OWSLEY FORK WATER QUALITY IMPACT STUDY
BIG HILL TRANSMISSION LINE CONSTRUCTION

CITY OF BEREA, KENTUCKY

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TABLE OF CONTENTS

I. INTRODUCTION **2**

II. BACKGROUND **2**

III. IMPACTS TO WATER QUALITY **3**

A. ACTIVITIES RELATED TO CONSTRUCTION *3*

B. ACTIVITES RELATED TO MAINTENANCE AND OPERATION *4*

C. OTHER CONSIDERATIONS *5*

IV. RECOMMENDATIONS **5**

V. CONCLUSIONS **6**

APPENDICES

Figure 1 - Big Hill 69 kV Transmission Line Project Study Area

Figure 2 – Cultural Resources Map

Figure 3 – Owsley Fork Reservoir Wetland Resource Map

I. INTRODUCTION

Bell Engineering, Inc. (Bell) entered into a contract with the City of Berea on December 7th, 2023 to conduct a Water Quality Impact Study at the Owsley Fork Reservoir. This agreement was triggered in response to East Kentucky Power Cooperative's (EKPC) announced plans to construct a high-voltage transmission main within the watershed boundary of the Owsley Fork Reservoir, which is the primary source of drinking water for the City of Berea and Southern Madison Water District.

The purpose of this report is to summarize the potential effects of the construction activities within the watershed and to provide recommendations to mitigate the potential negative impacts of said construction. Bell's scope of work includes the following deliverables:

- Evaluate the corridor map provided and identify potential issues that may arise during or after the construction of the proposed transmission line that could affect water quality.

- Address concerns or negative impacts that would be exacerbated if the proposed corridor were to be moved closer to Radford Hollow Road, as indicated by the red line in the attachment.

- Create a written report that specifies negative impacts that may occur to water quality during and after construction, and provide details of mitigation measures that need to be taken to prevent adverse effects on the raw water source.

- Produce a detailed map indicating where archaeological and environmental impact surveys have been conducted as part of the ongoing Owsley Fork Dam Design, with reference to the attached corridor map.

II. BACKGROUND

The Eastern Kentucky Power Cooperative has proposed the installation of a new high-voltage transmission line that would traverse select portions of southern Madison County. The outlined project area encompasses a large portion of the watershed area that provides flow into the Owsley Fork Reservoir, the principal source of drinking water for the City of Berea. This reservoir also serves as the primary water source for Southern Madison Water District, as they purchase all of their water through Berea Municipal Utilities.

The proposed project would involve the construction of a new power substation near to the intersection of Kentucky 421 and Red Lick Road, which would lessen the load on a nearby existing power substation. The Big Hill Transmission Line will be a 69-kilovolt transmission line, running for approximately 8.5 miles in Madison and Jackson Counties. Much of this proposed alignment falls within approximately 2 miles of the Owsley Fork Reservoir, as shown in the attached Figure 1. During the public comment period, a suggestion was made to move the line closer to Radford Hollow Road due to landowner concerns that the original alignment might affect the viewshed of nearby hiking areas. However, it was decided that this new

alignment would have an adverse impact on water quality in the Owsley Fork Reservoir and, hence, it is not recommended.

The project will utilize a mix of single and double pole construction, with a maximum pole to pole separation of 15 and a half feet. In addition to this pole-to-pole span, EKPC has begun pursuing easements for a 100-ft right of way along the path of the transmission line. This easement allows EKPC to clear and control trees within the right-of-way, as well as other trees that could interfere with transmission lines. Construction and clearing are slated to begin in November 2024 and are scheduled to last until June 2025.

III. IMPACTS TO WATER QUALITY

The construction and operation of a transmission line can have both short-term and long-term effects on the health of a watershed. The impact of the transmission line depends on the characteristics of the water resource and the transmission line design. Factors such as waterway usage, physical features like channel width and herbaceous plant cover, water quality, recreational use, and scenic quality are essential in assessing potential impacts.

