Matal Pilod	•Confidence in suppliers' ability?		No spatialized equilament or tapitization is needed	Unitely	Margina)	0
PE-0	Environmenta Milipation		None ars expected for this jap	Nosbacial construction is expective	UnBely	Negligible	0
FE-10	0				Unitely	Negligible	0
FE-11	0				Unillely	Nogigitio	0
FI5-12	Ramaining Construction tams	Confidence in contractor's ability to install?		Noother construction needs any specialized facilitation or equipment	Unitedy	Negligible	0
FB-13	Picimina, Enginearing & Dasion	•Configurace in contractor's ability to install?	Conference in contractor's ability to install?		Unitely	Merginal	0
FE-14	Construction Management	Confidence in contractor's ability to install?	Conference in contractor's ability to install?	The placement of the 12 fill and the Rp Rap will be the only challenging tap/cation but it is considered within the abilities of any well equiped competent general contractor	Unliely	Significant	1
Cost E stimate Assumptions			Wax Po	tentual Cost Growth	3.6%		
----------------------------	------------------------------------	---	---	---	---------	-------------	---
6141	Cliffic (Xe Towner Netocal Inni	• Lack confidence on militai coa termo?		These are no officially impacting alternative ? and 2 is the prevant Poresian no complications are expected.	Unkey	Marginia	
C1-2	Mile & Demole	• Site accessibility, invespori delaya, congesticut?	• Site accessibility, tamportanisy a, congrestian?	The treat of communication to the back shabitation down not require any spectrative equation into a large quantity to comprise the conduction and therine no major complications are separated.	Uskey	Morginal	0
cia.	Elare Wake Publics Presentes	• Lack confidence on critical cost (terms?		No converse with Storm were for some small or construction isotypic	Unitely	Nachabie	0
CH	Statutes	r Lask confidence in critical cost tierre?		na concerne with Singping for access road on construction fedgrant.	Uskoy	Morpha	0
C16	There Access the	• Sie acometelly, transport delays, uneganitad?	• The field if y and increases of key spaces? • Site acts web if y, the report decay a, strepetities?	Any respect on the coat wit be with any weature of the coal of meteries and damage of great in the soul	Possibe	Morpha	1
C14	Bank Statebraken 300	Site accessibility, inansport delays, comparison?	- Photohild y and method of boy quality? • Sale accessibility, intersport delays, compaction ?	Any impact on the cost will be with any vehicles of the cost of material and densary of the Hip Flap for the bank alabets alon	Poiside	Morgina	1
CH	Fe d2 Topets	- Assamptions mighting them productedly, cardiana?	• As surgitors regarding trees, productivity, overtime?	The land of construction for the back elaboration does not require any spectration equipment room lange question is complete the control data and there no maps complete lange as separate	Unitely	Significant	1
C 1-8	37° CMP (Conspired Metal Pipel	r Lack conidance or critical cost (terms?	<ul> <li>Stills accountability, theraport dolay a, compaction?</li> <li>Lack confidence on activation forms?</li> </ul>	Any impact the completion of the outwal will be a variation in the material case and any completions in the definity.	Possibe	Marpina	
CHR	Environmental Militarian	e Lack combanza on minal zoa tama?	• Gack confidence un entrot cost dans?	Plancifina chance for the need of additionel construction there each as a cofering.	Unitedy	Significant	1
C 8-10	0				Unitely	Nediable	0
6411	0				Unitely	Nedigbio	
C1-12	Nerselling Construction	• Lack confidence on critical cell terms?		Ro concerns de seen at Dira lana	Unitoy	Nediable	0
643	Permit, Dignating & Design	<ul> <li>Resultspaces which to preve set out-contractor methods is contractor?</li> </ul>		The least of comminaction to the back six bibliotion does not require any special and equipment into a large quentity to complete the counterbox and the fire or engine complications are argued ed.	Unitery	Marginia	0
C1-14	Construction Management	- Lask combines to other call liams?		This level of construction, by the brack stabilization states not measure any special and readyment in one languigation of the compose the construction and therefore normal constructions are exercised.	Unitely	Marginal	

