Document Type: EA-Administrative Record
Index Field: **Environmental Assessment**
Project Name: Ridgely Energy Farm Project
Project Number: 2020-24

RIDGELY ENERGY FARM PROJECT
FINAL ENVIRONMENTAL ASSESSMENT
Lake County, Tennessee

Prepared for:
Tennessee Valley Authority
Knoxville, Tennessee

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April 2021

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PHOTOS

LIST OF APPENDICES

SYMBOLS, ACRONYMS, AND ABBREVIATIONS

°F	degrees Fahrenheit
AADT	Average Annual Daily Traffic
AC	alternating current
ACM	asbestos containing material
AJD	Approved Jurisdictional Determination
APE	area of potential effect
ARAP	Aquatic Resource Alteration Permit
AST	above ground storage
BCC	birds of conservation concern
BMP	Best Management Practice
CAA	Clean Air Act of 1970
CBMPP	Construction Best Management Practices Plan
CBSA	Core Based Statistical Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
dB	decibel
dBA	A-weighted decibels
DC	direct current
DNL	day-night average sound level
DOT	U.S. Department of Transportation
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMF	Electromagnetic Field
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FR	Federal Register
ft	foot/feet
GHG	greenhouse gas
HUD	U.S. Department of Housing and Urban Development
Hwy	Highway
IEEE	Institute of Electrical and Electronics Engineers
in.	inches
IPaC	Information for Planning and Consultation
IRP	Integrated Resource Plan
kV	kilovolt
mg/m^3	milligrams per cubic meters
mi	mile
msl	mean sea level
MVA	mega-volt ampere
MW	megawatts
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act
NLCD	National Land Cover Database
NO_2	nitrogen dioxide

SYMBOLS, ACRONYMS, AND ABBREVIATIONS

NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O&M	operation and maintenance
O_3	ozone
OPGW	optical ground wire
OSHA	Occupational Safety and Health Administration
Pb	lead
PCS	power conversion station
PEL	permissible exposure limit
PEM	Palustrine Emergent Wetland
PFO	Palustrine Forested Wetland
PGA	peak horizontal ground acceleration
PM_{10}	particulate matter whose particles are less than or equal to 10 micrometers
$PM_{2.5}$	particulate matter whose particles are less than or equal to 2.5 micrometers
PPA	Power Purchase Agreement
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PUB(x)	Freshwater Pond
PV	photovoltaic
RAM	TVA Rapid Assessment Method
RCRA	Resource Conservation and Recovery Act
REC	recognized environmental conditions
RFP	Request for Proposal
ROI	region of interest
ROW	right-of-way
SHPO	State Historical Preservation Officer
SIP	State Implementation Plan
SMZ	streamside management zones
SO_2	sulfur dioxide
SPCC	Spill Prevention, Countermeasure and Control
SR	State Road
STEL	short-term exposure limit
SWPPP	Stormwater Pollution Prevention Plan
T&E	threatened and endangered
TCA	Tennessee Code Annotated
TDEC	Tennessee Department of Environment and Conservation
TDOA	Tennessee Division of Archaeology
TDOT	Tennessee Department of Transportation
TEMA	Tennessee Emergency Management Agency
THC	Tennessee Historical Commission
TLV	threshold limit value
TNECD	Tennessee Department of Economic and Community Development
TNW	traditional navigable water
TVA	Tennessee Valley Authority
TWA	time weighted average
ug/m^3	micrograms per cubic meter
U.S.	United States
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture

SYMBOLS, ACRONYMS, AND ABBREVIATIONS

USFWS	United States Fish and Wildlife Service
USGS	U.S. Geological Survey
WOTUS	Waters of the United States
WQC	water quality certification

GLOSSARY OF TERMS

100-Year Floodplain	The area inundated by the 1 percent annual chance (or 100- year) flood.
Air Basin	A regional area defined for state air quality management purposes based on considerations that include topographic features that influence meteorology and pollutant transport patterns, and political jurisdiction boundaries that influence the design and implementation of air quality management programs.
Ambient Air	Outdoor air in locations accessible to the general public.
Area of Potential Effects (APE)	The geographic area or areas within which an action may directly or indirectly cause changes in the character or use of historic properties, if such properties exist.
Attainment Areas	Those areas of the U.S. that meet NAAQS as determined by measurements of air pollutant levels.
Climate	A statistical description of daily, seasonal, or annual weather conditions based on recent or long-term weather data. Climate descriptions typically emphasize average, maximum, and minimum conditions for temperature, precipitation, humidity, wind, cloud cover, and sunlight intensity patterns; statistics on the frequency and intensity of tornado, hurricane, or other severe storm events may also be included.
Cumulative Impacts	Impacts that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions, regardless of what agency or person undertakes such actions (40 CFR § 1508.7).
Day/Night Average Sound Level (DNL)	A 24-hour average noise level rating with a 10 decibel (dB) penalty factor applied to nighttime noise levels. The DNL value is very similar to the community noise equivalent level value but does not include any weighting factor for noise during evening hours.
Decibel (dB)	A generic term for measurement units based on the logarithm of the ratio between a measured value and a reference value. Decibel scales are most commonly associated with acoustics (using air pressure fluctuation data); but decibel scales sometimes are used for ground-borne vibrations or various electronic signal measurements.
Deciduous	Vegetation that sheds leaves in autumn and produces new leaves in the spring.
Direct Impacts	Effects that are caused by the action and occur at the same time and place (40 CFR § 1508.8).
Ecoregion	A relatively homogeneous area of similar geography, topography, climate, and soils that supports similar plant and animal life.
Emergent Wetland	Wetlands dominated by erect, rooted herbaceous plants, such as cattails and bulrush.

GLOSSARY OF TERMS

Endangered Species	A species in danger of extinction throughout all or a significant portion of its range or territory. Endangered species recognized by the Endangered Species Act (ESA) or similar state legislation have special legal status for their protection and recovery.
Erosion	A natural process whereby soil and highly weathered rock materials are worn away and transported to another area, most commonly by wind or water.
Evergreen	Vegetation with leaves that stay green and persist all year.
Floodplains	Any land area susceptible to inundation by water from any source by a flood of selected frequency. For purposes of the National Flood Insurance Program, the floodplain, at a minimum, is that area subject to a 1 percent or greater chance of flooding (one in one hundred) in any given year.
Forest	Vegetation having tree crowns overlapping, generally forming 60-100 percent cover (Grossman et al. 1998).
Greenhouse Gas (GHG)	A gaseous compound that absorbs infrared radiation and re-radiates a portion of that back toward the earth's surface, thus trapping heat and warming the earth's atmosphere.
Habitat	A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.
Herbaceous Vegetation	Dominated by forbs, generally forming at least 25 percent cover; other life-forms with less than 25 percent cover (Grossman et al 1998).
Historic Property	Defined in 36 CFR § 800.16(l) as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places."
Indirect Impacts	Effects that are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable (40 CFR § 1508.8).
Landscape Features	The land and water form, vegetation, and structures which compose the characteristic landscape.
Landslide	A slope failure that involves downslope displacement and movement of material either triggered by static (i.e., gravity) or dynamic (i.e., earthquake) forces.
Liquefaction	A condition in which a saturated cohesion-less soil may lose shear strength because of a sudden increase in pore water pressure caused by an earthquake.

GLOSSARY OF TERMS

NatureServe	An international network of biological inventories (natural heritage programs or conservation data centers) that provides information about the location and status of animals, plants, and habitat communities, and establishes a system for ranking the relative rarity of those resources.
Maintenance Area	An area that currently meets federal ambient air quality standards, but which was previously designated as a nonattainment area. Federal agency actions occurring in a maintenance area are still subject to Clean Air Act conformity review requirements.
Mitigation	(a) Avoiding the impacts altogether by not taking an action or parts of an action, (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation, (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment, (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action, (e) Compensating for the impact by replacing or providing substitute resources or environments (40 CFR §1508.20).
National Ambient Air Quality Standards (NAAQS)	Uniform national air quality standards established by the EPA that restrict ambient levels of certain pollutants to protect public health (primary standards) or public welfare (secondary standards). Standards have been set for ozone, carbon monoxide, particulate matter, sulfur dioxide, nitrogen dioxide, and lead.
National Pollutant Discharge Elimination System (NPDES) and Water Quality Certification	The NPDES permit program was established under the Clean Water Act and controls, among other things, the discharge of stormwater associated with certain construction activities involving disturbance of one or more acres. The NPDES program has been delegated in Tennessee to the Department of Environment and Conservation (TDEC). In addition, Section 401 of the Clean Water Act requires that an applicant for a federal license or permit that allows activities resulting in a discharge to waters of the United States obtain a state certification that the discharge complies with the Clean Water Act.
Nitrogen Dioxide (NO_2)	A toxic, reddish gas formed by the oxidation of nitric oxide. Nitrogen dioxide is a strong respiratory and eye irritant. Most nitric oxide formed by combustion processes is converted into nitrogen dioxide by subsequent oxidation in the atmosphere. Nitrogen dioxide is a criteria pollutant, and is a precursor of ozone, numerous types of photochemically generated nitrate particles (including PAN), and atmospheric nitrous and nitric acids.
Nonattainment Area	An area that does not meet a federal or state ambient air quality standard. Federal agency actions occurring in a federal nonattainment area are subject to Clean Air Act conformity review requirements.

GLOSSARY OF TERMS

Ozone (O_3)	A compound consisting of three oxygen atoms. Ozone is a major constituent of photochemical smog that is formed primarily through chemical reactions in the atmosphere involving reactive organic compounds, nitrogen oxides, and ultraviolet light. Ozone is a toxic chemical that damages various types of plant and animal tissues and which causes chemical oxidation damage to various materials. Ozone is a respiratory irritant and appears to increase susceptibility to respiratory infections. A natural layer of ozone in the upper atmosphere absorbs high energy ultraviolet radiation, reducing the intensity and spectrum of ultraviolet light that reaches the earth's surface.
Paleontology	A science dealing with the life forms of past geological periods as known from fossil remains.
Particulate Matter	Solid or liquid material having size, shape, and density characteristics that allow the material to remain suspended in the atmosphere for more than a few minutes. Particulate matter can be characterized by chemical characteristics, physical form, or aerodynamic properties. Categories based on aerodynamic properties are commonly described as being size categories, although physical size is not used to define the categories. Many components of suspended particulate matter are respiratory irritants. Some components (such as crystalline or fibrous minerals) are primarily physical irritants. Other components are chemical irritants (such as sulfates, nitrates, and various organic chemicals). Suspended particulate matter also can contain compounds (such as heavy metals and various organic compounds) that are systemic toxins or necrotic agents. Suspended particulate matter or compounds adsorbed on the surface of particles can also be carcinogenic or mutagenic chemicals. See PM_{10} and $PM_{2.5}$.
Peak Ground Acceleration (PGA)	A common measure of ground motion during an earthquake. The PGA for a given component of motion is the largest value of horizontal acceleration obtained from a seismograph. PGA is expressed as the percentage of the acceleration due to gravity (g), which is approximately 980 centimeters per second squared. Unlike measures of magnitude, which provide a single measure of earthquake energy, PGA varies from place to place, and is dependent on the distance from the epicenter and the character of the underlying geology (e.g. hard bedrock, soft sediments, or artificial fills).
Physiographic Provinces	General divisions of land with each area having characteristic combinations of soil materials and topography.

GLOSSARY OF TERMS

PM_{10} (Inhalable Particulate Matter)	A fractional sampling of suspended particulate matter that approximates the extent to which suspended particles with aerodynamic equivalent diameters smaller than 50 microns penetrate to the lower respiratory tract (tracheo-bronchial airways and alveoli in the lungs). In a regulatory context, PM_{10} is any suspended particulate matter collected by a certified sampling device having a 50 percent collection efficiency for particles with aerodynamic equivalent diameters of 9.5 to 10.5 microns and a maximum aerodynamic diameter collection limit less than 50 microns. Collection efficiencies are greater than 50 percent for particles with aerodynamic diameters smaller than 10 microns and less than 50 percent for particles with aerodynamic diameters larger than 10 microns.
$PM_{2.5}$ (Fine Particulate Matter)	A fractional sampling of suspended particulate matter that approximates the extent to which suspended particles with aerodynamic equivalent diameters smaller than 6 microns penetrate into the alveoli in the lungs. In a regulatory context, $PM_{2.5}$ is any suspended particulate matter collected by a certified sampling device having a 50 percent collection efficiency for particles with aerodynamic equivalent diameters of 2.0 to 2.5 microns and a maximum aerodynamic diameter collection limit less than 6 microns. Collection efficiencies are greater than 50 percent for particles with aerodynamic diameters smaller than 2.5 microns and less than 50 percent for particles with aerodynamic diameters larger than 2.5 microns.
Power Purchase Agreement (PPA)	A contract between two parties, one who generates and intends to sell electricity, and one who is looking to purchase electricity, defining the commercial terms for the sale of electricity between the two parties.
Prehistoric	Refers to the period wherein American Indian cultural activities took place before written records and not yet influenced by contact with non-native culture(s).
Prime Farmland	Generally regarded as the best land for farming, these areas are flat or gently rolling and are usually susceptible to little or no soil erosion. Prime farmland produces the most food, feed, fiber, forage, and oil seed crops with the least amount of fuel, fertilizer, and labor. It combines favorable soil quality, growing season, and moisture supply and, under careful management, can be farmed continuously and at a high level of productivity without degrading either the environment or the resource base. Prime farmland does not include land already in or committed to urban development, roads, or water storage.
Riverine	Having characteristics similar to a river.
Row Crops	Agricultural crops, such as corn, wheat, beans, cotton, etc., which are most efficiently grown in large quantities by planting and cultivating in lines or rows.

GLOSSARY OF TERMS

Scrub-Shrub	Woody vegetation less than about 20 feet tall. Species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions.
Slack Span	TVA defines this as the portion of transmission line which connects the new substation to the existing transmission line.
State Historic Preservation Officer (SHPO)	The official within and authorized by each state at the request of the Secretary of the Interior to act as liaison for the National Historic Preservation Act.
State Implementation Plan (SIP)	Legally enforceable plans adopted by states and submitted to EPA for approval, which identify the actions and programs to be undertaken by the State and its subdivisions to achieve and maintain national ambient air quality standards in a time frame mandated by the Clean Air Act.
Subsurface	Of or pertaining to rock or mineral deposits which generally are found below the ground surface.
Sulfur Dioxide (SO_2)	A pungent, colorless, and toxic oxide of sulfur formed primarily by the combustion of fossil fuels. It is a respiratory irritant, especially for asthmatics. A criteria pollutant in its own right, and a precursor of sulfate particles and atmospheric sulfuric acid.
Threatened Species	A species threatened with extinction throughout all or a significant portion of its range or territory. Threatened species recognized by the ESA or similar state legislation have special legal status for their protection and recovery.
Upland	The higher parts of a region, not closely associated with streams or lakes.
Wetlands	Areas inundated by surface or ground water with a frequency sufficient to support, and under normal circumstances do or would support, a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, mud flats, and natural ponds.
Wildlife Management Area	Land and/or water areas designated by state wildlife agencies, such as TDEC, for the protection and management of wildlife. These areas typically have specific hunting and trapping regulations as well as rules regarding appropriate uses of these areas by the public.
Woodland	Open stands of trees with crowns not usually touching, generally forming 25 to 60 percent cover (Grossman et al. 1998).

CHAPTER 1

1.0 INTRODUCTION

The Tennessee Valley Authority (TVA) has entered into a conditional power purchase agreement (PPA) with Ridgely Energy Farm, LLC (referred to herein as "Ridgely Solar"), to purchase the power generated by the proposed Ridgely Solar Project (Project) in Lake County, Tennessee. The Project is able to accommodate as much as 300 megawatts (MW) alternating current (AC) in generating capacity and would be constructed and operated by Ridgely Solar. Under the terms of the conditional PPA between TVA and Ridgely Solar, dated March 12, 2020, TVA would purchase the electric output generated by the initial 177 MW proposed solar facility on the Project Site for an initial term of 20 years, subject to satisfactory completion of all applicable environmental reviews. In addition to purchasing the electric output under the PPA with Ridgely Solar, TVA also proposes to build the interconnection facilities and communications equipment required to connect Ridgely Solar to the existing electrical grid. This includes the construction of a new 161-kilovolt (kV) multi-breaker ring bus switching station and subsequent connection to the existing TVA Tiptonville to Highway (Hwy) 412/Dyersburg 161-kV transmission line (referred to herein as the Lake County, TN 161-kV Switching Station), in addition to any required system protection, upgrades, and/or communication equipment on the existing 161-kV transmission line between the TVA Tiptonville Substation and the proposed Lake County, TN 161-kV Switching Station.

Following a detailed investigation of various alternatives (see Section 2.3), the proposed Ridgely Solar Project has been designed to occupy approximately 2,344 acres of land located 2 miles (mi) north of the City of Ridgely, in Lake County, Tennessee (herein referred to as the "Project Site"). The proposed solar facility footprint is shown in Figure 1-1. The Project would also include transmission upgrades (e.g., installation of new optical ground wire [OPGW] fiber) to a 5.5-mi long, 100-ft wide stretch of existing TVA transmission line right-of-way (ROW; referred herein to as "transmission ROW") that would occupy approximately 60 acres. The total area for the Proposed Action under evaluation in this EA is referred to as the "Project Area" and includes both the Project Site and the transmission ROW, a total of approximately 2,404 acres. The Ridgely Solar generating facility would consist of multiple parallel rows of photovoltaic (PV) panels on single-axis tracking structures, direct current (DC) to AC inverters, and transformers. The facility would be connected to TVA's existing Tiptonville to Hwy 412/Dyersburg 161-kV transmission line, which traverses the western side of the proposed Project Site from north to south.

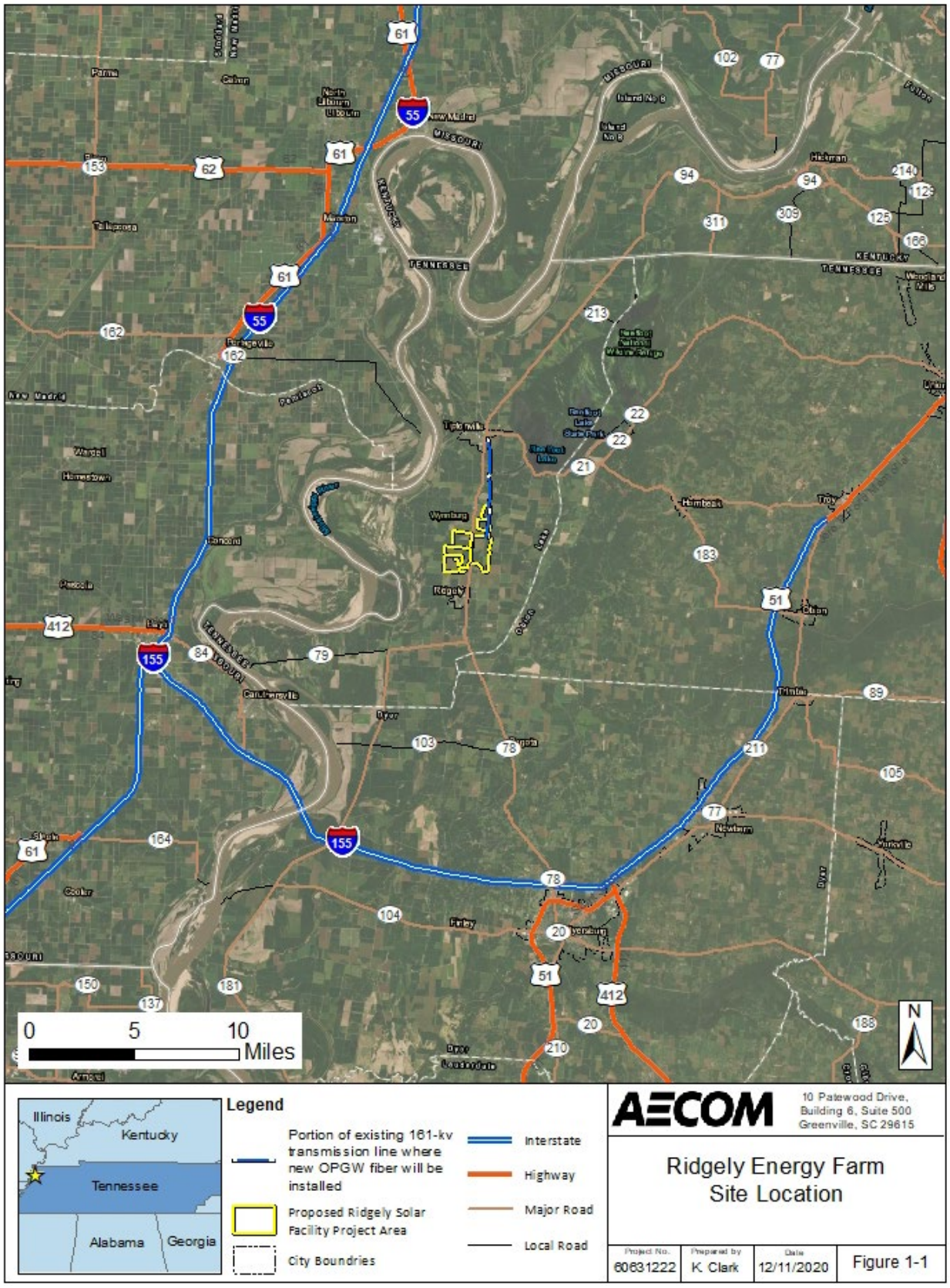

Figure 1-1. Site Location Map

1.1 PURPOSE AND NEED FOR ACTION

TVA is a corporate agency of the United States that provides electricity for business customers and local power companies serving nearly 10 million people in parts of seven southeastern states called the Tennessee Valley. TVA's mission is to serve the people of the Tennessee Valley region, accomplished through three main areas of work – energy, the environment, and economic development.

TVA produces or obtains electricity from a diverse portfolio of energy sources, including solar, hydroelectric, wind, biomass, fossil fuel, and nuclear. In 2015, TVA completed an Integrated Resource Plan (IRP) and associated Environmental Impact Statement (EIS) (TVA 2015). The IRP identified the various resources that TVA intends to use to meet the energy needs of the TVA region over the 20-year planning period while achieving TVA's objectives to deliver reliable, low-cost, and cleaner energy and to reduce environmental impacts. These energy resources from the 2015 IRP included the addition of between 175 and 800 MW (AC) of solar capacity by 2023. In June 2019, TVA released the final 2019 IRP and the associated EIS (TVA 2019a). This updated IRP provides further direction on how TVA will deliver clean, reliable and affordable energy in the Valley over the next 20 years, and the associated EIS describes the natural, cultural and socioeconomic impacts associated with the IRP. The 2019 IRP recommends solar expansion and anticipates growth in all scenarios analyzed, with most scenarios anticipating 5,000-8,000 MW and one anticipating up to 14,000 MW by 2038 (TVA 2019a). Customer demand prompted TVA to release a Request for Proposal (RFP) for renewable energy resources (2019 Renewable RFP). The PPAs that resulted from this RFP will help TVA meet immediate needs for additional renewable generating capacity in response to customer demands and fulfill the renewable energy goals established in the 2019 IRP. The Proposed Action would provide cost-effective renewable energy consistent with the IRP and TVA goals.

1.2 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

The National Environmental Policy Act (42 United States Code [U.S.C.] §§ 4321-4347) (NEPA) requires federal agencies to evaluate the potential environmental impacts of their proposed actions. This environmental assessment (EA) has been prepared to assess the potential impacts of TVA's Proposed Action (the purchase of power under the PPA) on the environment in accordance the Council on Environmental Quality (CEQ) regulations for implementing NEPA at 40 Code of Federal Regulations (CFR) 1500-1508 issued in 1978 (43 Federal Register [FR] 55990, Nov. 29, 1978), with minor revisions in 1979 and 1986, as well as TVA regulations at 18 CFR 1318 issued in 2020 (85 FR 17434, Mar. 27, 2020). Because TVA began this EA before CEQ issued revised NEPA regulations (85 FR 43304-43376, Jul. 16, 2020), TVA applied the previously promulgated 1978 CEQ regulations and TVA's 2020 NEPA regulations in the preparation of this EA (see 40 CFR 1506.13).

TVA's Proposed Action would result in the construction and operation of the proposed solar facility by Ridgely Solar and actions taken by TVA to connect the solar facility to the TVA transmission system. The scope of this EA therefore focuses on impacts related to the construction and operation of the proposed solar facility and associated modifications to the TVA transmission system associated with the proposed solar facility.

This EA (1) describes the existing environment at the Project Site, (2) analyzes potential environmental impacts associated with the Proposed Action and the No Action Alternative, and (3) identifies and characterizes potential cumulative impacts from the proposed Project in relation to other ongoing and reasonably foreseeable proposed activities within the surrounding area of the Project Site.

Under the PPA, TVA's obligation to purchase renewable power is contingent upon the satisfactory completion of the appropriate environmental review and TVA's determination that the Proposed Action will

be “environmentally acceptable.” To be deemed acceptable, TVA must assess the impacts of the Project on the human environment to determine whether (1) any significant impacts would result from the location, operation, and/or maintenance of the proposed Project and/or associated facilities, and (2) the Project would be consistent with the purposes, provisions, and requirements of applicable federal, state, and local environmental laws and regulations.

Based on internal scoping and identification of applicable laws, regulations, executive orders, and policies, TVA identified the following resource areas for analysis within this EA: Land Use; Geology, Soils, and Prime Farmland; Water Resources; Biological Resources; Visual Resources; Noise; Air Quality and Climate Change; Cultural Resources; Natural Areas and Recreation; Utilities; Waste Management; Public and Occupational Health and Safety; Transportation; Socioeconomics; and Environmental Justice.

This EA consists of six chapters discussing the Project alternatives, resource areas potentially impacted, and analyses of these impacts. Additionally, this document includes seven appendices, which generally contain more detail on technical analyses and supporting data. The structure of the EA is outlined below:

- **Chapter 1.0:** Describes the purpose and need for the Project, the decision to be made, related environmental reviews and consultation requirements, necessary permits or licenses, and the EA overview.
- **Chapter 2.0:** Describes the Proposed Action and the No Action Alternative, provides a comparison of alternatives, and identifies the Preferred Alternative.
- **Chapter 3.0:** Discusses the affected environment and the potential direct and indirect impacts on these resource areas. Mitigation measures are also proposed, as appropriate.
- **Chapter 4.0:** Discusses the cumulative impacts in relation to other ongoing and reasonably foreseeable proposed activities within the surrounding area of the Project Site.
- **Chapters 5.0 and 6.0:** Contain the List of Preparers of this EA and the Literature Cited in preparation of this EA, respectively.
- **Appendix A:** TVA ROW Clearing Specifications
- **Appendix B:** TVA Environmental Quality Protection Specifications for Transmission Line Construction
- **Appendix C:** TVA Transmission Construction Guidelines near Streams
- **Appendix D:** TVA Environmental Quality Protection Specifications for Transmission Substation or Communications Construction
- **Appendix E:** TVA ROW Vegetation Management Guidelines 2013
- **Appendix F:** Consultation Information
- **Appendix G:** Natural Resources Report (Wetlands and Protected Species)
- **Appendix H:** Public Comments and Responses

1.3 PUBLIC INVOLVEMENT

On January 21, 2021, TVA issued the draft EA for a 30-day public review and comment period that ended on February 18, 2021. TVA informed the public of the review period via a media advisory, a notice in Tiptonville's Lake County Banner, and outreach to key stakeholders, government agencies, and interested federally recognized Indian tribes. TVA posted the draft EA on its webpage (www.tva.gov/nepa) with information about how to submit comments.

During the comment period, TVA received a total of six (6) submissions: four submissions from members of the public (i.e., three submissions expressing support for the project and one submission inquiring about construction schedule and adherence to mitigation measures), one email submission from the Tennessee Department of Environment and Conservation (TDEC) regarding a nearby TDEC Division of Remediation site, and one letter submission from the TDEC Office of Policy and Sustainable Practices providing comments on the Draft EA. The full set of comments and responses to substantive comments are provided in Appendix H.

1.4 REQUIRED PERMITS AND LICENSES

1.4.1 Solar Facility

A Tennessee Stormwater Construction Permit (National Pollutant Discharge Elimination System [NPDES] Permit No. TNR100000) would be required for the construction of the Preferred Alternative. NPDES Permit No. TNR100000 is a general permit issued by the TDEC authorizing stormwater discharges associated with construction activities (e.g., clearing, grading, or excavation) that result in a total land disturbance of 1 acre or greater. Construction-site operators/owners seeking coverage under this general permit must submit a Notice of Intent (NOI) for General NPDES Permit for Stormwater Discharges from Construction Activities and a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the permit requirements prior to any construction activities. The NOI must include project and permittee information, and a map with boundaries 1-2 mi outside the site property with the site and construction area outlined and the receiving water or receiving storm sewer highlighted and identified. In addition, a Notice of Coverage (NOC) must be issued by TDEC prior to any land disturbing activities.

A site-specific SWPPP is also required for the Stormwater Construction Permit and must be developed and submitted to TDEC as part of the permitting process. The SWPPP addresses all construction-related activities from the date construction commences to the date of termination of permit coverage. The design, inspection, and maintenance of Best Management Practices (BMPs) must be prepared in accordance with good engineering practices and must be consistent with the requirements and recommendations contained in the *Tennessee Erosion and Sediment Control Handbook* (TDEC 2012).

Section 404 of the Clean Water Act (CWA) prohibits the discharge of dredged or fill material into Waters of the United States (WOTUS), including wetlands and streams, unless authorized by the United States Army Corps of Engineers (USACE). Waters determined by the USACE to be WOTUS and subject to CWA Section 404 are referred to as jurisdictional (i.e., under federal jurisdiction). A CWA Section 404 permit from the USACE would be required before the discharge of dredged or fill material into a jurisdictional wetland or stream. If impacts to jurisdictional waters would be less than ½ acre, the proposed project could be completed under a nationwide permit (NWP) from USACE. Permanent impacts to jurisdictional waters that exceed the ½-acre threshold for NWPs would require an Individual Permit from USACE. Section 404 permits require water quality certification (WQC) as set forth in Section 401 of the CWA prior to discharging fill materials into waters of the United States (WOTUS). Section 401 requires any applicant requesting a federal permit or license for activities that may result in discharges to first obtain a certification from the state that the permitted discharges comply with the state's applicable effluent limitations and water quality standards.

In Tennessee, TDEC is responsible for the issuance of CWA Section 401 WQC, pursuant to the TDEC's regulations (i.e., Tennessee Code Annotated [TCA] § 69-3-108, TDEC 0400-40-7, and TDEC 0400-40-03). The TDEC Division of Water Resources issues this Section 401 WQC in the form of an Aquatic Resource

Alteration Permit (ARAP). An ARAP may be required if the Project would disturb or cause alterations of a stream or wetland.

The Tennessee Department of Transportation (TDOT) regulates the installation, adjustment, and relocation of utilities in state highway ROWs to ensure the integrity, safety, and functionality of state roadways while accommodating utilities. Per *the Rules and Regulations for Accommodating Utilities within Highway Rights-of-Way* (Chapter 1680-6-1), if any portion of the Project requires aboveground or below ground installation within state, federal-aid metro-urban, and state-aid highway system road ROWs, a TDOT permit would be obtained.

The proposed operation and maintenance (O&M) building would include an associated leach field and potable water well, both of which would require permitting. If the leach field installed is a septic tank with field lines large enough to have capacity to serve 20 or more persons per day, it would be classified as a 'large capacity subsurface disposal system.' The potable water well that would service the O&M building would not likely be classified as a transient or non-transient noncommunity water system, but the other water withdrawal wells would need to be registered if they produce more than 10,000 gallons per day on any day. All wells would be drilled by a driller licensed in the State of Tennessee.

A list of potential permits, approvals, and licenses required for the Project is presented in Table 1.4-1.

Table 1.4-1. Ridgely Solar Permit and Approval List

Permit/Approval	Justification	Lead Agency
Federal Permits & Approvals		
Endangered Species Act (ESA) Section 7 informal consultation	ESA Section 7 requires Federal agencies to consult with USFWS when an action may affect a listed endangered or threatened species; must include biological resources survey results.	United States Fish and Wildlife Service (USFWS)
Migratory Bird Treaty Act (MBTA)	Prohibits the "take" of protected migratory birds, including killing, capturing, selling, trading and transport, without prior authorization from the USFWS.	USFWS
Bald and Golden Eagle Protection Act	Prohibits anyone from killing, harassing, possessing (without a permit), or selling bald and golden eagles, their parts, nests or eggs. This includes impacts that result from human-induced alterations around a previously used nest site if it affects the eagle upon return.	USFWS
Clean Water Act (CWA) Section 404 Nationwide and/or Individual Permit	Required for complex and/or large-scale projects with the potential to significantly impact water resources (e.g., discharges to surface waters).	United States Army Corp of Engineers (USACE)
State Permits, Approvals, Registration, or Coordination		
Section 106 National Historical Preservation Act (NHPA) consultation	NHPA Section 106 requires Federal agencies to consider the effects of Agency actions on	Tennessee State Historic Preservation Officer (SHPO)

Table 1.4-1. Ridgely Solar Permit and Approval List

Permit/Approval	Justification	Lead Agency
	historic properties; must include cultural resources survey results.	
National Pollutant Discharge Elimination System (NPDES) Stormwater Construction Permit (TNR100000)	Required for discharges into WOTUS. Must include Notice of Intent (form) associated with existing General Permit and a site-specific Stormwater Pollution Prevention Plan (SWPPP).	TDEC
Aquatic Resource Alteration Permit (ARAP)/Section 401 Water Quality Certification	Required if there will be alterations to a stream, river, lake, or wetland.	TDEC – Division of Water Resources (DWR)
Septic System Permit	Required if a septic system will be installed to estimate the water use amounts and to provide proposed location; may require submission of a soils map.	TDEC – DWR
Water Withdrawal Registration	Required if average withdrawal of 10,000 gallons or more per day from either surface water or ground water source.	TDEC – DWR
NPDES General Permit for Application of Pesticides (associated with Permit TNR 100000)	May be required if pesticides or herbicides will be used as part of construction or maintenance activities that can result in discharges into waters of the state; would require a pesticide discharge management plan.	TDEC
Permit-by-Rule permit for National Emission Standard for Hazardous Pollutants	May be required if an emergency generator fueled by diesel or natural gas will be installed on the site to supply electrical power to the project during emergency situations.	TDEC - Division of Air Pollution Control
State Wildlife Coordination	Required to conserve endangered and threatened species. Must include biological resources survey results.	Tennessee Wildlife Resources Agency (TWRA)
Utility Permit Form	May be required if any state highways are crossed during transmission line construction.	Tennessee Department of Transportation (TDOT)- Region 4 Utilities Office
Burning permit	May be required for burning trees and other combustible materials removed during construction.	TDEC – Division of Forestry

1.4.2 Transmission Interconnection

A Tennessee Construction General Permit (NPDES Permit No. TNR100000) would be required for the construction of the associated transmission interconnection. Permitting and licensing requirements would

be reviewed on a site-specific basis after further study confirms the specific upgrades necessary and the location of the transmission connection. Generally, however, a permit would be required from TDEC for the discharge of construction-site storm water associated with construction upgrades to the existing transmission line. Similarly, a permit would be required if soil disturbance, including temporary access roads, would be one acre or more. TVA would prepare the required erosion and sedimentation control plans and coordinate with the appropriate state and local authorities. A permit may also be required for burning trees and other combustible materials removed during transmission line construction. A Section 404 Nationwide or Individual Permit would be obtained from the USACE and/or a Section 401 ARAP would be obtained from TDEC for the discharge of dredge or fill material into WOTUS, if applicable.

CHAPTER 2

2.0 DESCRIPTION OF THE PROPOSED SOLAR PROJECT AND ALTERNATIVES

This chapter explains the rationale for identifying the alternatives to be evaluated, including the No Action Alternative required by NEPA, describes each alternative, provides a comparison of alternatives with respect to their potential environmental impacts, and identifies the Preferred Alternative.

2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, TVA would not purchase the power generated by the Project under the 20-year PPA with Ridgely Solar, and TVA would not be involved with the Project. If TVA were to select this alternative, and Ridgely Solar elected not to proceed with the Project, then Ridgely Solar would not construct any facility on any tracts of land in Lake County, Tennessee, and TVA would not make the associated modifications to its transmission system. Ridgely Solar would not complete the purchase of the property necessary to construct the Preferred Alternative or make tax payments associated with the project to Lake County in accordance with the property tax agreement Lake County put in place to attract capital investment for the Project. Existing conditions would remain unchanged (i.e., property would remain as predominantly disturbed agricultural land) and agricultural activities would likely continue. In addition, TVA would continue to rely on other sources of generation described in the 2019 IRP (TVA 2019a) to ensure an adequate energy supply and to meet its goals for increased renewable and low greenhouse gas (GHG)-emitting generation.