As of July 2022, the Owsley Fork Reservoir meets or exceeds the quality limits set by its designated uses. An assessment of the waterway found that the Reservoir is in full support of Warm Water Aquatic Habitat, Secondary Contact Recreation, and use as a Domestic Water Supply. Moreover, a bathymetric survey conducted in 2015 found that sedimentation within the reservoir is occurring at a slower-than-average pace. This means that the reservoir is expected to meet its current design capacity for longer than previously expected.

The Owsley Fork Reservoir has maintained excellent quality and quantity performance due to its location in a mostly wooded and undisturbed watershed. It is anticipated that any significant disturbance of the watershed would hinder the reservoir's ability to continue performing at its current level, both in terms of quality and quantity.

A. ACTIVITIES RELATED TO CONSTRUCTION

Water quality can be affected not only by activities within a waterway but also by nearby vegetation clearing and construction activities. The removal of adjacent vegetation can cause water temperatures to rise and negatively impact aquatic habitats. It can also increase erosion of adjacent soils, causing sediment to be deposited into the waterbody, especially during rain events. During construction, temporary bridges may be built that, if not correctly installed, may damage banks and cause erosion or be overtopped or dislodged, thus backing up water.

Several potential impacts on water quality may result from the construction and operation of transmission lines and their rights-of-way. These impacts include, but are not limited to:

- Erosion caused by stripping vegetation during power line right-of-way clearance and construction. Erosion impacts are likely to be of concern, particularly in areas where forested hillsides must be logged to create a transmission right of way.

- Erosion caused by access road construction and vehicle traffic on existing and new access roads during power line operation.

- Impacts of heavy machinery operation in rivers and wetlands on water quality.
- Lubrication oil and fuel leakage and other emissions from heavy machinery used in power line construction and maintenance.
- Accidental spills and other emissions of liquids used in transmission infrastructure, including transformer oils.
- Pollution of run-off and groundwater from herbicide treatment of power-line rights-of-way, if such treatments are used.

Each of these classes of emissions and impacts can directly affect nearby plants and animals through toxic responses or changes in water availability or quality. They may also affect downstream ecosystems, as well as human and animal populations through their impacts on water quality and hydrology. These impacts can increase the quantity of sediments, sediment-borne chemicals, and chemicals from human activities carried in water. Impacts on hydrology can change the seasonal rate of flow of water in watersheds, change the way that water flows through soils, and change the quality and quantity of groundwater in specific locations.

These impacts on their own can be harmful to the health of a water body. This risk is more impactful to a drinking water source, as treatment and distribution system operation are dependent on plentiful access to good quality water. Increased pollution and sedimentation do not only affect the quantity of water available for use, but may also impact the effectiveness of treatment operations at the water treatment plant. Additionally, sedimentation within the reservoir may cause damage to equipment used to draw raw water from the reservoir, leading to the inability of the water system to access water from its primary source while repairs are made and shorten the useful life of the reservoir.

B. ACTIVITES RELATED TO MAINTENANCE AND OPERATION

It is expected that the maintenance of a high voltage transmission line will result in several effects beyond its initial construction. These include accidental spills and emissions of liquids used in transmission infrastructure, like transformer oils. Herbicide treatment of power-line rights-of-way, if used, can also pollute run-off and groundwater. Hazardous materials used in substation transformers, including oils, can contaminate the environment. Additionally, old equipment that has surpassed its useful life may need to be decommissioned or replaced. In cases where transmission facilities are upgraded or modernized to install the interconnection line, older equipment may contain PCBs (Polychlorinated Biphenyls) that, if not disposed of properly, could cause various impacts.

Much like the impacts of the initial construction, continued maintenance of the power transmission lines poses a significant continued risk to the drinking water source. Pollutants that may enter the watershed area due to continued maintenance will enter the drinking water source for the City of Berea, where they may not easily be removed by treatment processes at the water treatment plant.