Externa	l Project Risks						
					Max Po	tential Cost Growth	40%
EX-1	Utilities (for Tower Relocation)	<ul> <li>Potential for market volatility impacting competition, pricing?</li> </ul>	<ul> <li>Unanticipated inflations in fuel, key materials?</li> <li>Political influences, lack of support, obstacles?</li> <li>Potential for market volatility impacting competition, pricing?</li> </ul>	There could be difficulties in obtaining Right-Of-Way for the site. The landowners willingness to sell or not.	Likely	Marginal	2
EX-2	Mob & Demob	Unanticipated inflations in fuel, key materials?	Unanticipated inflations in fuel, key materials?		Possible	Negligible	0
EX-3	Storm Water Polution Prevention	Potential for severe adverse weather?	Potential for severe adverse weather?	Severe flooding could impact construction and schedule	Possible	Negligible	0
EX-4	Stripping	Potential for severe adverse weather?			Unlikely	Marginal	0
EX-5	Temp Access Road	Political influences, lack of support, obstacles?	Unanticipated inflations in fuel, key materials?     Political influences, lack of support, obstacles?	Concern for lack of support from the local farm owner and Wolf River Conservancy	Possible	Marginal	1
EX-6	Bank Stabilization 300'	Potential for severe adverse weather?	Unanticipated inflations in fuel, key materials?     Potential for severe adverse weather?	Adverse weather could remove the bank protection	Possible	Significant	2
EX-7	Fill (12" Topsoil)	Political influences, lack of support, obstacles?	<ul> <li>Potential for severe adverse weather?</li> <li>Political influences, lack of support, obstacles?</li> </ul>	There is a chance that the maintenance of the seeding on the fill will not insure that it becomes established. There is a chance that if a borrow area will be needed an agreement will have to be made with the local land owner.	Possible	Marginal	1
EX-8	30" CMP (Corrugated Metal Pipe)	Unanticipated inflations in fuel, key materials?	Unanticipated inflations in fuel, key materials?		Unlikely	Marginal	0
EX-9	Environmental Mitigation	Political influences, lack of support, obstacles?	<ul> <li>Potential for severe adverse weather?</li> <li>Political influences, lack of support, obstacles?</li> </ul>	Possible impact from weather delays causing project growth and difficulty obtaining mitigation credits	Unlikely	Significant	1
EX-10	0				Unlikely	Negligible	0
EX-11	0				Unlikely	Negligible	0
EX-12	Remaining Construction	Potential for severe adverse weather?		No other construction items are considered at risk	Unlikely	Negligible	0
EX-13	Planning, Engineering, & Design	Political influences, lack of support, obstacles?			Unlikely	Negligible	0
EX-14	Construction Management	Potential for severe adverse weather?	Potential for severe adverse weather?	Could cause a delay to the schedule	Possible	Negligible	0

# **Appendix C: Cost Engineering**

# Appendix C-D LERRDs

Abbreviated Risk Analysis

Project (less than \$40M): MLGW 1613 TOWER STUDY Project Development Stage: Feasibility (Alternatives) Risk Category: Moderate Risk: Typical Project or Possible Life Safety

Total Construction Contract Cost = \$ 2,670,000

CWWBS	Feature of Work	<u>C</u>	ontract Cost		% Contingency	<u>\$ C</u>	ontingency	<u>Total</u>
01 LANDS AND DAMAGES	Real Estate				20.00%	\$	- \$	
02 RELOCATIONS	Utilities (for Tower Relocation)	\$	2,670,000		24.90%	\$	664,756 \$	3,334,755.90
					0.00%	\$	- \$	-
					0.00%	\$	- \$	-
					0.00%	\$	- \$	
					0.00%	\$	- \$	-
					0.00%	\$	- \$	-
					0.00%	\$	- \$	-
					0.00%	\$	- \$	-
					0.00%	\$	- \$	
					0.00%	\$	- \$	-
					0.00%	\$	- \$	
	Remaining Construction Items	\$		0.0%	0.00%	\$	- \$	-
30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	Ŧ			0.00%	\$	- \$	-
31 CONSTRUCTION MANAGEMENT	Construction Management				0.00%	\$	- \$	
	Totals Real Estatı Total Construction Estimatı Total Planning, Engineering & Desig	e \$ e \$ n \$	2,670,000		0.00% 24.90% 0.00%	\$ \$ \$	- \$ 664,756 \$ - \$	3,334,756
	Total Construction Managemen Tota	1\$ 1\$	2,670,000		0.00%	\$	- \$ 664,756 \$	3,334,756

#### Abbreviated Risk Analysis

Project (less than \$40M): MLGW 1613 TOWER STUDY ALT-2 Project Development Stage: Feasibility (Alternatives) Risk Category: Moderate Risk: Typical Project or Possible Life Safety

Total Construction Contract Cost = \$ 779,200

CWWBS	Feature of Work	Contract Cost

	01 LANDS AND DAMAGES	Real Estate		
1				
2	16 BANK STABILIZATION	Mob & Demob	\$ 142,820	
3	16 BANK STABILIZATION	Storm Water Polution Prevention	\$ 17,939	
4	16 BANK STABILIZATION	Stripping	\$ 3,690	
5	16 BANK STABILIZATION	Temp Access Road	\$ 87,235	
6	16 BANK STABILIZATION	Bank Stabilization 300'	\$ 481,416	
7	15 FLOODWAY CONTROL AND DIVERSION STRUCTURES	30" CMP (Corrugated Metal Pipe)	\$ 8,101	
8	16 BANK STABILIZATION	Environmental Mitigation	\$ 38,000	
9				
10				
11				
12		Remaining Construction Items	\$ - 0	).0
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ 310,745	
14	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ 105,036	