Under the No Action Alternative, there would be no project-related changes to land use, natural resources, or socioeconomics in the immediate future.

2.2 PROPOSED ACTION

Under the Proposed Action, Ridgely Solar would acquire approximately 2,344 acres of land in Lake County, Tennessee, and construct, operate, and maintain a single-axis tracking PV solar power facility of up to 300 MW AC generating capacity. The energy generated by the initial 177-MW proposed solar facility on the Project Site would be sold to TVA in accordance with the terms of the PPA. Ridgely Solar would construct a Project Substation (the Ridgely Solar, TN 161-kV Substation) at the Project Site. The Project would interconnect to TVA's existing Tiptonville to Hwy 412/Dyersburg 161-kV transmission line, which traverses the Project Site at its northeast corner. TVA would construct a line-tap into the existing transmission line to connect the proposed new Lake County, TN 161-kV Switching Station, also located on the Project Site. This EA assesses the impact of TVA's action of entering into the PPA with Ridgely Solar, the associated impacts of the construction and operation of the proposed solar facility (including substation) by Ridgely Solar, and the transmission interconnections and switching station proposed by TVA.

2.2.1 Project Description

The Project Site consists of 13 parcels of land and one medium voltage easement. Multiple private parties currently own all of the land required for the Project. These parcels total approximately 2,344 acres and comprise the Project Site, which is located less than 1 mi southeast of Wynnburg, approximately 2 mi north of Ridgely, and approximately 5 mi south of Tiptonville (Figure 1-1). State Road 78/Headden Drive runs north-to-south and bisects the Project (Figure 2-1).

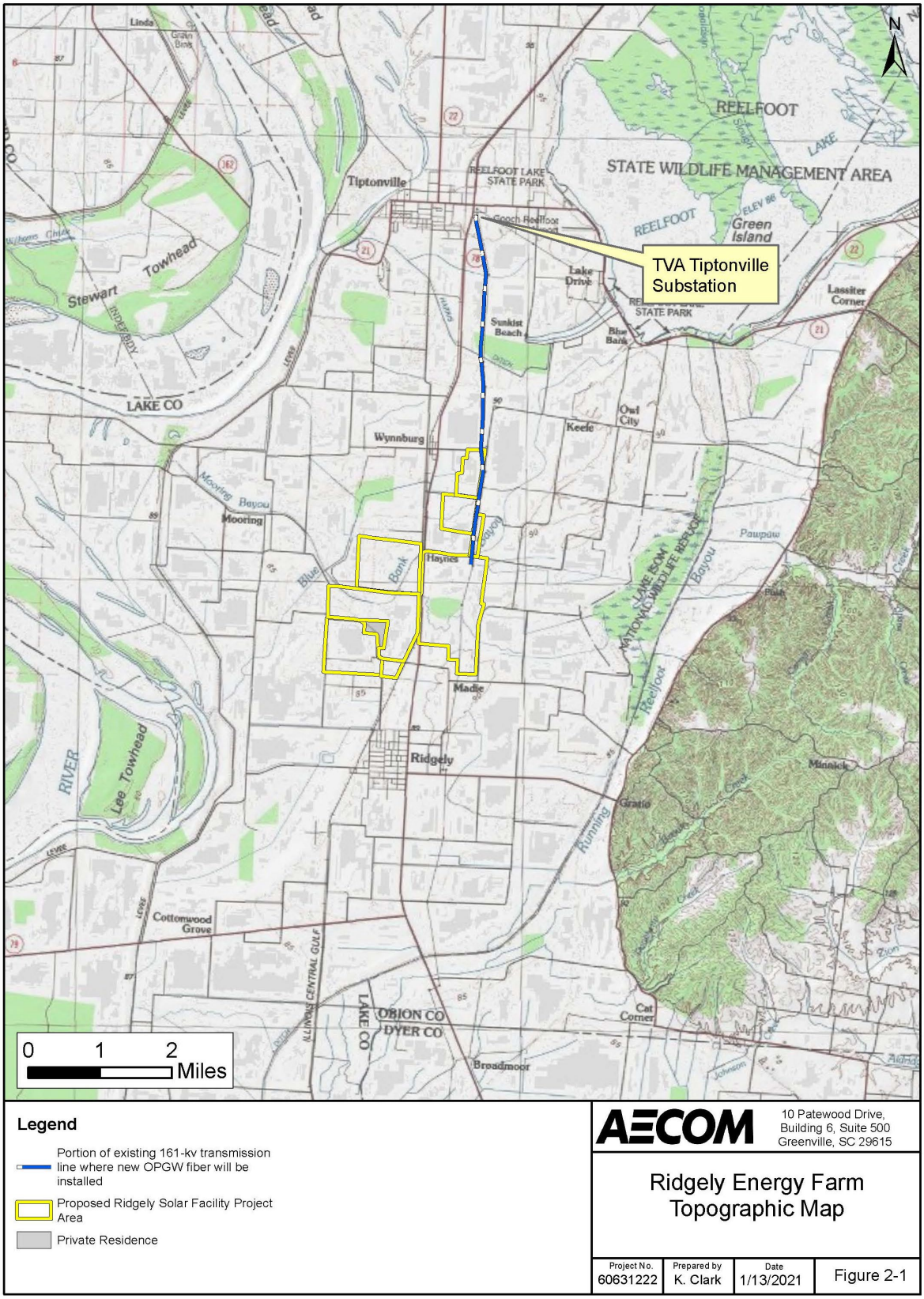

Figure 2-1. Ridgely Solar Project Site and Transmission Line Location Map

The Proposed Action also includes the construction of interconnection facilities and communications equipment required to connect Ridgely Solar to the existing electrical grid. Specifically, TVA would construct a new 161-kV multi-position ring bus station on the existing Tiptonville to Hwy 412/Dyersburg 161-kV transmission line, in addition to any required system protection, upgrades, and/or communication equipment on the existing 161-kV transmission line between the Tiptonville and Hwy 412/Dyersburg substations.

The Project Site layout is shown in Figure 2-2 and would occupy approximately 2,344 acres, of which approximately 1,961 acres would be permanently disturbed, and 43 acres would undergo temporary disturbance. Approximately 52 acres of exclusion areas were identified by Ridgely Solar as being restricted from any development or construction activities; these areas, illustrated in red hatching on Figure 2-3, are considered not useable for the Project, because they contain wetlands, floodplains, and/or sensitive resources. An existing private residence (approximately 50 acres) is located in the interior of the Project Site near the southwestern corner (Figure 2-2); this area would be avoided by the Project and access via an existing public roadway to this residence would remain open during construction and operation. The Project would also include transmission upgrades (e.g., installation of new OPGW fiber) to a 5.5-mi long, 100-ft wide stretch of existing TVA transmission ROW that would occupy approximately 60 acres. The total area for the Proposed Action under evaluation in this EA is referred to as the "Project Area" and includes both the Project Site and the transmission ROW, a total of approximately 2,404 acres. Figure 2-3 illustrates that under the Proposed Action, approximately 1,961 acres would be permanently impacted (e.g., solar arrays, substation, switching station, retention basins, O&M building, etc.) and approximately 103 acres (43 acres within the Project Site and 60 acres of transmission ROW) would be temporarily impacted (e.g., laydown area, underground mega-volt ampere [MVA] gen-tie easement, transmission ROW).

Access to the Project Site is achieved through numerous permanent entrances located throughout the site (Figure 2-2). In addition to the solar arrays which would comprise the majority of the Project Site, a proposed new Ridgely Solar, TN 161-kV Substation would be located on approximately 5 acres on the northeastern portion of the Site; in the substation, medium voltage power generated by the solar facility would be stepped-up to high-voltage for transfer onto TVA-owned infrastructure. Next to the substation, TVA would construct the new high-voltage Lake County, TN 161-kV Switching Station, on approximately 8 acres. Additional dead-end support structures may need to be installed to support the loop-in-loop-out of the existing 161-kV transmission line to the Lake County, TN 161-kV Switching Station. A small O&M Building would be located on approximately 2 acres and would include a leach field and potable water well. The O&M Building would be located adjacent to the Project Substation.

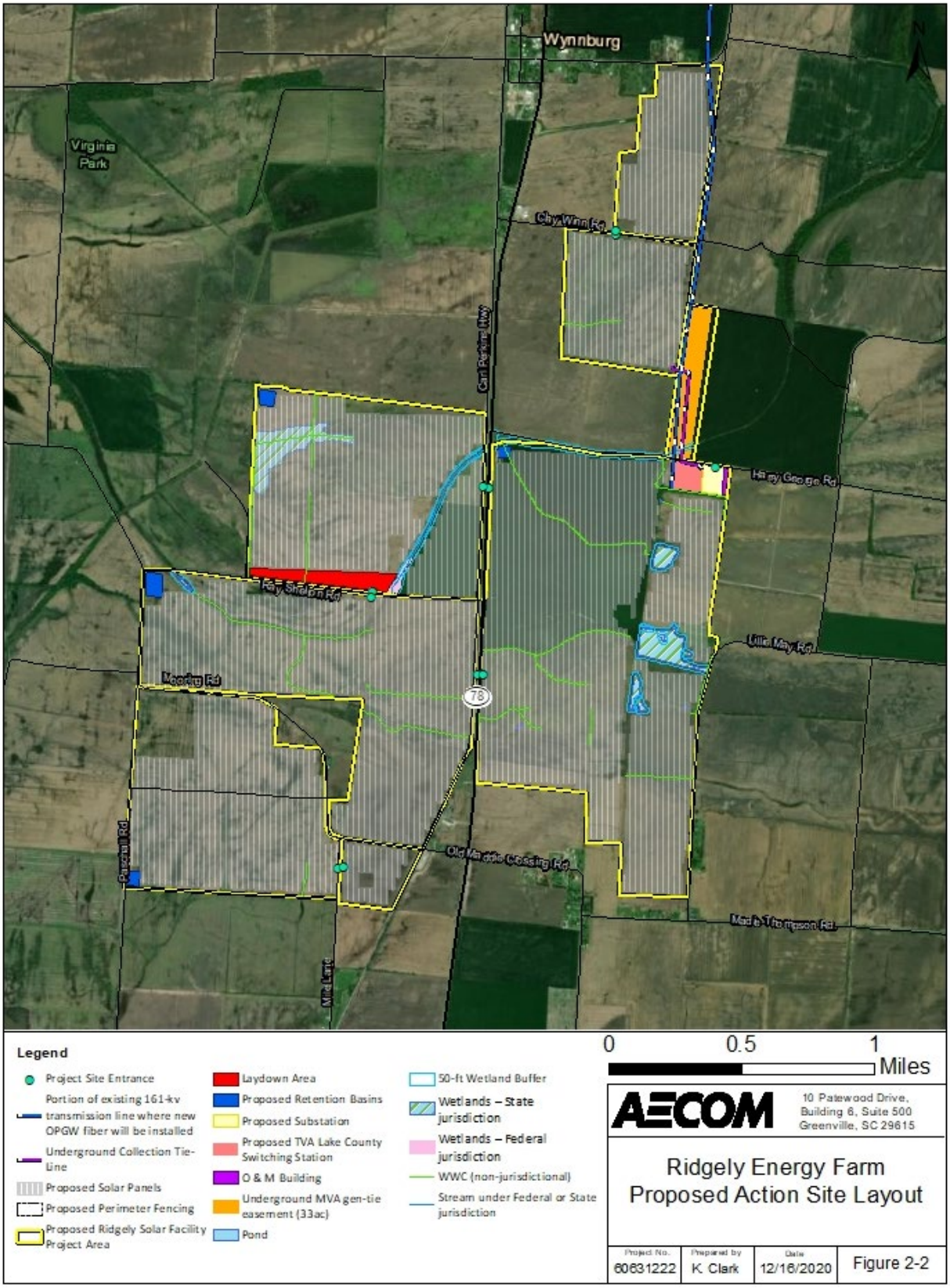

Figure 2-2. Proposed Action Site Layout Map

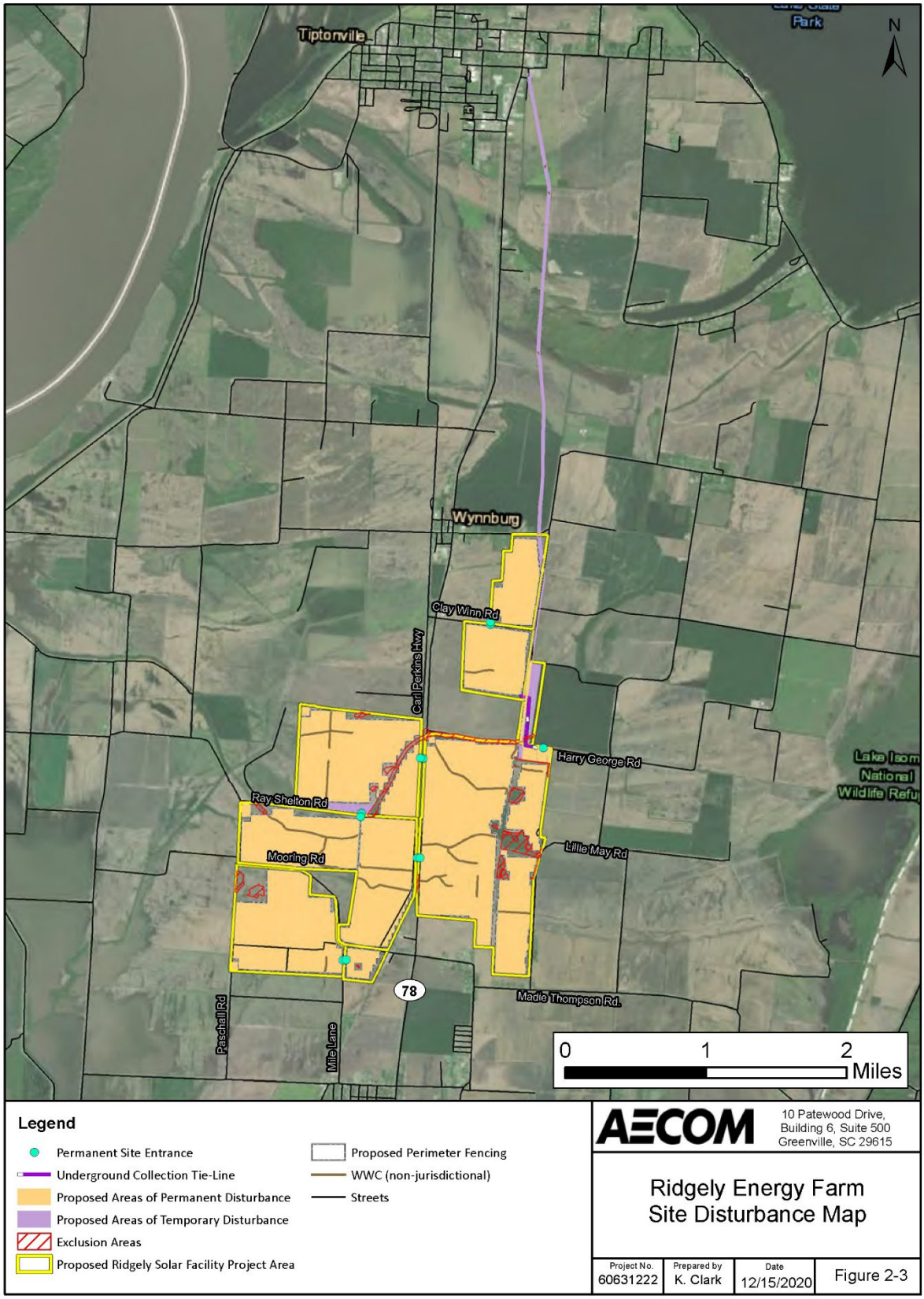

Figure 2-3. Proposed Action Site Disturbance Map

PV power generation is the direct conversion of light into electricity at the atomic level. Some materials exhibit a property known as the photoelectric effect that causes them to absorb photons of light and release electrons. When these free electrons are captured, an electric current is produced, which can be used as electricity. This project would convert sunlight into DC electrical energy within thin-film semiconductor PV modules (Photo 2-1). The solar arrays utilized for the proposed facility would be composed of ground-mounted thin film cells. The PV modules are each capable of producing approximately 410 to 450 watts and would be mounted together in arrays. These arrays would be grouped into individual blocks with an output of approximately 2.0 to 4.0 MVA AC. Each block would consist of PV modules configured into arrays and a power conversion station (PCS), which would include inverters and transformers to convert the DC electricity generated by the solar panels into AC electricity for transmission across the Project's electrical collection system and to the on-site Ridgely Solar, TN 161-kV Substation.

The current design reflects that the facility could be grouped into five AC collection blocks, with each block made up of approximately 10 to 15 arrays. There are several different array configurations to account for varying site constraints and land utilization, but generally each array would consist of approximately 8,000 to 10,000 Series 6 (or functional equivalent) modules. Although any array using Series 4 modules would require more modules, the project area would remain the same regardless of the specific module used. The exact number of blocks, arrays, and modules will be finalized during detailed design at project execution.

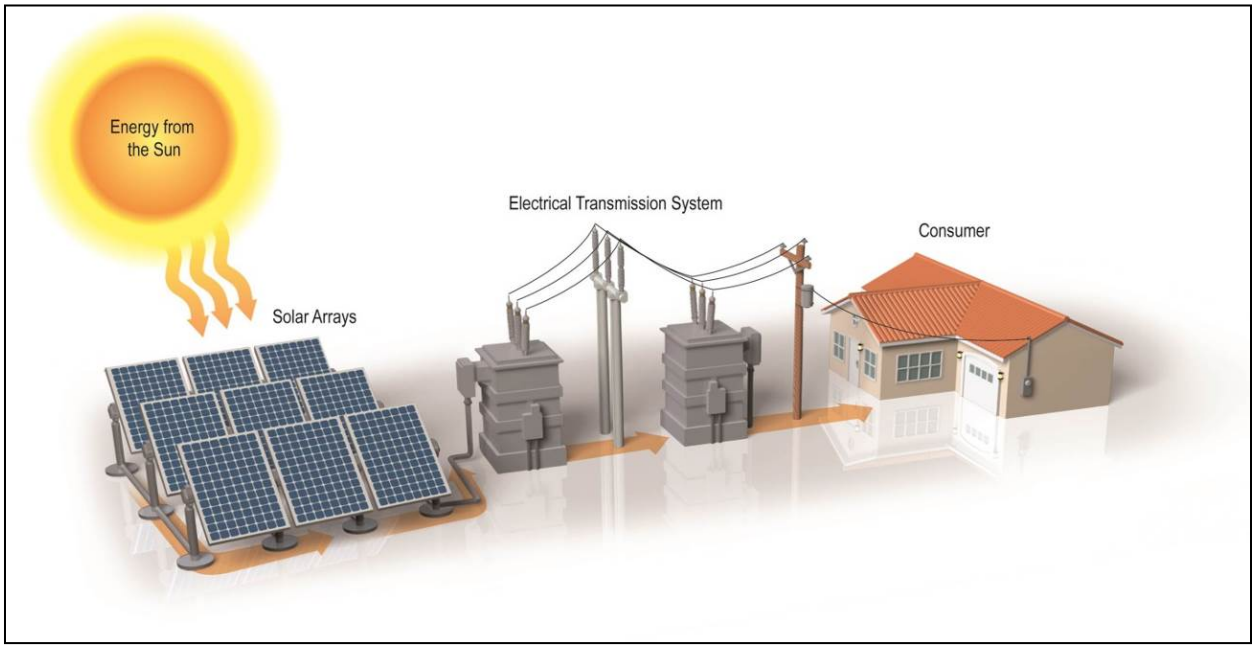

Photo 2-1. General Energy Flow Diagram of PV Solar System

There would be several access roads internal to the site to allow access to the arrays and PCS skids for operations and maintenance purposes. These unpaved roads typically consist of compacted native soils or aggregate base gravel where needed. Temporary laydown or staging areas would be used for stockpiling and storage of construction materials during different phases of construction (Figure 2-2). Detention basins would be utilized on site to protect against flooding and downstream impacts due to sediment releases.

Wetlands and streams determined by USACE to be under federal jurisdiction, as discussed in Section 1.4.1, are subject to the regulatory requirements of CWA Section 404; would be protected by buffers; and would not be impacted directly. Other streams and wetlands that are under TDEC jurisdiction could be unavoidably affected, and an ARAP would be required. Periodic maintenance activities would be required to maintain vegetation below a certain height. BMPs would also be used during construction and maintenance activities to minimize sediment release.

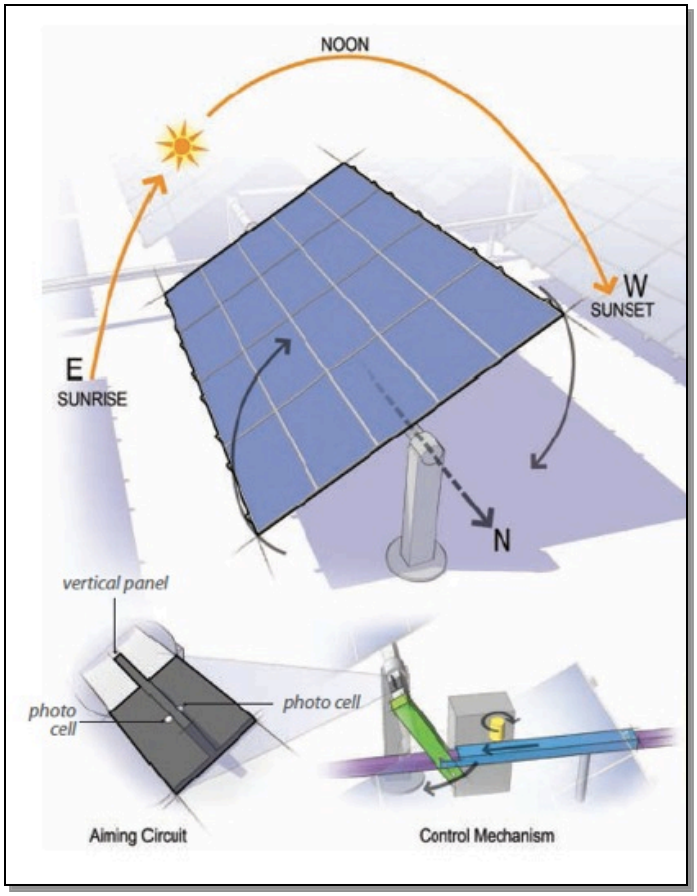

Photo 2-2. Diagram of Single-Axis Tracking System

For this project, Ridgely Solar would utilize recently released large format PV modules known as Series 6 (or functional equivalent) manufactured by First Solar, Inc. These panels were designed with an under-mount frame which facilitates natural snow shedding and cleansing benefits of rainfall. The PV panels would be mounted on a motor-operated axis tracker structure, commonly referred to as a single-axis tracker. The axis tracker would be designed to follow the path of the sun from the east to the west across the sky. The tracker assemblies would be constructed in parallel north-south rows using steel piles (6-inches by 6-inches) installed using a pile driver with an approximate depth of 6 to 10 ft below grade (Photo 2-2); approximately 75 piles would be installed per acre of panels on the Project Site. For isolated instances of poor-quality soil, which are not anticipated for this Project, longer piles and/or helical piles may be used.

The PV modules would be electrically connected using the Series 6 (or functional equivalent) dual junction box design. A combiner box at the end of each module row would collect power from several strings of modules and feed a PCS via cables. DC cabling may be routed above-ground or mounted to the tracking structures on cable trays or other equivalent management systems.

Each PCS consists of a unit containing several power inverter units electrically connected to the adjacent transformers and mounted on concrete pads or piers. The PCS would be approximately 8 to 10 ft tall and approximately 40 ft long; the transformer enclosure would be approximately 6.5 ft tall. The inverters change the DC output from the combiner boxes into AC electricity. The resulting AC current from each individual PCS would then be transformed at the adjacent pad-mounted transformers into the AC collection voltage, typically 34.5 kV. The medium voltage collection circuits (either direct-buried or mounted on overhead pole structures) function to deliver AC electricity from the PCSs to the Ridgely Solar, TN 161-kV Substation.

2.2.2 Solar Facility Construction

Site preparation (surveying and staking, removal of tall vegetation, grading, clearing and grubbing as needed, installation of a perimeter security fence and area lighting as required for security and compliance with local ordinance, and preparation of construction laydown or staging areas) is generally required prior to solar array assembly and construction of the solar facility, which includes driving steel piles for the tracker support structures, installation of solar panels, electrical connections, and testing/verification.

Ridgely Solar would utilize industry standard practices to work with the existing landscape (e.g., slope, drainage, utilization of existing roads) where feasible and minimize or eliminate grading work to the extent possible. While the Project Site is primarily flat, any required grading activities would be performed with portable earthmoving equipment and would result in a relatively consistent slope to local land areas. Prior to grading, native topsoil would be removed from the area to be graded and stockpiled on-site for redistribution over the disturbed area after the grading is completed. Silt fence and other appropriate controls would be used (as needed) to minimize exposure of soil and to prevent sediment from leaving the work area. Disturbed areas would be seeded using a good mixture of certified weed-free, low-growing native grass seed. Erosion control measures would be inspected and maintained until vegetation in the disturbed areas has returned to the pre-construction conditions or the site is stable. Drainage features such as retention/detention basins and conveyance channels will be part of a comprehensive SWPPP, to be finalized as part of detailed Civil Engineering at project execution.

Grading would consist of the excavation and compaction of earth to meet the final design requirements. Due to the existing topography of the site and the use of single-axis tracking, cut and fill grading activities are not expected to be necessary at this time. If required, grading may include stripping, cutting, filling, stockpiling or any combination thereof. Grading activities at the site are expected to result in a net zero balanced cut and fill quantity of earthwork to the extent practical and therefore not require any off-site or on-site hauling. Clearing and grubbing would include the removal of trees, shrubs, and vegetation.

A project grading plan will be finalized during the design process. For the purposes of this EA, the proposed areas of temporary (e.g., laydown areas) and permanent disturbance (e.g., structures and panel footprints) are illustrated on Figure 2-3. Exclusion areas were identified by Ridgely Solar as being restricted from any development or construction activities; these areas, illustrated in red hatching on Figure 2-3, are considered not useable for the Project, because they contain wetlands, streams, floodplains, and/or sensitive resources. This site disturbance map shows that approximately 1,961 acres of the Project Site could be subject to grading and/or ground-disturbing activities and approximately 103 acres would be temporarily disturbed, including mowing and light surface preparation (i.e., clearing/grubbing of existing vegetation). The mowing and light surface preparation would be similar in nature to that of the current on-site agricultural activities. Where necessary, tall vegetation would be removed from both permanently and temporarily disturbed areas to reduce shading and maximize power production. Buffers of 50 ft (100 ft total width) would be maintained along each side of streams and around wetlands under federal or state jurisdiction as a conservative avoidance measure.

Waters that are jurisdictional under the CWA are subject to the regulatory requirements of Section 404, whereas waters that are not under federal jurisdiction likely are under state jurisdiction. Streams and wetlands would be avoided to the maximum extent practicable, in accordance with Executive Order (EO) 11990. Streams and wetlands considered non-jurisdictional by USACE may be waters of the state within the jurisdiction of TDEC and may require an ARAP if they would be impacted. Figure 2-3 identifies areas that may be permanently disturbed (i.e., converted to support solar panels or other facilities). The streams and wetlands under federal or state jurisdiction, shown on Figure 2-2, would be avoided during construction to the greatest extent feasible, although some minor work may occur within the buffer zones. Small

crossings or culverts may be installed within WWCs (if necessary) to access collection blocks once the final design is determined. Once areas to be avoided are marked, construction areas would be cleared and mowed of vegetation and miscellaneous debris. Ongoing mowing and clearing operations would continue, as needed, to control vegetation growth during construction (Figure 2-3).

Four on-site stormwater detention basins (totaling approximately 9 acres) would be constructed in appropriately designed locations on the Project Site (Figure 2-2). The final design and exact position of these conceptual drainage basins within the Project Site boundaries would be based on the most recent hydrology study and would function to temporarily store stormwater, minimize sediment releases, and reduce the rate of runoff. These basins would be constructed either by impoundment of a natural depression(s) or by excavating the existing soil. The bottom elevation and embankments of the ponds would be allowed to naturally reestablish native vegetation after construction (or be replanted as necessary) to provide natural stabilization, minimizing subsequent erosion. Water from the ponds would be released through specially designed outlet or discharge structures, which control the rate of outflow.

Water would be needed as a standard BMP for soil compaction and dust control during construction, including on access roads. During construction, the primary water use would be for dust control during grading activities. As grading activities are completed, overall Project water requirements would decrease, and construction-related dust control would be the primary water use. Portable toilets would be available on-site for the duration of the construction period. Water would be needed to a lesser extent during operations for minor dust control. Water needs during operations would also include the potable water well and leach field for the O&M Building.

Water in sufficient quantity and of the requisite quality would be expected to be made available for this Project through use of existing or newly-drilled on-site groundwater wells or delivery via water trucks; however, due to the temporary nature of the need for water only during construction, utilizing groundwater for construction activities is the preferred approach. Ridgely Solar would determine daily water requirements based on the preliminary grading plan and to determine the size of any new on-site wells. Ridgely Solar will perform groundwater drilling and testing work prior to full construction to generate data on aquifer characteristics and develop a plan for the production well design. Between two to four on-site groundwater supply wells would be utilized for the Project (depending on flow capacity of each well). The exact location and capacity of the wells would be identified in the final design. The wells would be spaced around the Project Site to provide easy access for construction water and to reduce the potential for any significant water level drawdown. The well field would include a sufficient number of standby wells to provide water in the event the primary wells are shut down for maintenance or water would be trucked in from an off-site source. On-site tanks may be utilized to store water during construction only.

If needed, construction of production wells would consist of conventional well-drilling techniques. A truck-mounted drilling rig would be set up at the identified installation location. No permanent drilling pad would be constructed, although gravel in the area would likely be used to temporarily stabilize the surface. Water based drilling muds (if required) would be collected and dewatered, with runoff occurring locally into nearby field areas. Because dewatered muds would be non-toxic, they could be spread as subsoil as part of the Project Site grading. Well construction would take place using power from the drilling truck, and a portable generator would be used for initial well testing and construction production. Well production during operation would be powered with electric motors off of the Project distribution power system.

One temporary construction yard/laydown area (approximately 16 acres; Figure 2-2) would be utilized during construction for job office trailers, equipment storage, material storage, and employee parking. The construction yard would be built shortly after Site access is granted to begin construction and would be

utilized throughout the construction period. Once all Project equipment and materials have been installed, a portion of the construction yard may be reclaimed and converted into a detention basin (Figure 2-2).

Series 6 solar modules (or functional equivalent) are designed for quick and easy two-person installation. Thus, the array assembly would occur on-site adjacent to the installation point. The mounting system likely to be selected for the Project would be manufactured by NEXTracker, or a functional equivalent tracking system would be used. Components of the mounting system would be pre-assembled by the manufacturer to the extent practicable and/or assembled at the site of installation. The system utilizes a bottom clamp system for installing Series 6 solar modules (or functional equivalent). In this solar tracker mounting system, a shared rail self-locates underneath the frames of two adjacent modules, reducing handling and install times. A single set of clamps are mounted to this rail, which are used to secure the two modules. During installation, the clamps pass through the module frame mounting slots and are then tightened to the mounting rail. Grounding of the module frame to the tracker structure is built-in to the rail system, without need for additional grounding components. Longer rows improve tracker economics and simplify DC wiring. Final assembly typically involves tractors and forklifts to place the trackers onto the support structures. The tracker assemblies would be arranged in parallel north-south rows.

During this work, multiple crews and vehicles would be working on the solar facility (average of 200 to 300 full-time workers on-site per day would either carpool or drive individually), including flatbed trucks for transporting the arrays (approximately 15 semi-tractor trailer trucks or other large vehicles visiting the site per day during a 6-month portion of the construction activities). The total number of deliveries to the Project Site is estimated at approximately 2,500 over the entire 12-month construction period. Array construction vehicles would include pick-up trucks to transport materials and workers on access roads and array aisles. A list of construction vehicles and their estimated usage is provided in Table 3.6-1. Access roads are typically 20 to 25 ft wide or less consisting of 12 inches of compacted native subgrade material and surfaced with 6 inches of compacted gravel. Access roads would be graded to slope of existing ground conditions, which would allow for proper drainage.

Typically, tracker support structures are constructed using steel piles. The driven steel pile foundation is typically galvanized and used where high load bearing capacities are required. The pile is driven with either a hydraulic ram or vibratory action. Soil disturbance is restricted to the pile insertion location with temporary disturbance from the hydraulic ram machinery, which is about the size of a small tractor. Adverse soil conditions may necessitate the use of screw piles which are driven into the ground with a truck-mounted auger. Screw piles create a similar soil disturbance footprint as driven piles.

Solar panels would be manufactured off-site and shipped to the Site ready for installation. Once most components are placed on their respective foundations and structures, electricians and support workers would run the electrical cabling throughout the solar field. After the equipment is electrically connected, electrical service would be tested, motors checked, and control logic verified. As the solar arrays are installed, the balance of the Project would continue to be constructed and installed and the electrical power and instrumentation would be placed. Once the individual systems have been tested, integrated testing of the Project would occur.

The proposed Project would also include both a Project Substation (Ridgely Solar, TN 161-kV Substation) and Switching Station (Lake County, TN 161-kV Switching Station) (Figure 2-2). Transmission system/electrical interconnection details are provided in Section 2.2.3.

The 2,344-acre Project Site consists of 13 parcels of land and one medium voltage easement currently owned by multiple private parties; these parcels would be acquired for the Project through lease or

purchase. For parcels which have existing structures, it would be expected that most structures would be demolished or relocated; however, some structures could ultimately be excluded from the Project boundary. TDEC asbestos renovation and demolition regulations apply to any building or structure known to contain asbestos or to any buildings proposed to be demolished. When any structures are proposed to be demolished, an asbestos demolition notification must be provided in advance, and proper pre demolition surveys need to be conducted to identify any regulated asbestos containing material (ACM) present. Prior to any demolition, all facilities must to be examined for ACM and all potential ACM in the buildings proposed for demolition must be handled and disposed of according to the applicable federal, state, and local regulations.

Due to the terrain and the large amount of agricultural land in the immediate vicinity, construction and operation of the Proposed Action would be primarily visible from up to 1 mi away, with significantly less visibility from between 1 to 2 mi away. For any existing occupied, residential structure within 300 ft of a solar panel where there is no existing vegetative buffer present, a vegetative buffer would be installed to create a screen for such residence. Security fencing would be installed prior to construction and would remain in place for the duration of the Project operation. Construction would be executed by utilizing local subcontractors and larger national and international subcontractors (where required) to supplement local resources. Construction activities for the Project would take approximately 12 months to complete using a crew that ranges from 200 to 300 workers. Work would generally occur Monday through Friday from 7 am to 7 pm. Additional hours could be necessary to make up schedule deficiencies or to complete critical construction activities. During the Project startup phase, equipment and system testing and similar activities could continue 24 hours per day, 7 days a week.

2.2.3 TVA Electrical Interconnection

Under the Proposed Action, TVA also proposes to build the interconnection facilities and communications equipment required to connect Ridgely Solar to the existing electrical grid. This includes the construction of a new 161-kV three-position ring bus station on the existing Tiptonville to Hwy 412/Dyersburg 161-kV transmission line, in addition to any required system protection, upgrades, and/or communication equipment on the existing 161-kV transmission line between the Tiptonville and Hwy 412/Dyersburg substations.

TVA will provide a tap connection and construct a new, permanent switching station. TVA would become the fee-simple owner of the land underlying the permanent switching station and would have a permanent access from Harry George Road. No new ROWs are required for this Project; however, some structural upgrades would be made on a portion of the nearby existing Tiptonville-Highway 412 161-kV transmission line. The portion of existing transmission line ROW requiring upgrades is shown on Figure 2-2 and is approximately 5.5 mi long and 100 ft wide (corridor).

To facilitate the operation of the proposed site and transmission line connection, TVA proposes to undertake the following activities:

- Installation of fiber OPGW on approximately 5.5 mi of the Tiptonville to Hwy 412/Dyersburg 161-kV transmission line (L5931) from the Ridgely Solar interconnection to the Tiptonville switching station;
- Installation of splice cases on Structures 199, 208, and 219, addition of steel X-braces on Structures 200, 202-203, 205, 207, 209-212, 217-222, and 224-227, and addition of an OPGW dead-end at Structures 208 and 219 on the Tiptonville to Hwy 412/Dyersburg 161-kV transmission line to accommodate the installation of the OPGW;

- Installation of telecommunication connections at the following sites: Weakley, MS; South Nashville, TN; South Jackson, TN; System Operations Center (SOC); and Power System Control Center (ROC);
- Modification of TVA system map boards to include names and numbers of the new transmission line and Lake County, TN 161-kV Switching Station; and
- Two new 3-pole transmission structures (Photo 2-3) would be installed at the junction of a new loop line and the Tiptonville to Hwy 412/Dyersburg 161-kV line. The new loop line would consist of two, approximately 200-ft spans of 161-kV transmission line along with associated OPGW.