C. OTHER CONSIDERATIONS

Apart from the impacts resulting from the initial construction and ongoing maintenance, there are several other negative effects that a watershed may experience from the installation of a high-voltage transmission line. One of the primary concerns is the preservation of natural health and scenic beauty in the watershed area. The installation of overhead transmission lines across or within the sight of major rivers, lakes, or streams may have a visual impact on reservoir users. This can also pose a potential collision hazard for waterfowl and other large birds, particularly when located in a migratory corridor. Recreational activities such as fishing, bird watching, sightseeing, or boating may also be negatively affected. In addition, many people may object to the construction of such infrastructure in a scenic natural area, based on the aesthetics of the region.

Another major concern is the increased risk of fire. Electric utility lines have been known to cause wildfires, especially in remote and wooded areas like the Owsley Fork Reservoir watershed. These fires can be caused by several issues such as downed power lines, contact with vegetation, and equipment failures. Kentucky has experienced more than 10,000 reported wildfires in the last decade alone, burning approximately 300,000 acres of land. Wildfires can have adverse impacts on the water quality, causing increased erosion, flooding, and introduction of debris and contaminants to the water source. These impacts could pose significant risks to the continued use of the Owsley Fork Reservoir as a water source.

Furthermore, the construction of the transmission line may negatively impact numerous cultural and historic resources in the area. Many of these sites are prehistoric and offer significant opportunities for further archaeological analysis. Figure 2 attached to this document shows the locations of these known resources in relation to the construction pathway.

IV. RECOMMENDATIONS

Construction of the Big Hill High Voltage Transmission line is expected to cause some level of erosion and sedimentation into the receiving waters of the Owsley Fork Reservoir. However, following appropriate best management practices for construction can minimize long-term impacts and reduce the levels of impairment to the water source. To avoid impairments, Bell recommends the implementation of the following strategies:

- Choose a route that avoids construction within sensitive riparian boundaries and wetland areas.
- Ensure that all construction activities comply with the most recent state guidelines for erosion and sediment control.
- Develop an erosion and sediment control plan for the construction of the facilities.
- Implement controls laid out in the Kentucky Division of Water's *Kentucky Erosion Prevention and Sediment Control Field Guide* to prevent accidental spills of fuel, oils, chemicals, concrete leachate, and sediments into aquatic habitats. This may include proper storage, use, and cleanup of all chemicals used in construction, or the installation

of sediment control features such as silt fencing, straw bales, or check dams, among others.

- Limit the clearing of vegetation to only areas necessary for the construction of the transmission line. Only remove trees and shrubs extending into the required clear area for the power lines and use vegetative ground cover wherever possible.

- Prohibit the application of pesticides in the construction area to the greatest extent possible.

- Limit grading, filling, and excavating to areas necessary for construction and limit excavation in areas within the 100-year floodplain whenever possible.

- If stream and river crossings must be installed, ensure construction activities take place only during periods of low flow.

- Deposit excavated sediments in containment areas away from potential interaction with surface water runoff for the duration of construction activities.

- Install sedimentation basins downstream of disturbed areas to limit the discharge of water high in Total Suspended Solids.