Totals	
Real Estate	\$ -
Total Construction Estimate	\$ 779,200
Total Planning, Engineering & Design	\$ 310,745
Total Construction Management	\$ 105,036
Total	\$ 1,194,982

#### Abbreviated Risk Analysis

Project (less than \$40M): MLGW 1613 TOWER STUDY ALT-4 Project Development Stage: Feasibility (Alternatives) Risk Category: Moderate Risk: Typical Project or Possible Life Safety

Total Construction Contract Cost = \$ 793,307

	CWWBS	Feature of Work	<u>C</u>	ontract Cost		% Contingency	<u>\$</u>	Contingency	<u>Total</u>
	01 LANDS AND DAMAGES	Real Estate				20.00%	\$	-	\$ -
1						0.00%	\$	-	\$ -
2	16 BANK STABILIZATION	Mob & Demob	\$	142,866		9.37%	\$	13,389	\$ 156,254.96
3	16 BANK STABILIZATION	Storm Water Polution Prevention	\$	17,945		11.28%	\$	2,023	\$ 19,968.65
4	16 BANK STABILIZATION	Stripping	\$	3,691		7.00%	\$	258	\$ 3,949.24
5	16 BANK STABILIZATION	Temp Access Road	\$	87,261		11.13%	\$	9,710	\$ 96,970.92
6	16 BANK STABILIZATION	Bank Stabilization 300'	\$	481,573		52.85%	\$	254,520	\$ 736,093.72
7	16 BANK STABILIZATION	Fill (12" Topsoil)	\$	13,867		14.85%	\$	2,059	\$ 15,926.46
8	15 FLOODWAY CONTROL AND DIVERSION STRUCTURES	30" CMP (Corrugated Metal Pipe)	\$	8,103		10.86%	\$	880	\$ 8,982.99
9	18 CULTURAL RESOURCE PRESERVATION	Environmental Mitigation	\$	38,000		19.20%	\$	7,295	\$ 45,295.03
10						0.00%	\$	-	\$ -
11						0.00%	\$	-	\$ -
12		Remaining Construction Items	\$	-	0.0%	0.00%	\$	-	\$ -
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$	316,371		10.72%	\$	33,928	\$ 350,299.13
14	31 CONSTRUCTION MANAGEMENT	Construction Management	\$	106,938		11.28%	\$	12,057	\$ 118,995.12
		Totals							
		Real Estate	\$	-		0.00%	\$	-	\$ -
		Total Construction Estimate	\$	793,307		36.57%	\$	290,135	\$ 1,083,442
		Total Planning, Engineering & Design	\$	316,371		10.72%	\$	33,928	\$ 350,299
		Total Construction Management	\$	106,938		11.28%	\$	12,057	\$ 118,995
		Total	\$	1,216,616			\$	336,121	\$ 1,552,736



# **Appendix D: Real Estate Plan**

Wolf River Basin MLGW Tower #1613 CAP Section 14

Project Number: 487478



MEMPHIS DISTRICT

### U.S. ARMY CORPS OF ENGINEERS

#### 17-SEPTEMBER-24

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### PURPOSE OF REAL ESTATE PLAN

This Real Estate Plan (REP) presents the real estate requirements and costs for the Memphis Light Gas and Water (MLGW) Tower #1613, CAP SECTION 14 – Emergency Streambank Protection Study. The REP is tentative in nature; it is for planning purposes only and both the final real property acquisition lines and the real estate cost estimates provided are subject to change. Design optimization and feature prioritization will be performed after project authorization; therefore, this REP may be revised upon further analysis. Detailed maps for access, staging and other specifics relating to project features may not be developed until each project feature or measure undergoes more detailed design analysis. The Project Area is shown in Figure 6-1 below.



Figure 6-1. Memphis Light Gas and Water (MLGW) Tower #1613, CAP SECTION 14 – Emergency Streambank Protection Study Area

#### 1.1 PROJECT PURPOSE

The Non-Federal Sponsor (NFS) is Memphis Light, Gas and Water (MLGW) who is a municipal public works utilities provider in Memphis, TN and Shelby County.

(MLGW) has requested emergency assistance to protect major transmission lines that service most of the City of Memphis and northern Shelby County.

**<u>Objective #1:</u>** Reduce the risk of erosion and active scour on the streambank in the vicinity of the MLGW Tower #1613.

**Objective #2:** Protect the essential utility services provided MLGW Tower #1613 that proved power to a portion of the City of Memphis and northern Shelby County.

#### 1.2 PROJECT LOCATION

The study area is located 7.5 miles Northeast of Memphis, TN near Interstate 40 and State Highway 14 convergence within congressional delegation TN-09.