Photo 2-3. Example of switch structures and associated 3-pole transmission structure at a transmission line tap point

2.2.3.1 TVA Transmission Line Upgrades

During early project development and discussions with TVA, it was determined that the Ridgely Solar Facility could be constructed and operated using the communication path provided by the 5.5-mi long OPGW being installed from the TVA Tiptonville Substation to the proposed Lake County, TN 161-kV Switching Station described previously. However, due to TVA's communication requirements for anticipated future generation resources, the 23-mi long transmission upgrade is likely to be constructed at some point following the development of additional details regarding the network upgrades, such as the exact locations of pull points or any potential pole replacements, are still being developed, and the identification and consideration of any affected environmental resources. Therefore, the 23-mi long transmission upgrade would likely be reviewed and permitted under a separate action in the future.

Additional details regarding the network upgrades, such as the exact locations of pull points or any potential pole replacements, are still being developed. Supplemental NEPA analysis would be conducted if additional environmental resources are affected.

2.2.3.2 Right-of-Way Clearing

Although this Project does not include the addition of any new transmission lines or ROW (i.e., no ROW acquisition is required), upgrade activities within an approximately 5.5-mi long stretch of existing transmission line ROW would be necessary.

Because the area in which the proposed transmission line upgrades would occur is within the existing transmission line ROW, limited clearing would be expected within the existing ROW. Based on recent site surveys (Cardno 2020), there are no trees present within the existing 5.5-mi long ROW that would require clearing. In areas where clearing is needed to maintain adequate clearance between tall vegetation and transmission line conductors and to provide access for construction equipment, vegetation would be

removed from the ROW. Equipment used during this ROW clearing could include chain saws, skidders, bulldozers, or tractors. Woody debris and other vegetation would be piled and burned, chipped, or taken off-site. Vegetation removal in buffer zones and wetlands would be restricted to vegetation tall enough, or with the potential to soon grow tall enough, to interfere with conductors. Clearing in buffer zones would be accomplished using hand-held equipment or remote-handling equipment in order to limit ground disturbance. *TVA ROW Clearing Specifications, Environmental Quality Protection Specifications for Transmission Line Construction, Transmission Construction Guidelines Near Streams* (Appendices A, B and C), and *Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities* (TVA 2017) would provide guidance for clearing and construction activities.

Following clearing and upgrade activities, vegetative cover on the ROW would be restored to its condition prior to construction, to the extent practicable, utilizing appropriate seed mixtures as described in *A Guide for Environmental Protection and BMPs for TVA Construction and Maintenance Activities* (TVA 2017). Erosion controls would remain in place until the plant communities become permanently established/stabilized. Streamside areas would be revegetated as described in Appendices A, B and C, and in *A Guide for Environmental Protection and BMPs for TVA Construction and Maintenance Activities* (TVA 2017). Native vegetation or plants with favorable growth patterns (slow growth and low mature heights) would be maintained within the ROW following construction.

2.2.3.3 Transmission Line Construction

Transmission-related project features would be accessed using existing access roads to the extent possible. Access roads would be needed to allow vehicular access to each structure and other points along the ROW during the construction period. Typically, temporary access roads used for transmission lines are located on the ROW wherever possible and are designed to avoid severe slope conditions and minimize stream crossings. Temporary access roads are typically about 10 ft to 20 ft wide and are surfaced with dirt, mulch, or gravel. Culverts and other drainage devices, fences, and gates are installed as necessary. Culverts may be left or removed, depending on the wishes of the landowner or applicable permit conditions. If desired by the property owner, TVA would restore new temporary access roads to previous conditions.

Construction assembly areas (laydown areas) would be required for worker assembly, vehicle parking, and material storage during construction. The approximate locations of these areas are shown on Figure 2-2.

Two new 3-pole transmission structures (Photo 2-3) would be installed at the junction of a new loop line and the Tiptonville to Hwy 412/Dyersburg 161-kV line. The structures would use steel poles between 80 and 120 ft tall. Three conductors (the cables that carry the electrical current) are required to make up a single-circuit, alternating-current transmission line. Each conductor would be attached to a porcelain insulator suspended from the structure cross arm. A smaller overhead ground wire containing fiber optic communication cables would be attached to the top of the structures.

Most poles would be directly imbedded in holes augured into the ground to a depth equal to 10 percent of the pole's length plus an additional 2 ft. Typically, the holes would be backfilled with the excavated material, but, in some cases, gravel or a concrete-and-gravel mixture would be used. Poles at angles (angle points) in the transmission line would be self-supporting or require supporting screw, rock, or log-anchored guys.

Equipment used during the construction phase would include trucks, truck-mounted augers, and drills, as well as tracked cranes and bulldozers. Low ground-pressure-type equipment would be used in specified locations (such as areas with soft ground) to reduce the potential for environmental impacts.

Reels of conductor and OPGW would be delivered to the Site. A small rope would be pulled from structure to structure. This rope would be connected to the conductor and used to pull it down the line through pulleys suspended from the insulators from pull-points along the ROW. A bulldozer and specialized tensioning equipment would be used to pull conductors and ground wires to the proper tension. Crews would then clamp the wires to the insulators and remove the pulleys. The OPGW would be installed in a similar manner. Prior to installing the OPGW, the existing steel ground wire would be unclipped from the structures and removed using a pulley system from pull points along the ROW. The OPGW would be spliced to existing communication lines at each end of its span.

2.2.3.4 Switching Station Construction

The Proposed Action includes the construction of one on-site Project Substation owned by Ridgely Solar to step up medium-voltage power to high-voltage power for subsequent transfer to TVA; and one TVA-owned high-voltage Switching Station (Lake County, TN 161-kV Switching Station). *TVA Environmental Quality Protection Specifications for Transmission Substation or Communications Construction* (Appendix D) would provide guidance for clearing and construction activities. The Ridgely Solar, TN 161-kV Substation and Lake County, TN 161-kV Switching Station will be in close proximity to each other in the northeast corner of the Project Site. The Ridgely Solar, TN 161-kV Substation will combine all the AC power from the collection circuits and increase its voltage to match the voltage of the connecting transmission line. This substation would include buses, circuit breakers, disconnect switches, and the main step-up transformer. The high-voltage Lake County, TN 161-kV Switching Station's specific function is to enable the facility to tap into the main transmission line through a breaker scheme of TVA's choosing (breaker-and-a-half, ring-bus, etc.), which would allow the transmission line to be isolated in either direction or allow isolation of the solar array itself from the transmission line.

The proposed Ridgely Solar, TN 161-kV Substation, the Lake County, TN 161-kV Switching Station, and the Project O&M Building combined would occupy less than 15 acres (Figure 2-2) and would consist of a 34.5/161-kV main transformer, multiple 161-kV breakers, motor-operated and manually operated switches, a control enclosure, instrument transformers for metering, and galvanized steel support structures within an 8.5-ft-tall fenced enclosure. The control enclosure would measure approximately 15 ft by 45 ft and would house the protection and control equipment, metering equipment, automation relay panels, and communication equipment. The Project O&M Building will consist of a small building, leach field, and potable water well.

Galvanized steel would support most of the substation/switching station equipment. Concrete foundations and embedments for equipment would be installed with trenching machines, concrete trucks and pumpers, vibrators, forklifts, boom trucks, and large cranes. Above-ground and below-ground conduits from this equipment would run to the control enclosure. A station service transformer would be installed for auxiliary AC power requirements, such as operating the solar array tracker motors. Battery banks and chargers would be installed inside the enclosure to provide backup DC power. For personnel safety and equipment protection during faulted conditions, a ground grid would be installed in the area. This would consist of appropriately sized conductors meshed and buried below ground. Each piece of equipment and supporting structure within the substation would be electrically connected to the ground grid per the requirements of Institute of Electrical and Electronics Engineers (IEEE) Standard 80.

After the final voltage step-up, the Project would be interconnected to the proposed 161-kV TVA transmission line to connect to the electrical system.

2.2.3.5 Transmission Line Operation and Maintenance

Periodic inspections of transmission lines are performed by helicopter aerial surveillance after operation begins. Foot patrols or climbing inspections are also performed in order to locate damaged conductors, insulators, or structures, and to discover any abnormal conditions that might hamper the normal operation of the line or adversely affect the surrounding area. During these inspections, the condition of vegetation within the ROW, as well as immediately adjoining the ROW, is noted. These observations are then used to plan corrective maintenance and routine vegetation management.

TVA vegetation management standards, based on National Electrical Safety Code requirements, require a minimum vegetation clearance of 24 ft for 161-kV transmission lines. Vegetation management along the ROW would consist of the felling of danger trees adjacent to the cleared ROW (as described above in the Right-of-Way Clearing Section) and vegetation control within the cleared ROW. These activities occur on approximately 3- to 5-year cycles. TVA utilizes an integrated management approach for its ROW vegetation management that is designed to encourage low-growing plant species and discourage tall-growing plant species. A vegetation re-clearing plan is developed for the transmission line, based on the results of the periodic inspections described above. The two principal management techniques are mechanical mowing (using tractor-mounted rotary mowers) and herbicide application. Herbicides are normally applied in areas where heavy growth of woody vegetation is occurring on the ROW and mechanical mowing is not practical. Herbicides would be selectively applied by helicopter or from the ground with backpack sprayers or vehicle-mounted sprayers. Provided the current agricultural land use continues, little ROW maintenance would be required in the future.

Any herbicides used are applied in accordance with applicable state and federal laws and regulations. Only herbicides registered with the U.S. Environmental Protection Agency (EPA) are used. A list of the herbicides currently used by TVA in ROW management is presented in Appendix E. This list may change over time as new herbicides are developed or new information on presently approved herbicides becomes available.

Other than vegetation management, little maintenance work is generally required. The transmission line structures and other components typically last several decades.

2.2.4 Operations

During operation of the Ridgely Solar Project, no major physical disturbance would occur. Moving parts of the solar array would be restricted to the east-to-west facing tracking motion of the solar modules, which amounts to a movement of less than a 1 degree angle every few minutes (barely perceptible). At sunset the modules would track to a flat stow position. Otherwise, the PV modules would simply collect solar energy and transmit it to the TVA power grid. Apart from routine maintenance, periodic motor replacement, inverter air filter replacement, fence repair, vegetation control, and periodic array inspection, repairs, and maintenance, the Project Site would be relatively undisturbed.

Vegetation on the Site would be actively maintained to control growth and prevent overshadowing or shading of the PV panels. For vegetation control during operations, Ridgely would implement traditional mechanized landscaping using lawnmowers, string trimmers, herbicides (pre-emergent and post-emergent), etc. When possible, electric-powered lawn equipment would be used for routine long-term site maintenance activities to help reduce noise, emissions, fuel costs, and waste associated with traditional gas-powered models. Traditional trimming and mowing would be performed on an interval basis to maintain the vegetation at a height of less than 2 ft. During operations, selective use of herbicides may also be employed around structures to control vegetation. Herbicides would be applied per the EPA-approved label or by certified, licensed applicators.

Once operating, one to three regular O&M employees would be on-site as needed for scheduled/preventative maintenance or any unscheduled maintenance or outages. Routine maintenance work would normally take place during daylight hours on weekdays. Any work that might interfere with power production may occur in the early evening hours. Should a more complex repair or O&M activity be needed, such as an inverter module replacement, additional contract employees may be brought on-site to assist.

Very little water would be required during operations. There may be an occasional need to wash panels, but for this region of the country, normal rainfall would generally be sufficient to keep the panels clean of dust. In the case of extreme weather events, such as drought, water could be trucked in for panel washing. This work would take place primarily during early morning hours or late in the day, avoiding "peak" sun/heat hours to minimize impacts to generation and minimize evaporation. A temporary crew of up to 12 people along with water trucks would be brought on-site, if necessary. Reverse Osmosis or distilled water from an off-site source, without detergents or other additives, would be utilized and applied to modules by driving up and down the rows of modules. Module washing would take place no more than twice a year and water volumes would be so minimal that runoff is not expected to be generated by the washing process. Therefore, it is assumed that operation of this site would not require an NPDES permit for point source discharges.

In addition to on-site personnel, the proposed Project would be monitored remotely from the Ridgely Solar operational headquarters on a 24-hour a day, seven day a week basis to identify any security or operational issues. In the event a problem is discovered during non-working hours, a repair crew or law enforcement personnel would be contacted if an immediate response is warranted.

2.2.5 Decommissioning and Reclamation

The Proposed Action would operate and sell power under a PPA with TVA for the first 20 years of its life. At the end of the useful life, Ridgely Solar would assess whether to cease operations at the Project Site or replace equipment and attempt to enter into a new power purchase contract or other arrangement. If TVA or another entity is willing to enter into such an agreement, the Project could continue operating. If no commercial arrangement is possible, and if TVA opts not to exercise their option for purchase at the end of the 20-year term, the facilities would be decommissioned and dismantled, and the Project Site would be restored. In general, the majority of decommissioned equipment and materials would be recycled. Key components, including the Series 6 solar modules (or functional equivalent) to be used by Ridgely Solar, realize high recycling rates at the component supplier's state-of-the-art recycling facilities. With respect to the Series 6 solar modules (or functional equivalent), up to 90 percent of the semiconductor material can be reused in new modules and 90 percent of the glass can be reused in new glass products. Materials that cannot be recycled would be disposed of at approved facilities.

General decommissioning and reclamation activities are described below. Decommissioning activities would typically include:

- Dismantling and removal of above ground equipment (solar panels, panel supports, transformers, Project Substations, etc.);
- Removal of below ground electrical connections;
- Removal of posts;
- Plugging and abandonment of water wells (with landowner consent); removal of the top 2 ft of well casing and replacement of native soil and vegetation (TDEC 2015).

- Break-up and removal of concrete pads and foundations;
- Abandonment of underground utilities;
- Stabilization of site soils per NPDES construction permit (if required for decommissioning activities); and
- Scarification of compacted areas within and contiguous to the solar facility.

2.3 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

In determining the suitability for development of a site within TVA's service area that would meet the goals of expanding TVA's renewable energy portfolio as expressed in the 2019 IRP and meet customer demand, multiple factors were considered to screen many potential locations and ultimately eliminate those sites that did not provide the necessary attributes. This process of review and refinement ultimately led to the consideration of the current Project Site. The alternative site screening process consisted of several iterations of refinement prior to arriving at the proposed site (Figure 2-4).

Iteration one consisted of general solar resource screening within TVA's service area. In addition, further screening consisted of identifying suitable large-scale landscape features that would allow for utility scale solar development, such as areas with the following characteristics:

- Generally flat landscape with minimal slope, with preference given to disturbed contiguous land with no on-site infrastructure or existing tall infrastructure in the immediate vicinity;
- Land having sound geology for construction suitability, lacking floodplains or large forested or wetland areas; and
- Ability to avoid and/or minimize impacts to known sensitive biological, visual and cultural resources.

The second iteration of the alternative site screening process consisted of evaluation of the existing electrical transmission system and the capability of supporting the development of a large-scale solar power facility. Areas with nearby loads, planned large reductions in generating capacity or a combination of the two were incorporated into the expectation for transmission system suitability.

Iteration three consisted of desktop mapping of wetlands and other environmental features to evaluate suitability of the land within the already refined areas. Areas with large wetlands and other environmental features would involve additional impacts and require additional costs to successfully develop, and therefore, such areas were eliminated. After this refinement, land ownership was evaluated to determine the level of cost and the timeline required to secure the necessary site. Sites with either one landowner or a few landowners were generally favored over those with multiple landowners. Additionally, landowner contact information was collected, and initial interest gauged through telephone calls and email conversations.

The list of candidate sites for the final project siting was ultimately narrowed down to two sites, the Ridgely Solar Site and "Site #2", based on the above-mentioned criteria. Site #2 consists of over 1,500 acres of agricultural land and is generally comparable to that of the Ridgely Solar Site.

Iteration	Criteria	Ridgely Solar Site	Site #2
Iteration 1			
	Solar resource screen	●	●
	Flat landscape	●	●
	Contiguous	●	●
	Geology for construction suitability (minimal floodplains or forested/wetland areas)	●	●
	Ability to avoid/minimize impacts to known sensitive biological, visual and cultural resources	●	●
Iteration 2			
	Capability of existing electrical transmission system to support project without material network upgrades	●	●
	Beneficially positioned on TVA's transmission system for this RFP	●	●
Iteration 3			
	Suitability after desktop mapping of wetlands and other environmental features	●	●
	Cost of Land	●	●
	Timeline to secure land control	●	●
	Interconnection timing requirements suitable for development schedule	●	●

● Criteria Satisfied
● Criteria Not Satisfied

Figure 2-4. Alternative Site Screening Process

Analyses were performed on both sites to identify high-level development and permitting constraints. These included identification of known environmentally sensitive resources and potential land use or zoning conflicts. Separately, a preliminary review of the transmission systems to which the Project at each location would interconnect was conducted. Since location on TVA's transmission system played an important role for this opportunity, Site #2 was eliminated from further consideration due to the distance from the customer's load, particularly in comparison to Ridgely's more advantageous positioning. The list of candidate sites for the final Project siting was ultimately narrowed down to the Ridgely Solar Project Site.

2.4 COMPARISON OF ALTERNATIVES

Due to the reasons listed above, it was determined that the scope of this EA evaluates the potential environmental effects that could result from implementing the No Action Alternative or the Proposed Action at the Ridgely Solar Project Site in Lake County, Tennessee. The analysis of impacts in this EA is based on the current and potential future conditions on the property and within the surrounding region. A comparison of the impacts of the alternatives is provided in Table 2-1.

2.5 THE PREFERRED ALTERNATIVE

The TVA-preferred alternative for fulfilling the purpose and need for this Project is the Proposed Action. The Preferred Alternative (Proposed Action) would produce renewable energy for TVA and its customers with only minor direct and indirect environmental impacts, would help meet TVA's renewable energy goals, and would help TVA meet customer driven energy demands on the TVA system.

Table 2-1. Comparisons of Impacts by Alternatives

Resource Area	Impacts from the No Action Alternative (Status Quo)	Impacts from Proposed Action
Land Use	No direct impacts anticipated. Land will remain predominantly disturbed agricultural land. Indirect impacts are possible as undeveloped land may become residential or abandoned over the long term.	Minor direct adverse impacts with the Project Site. Land use on the Project Site would change from residential and agricultural to industrial. The surrounding area, however, is largely agricultural and undeveloped with some low-density residential and industrial areas, which would not change. No direct impacts within the transmission line ROW. No indirect impacts within the Project Area.
Geology, Soils, and Prime Farmland	No direct impacts anticipated. Indirect impacts to geologic and soil resources are possible over time if agricultural or undeveloped land becomes developed. Minor impacts to individual structures or portions of the TVA Tiptonville to Hwy 412/Dyersburg 161-kV transmission line. If current agricultural practices are continued, soils could become depleted or eroded over time. Both possibilities would result in minor soil changes on the Project Site.	Minor adverse impacts to geology and soils at excavation locations within the Project Site and transmission line ROW. Moderate impacts to the Project Area or project-related equipment associated with potential seismic activity. Minor adverse impacts to soils within the Project Area related to erosion and sedimentation from site construction and operation, in addition to transmission ROW upgrades and maintenance activities. Minor adverse impact to prime farmland soils within the Project Site due to conversion of 2 percent of prime farmland in Lake County. No impacts to prime farmland soils within the transmission line ROW. No indirect impacts anticipated within the Project Area.

Table 2-1. Comparisons of Impacts by Alternatives

Resource Area	Impacts from the No Action Alternative (Status Quo)	Impacts from Proposed Action
Water Resources	No direct impacts anticipated. Indirect impacts to water resources could result due to the continuing use of the Project Site as agricultural land. Increases in erosion and sediment runoff could occur if farming practices were not maintained to prevent this. Erosion and sedimentation on-site could alter runoff patterns on the Project Site and impact downstream surface water quality. In addition, if chemical fertilizers and pesticides are continually used, impacts to groundwater may occur if the local aquifers are recharged from surface water runoff.	**Groundwater**: No direct adverse impacts anticipated. Groundwater is available in sufficient quantity and quality for new wells installed to supply potable water for the O&M building and supply non-potable water for cleaning the solar arrays. Potential spills of fuels, lubricants, and other fluids during construction and maintenance would be minimized through the use of BMPs and spill prevention/response procedures. Indirect minor beneficial impacts could result from reducing fertilizer and pesticide runoff entering groundwater. Activities related to the electrical interconnection of the Project Site with the existing TVA transmission line, as well as planned upgrades to the existing line would not impact groundwater. **Surface Water:** Stream buffers (50 ft) would be maintained as a conservative avoidance measure to protect federal and state jurisdictional streams, and these streams would not be permanently disturbed by construction. During construction, runoff of sediment could adversely impact surface water quality. With the use of BMPs, these adverse impacts would be temporary and minor. Indirect minor beneficial impacts could result from reducing fertilizer and pesticide runoff from the land's previous use from entering surface waters. **Floodplains:** Minor direct and indirect adverse impacts would be minimized by adhering to standard BMPs during construction. **Wetlands:** Minor, direct, adverse impact from the unavoidable loss of isolated wetlands totaling approximately 0.01 acre**.** Minor direct adverse impacts to other on-site wetlands would be minimized with the use of BMPs, including maintaining 50-ft buffers around each wetland and avoiding the use of footings. No indirect impacts anticipated. Upgrade/improvement activities to the existing TVA transmission line are not expected to directly impact wetlands. Adherence to TVA specifications and BMPs would minimize the potential for indirect impacts.

Table 2-1. Comparisons of Impacts by Alternatives

Resource Area	Impacts from the No Action Alternative (Status Quo)	Impacts from Proposed Action
Biological Resources	No direct impacts anticipated. Potential indirect impacts if current human practices are discontinued.	**Vegetation:** Minor temporary direct and indirect adverse impacts associated with clearing/grading of previously disturbed land. The impacts of converting approximately 1,853 acres of cropland on the Project Site to herbaceous vegetation would be relatively small and potentially beneficial with respect to the diversity and abundance of native grasses and other herbaceous vegetation that would be planted and maintained in the Project Area. An additional 1.7 acres of forest would be cleared and converted to herbaceous vegetation. In the ROW, maintained vegetation would be temporarily impacted in places, but would be re-established. **Wildlife:** Overall, direct impacts on wildlife in the Project Area would be minor. These impacts would be minimized by the ability of mobile species to avoid construction activities, colonize similar habitats surrounding the project area, and potentially recolonize the project area after the completion of construction and revegetation. Indirect impacts also would be very minor as displaced wildlife would colonize similar habitats that are abundant in adjacent areas. **Threatened & Endangered (T&E) and Other Rare Species:** A small amount of suitable summer roosting habitat for Indiana bat and northern long-eared bat would be removed (1.7 acres). Trees would be removed in winter (October 15-March 31) to avoid direct impacts to these bats. Consultation with USFWS under Section 7 of the ESA concluded with concurrence on January 25, 2021. Suitable habitats for other terrestrial and aquatic T&E species are either not present in the Project Area, would be avoided, and/or the use of buffers and BMPs would protect such species in the vicinity from direct and indirect effects.

Table 2-1. Comparisons of Impacts by Alternatives

Resource Area	Impacts from the No Action Alternative (Status Quo)	Impacts from Proposed Action
Visual Resources	No direct or indirect impacts anticipated. Potential indirect impacts if current land use changes to residential development over time.	Due to the terrain and the large amount of agricultural land in the immediate vicinity, construction and operation of the Proposed Action would be visible from up to 1 mi away. These impacts may be mitigated with vegetative screening. For any existing occupied, residential structure within 300 ft of a solar panel where there is no existing vegetative buffer present, a vegetative buffer will be installed to create a screen for such residence. Minor temporary direct and indirect adverse impacts during construction related to vegetation removal and use of heavy equipment. Minor long term direct visual impacts in the immediate area, minor direct impacts over a larger scale due to the small number of available observers, intervening vegetation which would act as a visual screen, and additional vegetative screening mitigations that would be implemented.
Noise	No direct or indirect impacts anticipated. Potential indirect impacts if current land use changes to residential development over time.	Minor temporary direct and indirect adverse impacts during construction. Negligible adverse impacts associated with operation.
Air Quality and Greenhouse Gas Emissions	Minor direct impacts. No indirect impacts anticipated.	Minor, temporary adverse impacts during construction. Minor beneficial impacts from operation due to a potential decrease in overall pollutant emissions.
Cultural Resources	Minor direct impacts. No indirect impacts anticipated.	No direct or indirect impacts anticipated because culturally sensitive areas would be avoided.
Natural Areas and Recreation	No direct or indirect impacts anticipated.	No direct or indirect impacts anticipated.
Utilities	No direct or indirect impacts anticipated.	No direct or indirect adverse impacts anticipated.
Waste Management	No direct or indirect impacts anticipated.	No significant direct or indirect adverse impacts anticipated with the use of BMPs.

Table 2-1. Comparisons of Impacts by Alternatives

Resource Area	Impacts from the No Action Alternative (Status Quo)	Impacts from Proposed Action
Public and Occupational Health and Safety	No direct or indirect impacts anticipated.	With mitigation, minor temporary adverse impacts during construction of the Proposed Action, including transmission ROW work. No indirect impacts.
Transportation	No direct or indirect impacts anticipated.	With mitigation, minor temporary direct adverse impacts during construction of the Proposed Action, including transmission ROW work. No indirect impacts anticipated.
Socioeconomics	No direct or indirect impacts anticipated.	Minor beneficial and long-term direct impacts from construction and operation of the Project. Minor beneficial short-term indirect impacts from materials and services purchased, and expenditure of the workforce wages in the local area. The local tax base would increase from construction of the solar facility and would be most beneficial to the Lake County area.
Environmental Justice	No direct or indirect impacts anticipated.	No direct or indirect impacts anticipated.

CHAPTER 3

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the existing environmental, social, and economic conditions of the proposed Project Site and the surrounding areas that might be affected if the No Action Alternative or the Proposed Action are implemented, as well as the potential environmental effects that could result from implementing the No Action Alternative or the Proposed Action.

3.1 LAND USE

This section describes an overview of the existing land use at and surrounding the Project Area and potential impacts to land use associated with the No Action Alternative and the Proposed Action. The Project Area is located in a rural setting in the north-western portion of Lake County, Tennessee. The Project Site consists of 13 parcels of land and one medium voltage easement currently owned by multiple private parties. These parcels total approximately 2,344 acres and comprise the Project Site. The Project Site is located less than 1 mi southeast of Wynnburg, approximately 2 mi north of Ridgely, and approximately 5 mi south of Tiptonville. State Road 78/Headden Drive runs north-to-south and bisects the Project Site (Figure 2-1).

3.1.1 Affected Environment – Land Use

Land use is defined as the way people use and develop land, including uses such as undeveloped, agricultural, residential, and industrial uses. Many municipalities develop zoning ordinances and planning documents to control the direction of development and to keep similar land uses together. Land cover information assists in the identification of issues related to ecosystem health and patterns of landscape use, the derivation of landscape pattern metrics, the recognition of patterns of biodiversity, and the development of land management policies. The National Land Cover Database (NLCD) is a comprehensive dataset based on decadal Landsat satellite imagery and supplemental information from a variety of Federal agencies. As a national dataset, the NLCD allows for consistent analysis across broad areas of the United States, including the Study Area (NLCD 2016a).

The Project Area is not located within city or town limits, but rather in an unincorporated part of Lake County; there are no specific zoning ordinances in rural Lake County. The closest area which has a written comprehensive development plan is the City of Dyersburg, located approximately 23 mi south of the Project Site (Figure 1-1). Land use on the Project Area is not controlled by any municipality.

The National Land Cover database classifications show the Project Area as mostly agricultural land, primarily cultivated crops with areas of soybeans, cotton, corn, sorghum, and vegetables (Figures 3.1-1 and 3.1-2). The Project Site consists of relatively flat terrain with slight rises and depressions across the Project Site, and ranges in elevation from approximately 80-90 ft above mean sea level (msl). Several small stands of shrubs and trees are present across the Project Site. The Mississippi River is located approximately 3.8 mi to the west of the Project Site, and Reelfoot Lake is located approximately 2.7 mi northeast of the Project Site. Additionally, Blue Bank Bayou is located adjacent and within the Project Site and serves as a tributary to the Mississippi River and Reelfoot Lake. Tiptonville and Ridgely are the largest incorporated towns in the county (USDA 2019a).

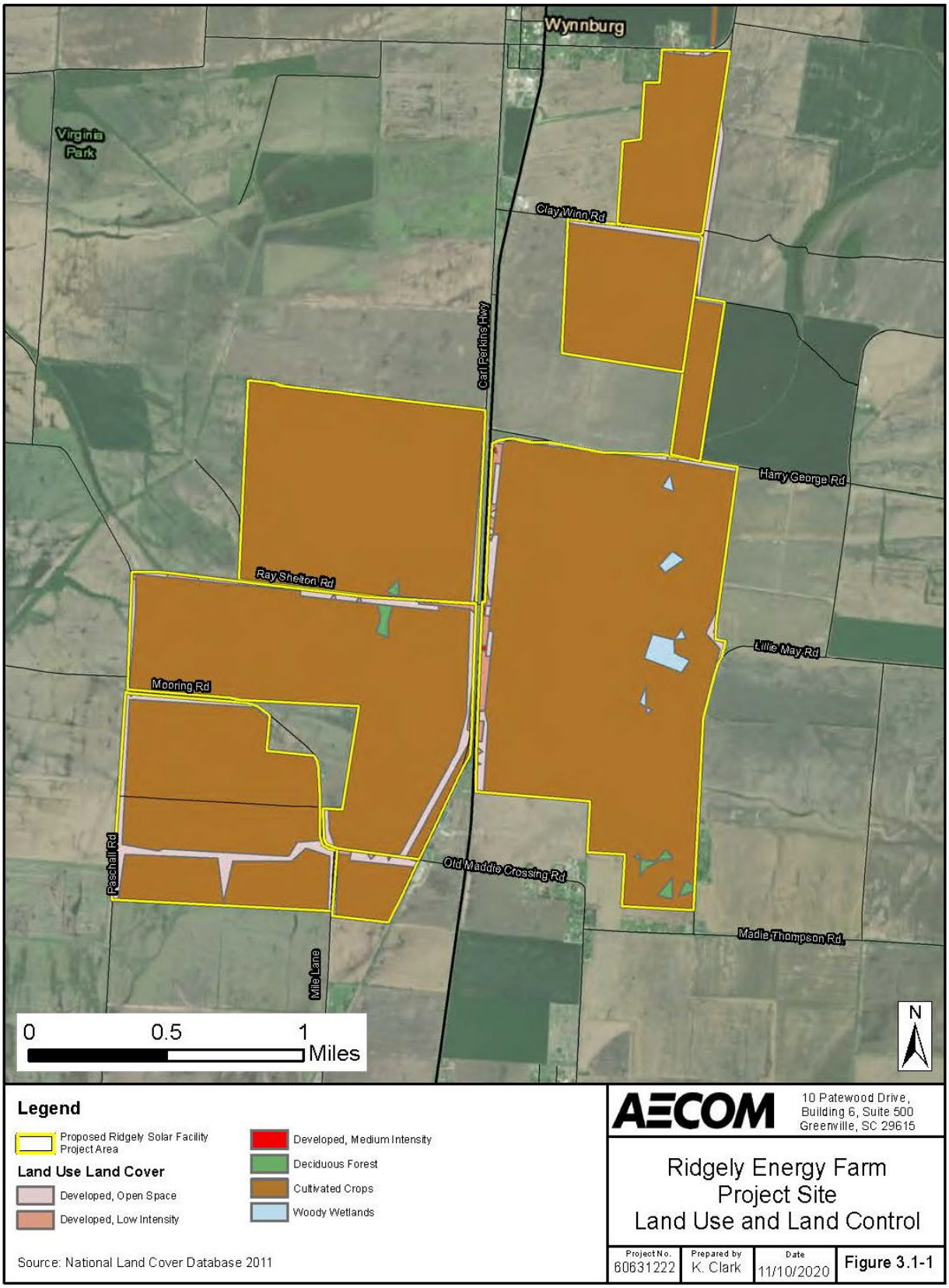

Figure 3.1-1. Project Site Land Use and Land Cover Map

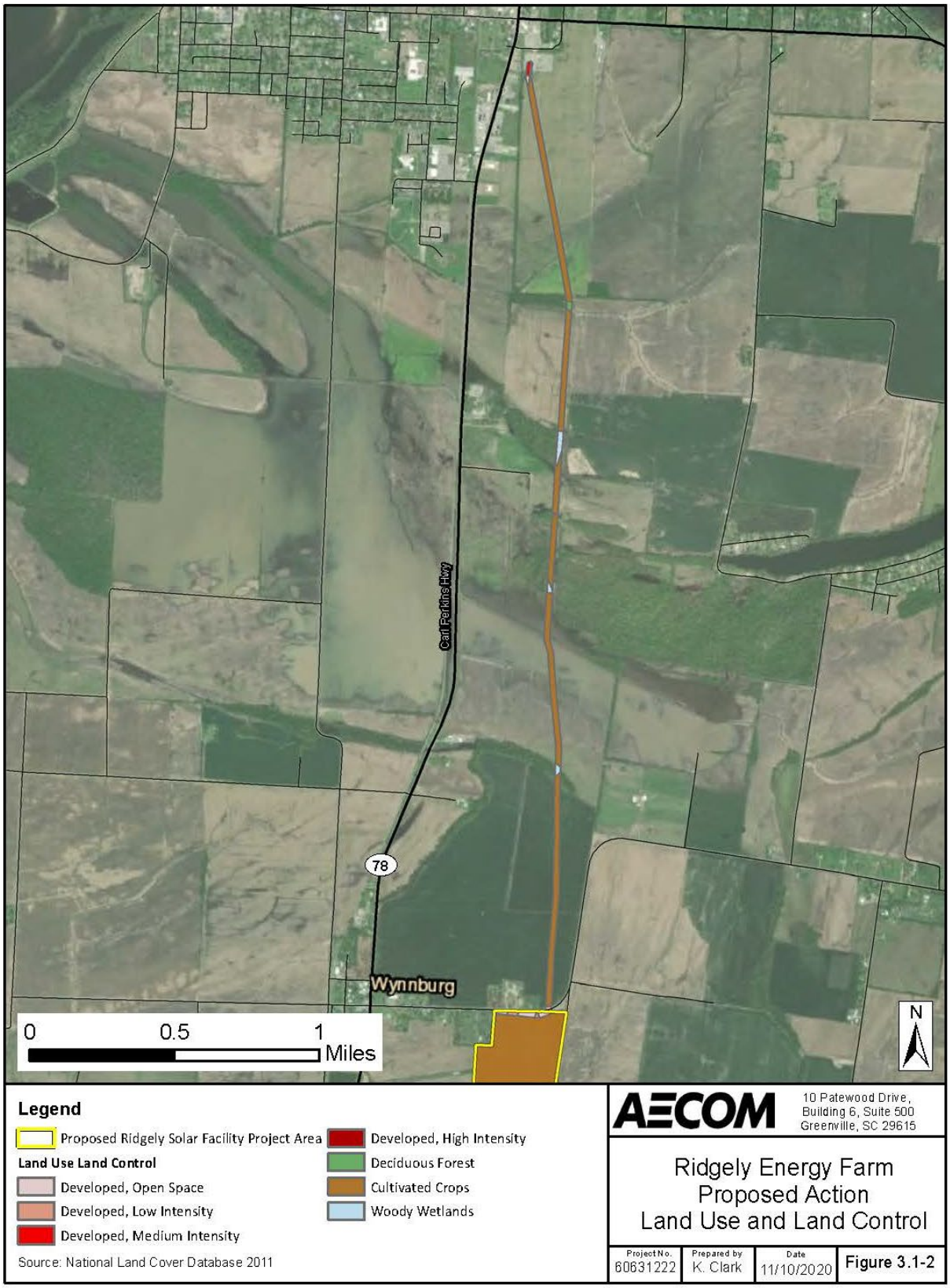

Figure 3.1-2. Transmission ROW Land Use and Land Cover Map

Very little of the Project Area (proposed solar facility site and associated transmission ROW) is developed, though residential structures and farm buildings are scattered across the site. For parcels containing existing structures that are acquired for the Project, it would be expected that most structures would be relocated or demolished; however, the potential exists for some residences, particularly those close to the county road, to ultimately be excluded from the Project Site. Additional residential structures and farms surround the Project Site on all sides.

Land use in the vicinity of the Project Area, including the existing 28.5-mi long Tiptonville to Hwy 412/Dyersburg 161-kv transmission corridor, is also primarily agricultural (cultivated crops); some low-density residential structures are located throughout this area (Figure 3.1-2). The transmission line ROW from Tiptonville to Dyersburg occupies a land use easement for the express purpose of the transmission line. The southern portion of transmission ROW crosses a small area of Deciduous Forest and Hay/Pasture to the northeast of Lenox, TN, then remains in mostly agricultural land until it nears Dyersburg when the ROW abuts more developed areas (Figure 3.1-2). Land cover within the ROW is primarily grasses and low shrubs which are periodically mowed and maintained to prevent encroachment on the transmission line and to enable full access to the line as needed. Topography varies over the full extent of the line from relatively flat terrain in the northern areas of the project to steeper, hilly region in the south north of Dyersburg.