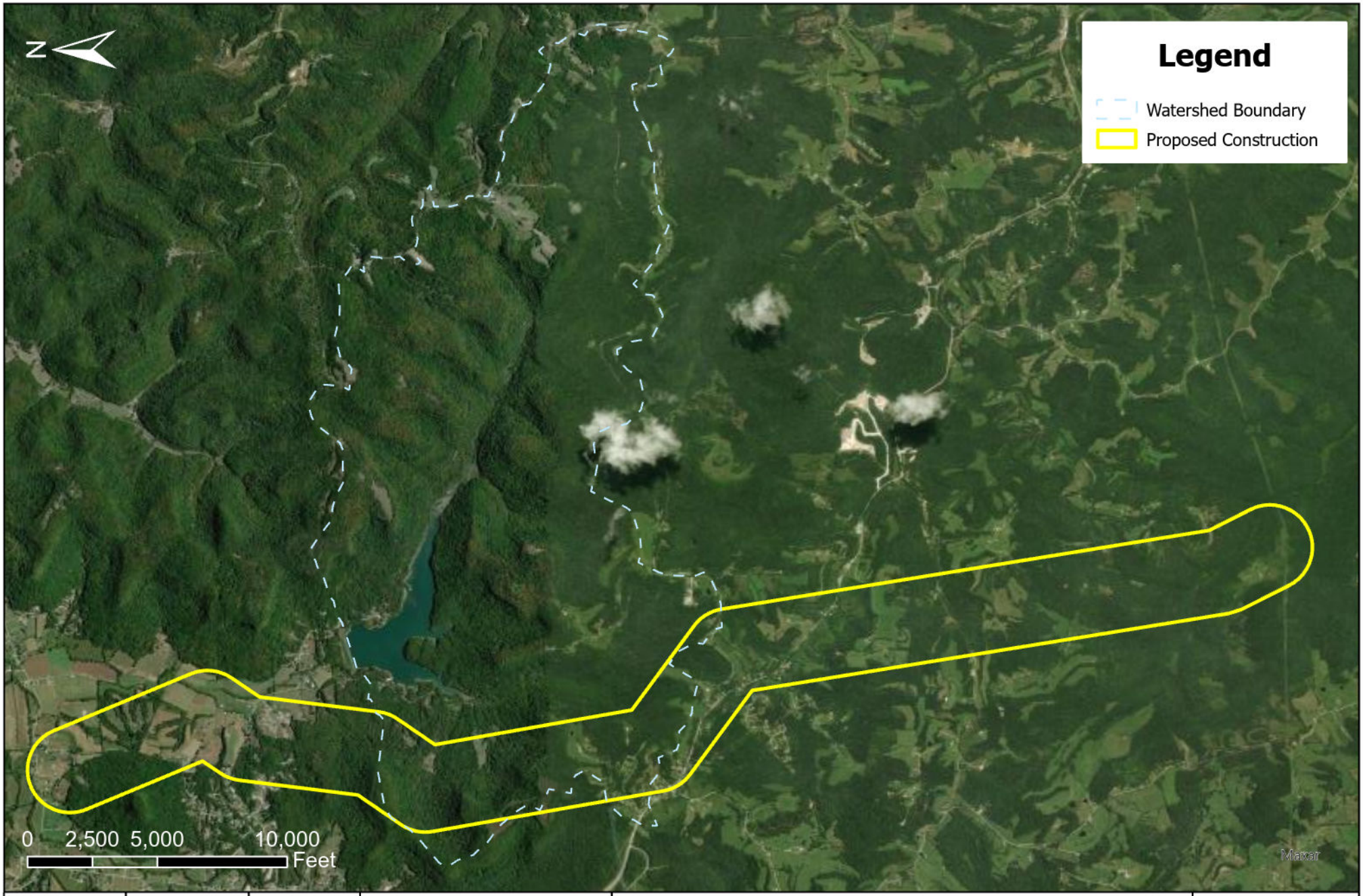
- Utilize good housekeeping procedures for the use and storage of chemicals and petroleum products used in construction.

- In areas where removal of vegetation is unavoidable, revegetate the disturbed areas with a diverse mix of native trees, shrubs, and herbaceous ground cover.

- Monitor the reservoir pre-construction, during construction, and post construction to identify changes in water quality.

V. CONCLUSIONS

The City of Berea requested Bell to conduct a Water Quality Impact Study at the Owsley Fork Reservoir in response to EKPC's proposal of building a high-voltage transmission line within the watershed boundary of the reservoir. The aim of this study was to determine if there would be any severe impacts on the quality of the reservoir due to the construction activities, as the Owsley Fork Reservoir is the primary water source for the City of Berea and Southern Madison Water District. The study revealed that the construction of the EKPC high-voltage transmission line would have a negative impact on the quality of the Owsley Fork Reservoir. However, the report outlines mitigation and best management practices for construction that, if implemented, would not result in a significant enough impact on water quality to warrant opposition to the project.