#### **1.3 PROJECT AUTHORITY**

Proposed action authorized under **Continuing Authorities Program (CAP) Section 14, Emergency Streambank and Shoreline Protection** in the Flood Control Act of 1946, dated 24 July 1946, Public Law 79-526, as amended.

Section 14 authority allows USACE (US Army Corps of Engineers) to study, design, and construct emergency shoreline and stream bank protection works in the interest of protecting public facilities such as utilities, bridges, roads, public buildings, sewage treatment plants, water wells, and non-profit public facilities such as churches, hospitals, and schools. Privately owned property and facilities are not eligible for protection under this authority.

Max Federal expenditure at any one site was expanded to \$10 million in WRDA 2022 Sec. 8138.

The project must be economically justified and environmentally sound.

### DESCRIPTION OF THE RECOMMENDED PLAN AND LANDS, EASEMENTS, RIGHTS-OF-WAY, RELOCATIONS, AND DISPOSAL (LERRD) SITES

# **RECOMMENDED PLAN SUMMARY**

The Recommended Plan (RP) as discussed in the main report includes placing rip rap and bedding stone along 300 Linear Feet (LF) of bank. Per USACE Guidance, the Project Delivery Team (PDT) identified the alternatives that reasonably maximize net economic benefits consistent with protecting the nation's environment.

PDT has identified a recommended plan (Alternative 2):

- 3.5 : 1 slope
- 300 LF R200 riprap along bank
- Minimum 15 LF riprap key-ins (perpendicular to bank), up- and downstream of riprap placement
- 6" bedding stone under riprap and key-ins

Attribute Type	Landowners	Estate	Acres		
Road	1	Perpetual Road Easement	.20		
Bank Stabilization (Includes Laydown Area)	3	Bank Protection Easement	2.47		
			Total	2.67	

#### Table 6-1: Real Estate Requirements

#### 2.1 ACCESS

MLGW appears to have an existing easement that was recorded in 1927 that gives them the right of ingress and egress to the maintenance of their transmission lines. This easement crosses a farm field that is leased to a farmer and owned in fee title by the Wolf River Conservancy. Records show that MLGW has 67.5 feet of right of way on both sides of their towers. A very small portion of real estate that is needed for access, falls outside of the real estate interest that MLGW acquired in 1927. The portion that falls outside of the real estate interest that MLGW acquired in 1927 is .20 acres. USACE has requested that MLGW provide documentation and any deeds that support their ownership of their existing easement. MLGW provided the deeds and legal descriptions, and our Office of Counsel has determined the deeds are legally sufficient and can be used to provide access for the project.

#### 2.2 BORROW

At this time, it does not appear borrow will be needed.

#### 2.3 DISPOSAL

At this time, it does not appear a disposal site will be needed for the project. It is assumed that the contractor will be able to excavate or dispose of material within the measure areas.

## NON-FEDERAL SPONSOR OWNED LERRD

MLGW has an existing easement that was recorded in 1927 that gives them the right of ingress and egress to the maintenance for their transmission lines. This easement crosses a farm field that is leased to a farmer and owned in fee title by the Wolf River Conservancy. Records show that MLGW has 67.5 feet of right of way on both sides of their towers. USACE requested that MLGW provide documentation and any deeds that support their ownership of this easement. MLGW provided the deeds and legal descriptions, and our Office of Counsel has determined the deeds are legally sufficient and can be used to provide access for the project.

## ESTATES

#### 4.1 ROAD EASEMENT (PERPETUAL AND TEMPORARY)

A (perpetual [exclusive] [non-exclusive] and assignable) (temporary) easement and right-ofway in, on, over and across (the land described in Schedule A) (Tracts Nos.\_\_\_\_\_\_, and\_\_\_\_\_\_) for the location, construction, operation, maintenance, alteration replacement of (a) road(s) and appurtenances thereto; together with the right to trim, cut, fell and remove therefrom all trees, underbrush, obstructions and other vegetation, structures, or obstacles within the limits of the right-of-way; (reserving, however, to the owners, their heirs and assigns, the right to cross over or under the right-of-way as access to their adjoining land at the locations indicated in Schedule B); subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

#### 4.2 BANK PROTECTION EASEMENT

A perpetual and assignable easement and right-of-way in, on, over and across the land hereinafter described for the location, construction, operation, maintenance, alteration, repair, rehabilitation and replacement of a bank protection works, and for the placement of stone, riprap and other materials for the protection of the bank against erosion; together with the continuing right to trim, cut, fell, remove and dispose therefrom all trees, underbrush, obstructions, and other vegetation; and to remove and dispose of structures or obstructions within the limits of the right-of-way; and to place thereon dredged, excavated or other fill material, to shape and grade said land to desired slopes and contour, and to prevent erosion by structural and vegetative methods and to do any other work necessary and incident to the project; together with the right of ingress and egress for such work; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however to existing easements for public roads and highways, public utilities, railroads and pipelines.