3.1.2 Environmental Consequences – Land Use

This section describes the potential impacts to land use should the No Action Alternative or the Proposed Action be implemented.

3.1.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility and transmission line upgrades would not be constructed; therefore, no project-related impacts to land use would result. Existing land use would be expected to remain largely cultivated crops and undeveloped land.

Indirect impacts to land use are possible as growth occurs within the towns of Ridgely, Tiptonville, and Wynnburg. Over time, it is possible that the agricultural land use of the project site could change if the resident population in the area grows significantly. Additionally, if the agricultural activities on the Project Site are discontinued, land could revert to undeveloped property. Indirect impacts to land use are possible under the No Action Alternative as agricultural land may become residential or abandoned over the long term.

3.1.2.2 Proposed Action

Under the Proposed Action, impacts to land use would be expected on the Project Site; no impacts would be anticipated in the transmission line ROW as land use within the corridor would not change. Land use on the Project Site would be converted from agricultural and residential to industrial. Figure 2-2 shows the Proposed Project layout of the solar arrays and associated facilities; Figure 2-3 shows the proposed ground disturbance (both temporary and permanent) and exclusion areas. Within the Project Site, streams and wetlands (i.e., waters that are subject to federal regulatory requirements of the CWA or state requirements), and culturally sensitive areas would be avoided and protected from disturbance to the extent practicable. Within a 23.4-acre, low-quality, agricultural wetland area under state jurisdiction and currently used for crop cultivation, only approximately 0.01 acre would be impacted by the installation of support pilings for solar arrays. The loss of wetland acreage would be negligible, and with the cessation of crop cultivation, wetland vegetation likely would become reestablished throughout this 23.4-acre area during the period of operation.

Thus, wetland impacts from new construction would be avoided to the maximum extent practicable and the area affected would be negligible, while the functional quality of the wetland would increase. The construction and maintenance of the Project transmission-related features would also require access roads capable of supporting heavy equipment (discussed in Section 2.2.3.2).

The surrounding area is largely agricultural and undeveloped with some developed open space, low-density residential, woody wetlands and deciduous forests, which is not likely to change significantly over the next 20 years. As a relatively small portion of a very large land use category in the vicinity would be lost, the Proposed Action would have an overall minor adverse impact that would be limited to the Project Site. Decommissioning of the solar facility would remove above ground equipment, concrete pads and foundations, posts, and below ground electrical connections from the Project Site. Some underground utilities may be abandoned in place. Groundwater wells would be plugged and abandoned with the well casing removed to below 2 ft of ground surface and replaced with native soil and vegetation (TDEC 2015). Reclamation activities, including breaking up soil compacted areas, could allow a large portion of the Project Site to be returned to agricultural use. The activities associated with the Proposed Action would not have any indirect effects on land use within either the Project Site, the transmission line ROW, or the surrounding area.

3.2 GEOLOGY, SOILS AND PRIME FARMLAND

The existing geological resources within the Project Site and the potential impacts on these geological resources associated with the No Action Alternative and the Proposed Action are discussed in this section. Geological resources analyzed include geology, geologic hazards, soils, and prime farmland.

3.2.1 Affected Environment – Geology, Soils and Prime Farmlands

3.2.1.1 Geology

The Project Area is located in Lake County, TN, near the eastern Gulf Coastal Plain geographic province made up of low-banked streams characterized by plateaus of moderate relief varying between 250 ft above msl and 630 ft above msl. The west region of Tennessee consists primarily of flatlands, with few or no hills, and includes the vast floodplain areas associated with the Mississippi River. Lake County (containing the Project Site) is in the Mississippi Alluvial Plain physiographic division of Tennessee. The Mississippi Alluvial Plain is characterized by low relief ridges and swales to near flat surfaces with meander lakes and scars. Within the Project Site, Blue Bank Bayou drains the area to the Mississippi River (AECOM 2020a, Soil Survey Staff 2020a, Weathers and Von Arsdale 2019, Anyplace America 2016).

Shown in Figure 3.2-1, the Project Area is in the Mississippi Embayment, a broad, relatively flat floodplain of the Mississippi River running from the southern tip of Illinois, through western Kentucky and Tennessee, and through large swaths of Arkansas, Mississippi, and Louisiana to the Gulf Coast. The Site is underlain by unconsolidated Quaternary alluvial deposits of sand and gravel along with silt and clay ranging from 80 to 175 ft thick. These sands top unconsolidated and semi-consolidated Paleogenic and Cretaceous shallow marine and deltaic deposits of sands, clays, and marls; resulting in approximately 1,970 ft of unconsolidated sediment over Paleozoic carbonates. Fossils are uncommon in these unconsolidated materials (USGS 1995, USGS 2019, Weathers and Von Arsdale 2019).

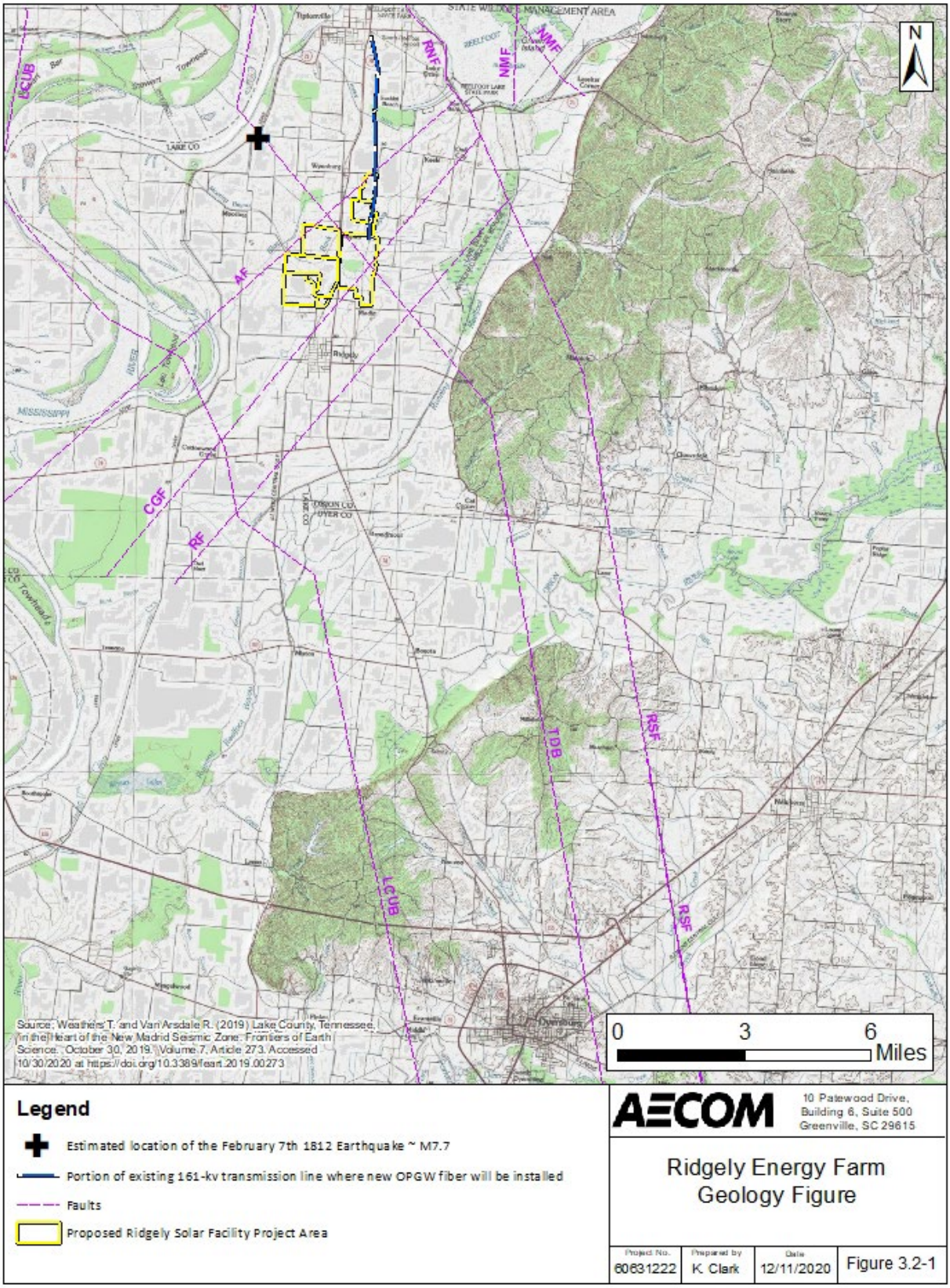

Figure 3.2-1. Ridgely Energy Farm Geologic Map

The Project Area is in an active seismic zone (USGS 2019, Tennessee Landforms 2020). Seismic activity could cause surface faulting, ground motion, ground deformation, and conditions including liquefaction and subsidence at various places within the Project Area. The Modified Mercalli Scale is used within the U.S. to measure the intensity of an earthquake. The scale arbitrarily quantifies the effects of an earthquake based on the observed effects on people and the natural and built environment. Mercalli intensities are measured on a scale of I through XII, with I denoting the weakest intensity and XII denoting the strongest intensity. The lower degrees of the scale generally deal with the manner in which the earthquake is felt by people, and the higher numbers of the scale are based on observed structural damage. This value is translated into a peak horizontal ground acceleration (PGA) value to measure the maximum force experienced. The PGA is the maximum acceleration experienced by a building or object at ground level during an earthquake on uniform, firm-rock site conditions. The PGA is measured in terms of percent of "g," the acceleration due to gravity. The U.S. Geological Survey (USGS) Earthquake Hazards Program publishes seismic hazard map data layers that display the PGA with 10 percent (1 in 500-year event) probability of exceedance in 50 years.

The Project Site is located in the New Madrid seismic zone in the Mississippi Embayment Area of Arkansas, Kentucky, Missouri, and Tennessee. As shown in Figure 3.2-2, the potential peak ground motion acceleration for the proposed Project Site that has a 10 percent probability of being exceeded within 50 years is 160 percent of gravity, or 160 %g. The New Madrid Seismic Zone is an intraplate seismic zone that produced three quakes, each with an estimated magnitude greater than or equal to M 7.3 during the winter of 1811-1812 resulting in the formation of Reelfoot Lake: a M 7.5 quake occurred December 1811 on the axial fault near Blytheville, Arkansas; a M 7.3 quake occurred January 1812 on the New Madrid North Fault near New Madrid, Missouri (running southwest to northeast beyond the extent of the map); and a M 7.7 quake occurred February 1812 on the Reelfoot North and South faults (near Tiptonville Tennessee; the estimated location of this earthquake is marked on Figure 3.2-1). These large magnitude quakes resulted in severe liquefaction of the saturated, unconsolidated sediments causing them to flow like water and erupt in sand blows. Faults in the region are shown on Figure 3.2-1. Movements on these faults resulted in uplifts and domes along with coincident subsidence of the Reelfoot Lake basin. Other faults in the region include the New Markham Fault, Cottonwood Grove fault, Ridgely fault, Tiptonville Dome back thrust fault, and Lake County uplift back thrust fault. Two possibilities are included for the uncertain location of the New Markham Fault. Continued low to moderate earthquake activity, coupled with the high potential for liquefaction of Lake County's unconsolidated sands, results in the Project Site being at risk of seismic hazard (Weathers and Van Arsdale 2019, Figure 3.2-2).

Soils

The soil types within the Project Area are shown on Figures 3.2-3 and 3.2-4, and soil type occurrence data for both the Project Site and the transmission line ROW are presented in Table 3.2-1. The soils at the Project Site, listed in order of decreasing prevalence, are Iberia silty clay loam, Reelfoot silt loam, Iberia silt loam, Adler silt loam, Bowdre silty clay, Commerce silt loam, Worthen silt loam, Reelfoot silty clay loam, Sharkey clay, Tiptonville silt loam, Bruno soils and alluvial land, and Tunica clay. Only the Tunica clay and the Bruno soils and alluvial land, which occupy about 3 percent of the Project Site, are neither prime farmland nor farmland of statewide importance.

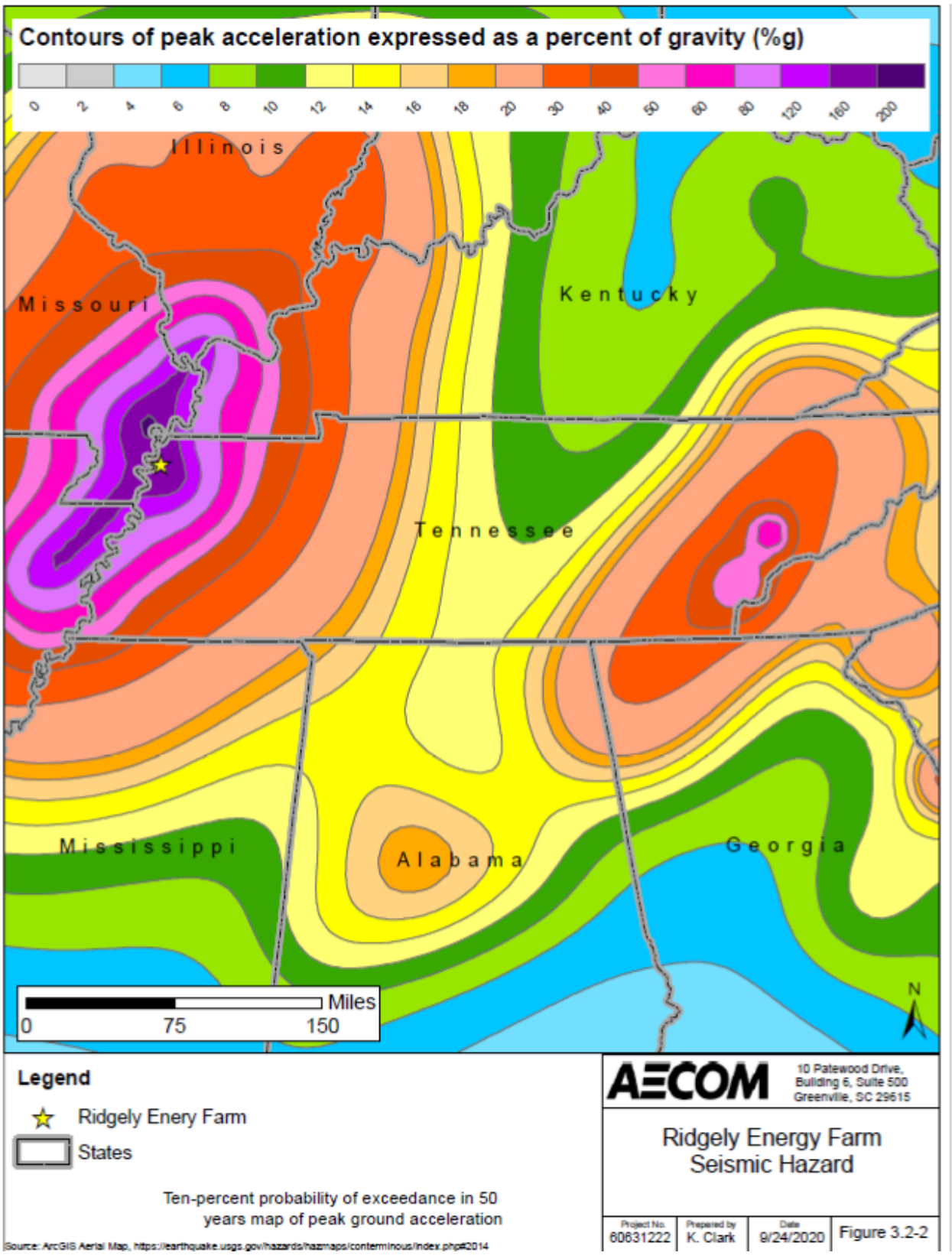

Figure 3.2-2. Seismic Hazard Map

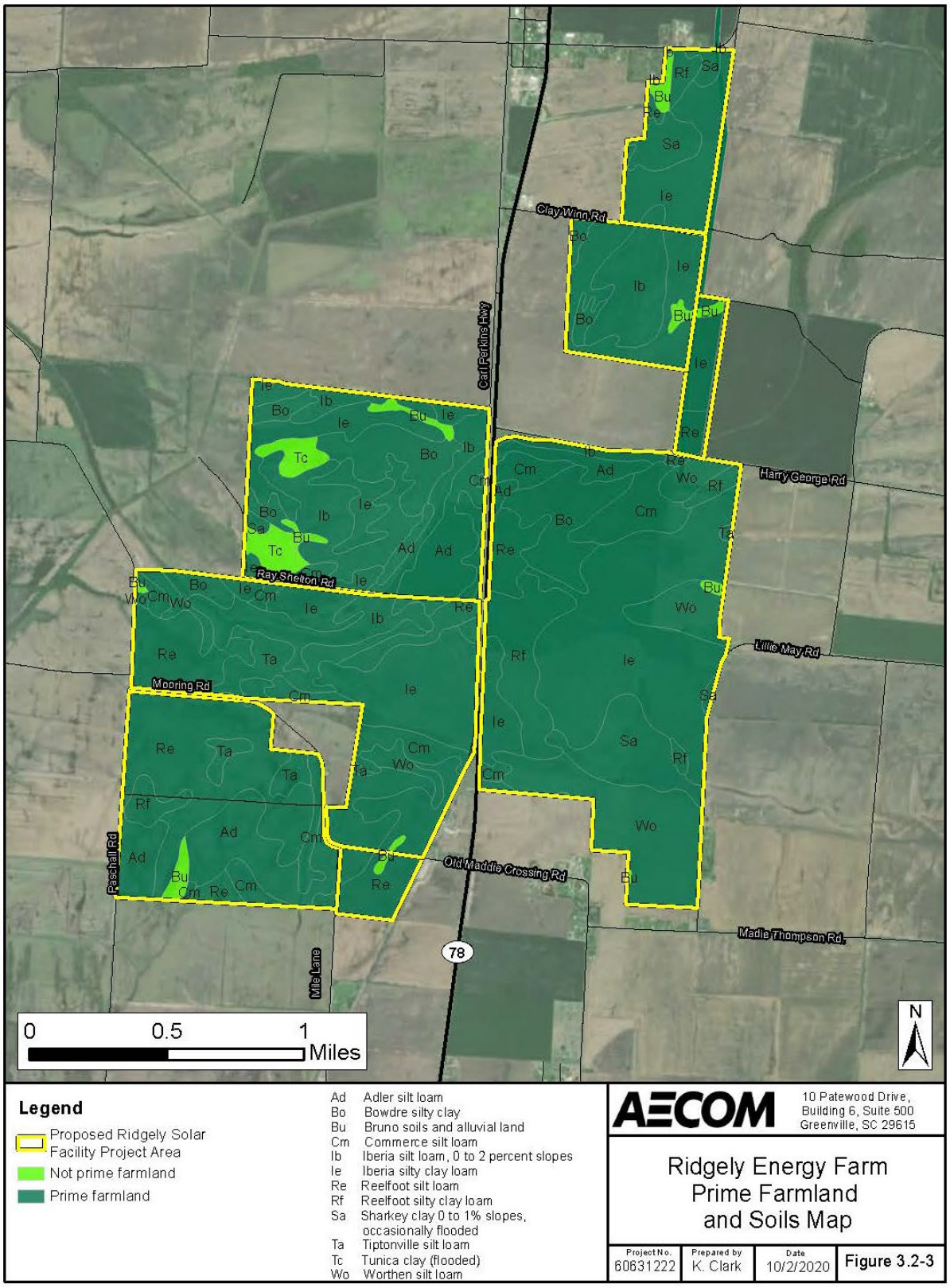

Figure 3.2-3. Project Site Prime Farmland and Soils Map

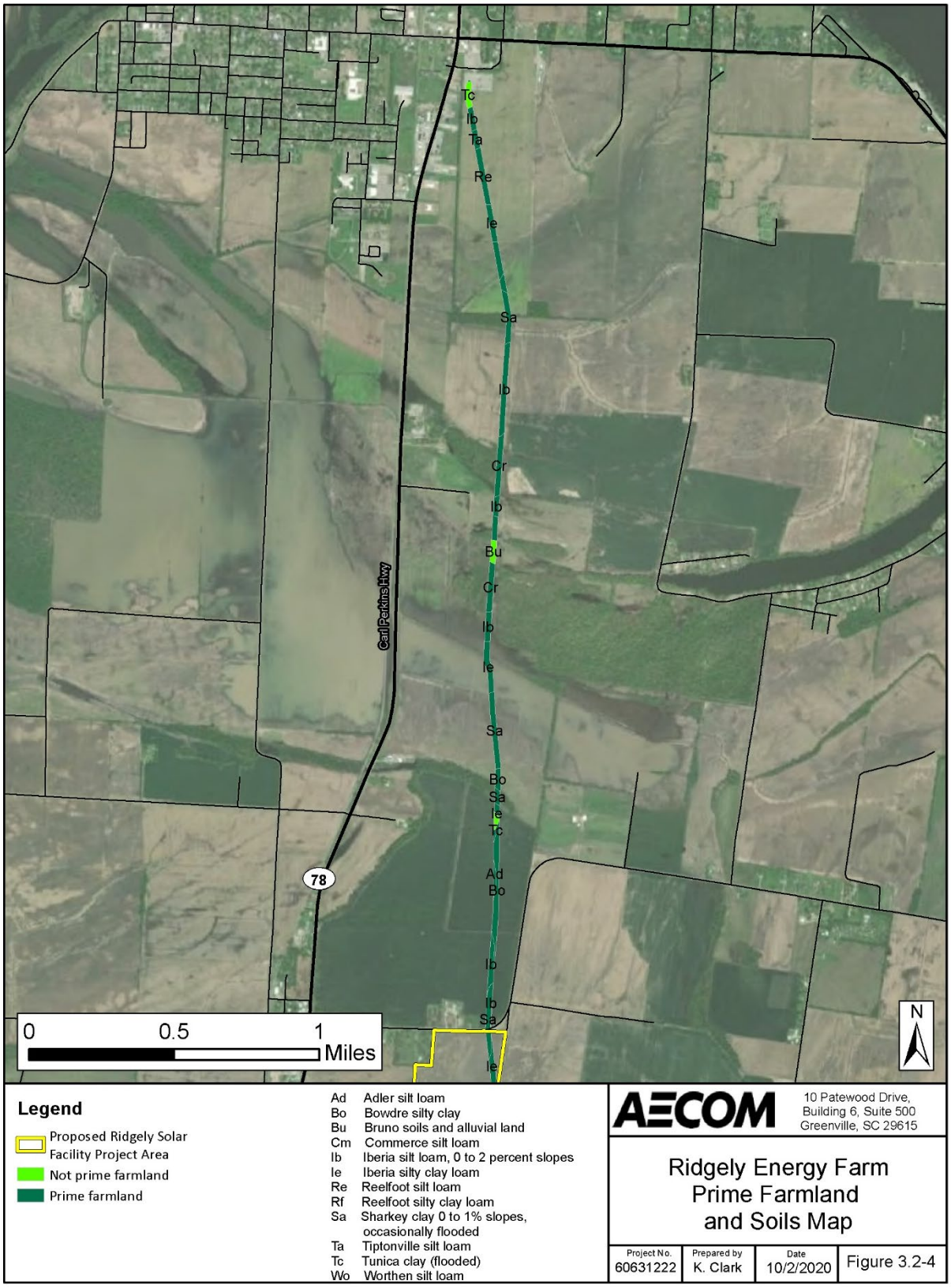

Figure 3.2-4. Prime Farmland and Soils Map Transmission ROW

Table 3.2-1. Soil Type Occurrence for the Proposed Action Project Area

Soil Type	Acreage in Transmission ROW	Acreage on Project Site (%)	Total Acres	Acreage on the Site Permanently / Temporarily Disturbed	Prime Farmland?	Farmland of Statewide Importance?
Adler silt loam (Ad), 0 to 2 percent slopes	0.6 (1%)	228.3 (9.7%)	228.9	199.98 /1.37	Yes	Yes
Bowdre silty clay (Bo), 0 to 2 percent slopes	5.1 (8.6%)	155.1 (6.6%)	160.2	143.15 /5.13	Yes	Yes
Bruno soils and alluvial land (Bu), 0 to 2 percent slopes	1.3 (2.2%)	35.7 (1.5%)	37	1.99 / 1.34	No	No
Commerce silt loam (Cm), 0 to 2 percent slopes	5.6 (9.3%)	134 (5.7%)	139.6	110.90 / 9.84	Yes	Yes
Iberia silt loam (Ib), 0 to 2 percent slopes	8.8 (14.6%)	257.3 (10.8%)	266.1	212.23 /12.45	Yes	Yes
Iberia silty clay loam (Ie), 0 to 2 percent slopes	19.8 (33%)	665.1 (23.4%)	684.9	535.86 / 26.24	Yes	Yes
Reelfoot silt loam (Re), 0 to 2 percent slopes	4.8 (8%)	375.1 (16%)	379.9	297.84 / 4.79	Yes	Yes
Reelfoot silty clay loam (Rf), 0 to 2 percent slopes	0 (0%)	109.2 (4.7%)	109.2	102.30 / 0	Yes	Yes
Sharkey clay (Sa), 0 to 1 percent slopes, occasionally flooded	10.1 (16.9%)	97.6 (4.2%)	107.7	81.78 / 10.11	Yes	Yes
Tiptonville silt loam (Ta), 0 to 2 percent slopes	0.8 (1.3%)	66.1 (2.8%)	66.9	63.55 / 0.78	Yes	Yes
Tunica clay flooded (Tc), 0 to 2 percent slopes	1.6 (2.6%)	31.5 (1.3%)	33.1	28.80 / 2.78	No	No
Worthen silt loam (Wo), 0 to 2 percent slopes	0.8 (1.4%)	116.9 (8%)	117.7	156.94 / 0.82	Yes	Yes
Total Acres	59.3	2344	2404	1954 / 43		
Totals within Transmission ROW Only				346.67		
Totals within Project Site Only				2344.09		
Totals within Project Site Disturbed				1987.00		

Source: Soil Survey Staff 2020b

As shown in Table 3.2-1, all of the soil types present within the northern portion of the transmission ROW are also found within the Project Site.

Prime Farmland

The Farmland Protection Policy Act, 7 U.S.C. § 4201 *et seq*., requires Federal agencies to consider the adverse effects of their actions on prime or unique farmlands. The purpose of the Act is "to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses."

Prime farmland is land most suitable for economically producing sustained high yields of food, feed, fiber, forage, and oilseed crops. Prime farmlands are available for agricultural use, i.e., not water or urban built-up land, and have the best combination of soil type, growing season, and moisture supply. Farmland of

statewide importance is not federally recognized prime farmland, but land that is important in the production of food, feed, fiber, forage, and oil seed crops. Individual states delineate their own important farmland (NRCS 2020).

As shown in Table 3.2-1, ten of the Site and transmission line soils, Adler silt loam, Bowdre silty clay, Commerce silt loam, Iberia silt loam, Iberia silty clay loam, Reelfoot silt loam, Reelfoot silty clay loam, Sharkey clay, Tiptonville silt loam, and Worthen silt loam, are classified as prime farmland. Only the Bruno soils and alluvial land and Tunica clay, which occupy about 3 percent of the Project Site, are neither prime farmland nor farmland of statewide importance. The locations of prime farmland soils on both the Project Site and the transmission ROW are identified on Figures 3.2-3 and 3.2-4, respectively. Table 3.2-2 provides a summary of farming in Lake County and overall, in the State of Tennessee for comparison. In addition, changes in the number and acreage of farms from 2012 to 2017 are also included (USDA 2019a, USDA 2019b).

Table 3.2-2. Farming Statistics for Lake County, Tennessee

	Number of Farms	Percentage of Total Area in Farms	Land in Farms (Acres)	Change from 2012 to 2017	
				Number of Farms	Land in Farms (Acres)
Lake County	52	71.1%	88,274	-13	+11
Tennessee	69,983	40.3%	10,874,238	+3	(Z)

Sources: USDA 2019a, USDA 2019b

3.2.2 Environmental Consequences – Geology, Soils and Prime Farmlands

This section describes the potential impacts to geology, geologic hazards, soils, and prime farmland should the No Action Alternative or the Proposed Action be implemented.

3.2.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility and transmission line upgrades would not be constructed; therefore, no direct or indirect project-related impacts on geological, soil resources, or prime farmlands would result, and there would be no risk to Project components from on-site geologic hazards. Existing land use would be expected to remain a mix of farmland and undeveloped land.

Over time, indirect impacts to soils and geology could occur if the current land use practices are abandoned. If the Site were to be developed, changes to the soils on-site would occur. Conversely, if agricultural practices were continued, soils could eventually become depleted in nutrients or erode, resulting in minor changes on the Project Site. Seismic activity could affect structures or isolated portions of the Project Area.

3.2.2.2 Proposed Action

Under the Proposed Action, construction and operation of the Project (including transmission line upgrades and maintenance activities within the transmission ROW) would be anticipated to result in minor direct impacts to geology and soil resources by contributing to erosion and sedimentation, and in the conversion of approximately 2 percent of Lake County's prime farmland. Approximately 1,961 acres would be cleared and potentially graded and approximately 103 acres would be temporarily disturbed; light surface

preparation and tall vegetation removal would occur as needed within these 103 acres (Figure 2-3). Clearing and grading would disturb existing soil profiles. Both grading and mowing would cause minor, localized increases in erosion and sedimentation. The exclusion areas would remain undisturbed.

Geology

Under the Proposed Action, minor impacts to geology could occur. The solar arrays would be supported by steel piles which would either be driven or screwed into the ground to a depth of 6 to 10 ft. The Ridgely Sola, TN 161-kV Substation, O&M building, and the Lake County, TN 161-kV Switching Station would occupy approximately 15 acres and would not require deep excavation. The potable water well and leach field for the O&M building would employ BMPs to minimize disruptions and would be constructed and maintained in compliance with Tennessee regulations (TDEC 2014). The four on-site detention basins (totaling approximately 9 acres) would be shallow and would utilize the existing terrain, minimizing the need for extensive excavation. The PV panels would be electrically connected using a Series 6 (or functional equivalent) dual junction combiner box, which would feed the block PCS. The PCS would then feed the transformer, which would route to the Ridgely Solar, TN 161-kV Substation. The voltage collection circuits may either be pole mounted or direct-buried. Minor excavations would be required for each block PCS and associated transformers. Due to the small amount of proposed subsurface disturbance, only minor direct impacts to potential subsurface geological resources are anticipated within the Project Site; no extensive excavation would be planned for the transmission line ROW. No indirect impacts to geological resources are anticipated in either the Project Site or the transmission line ROW.

As no significant excavation would be required, only minor direct impacts to geological resources would be anticipated.

Hazards resulting from seismic conditions would be moderate. There is a moderate probability for small to moderate intensity seismic activity in the project area. Seismic activity would likely only cause minor impacts to the Project area and equipment on the Site; offsite impacts would not be anticipated to the Project Area.

Soils

The Site preparation process may include a minimal amount of grading, in which topsoil from some areas of permanent disturbance would be removed, stockpiled, and redistributed on the Project Site (Figure 2-3). Once the Site is graded, the topsoil would be replaced prior to construction of the arrays. Soils within 52 acres of exclusion areas would not be disturbed. The topsoil under PCS blocks, their associated transformers, and the substation would not be replaced. Approximately 43 acres would be temporarily impacted during mowing and construction activities, including light surface preparation. Soils located in areas where only vegetation clearing is proposed would remain in place unless a circuit trench or foundation needed to be constructed. These acreage totals do not include the 50-ft stream/wetland buffers, and/or other areas necessary to leave undisturbed to protect sensitive biological or cultural resources encountered during the pre-construction stages.

A grading plan, which would be developed during the design process, would minimize or eliminate grading work to the extent possible to impact the least amount of soil possible, such that on-site soils would be used to fill areas that needed to be elevated per PV array design specifications. Although not anticipated, should borrow material be required, small amounts of sand and gravel aggregate may be obtained either from on-site activities or from local, existing, off-site sources. The creation of new impervious surfaces, in the form of the access roads, panel footings, and the foundations for the Ridgely Solar, TN 161-kV Substation and the Lake County, TN 161-kV Switching Station, would result in a minor increase in stormwater runoff and

potential increase in soil erosion. Use of BMPs such as soil erosion and sediment control measures would minimize the potential for increased soil erosion and runoff.

Due to disturbance within the Project Area being at least 1 acre, a NPDES Permit for discharges of stormwater associated with construction activities would be required. Application for the permit could require submission of a Construction Best Management Practices Plan (CBMPP) describing the management practices that would be utilized during construction to prevent erosion and runoff along with management practices to reduce pollutants in stormwater discharges from the Site. Following construction, implementation of soil stabilization and vegetation management measures would reduce the potential for erosion impacts during Site operations.

In addition to the soil disturbance on the Project Site, there would be minor impacts from project activities within the existing 100-foot wide transmission line corridor (5.5-mi long ROW from Tiptonville Substation to proposed Lake County, TN 161-kV Switching Station; Figure 2-3). The existing transmission line and structures would require the potential upgrade activities discussed in Section 2.2.3. As the ROW is already cleared and access roads already present, impacts would be similar to those occurring on-site, although lesser. Specific access points along the ROW and work zones are unknown at this time, but all work would occur within existing TVA ROW; therefore, any impacts from proposed activities within the 60-acre transmission corridor would be temporary. In the event sensitive biological resources are encountered along the ROW, such as wetlands or streams, BMPs and permit requirements would be followed during construction and post-construction periods to reduce erosion and sedimentation possibilities. The ROW would be allowed to re-vegetate or would be seeded as necessary to minimize erosion and possible sedimentation. TVA would continue regular vegetation maintenance activities within the ROW following the upgrades. Planned upgrades/improvements to the existing TVA Tiptonville 161-kV transmission line (see Section 2.2.3) could potentially impact soils within the transmission ROW. Adherence to *TVA ROW Clearing Specifications, Environmental Quality Protection Specifications for Transmission Line Construction* (Appendices A, B and C)*,* and *Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (TVA 2017) would ensure that impacts of the upgrade/improvement activities on the existing transmission ROW are not significant.

During operation of the solar facility, very minor disturbance could occur to soils. Routine maintenance would include periodic tracker motor replacement, inverter air filter replacement, fence repair, and vegetation control along with periodic array inspection, repairs, and maintenance. The Project would implement traditional mechanized landscaping using lawnmowers, weed eaters, etc. to control vegetation during operations. Traditional trimming and mowing would be performed periodically to maintain the vegetation at a height of less than 2 ft. Module washing would occur no more than twice a year and would use BMPs to prevent any soil erosion or stream and wetland sedimentation. Selective use of pre-emergent and post-emergent herbicides may also be employed around structures to control weeds. These maintenance activities would not result in any adverse impacts to soils on the Project Site during operations.

Prime Farmland

The acreages of prime farmland and farmland of state importance that would be impacted by the Project and associated upgrades to the existing transmission line are shown in Table 3.2-1. Should the Proposed Action be implemented, the entire 2,404-acre Project Site, containing approximately 2,276.3 acres of prime farmland and farmland of statewide importance, would be converted to nonagricultural renewable energy use, precluding farming for the duration of site operations. Approximately 56.4 acres of prime farmland and farmland of statewide importance present within the transmission line ROW has already been converted, as this is an existing corridor. Within the Project Site, a total of approximately 1,961 acres would be permanently disturbed and 43 acres temporarily disturbed by the Proposed Action. Activities within the

proposed area of permanent disturbance would result in the loss of some farmland soils through grading and excavation activities; however, the majority of on-site soils would remain in place. During site preparation and grading activities, topsoil would be stockpiled and re-applied to the respective surface areas once grading is complete. Any area within the Project Site not developed for the Project would remain undeveloped with no agricultural or other activities, aside from general mowing and maintenance of vegetation. Ground disturbances for upgrades to the transmission line would occur at discrete locations along the Transmission ROW and would be temporary. No loss of prime farmland or changes to agricultural practices are anticipated from Project upgrades to the Transmission ROW.

During operations, soils would have an opportunity to develop in place with minimal ground disturbance. In the event that the solar facility would be decommissioned and reclaimed in the future, the prime farmland could potentially be used again for agricultural purposes with no anticipated long-term loss of soil productivity on most of the Project Site. In fact, in areas where soil had become depleted, it is possible there could be a certain degree of soil regeneration.

The Project would convert a total of approximately 2 percent of prime farmland in Lake County, Tennessee, to non-agricultural use. Following decommissioning of the solar facility, most project components would be removed, and the majority of the Site could potentially be returned to agricultural use with little reduction in soil productivity or impact to prime farmland/farmland of statewide importance. Therefore, adverse impacts of this minor and reversible conversion of prime farmland would not be significant. Indirect impacts to prime farmland associated with the proposed actions would not be anticipated.