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Date: 1/3/2024

Drawn: KSP

Approved: BHS

Figure 1. Big Hill 69 kV Transmission Line Project Study Area

Scale: 1:5,000

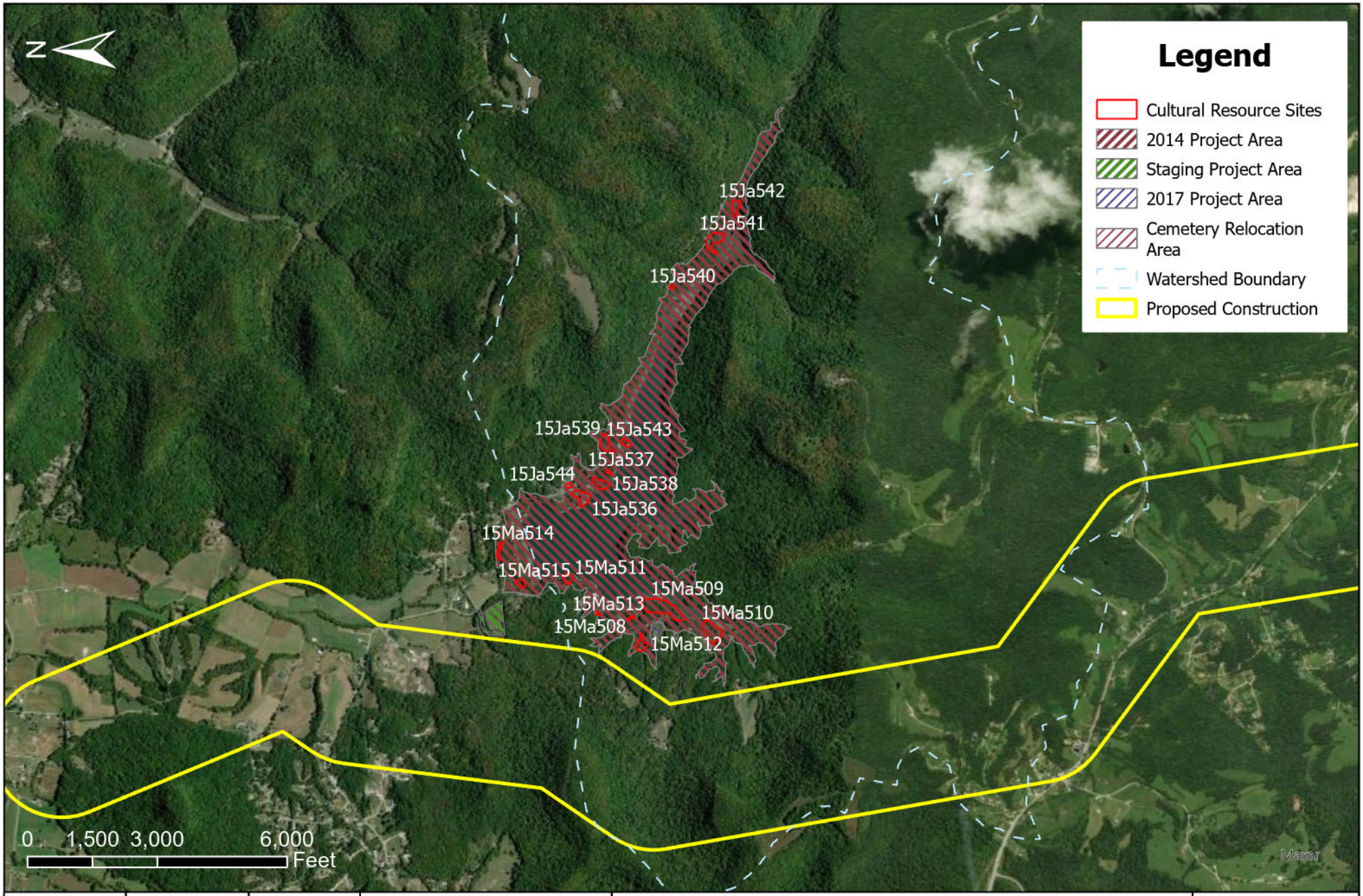

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Figure 2. Cultural Resources Map