### EXISTING FEDERAL PROJECTS WITHIN LERRD REQUIRED FOR THE PROJECT

No lands that are part of an existing federal project are needed for this project.

#### FEDERALLY OWNED LANDS WITHIN LERRD REQUIRED FOR THE PROJECT

There are no Federally owned lands within the Lands, Easements, Right- of- Way, Relocations and Disposals Sites required for the project.

# FEDERAL NAVIGATION SERVITUDE

The navigation servitude is the dominant right of the Government, under the Commerce Clause of the U.S. Constitution, to use, control, and regulate the navigable waters of the United States and submerged lands thereunder. Based on the information that the PDT has provided to, the project does not meet the requirements of the Real Estate Policy for implementation of Navigation Servitude at this time.



#### **PROJECT MAPS**

Figure 6-2. Memphis Light Gas and Water (MLGW) Tower #1613, CAP SECTION 14 – Wolf River Watershed



Figure 6-3. Memphis Light Gas and Water (MLGW) Tower #1613, CAP SECTION 14 – Vicinity Map, Memphis TN



Figure 6-4. Memphis Light Gas and Water (MLGW) Tower #1613, CAP SECTION 14 – Perpetual Road Easement- Access Route from Highland Street



Figure 6-5. Memphis Light Gas and Water (MLGW) Tower #1613, CAP SECTION 14 – Bank Protection Easement adjacent to Wolf River

#### **INDUCED FLOODING**

No induced flooding is anticipated as a result of Memphis Light Gas and Water (MLGW) Tower #1613, CAP SECTION 14 – Emergency Streambank Protection Study.

# **BASELINE COST ESTIMATE**

Total real estate costs for the structural components is \$160,006. This figure encompasses the cost of acquiring real property interest, damages, LERRD administrative costs, and contingencies.

Total Administrative Cost by Government (30 Account): \$22,860

Total Administrative Cost by Sponsor: \$86,400

Total NFS COST (Includes Administrative Cost by Sponsor) (01 Account): \$160,006

## P.L. 91-646 RELOCATION ASSISTANCE BENEFITS

#### **AER STRUCTURAL**

There have not been any residential or nonresidential structures identified for the structural portion of the project that would require the application of Public Law 91-646 relocation assistance benefits.

# MINERAL ACTIVITY/CROPS

MLGW has an existing easement that was recorded in 1927 that gives them the right of ingress and egress for the maintenance of their transmission lines. This easement crosses a farm field that is leased to a farmer and owned in fee title by the Wolf River Conservancy. Records show that MLGW has 67.5 feet of right of way on both sides of their towers. We requested that MLGW provide documentation and any deeds that support their ownership of this easement. MLGW provided the deeds and legal descriptions, and our Office of Counsel has determined the deeds are legally sufficient and can be used to provide access for the project.

### NON-FEDERAL SPONSOR CAPABILITY ASSESSMENT

A capability assessment has been completed. See Exhibit A.

# ZONING ORDINANCES

According to the Shelby County, TN Zoning Atlas this area is zoned Floodway. No construction is allowed in these areas without special mitigation measures.

## **ACQUISITION SCHEDULE**

The following schedule shows the tasks and duration for acquisition of the LERRD required for the project. The acquisitions appear to affect a total of 3 landowners. This schedule is subject to change based on project refinement during planning, engineering, and design. This schedule is for preliminary planning purposes and assumes that all tracts are acquired at the same time. This schedule assumes a staff of 2 negotiators.

1.	Preliminary Investigations (i.e., HTRW, structural, surveys, etc.)	2 months
2.	Mapping	2 months
3.	Title	2 months
4.	Appraisals	2 months
5.	Negotiations and Closing	4 months
6.	Condemnation (time could overlap with negotiation and closing)	4 months
7.	LERRD Certification	2 months

Based upon this schedule, all real property interests will be acquired in 14 months, with the exception of real property interests requiring condemnation. It is assumed that all easements will be acquired simultaneously.

Negotiations, Closings, and Condemnations (if necessary) will run concurrently.

The sponsor has concurred with this schedule.

# FACILITY/ UTILITY RELOCATIONS

AER-RP: At this time, no facility/utility relocations are anticipated to be required for the AER features of the Project.

### HTRW AND OTHER ENVIRONMENTAL CONSIDERATIONS

An abridged Phase I ESA was conducted to assess the potential for HTRW materials within the proposed project footprints for each of the work items included in the EA. The abridged Phase I ESA includes the following tasks: 1) the review of HTRW state and federal databases (e.g., Resource Conservation and Recovery Act Information, Toxic Release Inventory, Superfund Enterprise Management System, Assessment, Cleanup and Redevelopment Exchange System, and state databases on underground storage tanks and hazardous waste programs, etc.) to identify RECs, and 2) site reconnaissance to determine if RECs are within the work item right-of-way (ROW). A full Phase I ESA will be performed for each work item during detailed design, and the results will be included in the final report.