Implementation of the Proposed Action would result in temporary adverse effects to prime farmland during operation of the Solar Facility. Adhering to BMPs during construction and operation of the Solar Facility, including installing erosion control devices during stockpiling events, would preserve topsoil and limit erosion, resulting in negligible impacts to prime farmland. If the Project is decommissioned and the Solar Facility is removed, the majority of the Project Site could be returned to agricultural and pastureland uses with a negligible loss to soil productivity. Beneficial impacts to soil health could result with a re-vegetation strategy using native and non-invasive species while terminating the need for broad application of herbicides, pesticides, and fertilizers. Selective use of EPA-approved spot herbicides may be necessary to control weeds until the site vegetation has been established.

3.3 WATER RESOURCES

This section describes an overview of existing water resources within the Project Area and the potential impacts on these water resources that would be associated with the No Action Alternative or the Proposed Action. The specific types of water resources that are evaluated include groundwater, surface water, floodplains, and wetlands.

3.3.1 Affected Environment – Water Resources

3.3.1.1 Groundwater

Groundwater is water located beneath the ground surface, within soils and rock formations. An aquifer is a rock unit with sufficient permeability to conduct groundwater allowing economically significant quantities of water to be produced by man-made water wells and natural springs. To be productive, the aquifer must be permeable and porous while retaining qualities allowing water to flow through it easily. Sandstones, conglomerates, and fractured rocks can often be productive aquifers.

The Mississippi River watershed (08010100) drains into the Mississippi River and includes all or parts of Dyer, Lake, Lauderdale, Shelby, and Tipton counties in western Tennessee. The Mississippi River Watershed is approximately 1,086 square mi with 590 square mi, including 519.9 stream mi and 125 lake acres, in Tennessee (TDEC 2008).

Tennessee has both high quality and quantity of groundwater. In West Tennessee, most residents rely on groundwater for their drinking water. Tennessee's groundwater can be quite vulnerable to contamination, particularly in karst terrain and in unconfined sand aquifers. West Tennessee has unconfined sand aquifers that are particularly vulnerable to contamination. Lake County is located in the Mississippi Alluvial regional aquifer (TDEC 2016). Groundwater wells in Lake County (11) are primarily in the Mississippi River Valley alluvial aquifer (N100MSRVVL) national aquifer and the Holocene Alluvium (111ALVM) local aquifer. One of the wells is located in the Mississippi embayment aquifer system (S100MSEMBM) national aquifer and in the Memphis Sand (124MMPS) local aquifer (USGS 2020).

Under the authority of the Water Resources Information Act of 2002 and TCA Section 69-7-301, water withdrawals of 10,000 gallons or more on any day in Tennessee must be registered. The total amount of water withdrawals in 2015 were a little over two million gallons, with 99 percent from surface water and one percent from groundwater (TDEC 2016). Overall groundwater withdrawals in Tennessee in 2015 were between 2,001 and 5,000 million gallons per day, which is relatively low for the U.S. (USGS 2015). According to USGS estimates, approximately 594,000 households use self-supplied water in Tennessee, all of which is from groundwater (NGWA 2019).

3.3.1.2 Surface Water

The proposed Project Area is located in the Mississippi River Watershed. The Mississippi River is one of the major river systems of the world in size, habitat, and productivity. It is the second longest river in North America, flowing 2,350 mi from its source at Lake Itasca, Minnesota through the center of the continental United States to the Gulf of Mexico. The Mississippi River watershed is the fourth largest in the world (NPS 2018).

In the Mississippi River Basin, the Project Area is located within the Mississippi River subwatershed (HUC-080101000301) to the west of the Reelfoot Lake subwatershed (HUC-080102020403) of the North Fork Obion River watershed (08010202) (TDEC 2008). The Project boundaries include five waterways regularly assessed by TDEC: the Stewart-Towhead – MS River, Harris Ditch, and Mooring Bayou along the proposed transmission line, Blue Bank Bayou on the bulk of the Project Site, and Running Reelfoot Bayou and its tributaries at the south end of the Project Site (EPA 2020a, EPA 2020b, EPA 2020c, EPA 2020d, EPA 2020e). Blue Bank Bayou is listed on the state's 303(d) list for impaired waters for impairments to fish and aquatic life from dissolved oxygen, nitrate/nitrite, and sedimentation/siltation (EPA 2020a).

The Mississippi River is located approximately 3.8 mi west of the Project Site, and Reelfoot Lake is located approximately 2.7 mi northeast of the Project Site. Additionally, Blue Bank Bayou is located both adjacent to and within the Project Site and serves as a tributary to the Mississippi River to the west and Reelfoot Lake to the northeast (Cardno 2020). The intermediate segment of Blue Bank Bayou between the east- and west-draining segments has been modified historically by roads and agricultural use and is classified as ephemeral.

The delineation of WOTUS, including streams, was conducted during five site visits by Cardno scientists to different portions of the Project Area from July 2016 to June 2020. TVA hydrologic determination field data sheets were used by Cardno scientists in identifying whether watercourses were streams or WWCs according to TDEC criteria. The TVA hydrologic determination field data sheets are included in Appendix G. WWCs are equivalent to ephemeral streams as defined by USACE. Streams were also categorized as perennial or intermittent based on USACE definitions. One perennial stream, 22 WWCs, two intermittent streams, 15 wetlands, and one ponded area (WET-C-5; recorded as PUB(x) in Section 3.3.1.4) were identified within the Project Site boundaries (Figure 3.3-1; Cardno 2020). Table 3.3-1 lists the stream identification, various stream measurements, substrate type, whether the stream is under federal or state jurisdiction, and the TDEC hydrological determination.

Most of the identified watercourses are WWCs (ephemeral agricultural irrigation ditches) with the exception of segments of Blue Bank Bayou. Blue Bank Bayou intersects the Project Site from generally east to west and supports fringe wetlands along its perennial reach (S-D-2) and its western, intermittent segment (S-B-1-a). Based on TDEC hydrologic determinations, stream segments S-B-1-a and S-D-1 are also under state jurisdiction (TDEC 2020a), and S-B-1-b is a WWC. The USACE has confirmed in an approved jurisdictional determination (AJD) that the perennial reach of Blue Bank Bayou and its fringe forested wetlands are under federal jurisdiction and regulated by USACE (USACE 2020).

TVA Transmission Line

As shown in Figure 3.3-2, one WWC, two perennial streams, and one ponded area (WET-E-6; recorded as PUB(x) in Section 3.3.1.4) were identified within the 5.5-mi transmission ROW from TVA's Tiptonville Substation to the proposed Lake County, TN 161-kV Switching Station (Table 3.3-2).

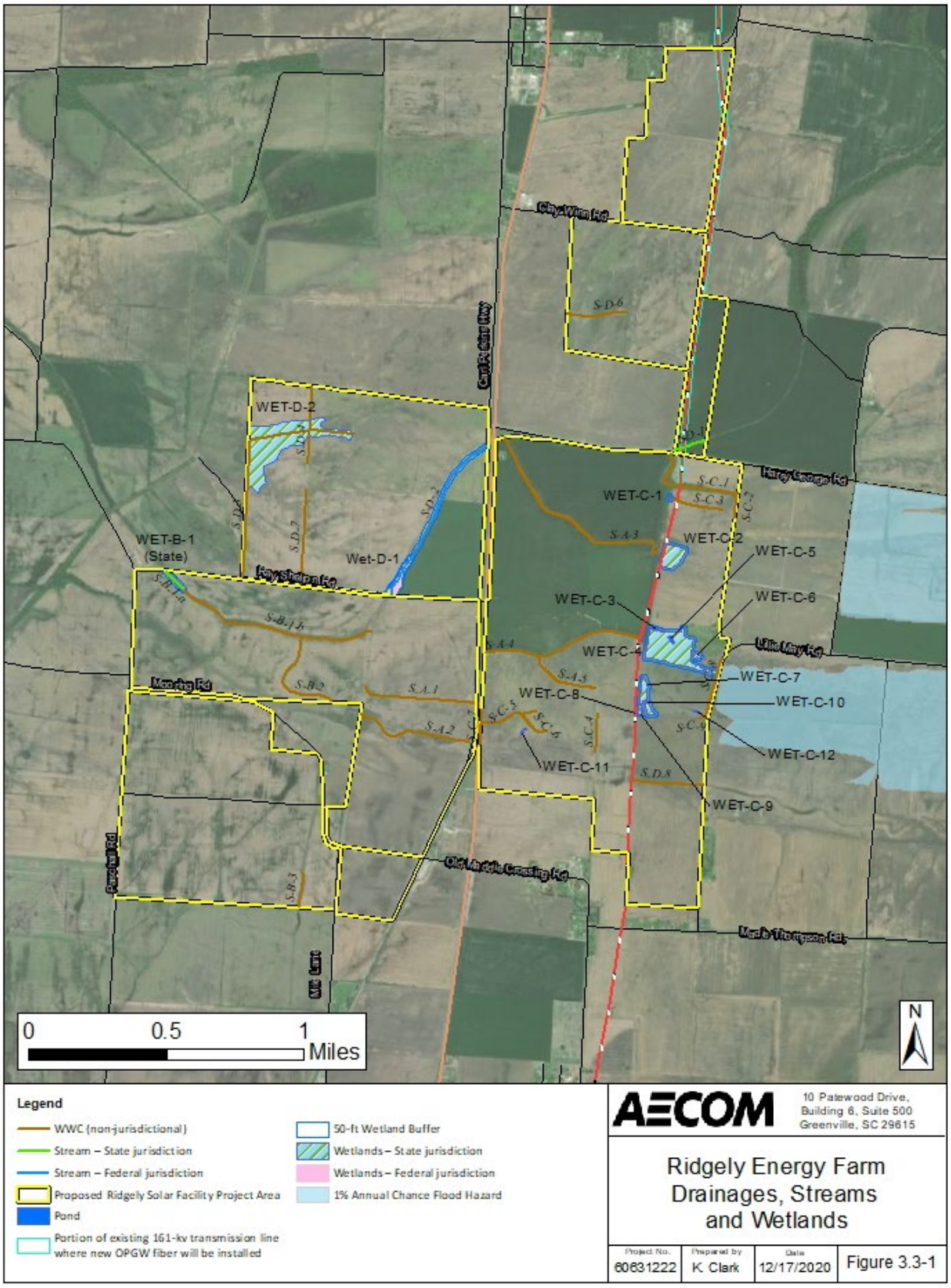

Figure 3.3-1. Drainages, Streams and Wetlands Within the Project Site

Table 3.3-1. Streams and WWCs Identified Within the Project Site

Stream ID	Flow Type	Stream Length (ft)	Water Depth	Width at Bankfull (ft)	Substrate	Federal or State Jurisdiction?	Hydrologic Determination (TDEC)
S-A-1	Ephemeral	2204.4	0	1.5	Organic	No	WWC
S-A-2	Ephemeral	2326.17	0	2	Organic	No	WWC
S-A-3	Ephemeral	4249.47	0	1.5	Organic	No	WWC
S-A-4	Ephemeral	3108.14	0	1.5	Organic	No	WWC
S-A-5	Ephemeral	1387.10	0	1.5	Organic	No	WWC
S-B-1-a	Intermittent	799.27	0	3	Organic	State	Stream
S-B-1-b	Ephemeral	3626.51	0	3	Organic	No	WWC
S-B-2	Ephemeral	2034.47	0	2.5	Organic	No	WWC
S-B-3	Ephemeral	682.78	0	2	Organic	No	WWC
S-C-1	Ephemeral	2057.52	0	5	Organic	No	WWC
S-C-2	Ephemeral	498.33	0	3	Organic	No	WWC
S-C-3	Ephemeral	1026.20	0	0.5	Organic	No	WWC
S-C-4	Ephemeral	761.39	5	3	Organic	No	WWC
S-C-5	Ephemeral	1106.07	0	0.5	Organic	No	WWC
S-C-6	Ephemeral	670.30	0	0.5	Organic	No	WWC
S-C-7	Ephemeral	701.54	0	0.5	Organic	No	WWC
S-C-8	Ephemeral	1216.49	0	0.5	Organic	No	WWC
S-C-9	Ephemeral	116.01	0	0.5	Organic	No	WWC
S-D-1	Intermittent	649.23	2	5	Organic	State	Stream
S-D-2 (Blue Bank Bayou)	Perennial	3505.05	10	6	Organic	Federal and State	Stream
S-D-3	Ephemeral	4621.98	2	3	Organic	No	WWC
S-D-4	Ephemeral	1483.61	3	3	Organic	No	WWC
S-D-6	Ephemeral	1183.66	0	3	Organic	No	WWC
S-D-7	Ephemeral	1810.63	0	3	Organic	No	WWC
S-D-8	Ephemeral	1378.02	0	3	Organic	No	WWC
Total		***46,390.20***					
Total Federal Jurisdictional Streams		***3505.05***					
Total State Jurisdictional Streams[1]		***1448.50***					
Total WWCs		***41,436.65***					

Source: Cardno (2020), USACE (2020), and TDEC (2020)
[1] Total for state jurisdictional streams does not include federally jurisdictional streams.
WWC = wet weather conveyance

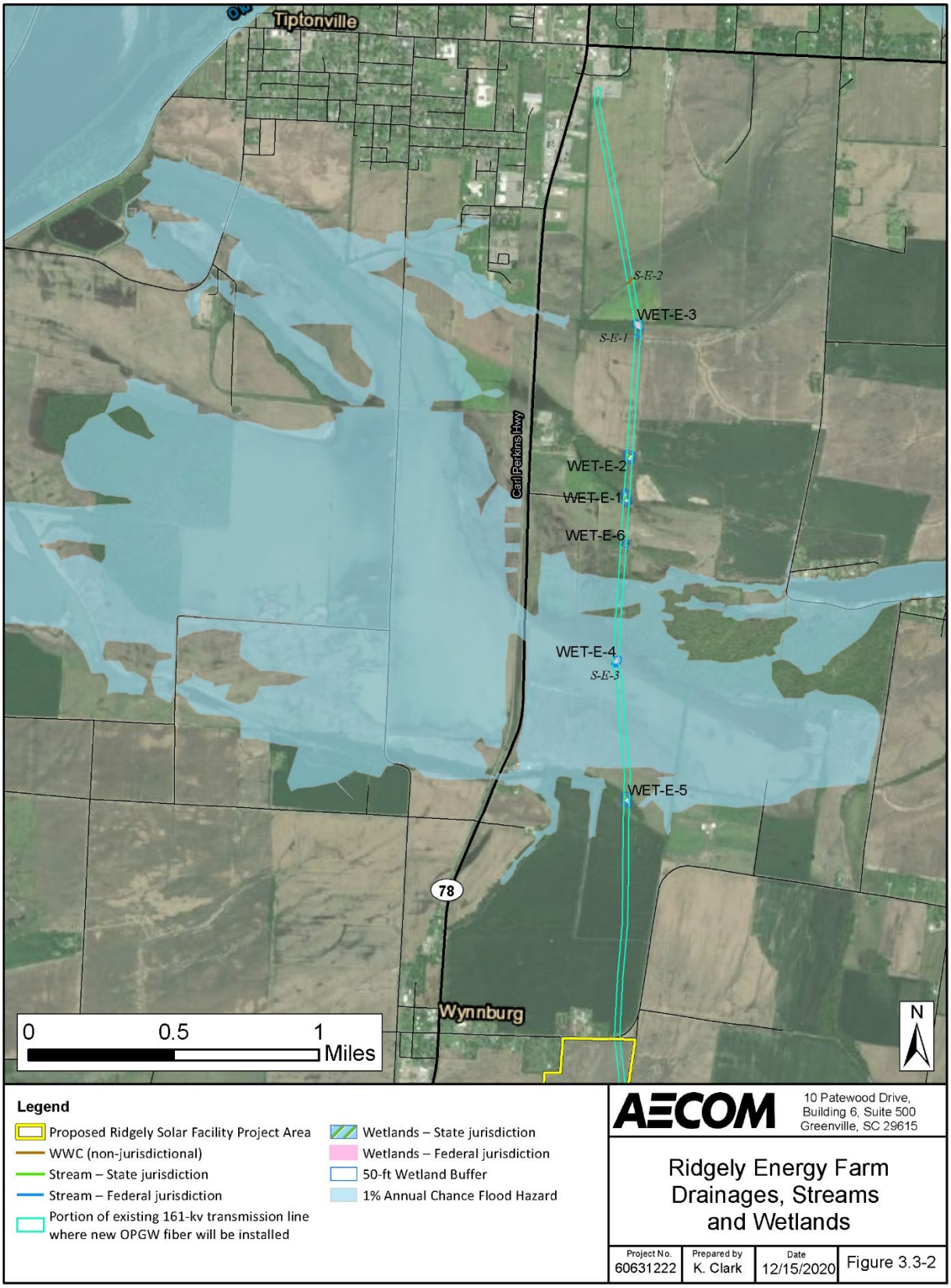

Figure 3.3-2. Proposed Action Transmission ROW Map

Table 3.3-2. Streams and WWCs Identified Within the TVA 161-kV Transmission Line

Stream ID	Flow Type	Length within ROW (ft)	Water Depth (inches)	Top of Bank at Bankfull (ft)	Substrate	Federal or State Jurisdiction ?	Hydrologic Determination (TDEC)
S-E-1	Perennial	110.96	12	10	Unconsol-idated	Federal and State	Stream
S-E-2	Ephemeral	126.19	3	4	Unconsol-idated	No	WWC
S-E-3	Perennial	109.19	12	9	Unconsol-idated	Federal and State	Stream
Total		**346.34**					
Total Federal Jurisdictional Streams		**220.15**					
Total State Jurisdictional Streams[1]		**0**					
Total WWCs		**126.19**					

Source: Cardno (2020) and USACE (2020)
[1] Total for state jurisdictional streams does not include federally jurisdictional streams.
WWC = wet weather conveyance

3.3.1.3 Floodplains

A floodplain is the relatively level land area along a stream or river that is subject to periodic flooding. The area subject to a one-percent chance of flooding in any given year is normally called the 100-year floodplain. The area subject to a 0.2-percent chance of flooding in any given year is normally called the 500-year floodplain. It is necessary to evaluate development in the floodplain to ensure that the Project is consistent with EO 11988, *Floodplain Management*.

The Federal Emergency Management Agency (FEMA) produces maps that show the likelihood of an area flooding. The majority (1,728 acres) of the Project Site is located in Shaded Zone X, protected from a 100-year flood by an accredited levee (Figure 3.3-3). Such areas are designated as moderate- to low-risk areas. The remainder of the Project Site (616 acres) is located in Zone X, outside of the 100- and 500-year floodplains, having less than a 0.2 percent chance of flooding annually (FEMA 2010).

The 5.5-mi TVA transmission ROW from Tiptonville to the Project Site travels primarily through Shaded Zone X, protected from a 100-year flood by an accredited levee. It also travels through Zone X, outside of the 100- and 500-year zones, and through Zone A, special flood hazard areas subject to 100-year floods (Figure 3.3-4). ROW acreage north of the Project Site includes almost 36 acres of area shaded Zone X, almost 5 acres of unshaded Zone X, and nearly 8 acres of Zone A.

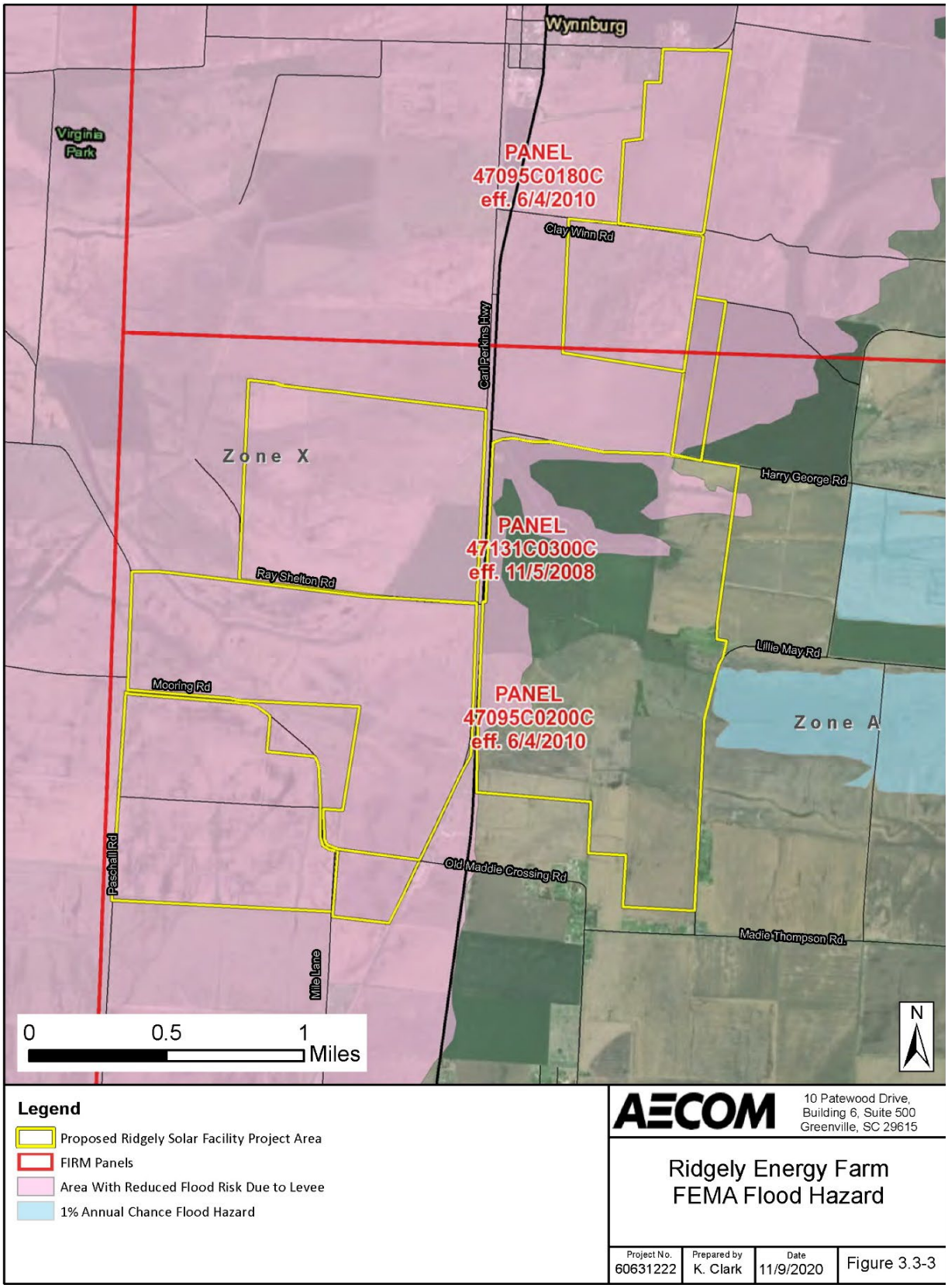

Figure 3.3-3. Project Site FEMA Flood Hazard Map

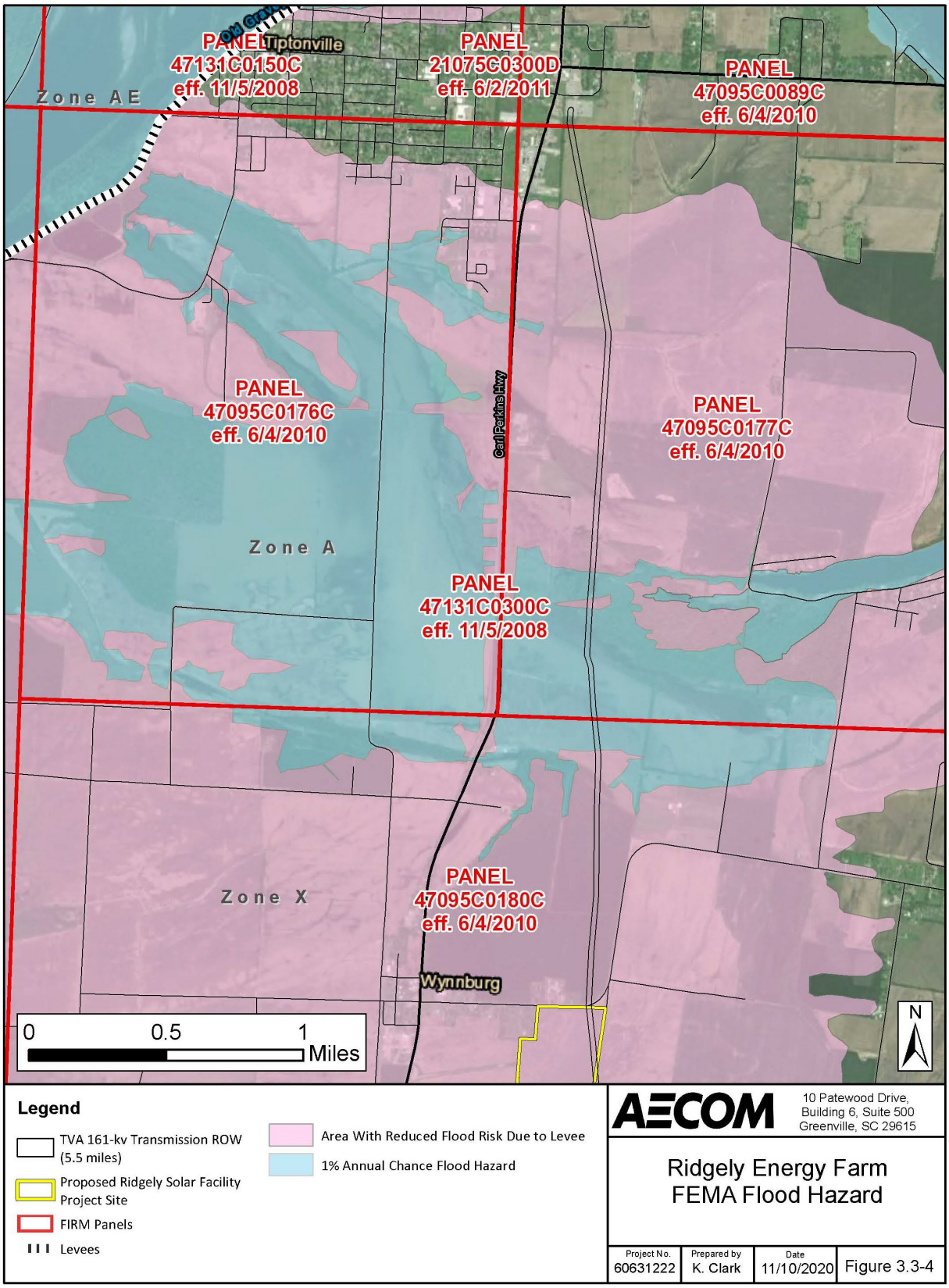

Figure 3.3-4. Proposed Action Transmission ROW FEMA Flood Hazard Map

3.3.1.4 Wetlands

Wetlands are defined by the USACE (Environmental Laboratory 1987) and the EPA (Federal Register 1980) as those areas that are inundated or saturated by surface or groundwater at a frequency or duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. An area is a wetland if it meets the wetland hydrology, hydrophytic vegetation, and hydric soil criteria established in the USACE Manual.

The delineation of WOTUS, including wetlands, was conducted during five site visits to different portions of the Project from July 2016 to June 2020. Cardno scientists performed all wetland delineation surveys in accordance with the *USACE Wetland Delineation Manual* (Environmental Laboratory 1987) in conjunction with the *Atlantic and Gulf Coastal Plain Regional Supplement to the USACE Delineation Manual* (USACE 2012). Cardno also completed TVA Rapid Assessment Method (RAM) datasheets (Appendix G) on all wetlands and classified them based on function and value. The USACE wetland determination data forms and TVA RAM datasheets are included in the Natural Resources Report (Cardno 2020; Appendix G).

The entire Project area is relatively well drained by overland flow, drainages, and culverts which lead to deeply cut roadside ditches or Blue Bank Bayou. Wetland vegetative communities within the Project Area were either herbaceous wetland or forested wetland. Soils were delineated with the X-Rite Munsell M50215B Soil Book of Color, and exhibited a hue, lightness, and chroma ranging from 10 YR (3/1) to 10YR (5/3) throughout the Project Area.

These on-site investigations identified 15 wetlands (Table 3.3-3) totaling approximately 43.49 acres. Only one wetland (WET-D-1) covering 1.52 acres was determined by USACE to be under federal jurisdiction. The remaining wetlands are under state jurisdiction. The wetlands are shown on Figure 3.3-1. Emergent herbaceous wetlands and forested wetlands were observed within the Project Site, as well as one small pond (WET-C-5).

Table 3.3-3. Wetlands Within the Project Site

Wetland ID	Type	Acreage	Federal or State Jurisdiction?	TVA RAM Category
WET-B-1	PEM	0.44	State	1
WET-C-1	PFO	0.02	State	1
WET-C-2	PFO	3.37	State	2
WET-C-3	PEM	0.13	State	2
WET-C-4	PFO	11.91	State	2
WET-C-5	PUB(x)	0.21	State	-
WET-C-6	PEM	0.19	State	1
WET-C-7	PFO	1.50	State	2
WET-C-8	PFO	0.58	State	2
WET-C-9	PEM	0.10	State	1
WET-C-10	PEM	0.04	State	1
WET-C-11	PEM	0.07	State	1

Table 3.3-3. Wetlands Within the Project Site

Wetland ID	Type	Acreage	Federal or State Jurisdiction?	TVA RAM Category
WET-C-12	PEM	0.03	State	1
WET-D-1	PFO	1.52	Federal	3
WET-D-2	PEM	23.38	State	1
Total		**43.49**		
Total Federal Jurisdictional Wetlands (USACE)		**1.52**		
Total State Jurisdictional Wetlands[1]		**41.97**		

Source: Cardno (2020) and USACE (2020)
[1] Total for state jurisdictional wetlands does not include federally jurisdictional wetlands.
PEM – Palustrine emergent wetland
PFO – Palustrine forested wetland
PUB(x) – Freshwater pond
RAM – Rapid Assessment Method
TVA RAM categories: 1 = low wetland function, condition, quality; 2 = good/moderate wetland function, condition, quality; 3 = superior wetland function, condition, quality.

The three types of wetland vegetative communities identified within the Project Site were: Palustrine Emergent Wetland (PEM), Palustrine Forested Wetland (PFO), and Palustrine Unconsolidated Bottom (PUB[x]). A significant portion of the Site is active or recently active agricultural cropland under wheat, corn, and soybean cultivation (ESE 2020).

TVA 161-kV Transmission Line

Cardno scientists investigated the TVA northern ROW in January 2020 for wetlands that exhibited the three USACE criteria (hydrophytic vegetation, wetland hydrology, and hydric soils). As shown in Figure 3.3-2, Cardno's on-site investigations identified five emergent wetlands (Table 3.3.4) totaling 1.07 acres and a 0.01-acre pond within the northern ROW (Cardno 2020). Only two wetlands (WET-E-3 and WET-E-4) covering 0.18 acre and 0.05 acre, respectively, were determined by USACE to be under federal jurisdiction. The remaining wetlands are under state jurisdiction.

Table 3.3-4. Wetlands Within the TVA Transmission Line ROW

Wetland ID	Type	Acreage	Federal or State Jurisdiction?	TVA RAM Category
WET-E-1	PEM	0.30	State	1
WET-E-2	PEM	0.25	State	1
WET-E-3	PEM	0.18	Federal	1
WET-E-4	PEM	0.05	Federal	1
WET-E-5	PEM	0.28	State	1
WET-E-6	PUB(x)	0.01	State	-
Total		**1.07**		
Total Federal Jurisdictional Wetlands (USACE)		**0.23**		
Total State Jurisdictional Wetlands[1]		**0.84**		

3.3.1.4.1 Jurisdictional Summary

Within the Project Site, one perennial stream, two intermittent streams, 22 WWCs, and 15 wetlands, including one excavated ponded area, were identified. The perennial stream, Blue Bank Bayou (S-D-2), and its forested fringe wetlands (Wet-D-1) possess a hydrological connection to the Mississippi River, a traditional navigable water (TNW). As a result, this stream and wetland are classified as federally jurisdictional by the USACE Memphis District. Based on TDEC criteria, three segments of Blue Bank Bayou (S-D-2, S-D-1, and S-B-1-a) are streams under state jurisdiction, and the remaining watercourses on the Project Site are WWCs, which are not classified by TDEC as streams and are not jurisdictional. The remaining wetlands on the Project Site are isolated and under state jurisdiction. The streams and wetlands under federal or state jurisdiction within the Project Site would be avoided to the greatest extent practicable and surrounded by buffers. Only one wetland under state jurisdiction (WET-D-2), a 23-acre, low-quality wetland currently used for agriculture, could not be avoided and would be minimally impacted by the installation of piles supporting solar arrays.

Within the TVA 161-kV transmission line ROW, two perennial streams, one WWC, five wetlands, and one pond were identified. The perennial streams (S-E-1 and S-E-3) are under federal and state jurisdiction. Two of the wetlands (WET-E-3 and WET-E-4) are under federal jurisdiction, and the remainder are isolated and under state jurisdiction.

Nationwide Permit (NWP) 51, pertaining to construction, expansion, or modification of land-based renewable energy generation facilities and attendant facilities, requires a pre-construction notification to the USACE when discharge would result in the loss of greater than 1/10-acre of WOTUS. Attendant facilities include infrastructure for collection as well as roads, parking lots, and stormwater management facilities. Utility lines transferring energy to a distribution system, regional grid, or other facility are generally considered to be separate single and complete linear projects. If the only activity requiring USACE authorization is the construction of a utility line (water or electric), then NWP 12 may be used (USACE 2017a, USACE 2017b). Required for the construction, maintenance, repair, or removal of utility lines and associated facilities, NWP 12 authorizes work or discharges of fill/dredged material into WOTUS. Discharges of dredged or fill material into wetlands and non-tidal WOTUS must not cause the loss of greater than 0.5-acre of wetlands and non-tidal WOTUS, including the loss of no more than 300 linear ft of stream bed. Permanent impacts exceeding the 0.5-acre threshold require an Individual Permit (USACE 2017b). Impacts to streams or wetlands under state jurisdiction require an ARAP from TDEC. As noted above, all would be avoided except WET-D-2, which may require an ARAP.

3.3.2 Environmental Consequences – Water Resources

This section describes the potential impacts to water resources should the No Action Alternative or the Proposed Action be implemented.

3.3.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility and upgrades to the existing transmission line would not be constructed; therefore, no project-related impacts to water resources would be expected to occur. Existing land use would remain a mix of farmland and undeveloped, privately-owned land, and water resources would remain as they are at the present time. Indirect impacts to water resources would continue if the Project Site continued to be used as agricultural land. Increases in erosion and sediment runoff would continue and/or occur if farming practices were not maintained to prevent erosion and runoff. Erosion and sedimentation on the Project Site could alter runoff patterns and impact downstream surface water quality.

In addition, if chemical fertilizers and pesticides are continually used, impacts to surface water and groundwater may occur.

3.3.2.2 Proposed Action

Under the Proposed Action, Ridgely Solar Project would be constructed on 2,344 acres of land in Lake County, Tennessee, permanently disturbing approximately 1,961 acres and temporarily disturbing 43 acres within the Project Site and an additional 60 acres of existing TVA transmission ROW. The Proposed Action would also include development and use of appropriately permitted and constructed non-potable water wells along with a potable water well and a small leach field near the O&M Building for use during construction and operation. Once installed, the total surface area of PV panels would cover approximately 1,931 acres. Minor direct and indirect impacts to groundwater, surface water, floodplains, and wetlands may result from this Proposed Action. The change in land use from cyclic agricultural tillage to permanent vegetative cover with occasional low-maintenance disturbance would produce minor direct impacts including potential increases in run-off and temporary ponding. Potential increased run-off may also lead to a slight decrease in infiltration. Beneficial indirect impacts may occur to groundwater and surface water resources from the conversion of land use from agricultural to developed solar with a reduction in applied fertilizer and pesticides along with reduced sedimentation and increased filtration through established noninvasive and native vegetation.

Groundwater

No adverse impacts to groundwater would be anticipated as a result of the Proposed Action.

Development and use of groundwater wells and the small sanitary leach field would employ BMPs to reduce impacts to the local aquifers. Water use would be primarily cleaning and dust suppression measures along with some sanitary and potable uses throughout the life of the project. Portable chemical toilets would be employed during construction and demolition phases; thus, minimizing impacts to groundwater. Water needs for the Proposed Action would not adversely affect available groundwater resources. The properly utilized and maintained leach field and wells would have minimal impact on groundwater. As part of decommissioning, groundwater wells would be plugged and abandoned, with well casing removed to 2 ft below ground surface and replaced with native soil and vegetation (TDEC 2015).