Scale: 1:3,000

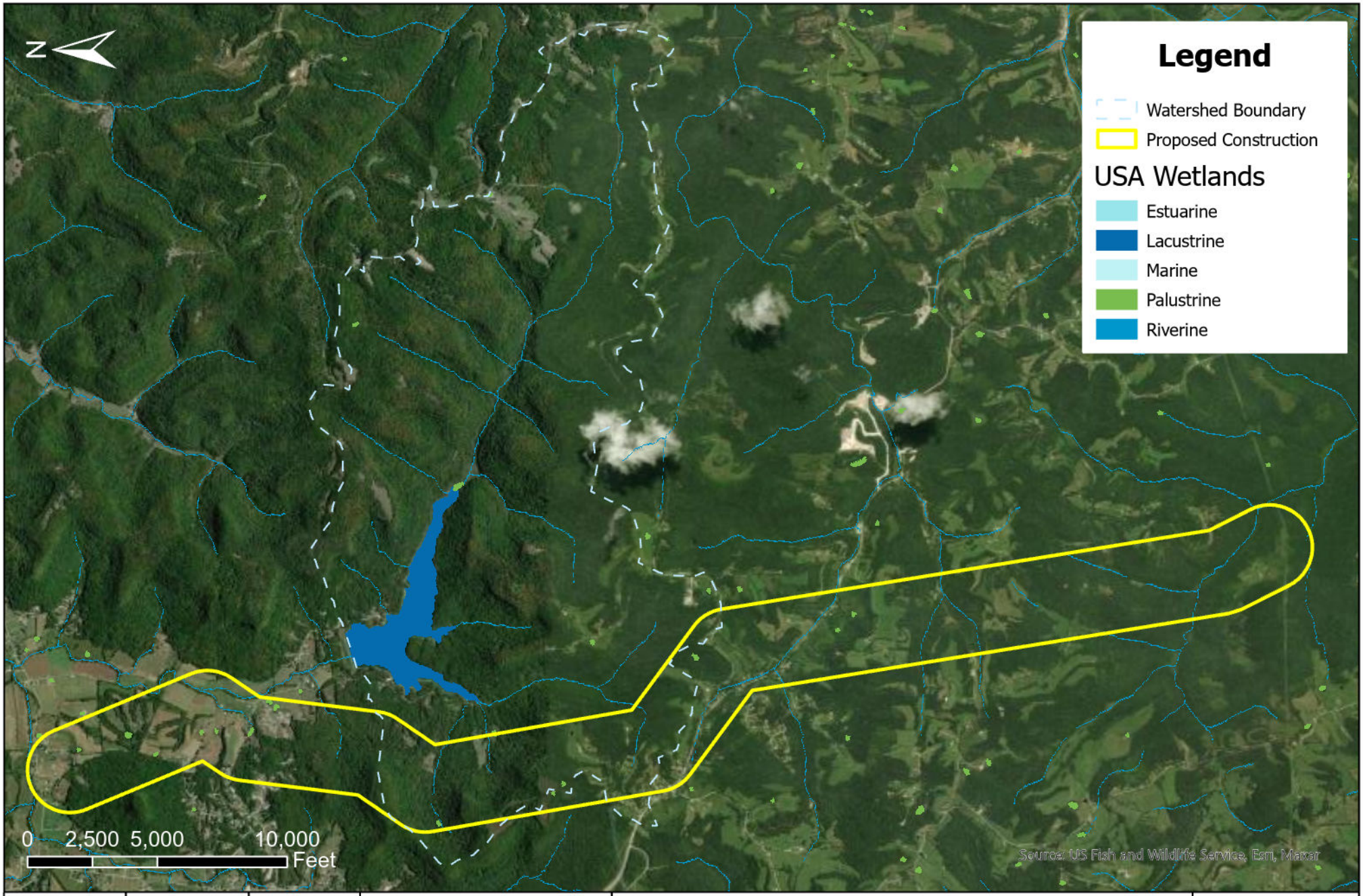

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Figure 3. Owsley Fork Reservoir Wetland Resource Map

Scale: 1:5,000

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