# LANDOWNER ATTITUDE

The Wolf River Conservancy has verbally expressed that they support the project. There may be a portion of real estate interest that needs to be acquired from the City of Memphis and Shelby County. The City of Memphis and MLGW have a long standing, positive working relationship.

#### **RISK NOTIFICATION**

A risk notification letter has been sent to the NFS. The NFS was notified in writing about the risks associated with acquiring land before the execution of the Project Partnership Agreement and the Government's formal notice to proceed with acquisition. This risk notification letter is included below as Exhibit B.

# **OTHER REAL ESTATE ISSUES**

It is not anticipated that there will be any other real estate issues for this project.

**Prepared By:** 

**Clayton Burford** 

**Realty Specialist** 

Phillip J. Swiney

Appraiser

**Recommended By:** 

Mark Harkison

Chief of Real Estate, Memphis

# **EXHIBIT A**

# **Capability Assessment from MLGW**
#### MEMPHIS LIGHT GAS AND WATER TOWER # 1613 CAP SECTION 14 STUDY

#### ASSESSMENT OF NON-FEDERAL SPONSOR'S REAL ESTATE ACQUISITION CAPABILITY

#### 1. Legal Authority:

a. Does the sponsor have legal authority to acquire and hold title to real property for project purposes? (ves/no) YES

Article 65.- Light, Gas and Water Division

"Sec. 677. - Authority to construct, operate, etc., electric system; purchase of electricity.

The said board of Light, Gas and Water Commissioners shall have the power and authority to construct, purchase, improve, operate and maintain, within the corporate limits of the City of Memphis or elsewhere within the limits of Shelby County, an electric plant or system, including without limitation, power plants, transmission lines, substations, feeders, primary and secondary distribution lines, including turbines, engines, pumps, boilers, generators, converters, switchboards, transformers, poles, conduits, wires, cables, lamps, fixtures, accessory apparatus, buildings and lands, right-of-way and easements, and all other appurtenances usual to such plants for the purpose of furnishing electric power or energy for lighting, heating, power or any other purpose for which electric power or energy can be used; provided no such electric plant or system shall be operated within the limits of any incorporated municipality, outside the corporate limits of the City of Memphis, without the consent of the governing body of such incorporated municipality."

 Does the sponsor have the power of eminent domain for this project? (yes/no) YES, Subject to court approval

Article 65.- Light, Gas and Water Division

Sec. 684. - Right of condemnation.

[The] Memphis light, gas and water division is hereby authorized and empowered to condemn any land, easements, or rights-of-way, either on, under or above the ground, for any and all purposes in connection with the construction, operation, improvement or maintenance of said electric system, gas system, or water system. Title to such property so condemned shall be taken in the name of the City of Memphis. Such condemnation proceedings shall be pursuant to and in accordance with sections 3109—3134, inclusive, of the 1932 Code of Tennessee;\* provided, however, that where title to any property sought to be condemned is defective, it shall be divested out of all persons, firms or corporations who have, or may have, any right, title or interest thereto, and be vested by decree of court; provided, further, that the court in which any such proceedings are filed shall, upon application by [the] Memphis light, gas and water division, and upon the posting of a bond with the clerk of the court in such amount as the court may deem commensurate with the value of the property, order that the right of possession shall issue immediately or as soon and upon such terms as the court, in its discretion, may deem proper and just.

Whenever the board of Light, Gas and Water Commissioners shall deem it necessary and proper, the right of condemnation herein granted shall extend to and include the right to condemn any property devoted to another public use, whether such property was acquired by condemnation or purchase; provided, that no property devoted to another public use shall be condemned without the consent and approval of the Board of Commissioners of the City of Memphis.

 Does the sponsor have "quick-take" authority for this project? (yes/no) YES, Subject to the approval of the court in a condemnation proceeding.

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- Are any of the lands/interests in land required for the project located outside the sponsor's political boundary? (yes/no) NO
- Are any of the lands/interests in land required for the project owned by an entity whose property the sponsor cannot condemn? (yes/no) NO

#### II. Human Resource Requirements:

- a. Will the sponsor's in-house staff require training to become familiar with the real estate requirements of Federal projects including P.L. 91-646, as amended? (yes/no) NO, however we will attend a meeting with the sponsor and provide a light overview of the LERRD crediting process and requirements.
- b. If the answer to II. a. is "yes," has a reasonable plan been developed to provide such training? (yes/no)
- Does the sponsor's in-house staff have sufficient real estate acquisition experience to meet its responsibilities for the project? (yes/no) YES
- Is the sponsor's projected in-house staffing level sufficient considering its other workload, if any, and the project schedule? (yes/no) YES