Additionally, no adverse groundwater impacts would be anticipated from the changed land use over the site acreage. Once installed, the total surface area of PV panels would cover approximately 1,931 acres. Covering almost the entire Project Site, these elevated panels would have relatively little effect on groundwater infiltration and surface water runoff. Rainwater would run off the panels to the adjacent ground where ground infiltration would occur, or it would run off and be collected within the on-site stormwater detention basins. Hazardous materials that could potentially contaminate groundwater would not be used or stored at the Site. However, use of petroleum fuels, lubricants, and hydraulic fluids during construction and by maintenance vehicles would result in the potential for small on-site spills. The use of BMPs to properly maintain vehicles to avoid leaks and spills along with procedures to immediately address any spills that did occur, would minimize the potential for adverse impacts to groundwater.

The Project would comply with the requirements of the CWA through preparation and implementation of a SWPPP and filing of a NOI to comply with the Construction General NPDES Permit. The SWPPP would include procedures to be followed during construction to implement and maintain effective erosion and sediment controls. The plan would also address non-stormwater discharges and contact between stormwater and potentially polluting substances. BMPs would be prepared in accordance with good

engineering practices and shall be consistent with the requirements and recommendations contained in the *Tennessee Erosion and Sediment Control Handbook* (TDEC 2012).

Indirect beneficial impacts to groundwater could occur if panel placement and/or the use of buffer zones leads to fewer pollutants and erosion products entering groundwater. While the majority of the on-site land use is agricultural, with possible fertilizer and pesticide groundwater contamination, construction and operation of the Proposed Action could eliminate the source of these potentially damaging impacts, resulting in a minor beneficial impact to groundwater.

Activities related to the electrical interconnection of the Ridgely Solar Project Site with the existing Tiptonville to Hwy 412/Dyersburg 161-kV transmission line, as well as planned upgrades to the existing line, would occur within existing TVA transmission ROW and would have no adverse impacts on groundwater.

Surface Water

Construction and operation of the Ridgely Solar Project could affect surface waters. During construction, runoff of sediment and pollutants could adversely impact surface water quality on the Project Site. The use of BMPs for controlling soil erosion and run off would minimize these potential impacts to surface water. Additionally, construction of up to four on-site stormwater detention basins totaling 9 acres would allow any sediments to settle out and remain on-site.

During the site layout development process (Figure 2-2), streams and wetlands were avoided to the extent practicable. Buffers of 50 ft would be maintained along each side of federal and state jurisdictional streams as a conservative avoidance measure. These areas would be avoided during construction to the greatest extent feasible, although minor work may occur within the buffer zones. Small crossings or culverts could be installed over WWCs (if necessary) to access collection blocks once the final design is determined. A total of 41,436.6 linear ft of WWCs are located within the Project Site, mostly in areas where solar arrays would be installed. In the transmission ROW, a total of 346.35 ft of streams and WWCs may be temporarily disturbed during upgrades along the transmission line (Figure 3.3-1). No federal or state jurisdictional streams would be adversely impacted by this project. State-jurisdictional stream segment S-D-1 crosses the underground MVA gen-tie easement, but the line would be installed by boring beneath the stream if water is present in this intermittent stream at the time of construction, thus avoiding construction impacts to the stream. If the stream is dry at the time of construction, trenching may be used to install the line beneath the stream bed. The stream crossing area would be restored before flow resumes, thus avoiding water quality impacts or other long-term effects from the installation.

Water needs for the Project Site would be met using groundwater or water trucks. The Proposed Action would utilize several groundwater wells along with a potable water well and a small leach field near the O&M Building. during construction and operation. During construction, portable chemical toilets would be used, and groundwater or trucked-in water used for dust suppression. During operation, modules would be cleaned using groundwater or trucked-in purified water, free of detergents and additives. Module cleaning would occur two or fewer times a year. It would not be anticipated that any discharges would leave the site from these cleaning activities; therefore, a NPDES discharge permit would not be required. Additionally, the proposed O&M Building would require potable water and a septic system. During decommissioning, portable chemical toilets would be used by workers, and either groundwater or trucked-in water would be used for dust suppression. As part of decommissioning, groundwater wells would be plugged and abandoned, with well casing removed to 2 ft below ground surface and replaced with native soil and vegetation (TDEC 2015).

Vegetation on the Project Site would be actively maintained to control growth and prevent overshadowing of the PV panels. In addition to mowing and trimming activities, pre-emergent and post-emergent herbicides may be selectively used. No herbicides would be used in the buffer areas or immediately adjacent to any waterbodies. Any herbicides used would be applied in accordance with applicable state and federal laws and regulations. Only herbicides registered with the EPA and applied per the EPA-approved label or by a certified, licensed applicator, would be used. All TVA required buffers and BMPs would be utilized to ensure that adverse impacts to water quality or aquatics species would be minimized during and after application. A list of the herbicides currently used by TVA in ROW management is presented in Appendix E. This list may change over time as new herbicides are developed or new information on presently approved herbicides becomes available.

As described above for groundwater, minor beneficial impacts to surface water could result from the change in land use and the reduction in the amount of fertilizer and pesticide runoff to surface water resources, the reduced likelihood of erosion and sedimentation, and the reduction of disturbance activities on the Project Site.

The construction/installation of transmission components of the Project would occur simultaneously with the construction of the solar facility. No streams within the ROW would be directly impacted. BMPs would be used throughout these processes to minimize any possible water quality impacts related to perennial and ephemeral streams in the project area. Upgrades/improvements to the existing TVA Tiptonville to Hwy 412/Dyersburg 161-kV transmission line could potentially impact the perennial and ephemeral streams within the transmission ROW. Adherence to *TVA ROW Clearing Specifications, Environmental Quality Protection Specifications for Transmission Line Construction, Transmission Construction Guidelines Near Streams* (Appendices A, B and C), and *Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (TVA 2017) would ensure that the impacts of upgrade/improvement activities on the existing transmission ROW are not significant.

Floodplains

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

The Proposed Action would involve constructing a solar PV facility within the Project Site (Figure 2-2), consisting of about 1,931 acres of solar panels on posts; 11 site entrances; four stormwater basins; access roads; a laydown area; a substation constructed by Ridgely Solar; an O&M Building constructed by Ridgely Solar; two new 3-pole transmission structures along with a new connection line and OPGW line at the junction of the new loop line and the Tiptonville to Hwy 412/Dyersburg 161-kV transmission line near the switching station and the 33-acre gen-tie easement; concrete pads for transformers and inverters; site grading, grubbing, and clearing; fencing and lighting; installation of groundwater wells; upgrades along a 5.5-mi long stretch of the existing TVA Tiptonville to Hwy 412/Dyersburg transmission line; and the Lake County, TN 161-kV Switching Station constructed by TVA.

As noted in Section 2.2.1, development of the solar facility would be restricted to areas outside the exclusion areas shown in Figure 2-3. The exclusion areas were established by Ridgely Solar to protect floodplains

and other sensitive resources. The proposed solar PV facility would avoid construction within 100-year floodplains, which would be consistent with EO 11988.

Demolition of existing structures on the Project Site could also occur. Demolition would be consistent with EO 11988 provided the demolition debris is disposed of outside of floodways.

Once the final site layout is complete, the four proposed drainage basins could be located in places other than the specific locations shown in Figure 2-2; however, as noted in Section 2.2.2, development of the solar facility would be restricted to areas outside the exclusion areas shown in Figure 2-3, which would avoid 100-year floodplains. Therefore, other locations for stormwater basins within the Project Site boundary would also be consistent with EO 11988.

The Proposed Action would also involve modifications to the existing TVA Tiptonville to Hwy 412/Dyersburg 161-kV transmission line, a permanent easement for access to the proposed Lake County, TN 161-kV Switching Station, as well as installation of telecommunications connections inside the proposed O&M Building, Switching Station, and substations. Telecommunications connections would involve installing equipment inside existing structures located outside the 100-year floodplain, which would be consistent with EO 11988.

The two new 3-pole transmission structures near the switching station and the 33-acre gen-tie easement connecting the new loop line and the Tiptonville to Hwy 412/Dyersburg 161-kV transmission line, would be located outside 100-year floodplains, which would be consistent with EO 11988.

In addition to the two new transmission structures, electrical interconnection of the Project would require upgrades to the existing transmission line. TVA would modify the Tiptonville to Hwy 412/Dyersburg 161-kV transmission line by installing splice cases on Structures 199, 208, and 219, and by adding steel X-braces on Structures 200, 202-203, 205, 207, 209-212, 217-222, and 224-227. To accommodate the installation of the OPGW along the length of the transmission line, TVA would install OPGW dead-end at Structures 208 and 219. None of these transmission poles are located within the 100-year floodplain, which would be consistent with EO 11988. To minimize adverse impacts, standard BMPs would be used during upgrade activities, and any needed road construction in the 100-year floodplain would not increase base flood levels by more than 1.0 foot.

Impacts could include development to enhance, serve, or service the Project. Lake County, Tennessee, participates in the National Flood Insurance Program, and any development must be consistent with its flood damage prevention ordinance. Therefore, compliance with the requirements of the flood damage prevention ordinance would ensure that impacts on the floodplain, as well as to development constructed within the floodplain, would be minimal.

Based on the following mitigation measures, the Proposed Action would have no significant impact on floodplains and their natural and beneficial values:

- standard BMPs would be used during replacement activities;
- any road construction in the 100-year floodplain would not increase base flood levels by more than 1.0 foot; and
- demolition debris would be disposed of outside of floodways;

Wetlands

Under the Proposed Action, potential impacts to wetlands would be minimized as the Project Site layout is designed to specifically avoid wetlands under federal or state jurisdiction to the extent practicable. Buffer zones of 50 ft would be maintained around all but one (WET-D-2) wetlands on the Project Site. Throughout the Project, BMPs (e.g., silt fences, hand-clearing of vegetation, etc.) would be implemented in order to minimize any soil disturbance within 50 ft of on-site wetlands and jurisdictional streams. The floor and embankments of the on-site detention basin(s) would be allowed to naturally reestablish native vegetation after construction or replanted as necessary to provide natural stabilization, minimizing subsequent erosion.

Total wetland acreages in the Project Area and the acreages to be impacted are the following:

- Total Project Site wetlands: 43.49 acres
- State jurisdictional wetlands on Project Site to be permanently impacted: 0.01 acre
- Total northern (5.5-mi long) ROW wetlands: 1.07 acres
- Federal or state jurisdictional wetlands on ROW to be temporarily impacted: 1.07 acres

Only one wetland under state jurisdiction (WET-D-2), a 23.4-acre, isolated, low-quality wetland currently used for agriculture could not be avoided and would be minimally impacted by the installation of piles supporting solar arrays. Impacts to this wetland would be minimized through the use of solar panels mounted on 6-by-6-inch steel pilings driven directly into the ground, 6 to 10 ft below grade. The Project would require approximately 75 piles per acre. While regulated by TDEC, the installation of these direct-driven pilings is not expected to constitute the filling of wetlands under USACE regulations. Based on the estimate of 75 pilings per acre (75 x 0.25 ft^2/pile = 18.75 ft^2/acre) on 23.4 acres, the area of state jurisdictional wetlands within the footprints of the pilings would total approximately 0.01 acre. The remainder of the area under the solar arrays would be revegetated. All other wetlands under federal or state jurisdiction would be surrounded by a 50-ft buffer and avoided. Thus, no other impacts to wetlands would be anticipated as a result of construction and operation of the solar facility.

Due to the Project siting requirements described in Section 2.3, TVA has determined that there is no practicable alternative to the permanent disturbance of an approximately 23.4-acre, low-quality, isolated wetland that is under state jurisdiction and currently in agricultural use. Measures described in the previous paragraph would help minimize wetland impacts, and the area that would be permanently altered by the installation of pilings would total only approximately 0.01 acre. The loss of wetland acreage would be negligible, and with the cessation of crop cultivation, emergent wetland vegetation likely would become reestablished throughout this 23-acre area during the period of operation. As a result, wetland impacts from new construction would be avoided to the maximum extent practicable, the wetland area lost to facilities would be negligible, and the functional quality of the wetland would increase. Thus, the action is consistent with the requirements of EO 11990, Protection of Wetlands.

Ridgely Solar submitted a letter requesting a jurisdictional determination from the USACE Memphis District on September 9, 2020 (Appendix F). The USACE conducted a site visit on April 18-19, 2019. The response from the USACE, dated December 16, 2020, included an AJD and is included in Appendix F.

Planned upgrades/improvements to the existing TVA Tiptonville to Hwy 412/Dyersburg 161-kV transmission line (see Section 2.2.3) could potentially impact five wetlands within the transmission ROW to the north of the Project Site and several wetlands south of the Project Site. North of the Project Site, six wetlands, WET-E-1, WET-E-2, WET-E-3, WET-E-4, WET-E-5, and WET-E-6, are described in Table 3.3-4 and shown on Figure 3.3-2. Wetlands south of the Project Site will be determined in supplemental

environmental reviews. Since this is an existing transmission line and ROW, the upgrade/improvement activities are not expected to directly impact the wetlands. Adherence to *TVA ROW Clearing Specifications, Environmental Quality Protection Specifications for Transmission Line Construction, Transmission Construction Guidelines Near Streams* (Appendices A, B and C) and *Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities* (TVA 2017) would ensure that the upgrade/improvement activities do not adversely affect these wetlands.

3.4 BIOLOGICAL RESOURCES

This section provides an overview of existing biological resources within the proposed Project Area, including the proposed Project Site and the transmission ROW, in which the existing line would be upgraded in conjunction with the Project. The potential impacts to these biological resources that would be associated with the No Action Alternative and the Proposed Action are evaluated. The biological resources analyzed below are vegetation; wildlife; and rare, threatened, and endangered species. Unless cited separately, information has been summarized from the Natural Resources Report for the Ridgely Solar Facility (Cardno 2020; Appendix G).

The Project Area is located in a rural area in central Lake County (Figures 1-1, 2-1, and 2-3). According to the EPA Level III and IV Ecoregions of Tennessee map, the Project Area falls within the Northern Mississippi Alluvial Plain ecoregion (73a). The area is within a relatively flat region of Quaternary alluvial deposits of sand, silt, clay, and gravel. It is bounded on the east by the Bluff Hills ecoregion (74a) and on the west by the Mississippi River. Most of the region is in cropland, with some areas covered in deciduous forest. The natural vegetation consists of southern floodplain forest dominated by oak, tupelo, and bald cypress. Soils within the Northern Mississippi Alluvial Plains are underlain by Holocene alluvium. The two main distinctions in the Tennessee portion of the ecoregion are between areas of loamy, silty, and sandy soils with better drainage, and areas of more clayey soils of poor drainage that may contain wooded swampland and oxbow lakes (Griffith et al. 1997).

The Project Area and surrounding areas are covered mainly by croplands used for growing soybeans, cotton, corn, sorghum, and vegetables. The Project Area is located approximately 3.8 mi east of the Mississippi River and approximately 2.7 mi southwest of Reelfoot Lake. Blue Bank Bayou crosses the Project Area and is a tributary to the Mississippi River and Reelfoot Lake.

Desktop investigations were conducted prior to field surveys of the proposed Project Area. Wildlife, vegetation, and threatened and endangered (T&E) species were researched during the desktop investigations and verified through the field surveys, which were conducted in different portions of the Project Area between July 2016 and August 2020. Results of desktop investigations and field surveys are described in this section.

A number of federal laws apply to biological resources in the vicinity of the Proposed Action, including the following: cv c

- NEPA (42 U.S.C. §§ 4321-4347)
- Endangered Species Act (ESA; 16 U.S.C. §§ 1531-1544)
- Migratory Bird Treaty Act (16 U.S.C. §§ 703-712)
- Bald and Golden Eagle Protection Act.

3.4.1 Affected Environment – Biological Resources

The existing biological resources within the Project Area comprise vegetation, wildlife, and rare species, including species with a federal or state listing status of threatened or endangered.

3.4.1.1 Vegetation

Field surveys were conducted in June and August 2020 to characterize plant communities within the proposed Project Site (2,344 acres) and the existing ROW to be upgraded that extends 5.5 mi from the Site to the TVA Tiptonville Substation (60 acres). Using the National Vegetation Classification System (Grossman et al. 1998), the vegetation types observed during field surveys can be classified as a combination of deciduous forest and herbaceous/agricultural vegetation. The vegetation communities in the Project Area are shown in Figures 3.1-1 and 3.1-2. These communities are common throughout the region, and those in the southern ROW are expected to be similar.

Approximately 2,192 acres (93.5 percent) of the Project Site are agricultural land where crops are cultivated, predominantly planted wheat (*Triticum aestivum*), soybeans (*Glycine max*), cotton (*Gossypium hirsutum*), or corn (*Zea mays*) (Cardno 2020).

The forest communities within the proposed Project Area are mostly deciduous. Deciduous forest, in which deciduous trees account for more than 75 percent of total canopy cover, occupies only approximately 20.6 acres (0.88 percent) of the Project Site, including 28.19 acres of wooded wetlands and 1.7 acres of non-wetland forest. Dominant species in the overstory of the small areas of deciduous forest include oaks (*Quercus* spp.), American sycamore (*Platanus occidentalis*), sweet gum (*Liquidambar styraciflua*), and ashes (*Fraxinus* spp.). The invasive Chinese privet (*Ligustrum sinense*) is prevalent in the understory of forested areas across the Project Site. This non-native species also occupies areas that were recently cleared, having invaded abandoned lots and farm fields where it now forms dense thickets (Cardno 2020).

Communities of grassland/herbaceous vegetation cover approximately 1.4 acres (0.06 percent) of the Project Area for the Proposed Action. This community type is characterized by greater than 75 percent cover of forbs and grasses and less than 25 percent cover of other types of vegetation. Species present include broomsedge (*Andropogon virginicus*) and non-native herbs such as curly dock (*Rumex crispus*), buckhorn (*Plantago lanceolata*), and winter ryegrass (*Lolium perenne*) (Cardno 2020).

Wetlands cover approximately 43.49 acres (1.8 percent) of the Project Site for the Proposed Action. This total consists of 1.52 acres of federal jurisdictional wetlands and 41.97 acres of state jurisdictional wetlands (see Section 3.3.1.4 for discussion of the wetland areas). Communities of woody wetland vegetation consist mainly of water oak (*Quercus nigra*), red maple (*Acer rubrum*), sweetgum, ash (*Fraxinus* spp.), bald cypress (*Taxodium distichum*), and American elm (*Ulmus americana*) in the overstory. Emergent herbaceous wetland plants on the Project Site include spikerush (*Eleocharis parvula*), yellow nutsedge (*Cyperus esculentus*), Gray's sedge (*Carex grayi*), Frank's sedge (*Carex frankii*), and soft rush (*Juncus effusus*) (Cardno 2020).

The existing Highway 412 to Tiptonville 161-kV transmission line that would be upgraded in conjunction with the Proposed Action is within a 100-ft-wide ROW that extends approximately 4 mi north from the proposed Project Site boundary to the Tiptonville substation. The predominant vegetation type within this 60-acre ROW is cultivated crops (48 acres; 80 percent). Small areas that are not in crop cultivation historically supported woody wetlands (2 acres) and deciduous forest (0.4 acre) but are now maintained as low-growing, mainly herbaceous vegetation within the ROW. The remaining 9 acres are predominantly developed open space (Figure 3.1-2). In areas that are not used for agriculture, TVA actively limits the

height of vegetation in the ROW. Vegetation within the southern ROW is similarly maintained and is expected to be of similar composition.

3.4.1.2 Wildlife

Wildlife species likely to occur in the field, forest, and transitional ecotone habitats of the Project Site and the northern ROW (Proposed Action) are those typically found in similar habitats across western Tennessee. Mammals likely to occur include the white-tailed deer (*Odocoileus virginianus*), woodchuck (*Marmota monax*), gray fox (*Urocyon cinereoargenteus*), red fox (*Vulpes vulpes*), coyote (*Canis latrans*), raccoon (*Procyon lotor*), gray squirrel (*Sciurus carolinensis*), eastern chipmunk (*Tamias striatus*), white-footed mouse (*Peromyscus leucopus*), woodland vole (*Microtus pinetorum*), southern short-tailed shrew (*Blarina carolinensis*), and cotton mouse (*Peromyscus gossypinus*).

Birds likely to occur in the habitats of the Project Area include songbirds, birds of prey, game birds, and wading birds. Songbirds that commonly occur in these habitat types include the American crow (*Corvus brachyrhynchos*), northern cardinal (*Cardinalis cardinalis*), tufted titmouse (*Baeolophus bicolor*), brown thrasher (*Toxostoma rufum*), northern mockingbird (*Mimus polyglottos*), American robin (*Turdus migratorius*), chipping sparrow (*Spizella passerina*), and Carolina wren (*Thryothorus ludovicianus*). Birds of prey expected in these habitats include the red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and turkey vulture (*Cathartes aura*). Game birds likely to occur include the bobwhite (*Colinus virginianus*) and mourning dove (*Zenaida macroura*). Wading birds likely to utilize wetland, stream, and pond habitats of the Project Area include the green heron (*Butorides virescens*) and great blue heron (*Ardea herodias*).

Reptiles and amphibians likely to occur in the Project include the box turtle (*Terrapene carolina*), eastern garter snake (*Thamnophis sirtalis*), cottonmouth (*Agkistrodon piscivorous*), black racer (*Coluber constrictor*), fence lizard (*Sceloporus undulatus*), upland chorus frog (*Pseudacris triseriata feriarum*), and American toad (*Bufo americanus*).

Many of these species are most likely to be found in relatively undisturbed areas of upland and wetland forest in the Project Area. However, the majority of the Project Site is actively farmed, so overall species diversity is expected to be relatively low, and most species present are widespread in their occurrence, adapted to open field and edge habitats, and relatively common in the region. During the winter, the agricultural fields are likely to be used by waterfowl and other birds feeding on crop residues. The two ponds in the area also may be used by waterfowl in the winter, as well as reptiles and amphibians year-round. For this evaluation, the Project Area was defined to include the Project Site (solar facility footprint) and transmission ROW (Proposed Action).

Migratory Birds

The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) Trust Resources Report for the Project Area (USFWS 2020a) contains a list of migratory birds of conservation concern (BCC) that potentially could occur in the area during breeding season, wintering season, or year-round.

Of the 12 BCC species identified in the IPAC report, five species could occur in the area during the breeding season: the American kestrel (*Falco sparverius paulus*), least tern (*Sterna antillarum*), prothonotary warbler (*Protonotaria citrea*), red-headed woodpecker (*Melanerpes erythrocephalus*), and wood thrush (*Hylocichla mustelina*). The report also notes that the bald eagle (*Haliaeetus leucocephalus*), which occurs in the area during its breeding season (September through July), is not a BCC in this area but is vulnerable and

protected under the Bald and Golden Eagle Protection Act. The other seven BCC species on the list breed elsewhere and may occur in the area only during winter or migration.

The majority of the Project Site is currently intensively cultivated for agriculture, and these agricultural areas do not provide quality nesting habitat for these BCC species or the bald eagle. No records of colonial wading bird colonies or osprey nests are known within 3 mi of the Project Area (TVA 2020a).

The American kestrel inhabits open or semi-open country, farmland, and forest edges. It nests in tree cavities. Suitable nesting habitats for the American kestrel may be present in the limited wooded areas on the Project Site, many of which are wetlands that would be excluded from development. However, only two small areas of trees would be cleared and could provide nesting habitat if suitable cavities are present.

The least tern forages in rivers and lakes and nests on sandbars and islands. These habitats are not present in the Project Area.

The prothonotary warbler forages and nests in swamps and forested riparian areas during the warmer months; it winters in the tropics. Similar habitats within the Project Site are wetlands and streams that would be excluded from development. Thus, the prothonotary warbler would not be present in habitats potentially affected by the Proposed Action.

The red-headed woodpecker can occur in the Project Area throughout the year. It typically forages in groves of tall trees in open and farm country, forest edges, and large scattered trees; it nests in dead trees. Suitable habitats for the red-headed woodpecker may be present in the limited wooded areas on the Project Site, many of which are wetlands that would be excluded from development. However, two small areas of trees that are not wetlands would be cleared.

The wood thrush nests in the understory of forests with tall trees, usually in damp forests and near streams. Habitat for the wood thrush potentially could be present in the Project Area only in the larger, wooded wetland areas that would be excluded from development.

3.4.1.3 Threatened and Endangered (T&E) and Other Rare Species

Species with a federal or state listing status and other rare species with recorded occurrences in the vicinity of the Project Area were identified based on desktop research. The USFWS IPaC report for the Project Area (see Appendix F of Cardno 2020 [Appendix G to this EA]) was used to identify species with federal listing status and the potential to occur in the vicinity. For this evaluation, the Project Area was defined to include the Project Site and northern ROW (Proposed Action). The TVA Natural Heritage Database was queried for federally listed species within Lake County and federally or state-listed species or other rare species with recorded occurrences within specified distances from the Project Area. These buffer distances differed among groups of organisms as follows: aquatic species – 10 mi; terrestrial animals – 3 mi; and plants – 5 mi. Additionally, information on rare species occurrences by county were obtained for Lake County from the website of the TDEC Natural Heritage Program (TDEC 2020b).

USFWS must be consulted for projects with a federal nexus and the potential to affect T&E species. Depending on the nature of potential impacts to listed species, consultation may be informal or formal. Formal consultation is required if informal consultation determines that the Proposed Action is likely to adversely affect listed species or their critical habitat. Based on the USFWS IPaC and TVA Natural Heritage databases, the species that have a federal or state listing status (or a state rank indicating the species is rare [S1 or S2] or vulnerable [S3]) and the potential to occur within the vicinity of or to be affected by the Project are those included in Table 3.4-1. The table identifies these species, their status and rank, their

typical habitats, and the likelihood of their occurrence in the Project Area based on the degree of correspondence between the habitats observed during ecological surveys of the Project Area and their habitat requirements. The IPaC report identified no designated critical habitats within the Project Area or potentially affected by the Project.

Table 3.4-1. Species with Federal or State Status and Recorded Occurrences in the Vicinity of the Project Area

Common Name	Scientific Name	Habitat[5]	Likelihood of Occurrence[6]	Federal Status	State Status	State Rank
Mammals						
Indiana bat [3]	*Myotis sodalis*	Caves and mines during winter; large trees with exfoliating bark near riparian areas in summer.	Moderate	E	E	S1
Northern long-eared bat [3]	*Myotis septentrionalis*	Caves and mines during winter; trees with exfoliating bark near riparian areas in summer.	Moderate	T	T	S1S2
Eastern woodrat [1]	*Neotoma floridana illinoensis*	Occurs in forested areas, but also uses caves and rocky outcrops.	Low	–	D	S3
Birds						
Interior least tern [1, 2. 3, 4]	*Sterna antillarum athalassos*	Mississippi River sand bars and islands; dikes.	None	E	E	S2S3B
Bald eagle [1, 2, 4]	*Haliaeetus leucocephalus*	Areas close to large bodies of water; roosts in sheltered sites in winter; communal roost sites common.	None	DM	D	S3
Bewick's wren [4]	*Thryomanes bewickii*	Brushy areas, thickets, and scrub in open country; open and riparian woodland.	Moderate	–	D	S1
Least bittern [4]	*Ixobrychus exilis*	Marshes with scattered bushes or other woody growth; readily uses artificial wetland habitats.	Low	–	D	S2B
Swainson's warbler [4]	*Limnothlypis swainsonii*	Mature, rich, damp, deciduous floodplain and swamp forests.	None	–	D	S3
Reptiles						
Mississippi green watersnake [1, 4]	*Nerodia cyclopeon*	Marshes, swamps, bayous, shallow lakes and ponds, wet prairies, oxbows and floodplain sloughs; far West Tennessee.	Moderate	–	D	S2
Fish						
Pallid sturgeon [1, 2, 3, 4]	*Scaphirhynchus albus*	Large, turbid, free-flowing riverine habitat, in strong current over firm gravel or sandy substrates; Mississippi River main channel.	None	E	E	S1

Table 3.4-1. Species with Federal or State Status and Recorded Occurrences in the Vicinity of the Project Area

Common Name	Scientific Name	Habitat[5]	Likelihood of Occurrence[6]	Federal Status	State Status	State Rank
Blue sucker [1, 2]	*Cycleptus elongatus*	Inhibits main stems of major rivers and lower sections of main tributaries. Well adapted to strong currents and found in riffles and rapidly flowing chutes. Require gravel or rock bottoms with constantly flowing water that is relatively silt-free.	None	–	T	S2
Alligator gar [1, 2, 4]	*Atractosteus spatula*	Sluggish pools of large rivers, oxbows, swamps, and backwaters; West Tennessee.	None	–	D	S1
Sicklefin chub [1, 2, 4]	*Macrhybopsis meeki*	Main channel of the Mississippi River in swift currents over sand and gravel substrates.	None	–	D	S2
Golden topminnow [1, 2, 4]	*Fundulus chrysotus*	Swamps, backwaters, and pools of ditches and slow-moving creeks; Reelfoot Lake & immediate vicinity.	Low	–	D	S1S2
Mollusks						
Striped whitelip [2, 4]	*Webbhelix multilineata*	Terrestrial snail: low wet habitats, marshes, floodplains, meadows; lake margins; under leaf litter or drift; Mississippi River floodplain	Moderate	–	R	S2
Fatmucket [4]	*Lampsilis siliquoidea*	Slack water with mud substrate; Wolf R (Miss R trib); West TN; may occur at Reelfoot Lk; also reported Drakes Ck (Cumberland R), Sumner Co.	Low	–	R	S2
Flowering Plants						
Blue mud-plantain [1, 3, 4]	*Heteranthera limosa*	Wetlands, mud flats	Moderate	–	T	S1S2
Bristly sedge [3, 4]	*Carex comosa*	Swamps	Moderate	–	T	S2
Yellow water-crowfoot [3, 4]	*Ranunculus flabellaris*	Ponds and marshes	Moderate	–	T	S2
Copper iris [4]	*Iris fulva*	Bottomlands	Moderate	–	T	S2
Nuttall's waterweed [4]	*Elodea nuttalii*	Submersed aquatic -- streams and ponds	Moderate	–	S	S2
Ovate-leaved arrowhead [1, 4]	*Sagittaria platyphylla*	Swamps, emergent	Moderate	–	S	S2S3
Featherfoil [1, 4]	*Hottonia inflata*	Aquatic – wet sloughs and ditches	Moderate	–	S	S2
Lake cress [1, 4]	*Neobeckia aquatica*	Gum or cypress swamps	Moderate	–	S	S2

Table 3.4-1. Species with Federal or State Status and Recorded Occurrences in the Vicinity of the Project Area

Common Name	Scientific Name	Habitat[5]	Likelihood of Occurrence[6]	Federal Status	State Status	State Rank
American ginseng [1]	*Panax quinquefolius*	Forest, often on north- or east-facing hills; requires deep, rich, well-drained soil with plenty of calcium and organic matter	Low	–	S - CE	S3S4

Federal and State Status Abbreviations:
E = Endangered
T = Threatened
S = Special Concern
R = Rare, not state-listed
D = Deemed in need of management
DM = Delisted but still monitored
CE = Commercially exploited
– = No federal status

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

Footnotes – Sources:
[1] TVA 2020a (buffer query: 10 mi aquatic, 3 mi terrestrial, 5 mi plants)
[2] TVA 2020a (county query [terrestrial] or hydrologic unit code query [aquatic])
[3] USFWS IPaC (USFWS 2020a)
[4] Tennessee Dept. of Environment and Conservation (TDEC), Natural Heritage Program, Rare Species by County (TDEC 2020b)
[5] Habitat description: TDEC (2020a)
[6] Likelihood of occurrence: based on habitat requirements versus habitats observed in project area during ecological field surveys

Mammals

The federally listed mammal species identified as having the potential to occur in the vicinity of the Project Area are the Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*). There are no designated critical habitats for these bats in the vicinity of the Proposed Action (USFWS 2020a). Field surveys of the Project Area for the Proposed Action were performed to search for and document the locations of potential bat habitats. The surveys for bat habitat were conducted as prescribed in the *Range-wide Indiana Bat Summer Survey Guidelines* (USFWS 2018), which are also applicable to the northern long-eared bat. A team of scientists surveyed the Project Area for the Proposed Action looking for suitable bat habitat. Based on the survey report including photographs of the forested areas in Project Site (Cardno 2020), TVA has determined that a small amount of suitable summer roosting habitat and forested foraging habitat does occur in the action area. The TVA Natural Heritage Database did not indicate the presence of caves within 3 mi of the Project Area.

Indiana bat

The endangered Indiana bat hibernates in caves and mines in winter and migrates to summer habitats in wooded areas. The large winter colonies disperse in spring, and reproductive females form smaller

maternity colonies in wooded areas. Males and non-reproductive females roost in trees but typically do not roost in colonies (USFWS 2020b). The Indiana bat typically forages in semi-open forested habitats and forest edges as well as riparian areas along river and lake shorelines (USFWS 2020b, NatureServe Explorer 2020). Suitable summer roosting habitat requires dead, dying, or living trees of sufficient size with sufficient exfoliating bark. Multiple roost sites are generally used. Primary summer roosts are typically behind the bark of large, dead trees, particularly those that are in gaps in the forest canopy or along forest edges so that they receive sufficient sun exposure (USFWS 2018).

The proposed Project Site is predominantly agricultural land. Wooded areas range in size from 12 acres to less than 1 acre. Most wooded areas remaining on site are associated with wetlands or fence rows. While the tree species occupying these wooded areas typically do not have exfoliating bark, there are some snags and large diameter trees present with exfoliating bark, cracks, or crevices. Wetlands, streams, and one pond on site provide foraging habitat for the Indiana bat. Due to the presence of trees greater than 5 inches in diameter with cracks and crevices, areas of open midstory and understory suitable for navigation, and close proximity to water, these areas offer suitable summer roosting and foraging habitat for Indiana bat. The existing ROW to the north also provides forest edge habitat that may be used by the Indiana bat for foraging. There are no extant records of the Indiana bat in Lake County (TVA 2020a).

Northern long-eared bat

The northern long-eared bat was officially listed as threatened in 2015, and the Project Area is within the range of this species, which includes 39 states across much of the eastern and north-central U.S. Its listing was based on the impacts from white-nose syndrome on a large proportion of the population, particularly in the northeastern U.S. The northern long-eared bat spends the winter hibernating in caves. In summer, it roosts singly or in colonies in live or dead trees beneath bark, in cavities, or in crevices. It also has been found, though rarely, roosting in barns, sheds, or other structures. The northern long-eared bat forages for flying insects by flying through the understory of forested hillsides and ridges, as well as over bodies of water (USFWS 2020c).

Wooded areas range in size from 12 acres to less than 1 acre. Most wooded areas remaining on site are associated with wetlands or fence rows. While the tree species occupying these wooded areas typically do not have exfoliating bark, there are some snags and large diameter trees present with exfoliating bark, cracks, or crevices. Wetlands, streams, and one pond on site provide foraging habitat for northern long-eared bat. Due to the presence of trees greater than 3 inches in diameter with cracks and crevices, areas of open midstory and understory suitable for navigation, and close proximity to water, these areas offer suitable summer roosting and foraging habitat for the northern long-eared bat. There are no extant records of the northern long-eared bat in Lake County (TVA 2020a).

Eastern woodrat

The eastern woodrat has a state listing status of deemed in need of management. Potential habitat for the eastern woodrat on the Project Site would be limited to the small and fragmented forested areas within the Project Area (Cardno 2020). The eastern woodrat has only a low likelihood of occurrence in the Project Area, and all but 1.7 acres of potential forest habitat are in wetland areas that would be excluded from development.

Birds

The federally listed interior least tern and the federally protected bald eagle are the only federally monitored bird species identified as having the potential to occur in the vicinity of the Project Area. The other three

bird species in Table 3.4-1 (Bewick's wren, least bittern, and Swainson's warbler) have a state status of deemed in need of management and state ranks ranging from extremely rare to very rare to vulnerable.

The interior least tern is federally and state-listed as endangered. Based on the lack of habitat that meets its requirements within or adjacent to the Project Area, the interior least tern is not expected to be present in the Project Area.

The bald eagle is a federally protected species. While it has been delisted from the ESA, it is still monitored by the USFWS. Four bald eagle nests are known from Lake County. Suitable foraging habitat and trees for roosting and nesting are not present in the predominantly agricultural Project Area. The closest known bald eagle nest is approximately 3.2 mi away. The bald eagle is not likely to occur in this area.

The Bewick's wren has a state listing status of deemed in need of management and a state rank indicating that it is extremely rare and critically imperiled in the state. No records of this species are known within 3 mi of the Project Area. Based on the presence of limited areas of potentially suitable habitat within or adjacent to the Project Area, the Bewick's wren has a moderate likelihood of occurrence in the Project Area.

The least bittern has a state listing status of deemed in need of management and a state rank indicating that it is very rare and imperiled in the state. No records of this species are known within 3 mi of the Project Area. Based on the limited wetland habitat meeting its requirements within or adjacent to the Project Area, the least bittern has only a low likelihood of occurrence in the Project Area. The wetland habitats in which it might occur are primarily in areas that would be excluded from development.

The Swainson's warbler has a state listing status of deemed in need of management and a state rank indicating that it is vulnerable in the state. No records of this species are known within 3 mi of the Project Area. Based on the lack of habitat meeting its requirements within or adjacent to the Project Area, the Swainson's warbler is not expected to be present in the Project Area.

Of these five bird species, based on the minimal habitats present within or adjacent to the Project Area, only the Bewick's wren has more than a low likelihood of being present in the Project Area. The habitats in which it may occur are primarily in areas that would be excluded from development.

Reptiles

The Mississippi green watersnake has a state listing status of deemed in need of management and a state rank indicating that it is very rare and imperiled in the state. Based on the presence of limited areas of potentially suitable wetland habitat, the Mississippi green watersnake has a moderate likelihood of occurrence in the Project Area. The habitats in which it may occur are primarily in areas that would be excluded from development.

Fish

The only federally listed fish species identified as having the potential to occur in the vicinity of the Project Area is the pallid sturgeon. The other four fish species in Table 3.4-1 have a state status of threatened (blue sucker) or deemed in need of management (alligator gar, sicklefin chub, and golden topminnow) and state ranks ranging from extremely rare to very rare.

The pallid sturgeon is federally and state listed as endangered, and it has a state rank indicating that it is extremely rare and critically imperiled in the state. Based on the lack of on-site habitat meeting its requirements, the pallid sturgeon would not occur on the Project Site.

The blue sucker has a state listing status of threatened and a state rank indicating that it is very rare and imperiled in the state. Based on the lack of on-site habitat meeting its requirements, the blue sucker would not occur in the Project Area.

The alligator gar has a state listing status of deemed in need of management and a state rank indicating that it is extremely rare and critically imperiled in the state. Based on the lack of on-site habitat meeting its requirements, the alligator gar would not occur in the Project Area.

The sicklefin chub has a state listing status of deemed in need of management and a state rank indicating that it is very rare and imperiled in the state. Based on the lack of on-site habitat meeting its requirements, the sicklefin chub would not occur in the Project Area.

The golden topminnow has a state listing status of deemed in need of management and a state rank indicating that it is extremely to very rare and critically imperiled to imperiled in the state. Based on the limited stream/ditch habitats meeting its requirements, the golden topminnow has only a low likelihood of occurrence in the Project Area.

Of these five fish species, based on the minimal aquatic habitats present, only the golden topminnow may be present in the Project Area. The habitats in which it may occur are in areas that would be excluded from development.

Mollusks

The striped whitelip is a terrestrial snail that has a state listing status of rare and a state rank indicating that it is very rare and imperiled in the state. Based on the limited presence of potentially suitable habitat for this snail, the striped whitelip has a moderate likelihood of occurring in the Project Area. The habitats in which it may occur are primarily in areas that would be excluded from development.

The fat mucket is a freshwater mussel that has a state listing status of rare and a state rank indicating that it is very rare and imperiled in the state. Based on the lack of stream habitats in the Project Area meeting its requirements, the fat mucket has only a low likelihood of occurring in the Project Area.

Flowering Plants

Nine plant species with a state listing status of threatened or special concern have recorded occurrences within 5 mi of the Project Area (Table 3.4-1). None of these species have a federal listing status.

Blue mud-plantain is a perennial herb that has a state listing status of threatened and a state rank indicating that it is extremely to very rare and critically imperiled to imperiled in the state. Blue mud-plantain has a moderate potential to occur in wetlands in the Project Area, but it was not found during field surveys. The specific wetland habitats that may be suitable for this plant are primarily located in areas that would be excluded from development.

Bristly sedge is a perennial herb that has a state listing status of threatened and a state rank indicating that it is very rare and imperiled in the state. Bristly sedge has a moderate potential to occur in forested wetlands in the Project Area, but it was not found during field surveys. The specific wetland habitats that may be suitable for this species are located within areas that would be excluded from development of this Project.

Yellow water-crowfoot is a perennial herb that has a state listing status of threatened and a state rank indicating that it is very rare and imperiled in the state. Yellow water-crowfoot has a moderate potential to occur in ponds and marshes in the Project Area, but it was not found during field surveys. The specific

wetland habitats that may be suitable for the yellow water-crowfoot are located within areas that would be excluded from development of this Project.

Copper iris is a perennial herb that has a state listing status of threatened and a state rank indicating that it is very rare and imperiled in the state. Copper iris has a moderate potential to occur in bottomlands and associated marshes and swamps in the Project Area, but it was not found during field surveys. The specific wetland habitats in which the copper iris may occur are areas that would be excluded from development.

Nuttall's waterweed is an aquatic perennial herb that has a state listing status of special concern and a state rank indicating that it is very rare and imperiled in the state. Nuttall's waterweed has a moderate potential to occur in ponds and streams in the Project Area, but it was not found during field surveys. The aquatic habitats that may be suitable for this species are located in areas that would be excluded from development.

Ovate-leaved arrowhead is a perennial herb that has a state listing status of special concern and a state rank indicating that it is very rare and imperiled to vulnerable in the state. Ovate-leaved arrowhead has a moderate potential to occur in wetlands on the Project Site, but it was not found on the Project Site during field surveys. The wetland habitats that may be suitable for this species on the Project Site are located in areas that would be excluded from development, and it was not found in surveys of these areas. However, an individual plant was observed during field surveys within one small wetland in the northern (5.5-mi long) existing TVA transmission ROW, and that location would be avoided.

Featherfoil is an aquatic perennial herb that has a state listing status of special concern and a state rank indicating that it is very rare and imperiled in the state. Featherfoil has a moderate potential to occur in wetlands in the Project Area, but it was not found during field surveys. The aquatic habitats that may be suitable for the featherfoil are located within areas that would be excluded from development.

Lake cress is an aquatic perennial herb that has a state listing status of special concern and a state rank indicating that it is very rare and imperiled in the state. Lake cress has a moderate potential to occur in wetlands in the Project Area, but it was not found during field surveys. The aquatic habitats that may be suitable for this species are located within areas that would be excluded from development.

American ginseng is an upland perennial herb that has a state listing status of special concern due to being commercially exploited and a state rank indicating it is vulnerable or apparently secure, but with cause for long-term concern. Based on the minimal forest habitat in the Project Area and the low likelihood of soil and other habitat requirements being met, American ginseng has only a low potential to occur in the Project Area, and it was not found during field surveys.

Eight of these state-listed plants are wetland/aquatic species that have a potential to occur only in habitats that would be excluded from development. American ginseng has a low potential to occur in the small, fragmented, upland forest habitats on the Project Site.

3.4.2 Environmental Consequences – Biological Resources

This section describes the potential impacts to biological resources under the No Action Alternative and the Proposed Action.

3.4.2.1 No Action Alternative

Vegetation

Under the No Action Alternative, there would be no impacts to the existing vegetation in the Project Area as a result of actions related to the Ridgely Solar Project. It is assumed that active farming, which is the predominant land use on the Project Site, and vegetation management in the transmission line ROW would continue. It is also assumed that vegetation within TVA's existing Dyersburg-to-Tiptonville 161-kV transmission line ROW would continue to be maintained to prevent the growth of tall vegetation that would interfere with the ongoing operation of the line.

Wildlife

Under the No Action Alternative, impacts to wildlife would continue as under current land use. Current agricultural use of the majority of the Project Site and vegetation maintenance practices in the transmission ROW prevent the development of a diverse or abundant community of wildlife. Cycles of planting, maintenance of crop monocultures, and harvesting create physical disturbance and prevent a natural vegetation community that provides habitat usable by most native species. If current practices continue, the agricultural fields, ecotones, small forested tracts, and forested riparian areas would continue to support wildlife assemblages typical of the vicinity, as described in Section 3.4.1.2. If these current practices were discontinued, the wildlife community over time would transition in conjunction with the vegetation community, shifting toward species that prefer old fields, shrub/scrub, and forest.

T&E and Other Rare Species

Under the No Action Alternative, no direct or indirect impacts on T&E or other rare species are anticipated. Current agricultural land uses over most of the Project Area do not support the habitat requirements of T&E or other rare terrestrial species native to the region, and this condition would continue. Eight of the nine state-listed plants that could occur in the vicinity are wetland/aquatic species that have a potential to occur only in habitats that are currently excluded from agricultural activities and avoided during ROW maintenance. American ginseng has a low potential to occur in the small, fragmented, upland forest habitats on the Project Site that are also excluded from current agricultural activities. Thus, these plants would not be adversely affected by the No Action Alternative.

3.4.2.2 Proposed Action

Vegetation

Under the Proposed Action, a solar facility would be constructed on the Project Site, and an approximately 5.5-mi segment of existing transmission line would be upgraded, which would have direct impacts on vegetation in the ROW. Clearing and grading would be conducted to establish the new access roads, staging/laydown areas, concrete pads, substation, switch yard, and solar arrays. The Project Site encompasses 2,344 acres, of which approximately 1,961 acres would be permanently affected by clearing and construction of facilities. Approximately 1,853 acres of agricultural fields and 1.7 acres of deciduous forest (Figure 3.4-1) occur in areas where the PV arrays and other permanent facilities (Figure 2-2) would be installed on the Project Site. Those areas where the PV arrays would be installed would be converted from extensive areas used for agriculture or two small areas of forest to herbaceous ground cover. Approximately 16 acres of cropland would be temporarily disturbed for use as a laydown area during construction. Following construction, the solar facility would be maintained as described in Section 2.2.4 with a groundcover that is a mixture of grasses and forbs and is maintained to prevent the vegetation from growing taller than about 2 ft. This would result in the long-term conversion of most of the Project Site from seasonal row crops to herbaceous vegetation maintained at a low height.

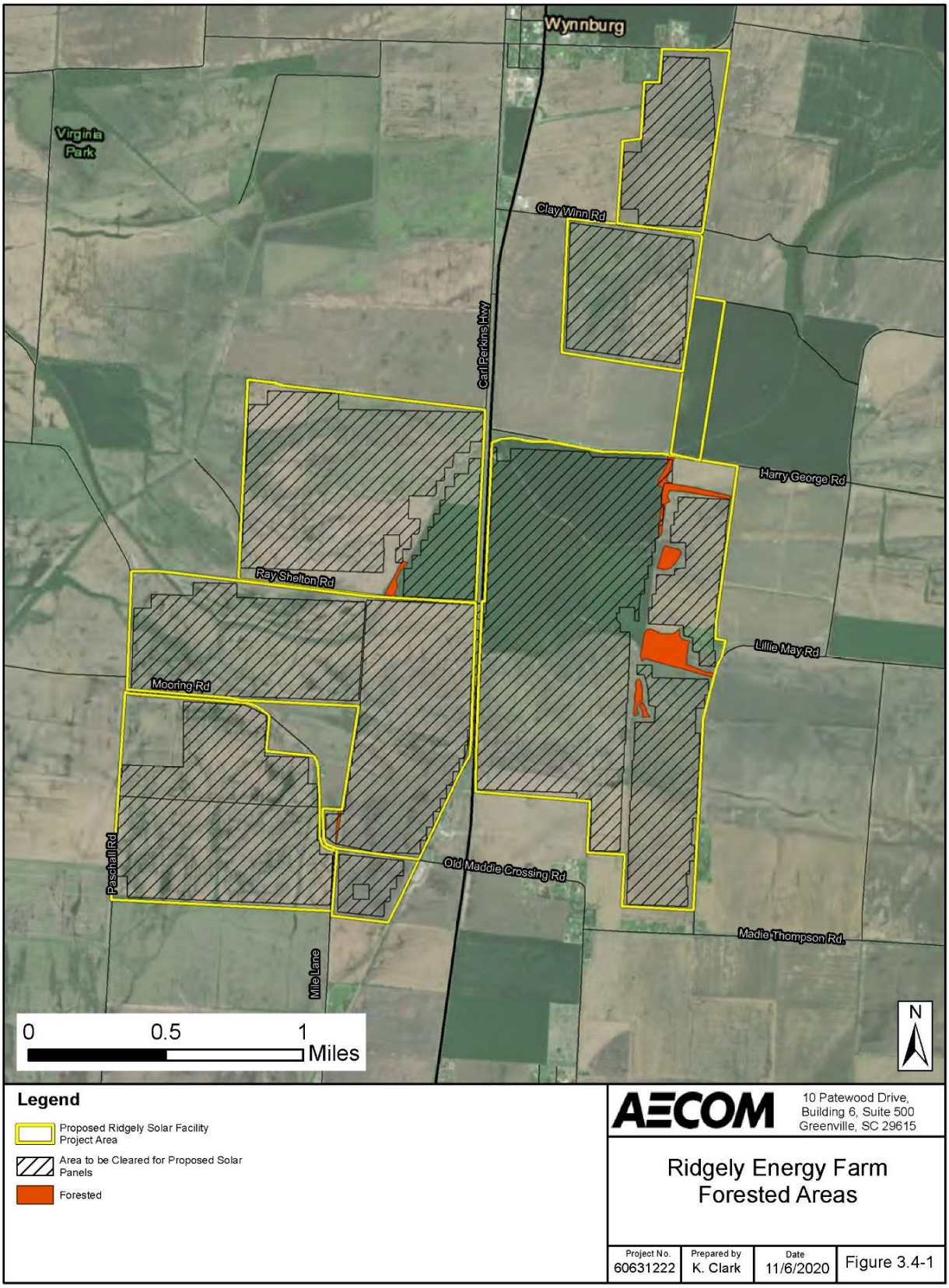

Figure 3.4-1. Forested Areas on the Project Site

The activities involved in upgrading the existing 161-kV transmission line north of the Project Site would occur within the existing ROW, and additional ROWs would not be established, cleared, or developed outside the Project Site. The vegetation resources within the ROW would be temporarily impacted by vehicle access and associated activities required for the planned upgrades but would not be noticeably affected over the long term. BMPs would be employed to prevent soil erosion and related impacts on vegetation from temporarily accessing and working on these line modifications.

Construction would be sequenced to minimize the exposure time of the disturbed areas. Silt fence and other appropriate erosion controls, such as temporary cover, would be used as needed to minimize exposure of soil and to prevent eroded soil from leaving the work area. Disturbed areas including, but not limited to, road shoulders and reclaimed road sections, office/laydown areas, stormwater drainage basins, and other Project-specific locations would be seeded. A mixture of weed-free, low-growing, native grass seed obtained from a reputable seed dealer and in compliance with species recommendations of the local Natural Resources Conservation Service office would be used. If conditions require, soil stabilization by mulch or sprayable fiber mat could be necessary. If the area seeded is a steep slope, hydro seeding may be employed as an alternative. Hay mulch also would be utilized as needed. Erosion control measures would be inspected and maintained until vegetation in the disturbed areas has become well-established and soils on the Project Site are stable.

Direct impacts to forested areas would be minimal under the Proposed Action as most of the trees are located within wetlands and the 50-ft buffer areas associated with waterbodies and wetlands. Construction within these buffer zones would be avoided to the extent possible, but minor work could occur within the buffers. Several small stands of trees would be removed during the clearing process. Additionally, minor impacts may occur if trees taller than 65 ft would shade the PV arrays and in locations where trees would interfere with the placement of a structure or a drainage basin.

Taking into consideration the large amount of similar habitat and land cover in the area locally and regionally, as well as the previously-disturbed nature of the Project Site, the clearing/grading of approximately 1.7 acres of existing deciduous forest and their conversion to herbaceous vegetation would have a minor impact. The impacted portions of the Project Site consist predominantly of recently cultivated agricultural land. These fields have been repeatedly cleared and revegetated with crops on a regular basis.

Current species diversity and abundance are limited due to agricultural practices. However, the re-vegetation and seeding process after the installation of solar arrays could potentially increase the number of plant species on the Project Site. In addition, the land in much of the surrounding vicinity is used for very similar agricultural purposes. Therefore, the impacts of converting approximately 1,853 acres of cropland to herbaceous vegetation would be relatively small and potentially beneficial with respect to the diversity and abundance of native grasses and other herbaceous vegetation that would be planted and maintained on the Project Site.

The existing vegetation on the Project Site consists predominantly of planted crops. These would be converted to a new type of plant community by seeding the areas of solar arrays with grasses and forbs, which would be maintained at a height less than 2 ft in order to prevent interference with the arrays. Thus, the Project Site would be vegetated year-round with early successional, maintained, herbaceous/grassland vegetation, resulting in a continuous cover of vegetation on area soils and impacts to regional plant communities that would be more beneficial than adverse. In the ROW, disturbed areas would be revegetated according to standard TVA best management practices, and ongoing vegetation maintenance practices in the ROW would continue.

Wildlife

Direct impacts to wildlife under the Proposed Action are anticipated to be limited. The abundance and diversity of wildlife living on the Project Site where solar arrays would be installed are limited due to the agricultural activities in these areas historically and currently. Wildlife present at the time of construction would be disturbed, and mobile individuals would be displaced by construction activities. Disturbance, displacement, and direct mortality of individual animals likely would occur during the limited period when heavy equipment is used for clearing, grading, and excavation. Mobile animals, including adult birds, larger mammals, and some reptiles, would avoid such activities and move to safer areas. However, small, less-mobile animals, such as amphibians, turtles, and small mammals, are likely to be at much greater risk of mortality. Mortality of eggs, nestlings, or species in borrows underground also may occur if they are present during the construction period. Although wildlife displaced by clearing activities and associated noise can find refuge in undisturbed habitats in the vicinity, temporary reductions in population could occur as a result of increased predation and competition in these habitats.

The effects from clearing and installation of facilities also would occur on a smaller scale in localized areas off of the Project Site along the northern transmission ROW where facility upgrades would occur. Effects within the ROW would be particularly limited because the disturbance would be temporary and within an existing ROW in which vegetation already receives routine maintenance.

Following the completion of construction and revegetation, species adapted to grassland, herbaceous fields, and ecotones between the fields and forests would likely reoccupy most of the affected areas. Most of the species that currently utilize the agricultural fields and ecotones on the proposed Project Site would be well-adapted to the herbaceous community that would be established in the areas of solar arrays. Minor shifts in species composition may occur due to the change in disturbance regime and the shift to periodically mowed grass and herbaceous fields. Species occupying the wooded areas to be cleared would be permanently displaced.

The wooded areas that would be cleared (totaling 1.7 acres) are small and highly fragmented, greatly limiting the numbers and diversity of the wildlife they support. They also make up a negligible portion of the overall forested habitat in the vicinity of the Project Site. The clearing of the relatively small forest fragments that would occur on the Project Site would not result in a substantial increase in forest fragmentation or impede the movements of terrestrial wildlife. Of the twelve birds identified as BCC in the Project Area, only the American kestrel and red-headed woodpecker potentially may nest in trees of these two small wooded areas with proposed tree removal. Tree clearing would be conducted only during the period October 15 – March 31, when these birds would not be nesting in the Project Area.

Although it is possible for both birds and bats to collide with PV panels and other structures, resulting in injury or mortality, the likelihood and significance of such potential collisions would be minor. The low height and lack of rapid movement of the panels is likely to minimize the potential for birds and bats to collide with the panels. In addition, the panels would be non-reflective to further reduce the potential for bird collisions. Accordingly, direct impacts on migratory birds and bats after the installation of facilities under the Proposed Action are anticipated to be minimal.

Overall, direct impacts on wildlife in the Project Area would be minor. These impacts would be minimized by the ability of mobile species to colonize similar habitats surrounding the Project Area and to recolonize the Project Area after the completion of construction and revegetation. The habitat acreage that would be permanently lost would be a small component of the accessible, undeveloped habitat in the vicinity to which animals can disperse with minimal effects on populations. Indirect impacts from displacement of individuals

and temporary disturbance due to construction activities and associated noise also would be very minor because displaced wildlife would colonize similar habitats that are abundant in adjacent areas.

T&E and Other Rare Species

Under the Proposed Action, federally listed T&E species would not be significantly affected. No federally listed species were observed during field surveys on or in the immediate vicinity of the Project Area. As described in Section 3.4.1.3, a team of scientists surveyed the Project Area for suitable summer roosting habitat for Indiana bat and northern long-eared bat. While the tree species occupying these wooded areas typically do not have exfoliating bark, there are some snags and large diameter trees present with exfoliating bark, cracks, or crevices. Due to the presence of trees greater than 3 inches in diameter with cracks and crevices, areas of open midstory and understory suitable for navigation, and close proximity to water, these areas offer suitable summer roosting and foraging habitat for the Indiana bat and northern long-eared bat.

The Project Site includes eight small, fragmented areas of forest totaling less than 21 acres. All but two of these forested areas are wetlands and would be excluded from development. Only two small areas of upland forest totaling 1.7 acres (Figure 3.4-1), consisting of small groups of trees along existing fencerows (Cardno 2020), would be cleared for the Proposed Action. Tree clearing would be conducted only during the winter window (October 15 – March 31) when federally listed bats are not roosting in trees or otherwise present in the Project Area.

Most wetlands, all streams, and a small pond would be surrounded by buffers and excluded from clearing and the installation of solar arrays. These features likely provide higher quality foraging habitat for bats due to the increased amount of water they are likely to hold. While some lower-quality foraging habitat would be impacted, much of the higher quality foraging habitat would remain intact following the Proposed Action. BMPs would be used to minimize the potential impacts of herbicides and sedimentation on wetlands and streams. With the use of BMPs, avoidance of the higher-quality foraging habitat, and similarly suitable foraging habitat in the surrounding landscape, the Proposed Action would have no measurable effect on foraging bats.

Consultation with USFWS under Section 7 of the ESA regarding potential impacts to Indiana bat and northern long-eared bat concluded on January 25, 2021 with a letter from USFWS stating that “based on the proposed conservation measure and consideration of the best available information regarding the Indiana bat and northern long-eared bat, we [USFWS] concur with your determination that the action may affect, but is not likely to adversely affect these species” (Appendix F).

Suitable habitats for terrestrial T&E species other than bats are very limited in the portions of the Project Site to be developed and absent from the northern ROW. The eastern wood rat and Bewick’s wren require woodland habitat, and only two small areas of upland forest totaling 1.7 acres would be cleared for the Proposed Action. These small groups of trees along existing fencerows are unlikely to provide habitat of sufficient quality or extent to support the eastern woodrat. Habitat suitable for Bewick’s wren may occur in these areas if they include brush or thickets, However, tree clearing would be conducted only during the period October 15 – March 31, when the wren would not be nesting and vulnerable. Adult birds if present during this period would be able to avoid impacts from forest-clearing activities in the small areas affected.

Wetland and aquatic habitats would be protected from impacts such as sedimentation or runoff from selective herbicide applications by the use of BMPs to prevent erosion during and after construction and the maintenance of buffers of 50 ft or more. The herbaceous vegetation cover to be established beneath and around the solar arrays is expected to further reduce the potential for erosion and sedimentation compared to the erosion potential of soils that are periodically tilled and exposed for crop cultivation. These

measures would minimize impacts to water quality within and downstream of the Project Area, thereby protecting aquatic state-listed species as well as aquatic insects that, in their adult phase, may be food for bats if they forage over wetlands and water bodies in the Project Area.

3.5 VISUAL RESOURCES

3.5.1 Affected Environment – Visual Resources

Visual resources are the visual characteristics of a place and include both natural and man-made attributes. Visual resources are important as they can determine how an observer experiences a particular location. For example, an agricultural setting would elicit very different feelings in an observer than a manufacturing plant or an industrial area. Visual resources are very important to people living in the area, people going through an area, and in the context of historical and culturally significant settings. The experience of a historically significant building can be severely altered if the surrounding visual character is changed. A viewshed is defined as the environment that can be seen from a certain vantage point; a viewpoint is the vantage point from where the visual character is seen.

The Project Area is north of the City of Ridgely. The regional character is mostly rural, with flat expansive agricultural fields, generally small towns, and very few forested areas. Attributes associated with the City of Ridgely would include many single-family homes with yards and trees, a few small shops and businesses (on Main Street and State Road [SR] 78), an elementary school with an athletic area, and small single-lane roads leading into the more widespread residential areas and then on to the rural areas. The town is located in the center of an open landscape of river flats enveloped in agricultural fields and floodplain areas nestled between the meandering Mississippi River and myriad wildlife refuges. Lake Isom National Wildlife Refuge is approximately 2 mi east of the Project Site and Reelfoot Lake's Blue Basin is approximately 2.5 mi northeast of the northernmost edge of the Project Site (See Section 3.9, *Natural Areas and Recreation*). Approximately 85 mi to the southwest of the Project Area is Memphis, a larger highly developed area which includes several smaller towns and suburbs.

Figure 3.5-1 shows the locations where photographs of the Project Area were taken. These locations were identified as areas from which the Project might be visible. The locations were selected based on geographic distribution, distance within the Study Area, and the presence of sensitive receptors such as residential areas, churches, parks, and similar land uses.

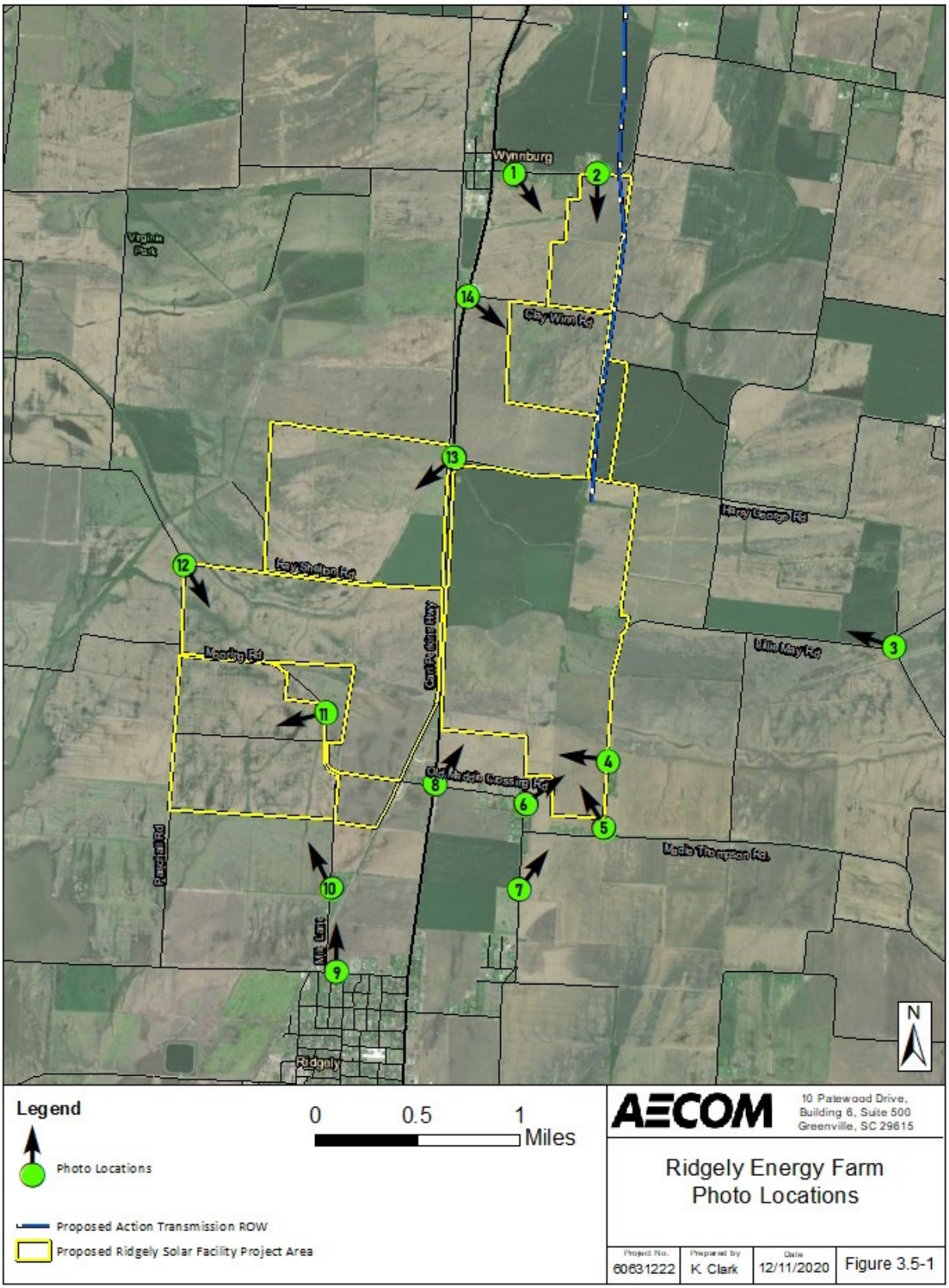

Figure 3.5-1. Photo Location Map

The Project Site is mostly agricultural land with actively farmed and small, isolated shrubby areas present throughout. The viewsheds constitute an almost completely agricultural setting, with very few man-made attributes. Man-made items include homes on adjoining properties, some residences, farm equipment buildings on-site, and paved and dirt roads traversing the parcel. Overall, in the Project vicinity, man-made items are generally tucked into small, forested areas or are mostly visually unobtrusive. For example, during the summer, the home in Photo 3.5-1 would be mostly surrounded by trees on several sides. Any houses within the boundary of the Project Area will be acquired; however, the house and 50 acres of property on Mooring Road (Location 11 on Figure 3.5-1) will not be acquired as it is not part of this Project.

Photo 3.5-1. Location 1 view of a residence on Wynnburg Bluebank Road looking southeast toward Project Site.

The Site has an overall flat topography reminiscent of agricultural and pastureland. The natural colored tones and unobtrusive man-made visual disturbances can create a feeling of peace and serenity. Although the uniformity of the croplands is a man-made visual disturbance, it can still be an appealing view due to its simple, yet classic, middle-American sensibility. The open expanse of green pastures presents an attractive pallet of natural colors and polygonal shapes. The majority of the Project Site is agricultural with small, spread out stands of trees sparsely situated between vast fields. Due to the farming practices, visual appearance will vary over the year; some areas will appear disturbed and weary when the crops have been harvested while some areas will be bright green with vegetation. Photo 3.5-2 illustrates the appearance of an unharvested field east of the Project Site (Location 3 on Figure 3.5-1) which is representative of the area.

Photo 3.5-2. Location 3 view from Lillie May Road outside the Project Site illustrating an unharvested agricultural field

Photo 3.5-3 (Location 7 on Figure 3.5-1) shows visual characteristics typical of the Project Site when fields are in a growing stage. During this season, the view would feel more like a natural setting, with small residences nestled within a treed yard, and forested areas far off in the distance. Photo 3.5-4 (Location 9 on Figure 3.5-1) also shows a typical view of a mowed and/or maintained residential area with sparse tree stands in the background. All the photos also show the presence of transmission lines in the view.

Photo 3.5-3. Location 7 view from Madie Road outside of the Project area showing early growing stage crops, residential homesteads, and transmission line

Photo 3.5-4. Location 9 view from Riley Road outside Project Site of a typical view of a mowed and/or maintained residential area with sparse tree stands in the background

There are several residential viewpoints for the Project Site as there are residences in the immediate vicinity. The southern boundary of the Project Site would not be visible from Riley Road, which is on the northern edge of the Town of Ridgely, due to the topography, trees and shrubs in the area that shield the view. The TDOT does provide Annual Average Daily Traffic (AADT) maps depicting traffic volumes based on a 24-hour, two-directional count at a given location. This provides an estimate of how many observers may travel local roads and possibly encounter the Project Site. Traffic counts on SR 78 in Ridgely and Wynnburg Bluebank Road in Wynnburg (unincorporated) indicated 4,061 and 761 cars, respectively, had traveled these roadways daily in 2020 (TDOT 2020).

3.5.2 Environmental Consequences – Visual Resources

This section describes the potential impacts to visual resources should the No Action Alternative or the Proposed Action be implemented. For this analysis, the construction and operation phases are treated separately as construction would be temporary and have different visual impacts from the longer-term operation phase.

3.5.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility and associated structures would not be constructed; therefore, no Project-related impacts to visual resources would result. Existing views would be expected to remain unchanged from predominantly disturbed agricultural land. Impacts to visual resources are possible as the City of Ridgely grows and land use changes to residential development. Additionally, visual changes may occur over time as vegetation on the Project Site changes. For example, if the land is no longer mowed or farmed, vegetation would change from low profile plants to bushes and trees.

3.5.2.2 Proposed Action

Visual concerns are often associated with both large- and small-scale solar facilities. Construction on the Project Site would convert primarily farmland, which has been actively cultivated for many years, to a commercial/industrial land use type. During the July 2020 site visit, the AECOM field team assessed the potential for visual impacts from the Proposed Action on the Project Site. In advance of arriving on-site, AECOM prepared a visibility assessment of the Project area, which identified the surrounding areas from which the Project could be visible (assuming a conservative maximum tree height of 30 ft). Although the panels would be visible from the immediate surrounding area, which is sparsely populated, the solar facility would not be visible from Reelfoot Lake State Park, located less than 3 mi northeast of the Project Site due to distance, topography, and intervening vegetation and structures. However, the solar panels may be visible on the horizon from a few viewpoints near the lake that are not screened by trees.

Large portions of the Project Site are visible from SR 78 and Old Ridgely Road because these roads run north-to-south and bisect the Project Site. Large portions of the Project Site are also visible from less traveled roads: Ray Shelton Road and Mooring Road which run east-west and bisect the western half of the Project Site, Paschall Road which runs north-south on the western boundary of the Site, and Madie Keefe Road which runs north-south on the eastern boundary of the Site. The topography of the area is generally flat; however, the majority of these roads are not heavily-trafficked roadways; therefore, the potential change in viewshed from agricultural to industrial would not be expected to result in major adverse impacts. The northeastern boundary, which is east of the Town of Wynnburg, and southern boundary, which is north of the Town of Ridgely, are more populated than the other boundaries. Some adjacent residences along these roads are screened from the Project Site by trees on their own land or on their neighbor's land.

The construction stage of the Proposed Action would create changes to the visible environment of the Project area. During construction, heavy machinery would be present, changing the visual aspects of the Project Site, which is now an agricultural landscape with few man-made items visible. Additionally, vegetation would be removed or trimmed, and part of the Project Site would be graded, changing the contouring, coloring, and texture of the scenery attributes. Much of the Project Site during construction would appear as a mixture of browns and grays due to earthmoving and concrete activities. Water would be used to keep soil from aerosolizing; therefore, dust clouds are not anticipated. These visual impacts would be most noticeable from SR 78 and Old Ridgely Road and the residences immediately south of the Project Site. Due to the terrain and the large amount of agricultural land in the immediate vicinity, construction and operation of the Proposed Action would be visible up to 1 mi away. Because the area is very sparsely populated, visual impacts during construction would be minor.

Indirect impacts to visual resources around the Project Site may occur due to increased traffic and movement of heavy machinery throughout the Site and along local roads. Overall, there would be minor temporary direct and indirect impacts to visual resources during the construction phase of the Proposed Action. Construction machinery and vegetation removal would change the views from a natural landscape

to an active construction-site. However, these impacts are considered minor as they would be temporary and there are few onlookers in the vicinity that would be affected by the appearance of the activities.

During the operation phase of the Proposed Action, minor visual impacts would continue to occur. Natural re-vegetation would be allowed to occur around the panels, and vegetation would be managed. New electrical lines would continue to be visible and dirt roads would be apparent throughout the solar facility. Chain-link security fencing topped with barbed wire would surround the panel arrays. Photo 3.5-5 shows typical solar panel arrays.

Photo 3.5-5. Single-axis, tracking photovoltaic system with panels close to maximum tilt

Visually, the PV panels would be dramatically different from the current scenery on the Site. AECOM visited the perimeter of the Site and captured photographs from accessible boundaries. As part of the visual resource analysis, AECOM created renderings of what the PV solar power plant would look like from 10 vantage points along Wynnburg Bluebank Road, Madie Keefe Road, Madie Thompson Road, Madie Road, Mile Lane, Mooring Road, and SR 78. Specific locations associated with sensitive receptors from which the Project would be visible (e.g., churches, cemeteries, residences, and recreation area) were identified during the viewshed analysis. Figure 3.5-1 shows the visual rendering baseline photo locations. The visual simulations for the photo locations show the baseline photos and the renderings of the likely appearance of the PV panels from these photo locations.

Photo 3.5-6 was taken from a vantage point near a residence on Wynnburg Bluebank Road looking south toward the Project Site at the northernmost region of the Site (Location 2 on Figure 3.5-1). The view is of an agricultural field of cultivated crops and there are trees on the horizon. Photo 3.5-7 is a rendering of what the view would look like if the Project were constructed. The panels are geometric and regular, giving the view an industrial appearance. Along this portion of Wynnburg Bluebank Road, the Project would extend for approximately 0.25 mi, but due to the distance of the panels from the road, intervening trees, and the topography of the site, the panels would be visible from this location. But driving past the solar facility on this road would not take long. Therefore, observers and residents along this portion of the Project Site would experience minor visual impacts.