- e. Can the sponsor obtain contractor support, if required in a timely fashion? (yes/no) YES
- f. Will the sponsor likely request USACE assistance in acquiring real estate? (yes/no)(If "yes," provide description) NO

#### III. Other ProjectVariables:

- a. Will the sponsor's staff be located within reasonable proximity to the project site? (yes/no) YES, 220 S. Main Street, Memphis, TN 38103
- b. Has the sponsor approved the project/real estate schedule/milestones? (yes/no) YES

#### IV. Overall Assessment:

- a. Has the sponsor performed satisfactorily on other USACE projects? (yes/no/not applicable) Not Applicable
- **b.** With regard to this project, the sponsor is anticipated to be highly capable/fully capable/moderately capable/marginally capable/ insufficiently capable. (If sponsor is believed to be "insufficiently capable," provide explanation) Fully Capable

#### v. <u>Coordination</u>:

- a. Has this assessment been coordinated with the sponsor? (yes/no) YES
- **b**. Does the sponsor concur with this assessment? (yes/no) (If "no," provide explanation) NO- The NFS stated that final plans will be needed before MLGW will agree to the acquisition timeline.

#### Prepared by:

BURFORD.CLAYTON. BLISTORD.CLAYTONULUVE.JSHII LLOYD.1380560336 Sevise Date: 300 A R. ISBNARE 17 USY

Clayton Burford Realty Specialist

#### Reviewed and approved by:

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 Digitally signed by HARKSCH MARK DOUGLAS, ave 7507478

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 7507478

 Date: 2024.08,1709(5635:0500)

Mark Harkison Chief of Real Estate

# EXHIBIT B Risk Notification Letter



DEPARTMENT OF THE ARMY U.S. ARMY CORPS OF ENGINEERS MEMPHIS DISTRICT 167 NORTH MAIN STREET B-202. MEMPHIS, TN 38103-1894

June 17, 2024

Memphis Light, Gas and Water c/o Ms. Angel Bailey, SRWA, E&U Supervisor, Prop. Mgmt. & Survey 220 South Main Street Memphis, Tennessee 38103

#### Dear Madam:

As you are aware, the Wolf River Basin MLGW Tower #1613 CAP Section 14 Study is nearing completion. The Final Feasibility Report is scheduled to be complete in August 2024. The report contains preliminary maps, which may change once the detail design of the project is completed. For this reason, in accordance with Corps of Engineers Regulation 405-1-12, Chapter 12, Change 31 dated May 1, 1998, we are hereby formally advising you of the risks associated with acquisition of real estate rights prior to signing of the Project Partnership Agreement (PPA) and receiving a request from our agency for right of entry for construction.

Should you decide to proceed with acquisition of realty interests needed for construction of the subject project prior to the government's request for commencement of the acquisition of required right-of-way, Memphis Light, Gas and Water (MLGW) will assume full and sole responsibility for any and all costs, responsibility, or liability arising out of such efforts.

Generally, these risks include, but may not be limited to the following:

- a. Congress may not appropriate funds to construct the proposed project;
- b. The proposed project may otherwise not be funded or approved for construction;
- c. PPA mutually agreeable to MLGW and the government may not be executed and implemented;
- d. MLGW may incur liability and expense by virtue of its ownership of contaminated lands, or interests therein, whether such liability should arise out of local, state or Federal laws or regulations, including liability arising out of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended;
  - e. MLGW may acquire interests or estates that are later determined by the Government to be inappropriate, insufficient or otherwise not required for the project, thus incurring costs or expenses which may not be creditable under the provisions of Public Law 99-662 (Water Resources Development Act of 1986) or the PPA; and
- f. MLGW may initially acquire insufficient or excessive real property acreage which may result in additional negotiations and/or benefit payments under Public Law 91-646 (Uniform Relocation Assistance and Real Property

Acquisition Policies Act of 1970), as amended, as well as the payment of additional fair market value to affected landowners, which could have been avoided by delaying acquisition until the PPA execution and the government's notice to commence acquisition and performance of Land, Easements, Rights-Of-Way, Relocation, and Disposal (LERRD).

However, should you decide to proceed with acquisition of real estate interests, you are hereby notified that acquisition activities must conform to Public Law 91-646, The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. The Uniform Act describes the rights of landowners impacted by a federally funded project and the responsibilities of government agencies performing acquisition of real estate interests for such projects. Furthermore, in order to ensure that you receive the maximum possible credit once the project alignment is finalized, we suggest that you send for our review the résumé and proposed fees of your intended contractors as well as the following real estate products once completed: ownership plat and legal descriptions, appraisal reports, title reports, proposed negotiated settlements, and relocations assistance payments, if applicable.

If you have questions regarding the acquisition and crediting process, please call Clinton Blake, Realty Specialist at (901) 502-4671.

Sincerely,

Brian Johnson

Brian S. Johnson Lead Realty Specialist

CF: CEMVM-PM-P (Jason Allmon)





## Appendix E: Economics and Social Considerations Wolf River Basin MLGW Tower #1613

**CAP Section 14** 

Project Number: 487478



MEMPHIS DISTRICT U.S. ARMY CORPS OF ENGINEERS

14-MARCH-2024

#### 1. Study Area

The MLGW Tower #1613 is located in Memphis, TN. The MLGW provides services to a large portion of Memphis, TN as well as areas outside of Memphis in Shelby County, TN. The tower is located directly on a bend of the Wolf River where it is prone to streambank erosion. The tower sits approximately 14 feet away from the river. Communities near the tower include the Raleigh, Frayser, Hollywood, and Berclair areas.

## 2. Other Social Effects

## 2.1 Health and Safety

Health and safety of an individual or group is a basic human need. When an event causes concern for individuals' health, an insurmountable amount of stress is placed on them. Streambank erosion and potential collapse of MLGW's tower #1613 into the Wolf River would pose a threat to health and safety of approximately 30,000 individuals residing in the Shelby County, TN, including Memphis, TN. Electricity outages can cause households to lose power for potentially long periods of time where they may be preserving essential medication or using medical devices that require electricity. Additionally, residents that become severely injured or ill may not be able to communicate with emergency services which are listed below for the area of interest.

## 2.1.1 Emergency Services

According to 2024 Environmental Systems Research Institute (ESRI) geographic information system (GIS) data, there are 34 police stations residing in Shelby County, TN, 29 of which are located in Memphis, TN. In addition, there are 80 fire stations in Shelby County, TN and 57 of them are in Memphis, TN. There are 21 hospitals in Shelby County, TN, including 18 that are in Memphis, TN. See the figure below to see the distribution of police stations, fire stations and hospitals in Shelby County.



Figure 1: Critical Infrastructure in the Study Area

## 2.2 Social Connectedness

Social connectedness can be properly evaluated by looking at the existing programs within the area of interest. These institutions better individuals' ability to communicate and gather with others on a frequent basis to enhance their relationships.

## 2.2.1 Civic Infrastructure

According to 2024 ESRI data, within Shelby County, TN there are a total of 359 schools. 294 of those are public schools and 65 are private schools. In Memphis, TN specifically, there are 284 total schools including 239 public schools and 45 private schools. In addition to schools, there are 834 places of worship residing in Shelby County where 643 of those are located in Memphis, TN. All of these venues allow residents to gather and create personal relationships among their community.

## 2.2.2 Community Events

The city of Memphis hosts ample community events throughout the year to include individuals with varying perspectives. This allows individuals to feel a sense of belonging and develop personal relationships. Shelby County also hosts a few events outside of Memphis throughout the year.

## 2.3 Leisure & Recreation

Leisure and recreation is the time that individuals can spend participating in the activities that they enjoy. Electrical outages remove the ability to recreate safely as well as take away time that individuals can spend leisurely.

## 2.3.1 Recreational Facilities

There are 151 parks in Memphis, TN where 31 of those facilities also operate a community center. There are four additional community centers as well as 3 golf courses that individuals can use for recreation. Shelby County also offers an additional 8 parks.

## 2.4 Social Vulnerability and Environmental Justice

## 2.4.1 Social Vulnerability Index

The Center for Disease Control's (CDC) Social Vulnerability Index (SoVI) was created to identify areas that are highly socially vulnerable. The index is computed by ranking census tracts based on 15 social factors that that fall under the following four categories. Those four categories are as follows: socioeconomic status, household composition & disability, minority status & language, and housing type & transportation according to the CDC's SoVI 2018 Documentation.

Figure 5 below shows the area of interest within Memphis, TN. The two census tracts surrounding the MLGW tower #1613 are highly socially vulnerable. Census tract 205.12 which is located to the northwest of the tower has a SoVI of 0.9114 and census tract 89 which is located to the southeast of the tower has a SoVi of 0.9537. SoVI ranking is from 0 to 1, where higher values indicate greater vulnerability of an area. Overall, both of these areas directly adjacent to the tower are at a high social vulnerability.



Figure 2: Social Vulnerability Index in the Study Area

#### 2.4.2 Environmental Justice

The CEQ tool was also used per EO 14008. This tool identifies communities that are disadvantaged in one or more categories of criteria if the census tract is above the threshold for one or more environmental or climate indicators and if the census tract is above the threshold for socioeconomic indicators. The two census tracts surrounding the MLGW tower #1613 exceeded the socioeconomic, climate change, energy, health, housing, and workforce development thresholds. Similar to the CDC's SoVI, the CEQ tool concludes that the census tracts surrounding the tower experience environmental justice concerns.