Photo 3.5-6. Location 2 view from a residence on Wynnburg Bluebank Road looking south towards the Project Site

Photo 3.5-7. A rendering of the Project's post-construction appearance from Location 2 (Photo 3.5-6)

Photo 3.5-8 shows the Project Site from a location near a residence along Madie Keefe Road (Location 4 on Figure 3.5-1). It shows a pasture area with a few buildings, green trees and transmission lines in the background. Photo 3.5-9 shows a rendering of the facility's appearance post-construction. The view is industrial in nature, as from the previous vantage point on Wynnburg Bluebank Road. The panels present a more mechanized view of the field, but the powerlines and trees are still somewhat visible in the distance. When plants begin to grow in under the panels and between the fence and the panels, the view would become less industrial. Along this portion of Madie Keefe Road, the Project would extend for approximately 1 mi. Driving past the solar facility would not take long, and the rustic country view would be restored once past it. Additionally, for any existing occupied, residential structure within 300 ft of a solar panel where there is no existing vegetative buffer present, a vegetative buffer would be installed to create a screen for such residence. Therefore, visual impacts would be minor, and the installation of visual screening would further minimize this visual impact.

Photo 3.5-8. Location 4 view from a residence on Madie Keefe Road looking west toward the Project Site

Photo 3.5-9. A rendering of the Project's post-construction appearance from Location 4 (Photo 3.5-8)

Photo 3.5-10 was taken near a church on Madie Thompson Road looking northwest toward the Project Site (Location 5 on Figure 3.5-1). The view is of an agricultural field with industrial irrigation equipment near the road. There are trees in the background and transmission lines in the foreground and background. With the exception of the irrigation equipment, the scene is rural and pastoral, as in previous photos. Photo 3.5-11 is a rendering of the proposed PV facility from the same location. The panels in this view are in the southeast corner of the Project Site, near residences and a church. Although the visual aspect of the Project Site would change from an agricultural scene to a more industrial view, due to the panel setback from the Project Site boundaries, and the fact that it would not be seen by many travelers or residences; therefore, the visual impacts would be minor.

Photo 3.5-10. Location 5 view from a church on Madie Thompson Road looking northwest toward the Project Site

Photo 3.5-11. A rendering of the Project's post-construction appearance from Location 5 (Photo 3.5-10)

Photo 3.5-12 shows a view from a location near a residence on Madie Road looking northeast toward the Project Site (Location 6 on Figure 3.5-1). The field has powerlines visible in the background as well as a few trees in the distance. Photo 3.5-13 is a rendering of the proposed PV facility from the same location. The panels are barely visible above the agricultural field in the foreground of this view and the trees are still visible in the background. Due to the distance, the panels are almost invisible. The impacts to visual resources from this photo location would be minor.

Photo 3.5-12. Location 6 view from a residence on Madie Road looking northeast toward the Project Site

Photo 3.5-13. A rendering of the Project's post-construction appearance from Location 6 (Photo 3.5-12)

Photo 3.5-14 is a view of the Project Site from the intersection of SR 78 and Madie Road looking northeast toward the Project Site (Location 8 on Figure 3.5-1). Similar to other photos, the view is primarily of a cultivated crop field with trees in the background and transmission lines in the foreground. Photo 3.5-15 is a rendering of the proposed PV facility from the same location. Similar to the view from Location 6 (Photo 3.5-13), the panels and fencing are barely visible from this location and appear to blend in with the distant trees. Therefore, at this photo location, there would be minor to no visual impacts.

Photo 3.5-14. Location 8 view from the intersection of SR 78 and Madie Road looking northeast toward the Project Site

Photo 3.5-15. A rendering of the Project's post-construction appearance from Location 8 (Photo 3.5-14)

Photo 3.5-16 is a view from The Town of Ridgely Recreation Area on Mile Lane looking northwest toward the Project Site (Location 10 on Figure 3.5-1). Similar to previously described photo locations, there are trees in the far distance of this agricultural field and there is a transmission line in the foreground. Photo 3.5-17 is a rendering of the proposed PV facility from the same location. Due to the distance, the panels are almost invisible and appear to blend in with the distant trees. Therefore, at this photo location, there would be minor to no visual impacts. Therefore, at this photo location, there would be no visual impacts.

Photo 3.5-16. Location 10 view from a recreation area on Mile Lane looking northwest toward the Project Site

Photo 3.5-17. A rendering of the Project's post-construction appearance from Location 10 (Photo 3.5-16)

Photo 3.5-18 was taken from a residence on Mooring Road looking west toward the Project Site (Location 11 on Figure 3.5-1). The photo shows a cultivated crop field with trees that are barely visible in the far distant horizon. Photo 3.5-19 is a rendering of the proposed PV facility from the same location. The fencing and panels would be more visible compared to other locations. Due to their geometrical design, the panels and the fence impart an industrial, man-made appearance which is juxtaposed with the rural and more natural setting. There is a single residence on this portion of Mooring Road (the view from which this photo was taken), and this residence will be surrounded on all sides by portions of the Project Site (see Figure 3.5-1). Therefore, this residence will experience visual impacts; however, for any existing occupied, residential structure within 300 ft of a solar panel where there is no existing vegetative buffer present, a vegetative buffer would be installed to create a screen for such residence. Installation of visual screening would further minimize this visual impact.

Photo 3.5-18. Location 11 view from a residence on Mooring Road looking west toward the Project Site

Photo 3.5-19. A rendering of the Project's post-construction appearance from Location 11 (Photo 3.5-18)

Photo 3.5-20 was taken from the intersection of Mooring Road and Ray Shelton Road looking southeast toward the Project Site (Location 12 on Figure 3.5-1). This photo shows the area as rural and pastoral, as in most other photos described. Photo 3.5-21 is a rendering of the Project Site. The fencing and panels would be visible here. As noted on Figure 2-2, a stormwater detension basin has been proposd at this location in the foreground of the solar panels. However the final design and exact position of these conceptual drainage basins within the Project Site boundaries would be based on the most recent hydrology study and would function to temporarily store stormwater, minimize erosion, and reduce the rate of runoff. These basins would be constructed either by impoundment of a natural depression(s) or by excavating the existing soil. From this intersection, the solar farm would continue for approximately 1.25 mi south or east. However, due to the relatively few observers in this location (almost exclusively travelers in vehicles) the overall visual impacts would be minor at this photo location.

Photo 3.5-20. Location 12 view from the intersection of Mooring Road and Ray Shelton Road looking southeast toward the Project Site

Photo 3.5-21. A rendering of the Project's post-construction appearance from Location 12 (Photo 3.5-20)

Photo 3.5-22 was take from a residence at the intersection of SR 78 and Harry George Road looking southwest toward the Project Site (Location 13 on Figure 3.5-1). It shows a railroad track, a cultivated crop field in the background, and trees in the distance. Photo 3.5-23 shows a rendering of the Project from the same location. The panels present a more mechanized view of the field, but some trees are still visible above them in the distance. As with the previous renderings, when plants begin to grow in under the panels and between the fence and the panels, the view would become less industrial. Due to the existing train tracks, the appearnace of the panels would be a minor visual impact as the view is already somewhat industrial. Additionally, northbound drivers passing this location would soon be re-immersed in the existing viewshed (i.e., agicultural fields beside a traintrack).

Photo 3.5-22. Location 13 view from the intersection of SR 78 and Harry George Road looking southwest toward the Project Site

Photo 3.5-23. A rendering of the Project's post-construction appearance from Location 13 (Photo 3.5-22)

Photo 3.5-24 is a view from a residence at the intersection of SR 78 and Clay Winn Road looking east toward the Project Site (Location 14 on Figure 3.5-1). The vast green and brown agricultural field has trees in the background and an electrical wire in the foreground. Photo 3.5-25 is a rendering of the Project from the same location. The panels are only barely visible above the agricultural field in the foreground and blend in with the trees in the background which are still visible. Due to the distance, the panels are almost invisible. The impacts to visual resources from this photo location would be minor.

Photo 3.5-24. Location 14 view from the intersection of SR 78 and Clay Winn Road looking east toward the Project Site

Photo 3.5-25. A rendering of the Project's post-construction appearance from Location 14 (Photo 3.5-24)

Site-wide, after construction of the Project, the softly undulating intermittently green and brown agricultural landscape would be replaced by industrial highly geometric patterns. The viewshed would change from a peaceful natural setting to a manufactured and structured appearance. Observers from the various viewpoints would most likely not experience the same aesthetic qualities that currently exist. These impacts would be most severe along SR 78 and Old Ridgely Road. The flat topography currently present would be replaced by the angular and geometrically arranged PV panels. Although grading plans intend to maintain the general topography of the Project Site, the panels themselves would contribute to making the Site look flat. The surface of the panels themselves would also alter the view, as the dark, almost black surfaces would provide some reflection of the sky and would not conform to the surrounding agricultural views which have softer tones and angles.

Overall, visual impacts during the operation phase of the Project would be moderate in the immediate vicinity, but minimal on a larger scale, due to a combination of changes to the visual attributes of the area, the visibility of the Project Site from up to 1 mi away, and the existing general local character. However, these impacts would be minimal due to the sparsely populated immediate area.

Figure 2-2 shows the site layout including the solar panels, drainage basins, conservation easements, the switch yard, and the substation. The switchyard and the substation would be located in the northeast portion of the Project Site along Harry George Road. There are no residences in this area; therefore, visual impacts are not anticipated for the general public. Observers driving on this road and farmers harvesting or planting fields in the area may see these features temporarily while driving on the road and from adjacent farmlands.

On-site drainage basins would be constructed throughout the Project Site to temporarily store stormwater and slowly release it. Although site layout designs have not been finalized, Figure 2-2 presents the proposed location of four small on-site drainage basins. Two of the proposed drainage basins may be seen on the western side of the Site from Pashall Road and the intersection of Mooring Road and Ray Shelton Road, of which one of these was discussed in the rendering photo of Location 12 (Photo 3.5-22). One basin in the internal portion of the Site would be visible from SR 78 and Old Ridgely Road, as it at the intersection of SR 78 and Harry George Road. Currently, there is a residence at the location of this proposed basin that would be acquired by the Project. The fourth proposed basin is on a western edge of the Site but it is in the middle of an agricultural field and would likely not be visible. However, the appearance of the basins would approximate small ponds that are already located on and around the Project Site. Since they would be recessed and are proposed to be allowed to revegetate along the edges post-construction, the basins would not create an unwanted visual disturbance. Rather, they would appear as basins surrounded by bushes and reeds in a clearing, with the panels in the distance. Therefore, no impacts to visual resources due to the basins would occur.

Overall, impacts to visual resources in the Project vicinity would be minor due to the small number of available observers, intervening vegetation which would act as a visual screen, and additional vegetative screening mitigations that would be implemented.

3.6 NOISE

This section provides an overview of the existing ambient sound environment in the Project Area, and the potential impacts to the ambient sound environment should the No Action Alternative or the Proposed Action be implemented.

3.6.1 Affected Environment – Noise

The area surrounding the Project Site is predominantly disturbed agricultural land. It is sparsely populated with few residences close to the Project Site boundaries. There is only one industrial development within 1 mi of the Project Site; a crop production service is located in Wynnburg, at the northeastern boundary of the Project Site, as described in Section 3.1.1. The Project Site is approximately 2 mi north of the City of Ridgely.

Noise is generally described as unwanted sound, which can be based either on objective effects (hearing loss, damage to structures, etc.) or subjective judgments (such as community annoyance). Sound is usually represented on a logarithmic scale with a unit called the decibel (dB). Sound on the decibel scale is referred to as sound level. The threshold of human hearing is approximately 0 dB, and the threshold of discomfort or pain is around 120 dB.

Noise levels are computed over a 24-hour period and adjusted for nighttime annoyances to produce the day-night average sound level (DNL). DNL is the community noise metric recommended by the EPA and has been adopted by most Federal agencies (EPA 1974). A DNL of 65 A-weighted decibels (dBA) is the level most commonly used for noise planning purposes and represents a compromise between community impact and the need for activities like construction. The A-weighted sound level, used extensively in this country for the measurement of community and transportation noise, represents the approximate frequency response characteristic of the average young human ear. Areas exposed to a DNL above 65 dBA are generally not considered suitable for residential use. A DNL of 55 dBA was identified by EPA as a level below which there is no adverse impact (EPA 1974).

Noise levels occurring at night generally produce a greater annoyance than do the same levels occurring during the day. It is generally agreed that people perceive intrusive noise at night as being 10 dBA louder than the same level of noise during the day. This perception is largely because background environmental sound levels at night in most areas are about 10 dBA lower than those during the day.

3.6.1.1 Noise Regulations

The Noise Control Act of 1972, along with its subsequent amendments, delegates authority to the states to regulate environmental noise and directs government agencies to comply with local community noise statutes and regulations. Although there are no Federal, state, or local regulations for community noise in Lake County, EPA guidelines recommend that DNL not exceed 55 dBA for outdoor residential areas. The EPA noise guideline is considered to be sufficient to protect the public from the effect of broadband environmental noise in typical outdoor and residential areas. These levels are not regulatory goals but are “intentionally conservative to protect the most sensitive portion of the American population” with “an additional margin of safety” (EPA 2009). The U.S. Department of Housing and Urban Development (HUD) considers a DNL of 65 dBA or less to be compatible with residential areas (HUD 1985). There are no local noise ordinances that apply to the Project Site.

3.6.1.2 Background Noise Levels

Noise levels continuously vary with location and time. Sound from a source spreads out as it travels from the source, and the sound pressure level diminishes with distance. In addition to distance attenuation, the air absorbs sound energy; atmospheric effects (wind, temperature, precipitation) and terrain/vegetation effects also influence sound propagation and attenuation over distance from the source. An individual’s sound exposure is determined by measurement of the noise that the individual experiences over a specified time interval.

In general, noise levels are high around major transportation corridors along highways, railways, airports, industrial facilities, and construction activities. Typical background day/night noise levels for rural areas range between 35 and 50 dB whereas higher-density residential and urban areas' background noise levels range from 43 dB to 72 dB (EPA 1974). Background noise levels greater than 65 dBA can interfere with normal conversation, watching television, using a telephone, listening to the radio, and sleeping.

The Project Site is predominately disturbed agricultural land. There are numerous existing sources of noise both within and near the Project Site. Ambient noise at the Project Site consists mainly of agricultural, transportation, rural, and natural sounds (e.g. farming equipment, moderate traffic, moderate voice, wind, wildlife, and similar sounds). Generally, noise levels in these types of areas range from 45 to 55 dBA. The nearby industrial business (crop production service) at the northern end of the Project Site also generates noise due to ongoing operations, though most of this noise is not detectable at the Project Site.

Transportation noise, including road and rail traffic, exists in the immediate vicinity of the Project Site. An active freight rail line (TennKen Railroad) runs north and south through the center of the Project Site, parallel to SR 78. Railroad crossings are located on Lower Wynnburg Road, Harry George Road, Ray Shelton Road, and Mooring Road (West Tennessee Rail Group 2020). In accordance with U.S. Department of Transportation (DOT) Federal Railroad Administration regulations, also known as the Train Horn Rule, locomotive horns must be sounded in advance of all public highway-rail crossings except in established quiet zones (49 CFR §222). The maximum volume level for the train horn is 110 dBs; the minimum sound is 96 dBs (49 CFR §222). There are no set schedules for freight trains, as they operate in response to commercial demand for transportation. In addition to the horn, the sound of a passing train may be audible for miles.

For point of reference, approximate noise levels (measured in dBA) of common activities/events are provided below.

- 0 dBA - the softest sound a person can hear with normal hearing
- 10 dBA - normal breathing
- 20 dBA - whispering at 5 ft
- 30 dBA - soft whisper
- 50 dBA - rainfall
- 60 dBA - normal conversation
- 110 dBA - shouting in ear
- 120 dBA – thunder

3.6.2 Environmental Consequences – Noise

This section describes the potential impacts to the ambient sound environment should the No Action Alternative or the Proposed Action be implemented.

3.6.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility and transmission line upgrades would not be constructed, and no project-related impacts on the ambient sound environment would occur. Existing land use would be expected to remain as predominantly disturbed agricultural land and agricultural activities

would likely continue; therefore, the ambient sound environment would be expected to remain as it is at present. As no changes to existing noise levels would be anticipated under this alternative, there would be no direct noise impacts. However, indirect impacts to noise levels in the vicinity of the Project Site are possible if the area becomes developed for residential or commercial purposes in the future.

3.6.2.2 Proposed Action

Direct and indirect noise impacts associated with implementation of the Proposed Action would primarily occur during construction of the Proposed Action. Typical construction equipment used for solar installation is presented in Table 3.6-1. Noise levels associated with these types of equipment are also listed.

Table 3.6-1. Proposed Construction Equipment

Equipment/Vehicle Type	HP*	Hours/ Day/ Vehicle	Miles/ Day/ Vehicle Round Trip	Daily Count in Peak Month	Daily Count in Average Month	Maximum Noise at 50 ft (dBA)
MOBILIZATION						
Off-Site Worker Commuter Bus, Small	220	1	50	1	1	84
Off-Site Worker Commute Car	140	1	50	48	48	55
Off-Site Water Delivery Truck	435	1	50	5	5	84
Off-Site Equipment/Material Delivery Truck	235	1	50	2	2	84
Generator	30	6	0	1	1	82
On-Site Pick Up Truck	235	8	20	3	3	55
On-Site Flatbed Delivery Truck	28	6	20	2	2	84
5000-gal Water Truck	240	8	10	5	5	84
On-Site Service Truck	235	4	20	1	1	55
On-Site Lube/Fuel Trucks	235	6	20	1	1	55
CIVIL IMPROVEMENTS - GRADING/ROADS/EARTHWORK						
Off-Site Worker Commute Car	140	1	50	132	112.8	55
Off-Site Water Delivery Truck	435	1	50	8	6.8	84
Off-Site Equipment/Material Delivery Truck	235	1	50	2	0.8	84
Dozer Cat D6R	185	8	10	4	4	85
Generator	30	8	0	4	4	82
Scraper Cat 623	365	8	10	4	4	85
Deere 210LE Skip Loader	78	8	10	4	4	84
Cat 140H Grader	185	8	10	6	6	85
5000-gal Water Truck	240	8	20	8	8	84
Roller Vibrator/compactor/other	350	6	5	2	0.8	80
Cat BG600D Paver	173	6	5	1	0.4	85
On-Site Heavy-Duty Pick-Up Truck	210	6	20	4	4	55
On-Site Flatbed Delivery Truck	280	6	20	3	1.2	84
On-Site Lube/Fuel Trucks	235	6	20	6	6	55
On-Site Service Truck	280	6	20	4	4	55

Table 3.6-1. Proposed Construction Equipment

Equipment/Vehicle Type	HP*	Hours/ Day/ Vehicle	Miles/ Day/ Vehicle Round Trip	Daily Count in Peak Month	Daily Count in Average Month	Maximum Noise at 50 ft (dBA)
On-Site Dump Truck	280	6	20	5	5	84
PLANT CONSTRUCTION						
Off-Site Worker Commuter Bus, Small	220	1	40	2	2	84
Off-Site Worker Commute Car	140	1	40	94	61	55
Off-Site Concrete Truck	300	1	40	4	3.5	85
Off-Site Equipment/Material Delivery Truck	235	1	40	6	6	84
Off-Site Equipment/Material Delivery Truck	235	2	100	4	4	84
Generator	30	8	0	2	2	82
Air Compressor	25	8	0	2	2	80
Dozer Cat D6R	185	4	10	1	1	85
Deere 210LE Skip Loader	78	8	10	3	3	84
Telehandler	99	8	10	4	4	84
Track Trencher	115	8	10	2	2	84
Cat 583T Pipelayer	310	6	10	2	2	84
On-Site Concrete Truck	350	8	30	0	0	85
On-Site Pick Up Truck	210	6	25	4	4	55
On-Site Heavy-Duty Pick-Up Truck	235	6	20	2	2	55
On-Site Flatbed Delivery Truck	280	6	25	4	4	84
On-Site Service Truck	210	6	25	3	2	55
On-Site Dump Truck	280	6	20	1	1	84
On-Site Lube/Fuel Trucks	210	6	25	2	2	55
Pauselli 1200 Solar Pile Driver	64	10	1.5	4	2	75
SUBSTATION-BLDG-CONSTRUCTION						
Off-Site Worker Commute Car	140	1	40	38	38	55
Off-Site Equipment/Material Delivery Truck	235	1	40	0.5	0.5	84
On-Site Heavy-Duty Pick-Up Truck	235	6	20	1	1	55
On-Site Flatbed Delivery Truck	280	6	20	2	2	84
Generator	30	6	0	1	1	82
Air Compressor	25	6	0	1	1	80
Skip Loader	78	6	10	2	2	84
Crane - Boom Truck	250	6	10	2	2	85
TESTING & COMMISSIONING						
Off-Site Worker Commute Car	140	1	40	30	30	55
Off-Site Equipment/Material Delivery Truck	235	1	40	0.5	0.5	84
On-Site Heavy-Duty Pick-Up Truck	235	6	20	2	2	55

Table 3.6-1. Proposed Construction Equipment

Equipment/Vehicle Type	HP*	Hours/ Day/ Vehicle	Miles/ Day/ Vehicle Round Trip	Daily Count in Peak Month	Daily Count in Average Month	Maximum Noise at 50 ft (dBA)
On-Site Service Truck	210	6	25	1	1	55
Cat BG600D Paver	173	6	5	1	1	85
Roller Vibrator/compactor/other	350	6	5	1	1	80

* - Horsepower (HP)
Source: DOT 2006

Construction equipment produces a range of sounds while operational. Construction noise would cause temporary and short-term adverse impacts to the ambient sound environment around the Project Site. As illustrated in Table 3.6-1 above, typical noise levels from construction equipment are expected to be 85 dBA or less at a distance of 50 ft from the construction site. These types of noise levels would diminish with distance from the Project Site at a rate of approximately 6 dBA per each doubling of distance. Therefore, noise would be expected to attenuate to the recommended HUD noise guideline of 65 dBA at approximately 500 ft, and to the recommended EPA noise guideline of 55 dBA at approximately 1,600 ft. However, this distance could be shorter in the field as objects and topography would cause further noise attenuation.

The nearest noise sensitive receptors are a single-family residence in the interior of the Project Site, and single-family residences immediately adjacent to the Project Site primarily on its northern and southeastern boundaries. There are also several churches and cemeteries to the north, south, and west of the Project Area. Residents of homes, farmers, and livestock adjacent to the property boundary could experience elevated noise levels. Construction noise is generally temporary and intermittent in nature as it generally only occurs on weekdays during daylight hours, which minimizes the impact to sensitive receptors.

Most of the proposed equipment would not be on-site and operating for the entire construction period but would be phased in and out according to the progress of the Project. The equipment most likely to make the most noise would be the pile driving activities during the construction of the array and building foundations. Standard construction pile drivers are estimated to produce between 90 to 95 dBA (calculated at a distance of 50 ft) at close range (DOT 2011). The specialty pile drivers (Pauselli 1200 Solar Pile Driver) proposed to be used for solar panel installation produce less noise (75 dBA) than standard pile drivers (Table 3.6-1), and the piles supporting solar panels would be driven into soil with little to no rock drilling anticipated. Existing ambient noise would periodically include tractors and other farm equipment, train horns, and industrial noise. As construction would occur during the day, presumably when farm activities occur, there would not be a significant difference in noise levels other than during pile driving.

Area residences may experience small increases in noise levels during construction from an increase in construction-related vehicles along local roadways due to construction worker vehicles and equipment; however, these increases would be temporary and would occur primarily during the day during the morning and evening commute hours. Therefore, the noise levels generated by construction-related traffic would be minor and temporary.

Construction of TVA's Lake County, TN 161-kV Switching Station, in the northeast portion of the Project Site, and transmission components in the adjacent ROW would have similar impacts on noise levels. Pile driving equipment (standard or specialty) could be used to erect the transmission structures. This ROW

area, however, is greater than 0.5 mi from any residence or other potential noise receptor. Therefore, impacts to noise due to construction in the ROW would be minimal.

Following completion of construction activities, the ambient sound environment would be expected to return to existing levels or below. The moving parts at the solar facility would be electric-powered and produce little noise. A typical inverter that would be used in the Project, such as a Power Electronics 3510kVA model, has noise levels of less than 79 dBA measured at 1 meter from the back of the unit, per PE FS3510M specification sheet (ENF Solar 2020). Noise levels will be considered in the configuration and placement of inverters such that noise from the Project would be consistent with existing background noise levels in the area when measured at the Project Site boundary. Consequently, the Proposed Action would have minimal effects on noise levels as a result of normal continuous operation. Periodic mowing would generate noise levels comparable to the operation of farm equipment.

Overall, implementation of the Proposed Action would result in minor, temporary, adverse impacts to the ambient noise environment for those residents living in proximity to the Project Site during construction and would result in no impacts during operation and maintenance of the solar facility.

3.7 AIR QUALITY AND GREENHOUSE GAS EMISSIONS

This section describes an overview of existing air quality and GHG emissions within the Project area and the potential impacts on air quality and GHG emissions should the No Action Alternative or the Proposed Action be implemented.

3.7.1 Affected Environment – Air Quality and Climate Change

Air Quality Standards

Ambient air quality is determined by the type and amount (concentration) of pollutants emitted into the atmosphere, the size and topography of the air basin in question, and the prevailing meteorological conditions in that air basin. Through its passage of the Clean Air Act of 1970 (CAA) and its amendments, Congress has mandated the protection and enhancement of our nation's air quality. The EPA has established the National Ambient Air Quality Standards (NAAQS) for the following criteria pollutants to protect the public health and welfare: sulfur dioxide (SO_2), ozone (O_3), nitrogen dioxide (NO_2), particulate matter whose particles are less than or equal to 10 micrometers (PM_{10}), particulate matter whose particles are less than or equal to 2.5 micrometers ($PM_{2.5}$), carbon monoxide (CO), and lead (Pb).

The primary NAAQS were promulgated to protect public health, and the secondary NAAQS were promulgated to protect public welfare (e.g., visibility, crops, forests, soils, and materials) from any known or anticipated adverse effects of air pollutants. Primary and secondary standards are listed in Table 3.7-1 (EPA 2020f).

Table 3.7-1. National Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	Level [a]
Ozone (O_3)	8-hour	70 ppb [b]
Particulate Matter ($PM_{2.5}$)	24-hour	35.0 ug/m^3
	Annual Mean	12.0 ug/m^3
Particulate Matter (PM_{10})	24-hour	150 ug/m^3

Table 3.7-1. National Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	Level [a]
Carbon Monoxide (CO)	1-hour	35.0 ppm
	8-hour	9.0 ppm
Lead (Pb)	3-month	0.15 ug/m^3
Nitrogen Dioxide (NO_2)	1-hour	100 ppb
	Annual Mean	53 ppb
Sulfur Dioxide (SO_2)	1-hour	75 ppb
	3-hour	0.5 ppm

Notes:
[a] All of the standards are primary standards, which provide public health protection, except for the 3-hour SO_2 limit, which is a secondary standard and provides public welfare protection. Units of measure are parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter (ug/m^3) of air.
[b] Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.
Source: EPA 2020f

Areas in compliance with the NAAQS are designated "attainment" areas. For areas EPA designates as *nonattainment*, there are several categories from *marginal* to *severe* that EPA could assign depending on the severity of the nonattainment. A *nonattainment* designation requires that a region submit a State Implementation Plan (SIP) that addresses how the NAAQS will be met in a future year. EPA later determines whether the region has met the SIP goals, and if so, EPA changes the designation from nonattainment area to *maintenance area*. The CAA General Conformity Rule requires that federal actions taking place in nonattainment areas conform to the region's SIP for reducing airborne concentrations of the nonattainment pollutant(s).

TDEC administers the delegable provisions of the CAA. Air Quality Standards are found in Chapter 1200-3-3 of Tennessee Air Pollution Control Regulations (EPA 2020g).

3.7.1.1 Regional Air Quality

Lake County, the location of the major portion of the Project Area which would contain the solar facility, is sparsely developed. It is designated as a rural county not adjacent to a metropolitan area (USDA 2013). Union City, TN-KY and Dyersburg, TN are the nearest core-based statistical areas (CBSA) that have an urban cluster of at least 10,000 people (USCB 2020a). Both CBSAs are located within 25 mi of the Project Site, are in attainment with applicable NAAQS and meet applicable federal and state air quality standards. Lake County, and the adjacent counties of Obion and Dyer, are also in attainment with applicable NAAQS and air quality standards (EPA 2020h, EPA 2020i). Therefore, the Project is located in an area with good air quality.

There are no air quality monitors in Lake County (TDEC 2020c). Table 3.7-2 lists the pollutant concentration values from the air monitoring site closest to the Project area, which is located in Dyer County (EPA 2020i). These concentrations, which represent air quality near the Project area, are in the form used to determine attainment with NAAQS. The only NAAQS monitored in the county is $PM_{2.5}$. The other NAAQS do not require monitoring due to EPA's set minimum requirements. The monitored pollutant concentrations are well below the standards.

Table 3.7-2. Air Quality Statistics in Dyer County (2019)

Pollutant		Concentration	Metric
Carbon Monoxide (CO)		NM [a]	2nd highest 1-hour measurement in the year
		NM [a]	2nd highest non-overlapping 8-hour average in the year
Lead (Pb)		NM [a]	Maximum of all rolling 3-month averages in the year
Nitrogen Dioxide (NO_2)		NM [a]	98th percentile of the daily max 1-hour measurements in the year
		NM [a]	Annual mean of all the 1-hour measurements in the year
Ozone (O_3)		NM [a]	4th highest daily max 8-hour average in the year
Particulate Matter (PM)	$PM_{2.5}$	15 µg/m^3	98th percentile of the daily average measurements in the year
		6.7 µg/m^3	Weighted Annual Mean (mean weighted by calendar quarter) for the year
	PM_{10}	NM [a]	2nd highest 24-hour average measurement in the year
Sulfur Dioxide (SO_2)		NM [a]	99th percentile of the daily max 1-hour measurements in the year
		NM [a]	Secondary 3-Hour Average Standard

[a] Not Monitored. TDEC does not monitor this pollutant due minimum monitoring requirements. Minimum monitoring requirements vary for each pollutant and can be based on a combination of factors such as population, level of traffic on nearby major roads, the level of monitored pollutants, and boundaries as defined by the US Census Bureau.

Source: EPA 2020i

Since the ROI (Lake County) where the Proposed Action is located is in attainment for all criteria pollutants, the CAA General Conformity rules would not apply to the implementation of the Proposed Action. Therefore, a general conformity applicability analysis is not required.

Table 3.7-3 presents the most recent EPA emission inventory data for criteria pollutants in Lake County. The data represents emissions from four major source types: stationary sources (such as fuel combustion, industrial operations, solvents, agricultural practices and dust from roads and construction); mobile sources (such as vehicle use, aircraft, commercial marine vessels and locomotives, and construction equipment), fires (wildfires and agricultural field burning) and biogenics (naturally occurring emissions from vegetation and soil) (EPA 2014).

Table 3.7-3. Average emissions of NAAQS pollutants in Lake County in 2017

County	Pollutant	Emissions (tons per year)
Lake	Carbon Monoxide	2,940.92
Lake	Nitrogen Oxides	901.76
Lake	PM10 Primary	687.70
Lake	PM2.5Primary	202.26
Lake	Sulfur Dioxide	7.70
Lake	Volatile Organic Compounds	3,211.26

Note: Tier 1 sectors include Agriculture, Dust, Fuel Combustion – Comm/Institutional, Fuel Combustion – Electric Generation, Fuel Combustion –Industrial Boilers, Fuel Combustion – Residential, Industrial Processes, Mobile, and Solvent.

Source: National Emissions Inventory (NEI) EPA 2017

3.7.1.2 Regional Climate

Weather conditions determine the potential for the atmosphere to disperse emissions of air pollutants. Generally, Tennessee has a temperate climate, characterized by warm, humid summers and mild winters. Average temperatures are around 75 degrees Fahrenheit (°F) in summer and around 39°F in winter (Current Results 2020a; Current Results 2020b). Precipitation averages 54 inches per year (Current Results 2020c). Snow cover rarely persists for more than a few days due to relatively mild winter temperatures (TDEC 2020c). Precipitation in the City of Dyersburg, approximately 19 mi southeast of the solar energy farm, is highest from November through May (US Climate Data 2020). The state's varied topography leads to a wide range of climatic conditions. Severe storms are relatively infrequent, as the state's location is east of the center of tornado activity, too far inland to be often affected by hurricanes, and south of most blizzard conditions (TDEC 2020c). During the winter and early spring, frequent migratory storms may bring general rains of high intensity resulting in widespread flooding and local flash floods. Heavy thunderstorm rainfalls during the summer may also result in flooding. In the fall, while flood producing rains are rare, a decadent tropical system on occasion causes serious floods (TDEC 2020c).

3.7.1.3 Greenhouse Gas Emissions

GHGs are compounds found naturally within the earth's atmosphere. These compounds trap and convert sunlight into infrared heat. In this way, GHGs act as insulation in the stratosphere and contribute to the maintenance of global temperatures. As the levels of GHGs increase at ground level, the result is an increase in temperature on earth, commonly known as global warming. The climate change associated with global warming is predicted to produce negative economic and social consequences across the globe through changes in weather (e.g., more intense hurricanes, greater risk of forest fires, flooding).

The most common GHG emitted from natural processes and human activities include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The primary GHG emitted by human activities in the U.S. is CO_2, representing approximately 85 percent of total GHG emissions. The largest source of CO_2 and of overall GHG emissions is fossil fuel combustion. CH_4 emissions, which have declined from 1990 levels, result primarily from enteric fermentation (digestion) associated with domestic livestock, decomposition of wastes in landfills, and natural gas systems. Agricultural soil management and mobile source fuel combustion are the major sources of N_2O emissions in the U.S. (EPA 2020j).

3.7.2 Environmental Consequences – Air Quality and Climate Change

This section describes the potential impacts to climate and air quality should the No Action Alternative or the Proposed Action be implemented.

3.7.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility and transmission line upgrades would not be constructed. Therefore, no air pollutants or GHGs would be generated by equipment or vehicles from construction or operation of the solar facility. Existing land use would be expected to remain a mix of farmland, undeveloped land, and industrial, and the existing habitat would be expected to remain as it is at present, with little effect on climate and air quality. The main source of emissions in the Project Area would continue to be from mobile sources such as automobiles and agricultural equipment. The No Action Alternative could also result in higher TVA system-wide emissions, as TVA may fulfill its power needs without this nearly emissions-free solar facility.

3.7.2.2 Proposed Action

Construction

Emissions on a construction site generally result from the engine exhaust of heavy construction equipment (e.g., bulldozers, dump trucks, pile drivers, etc.) powered by internal combustion engines, other motor vehicle exhaust, and fugitive dust. Emissions associated with the combustion of gas and diesel fuels by internal combustion engines would generate local emissions of particulate matter, nitrogen oxide, CO, volatile organic compounds, and SO_2 during the construction period. Air quality impacts from construction activities would depend on both man-made factors (intensity of activity, control measures, etc.) and natural factors such as wind speed and direction, soil moisture, and other factors. However, even under unusually adverse conditions, these emissions would have, at most, a minor transient impact on off-site air quality, which would remain well below the applicable ambient air quality standard.

Fugitive dust emissions from earth-moving activities, the use of unpaved haul-roads and soil disturbance have the potential to lead to substantial amounts of airborne particulates (dust) that can negatively impact air quality. Approximately 1,961 acres of the Project Site could be subject to grading and/or ground-disturbing activities which have the potential to emit fugitive dust. In addition, grading activities result in soil disturbance that can make soils vulnerable to wind erosion. Properly implemented control and suppression measures, as well as BMPs (such as covered loads and wet suppression), greatly minimize fugitive dust emissions. In addition, standard erosion control measures, such as redistribution of removed topsoil and reseeding, would minimize the potential for wind erosion.

Overall, with adherence to regulations and BMPs, air emissions associated with the construction of the solar facility are expected to be minor. Emissions from construction would have, at most, a minor transient impact on air quality, which would remain well below the applicable ambient air quality standards. Therefore, the potential impacts to air quality associated with construction under the Proposed Action would be minor and temporary (lasting for a period of 12 months).

No indirect impacts to air quality or climate are anticipated from construction activities.

Operations

The operation of the proposed solar facility is not anticipated to have any adverse impacts to air quality or GHG emissions, as only minor maintenance would be expected to occur, which would not constitute a major source of air pollutants.

Conversely, overall pollutant emissions from the TVA power system would decrease during operations as the emissions-free power generated by the solar facility would offset power that would otherwise be generated, at least in part, by the combustion of fossil fuels. According to TVA's 2019 IRP, power generated from solar energy is a substantial part of TVA's target power supply mix. Recommendations include the addition of between 1,500 and 8,000 MW of solar by 2028 and up to 14,000 MW by 2038. The solar facility would be part of the cleaner, lower emitting generating portfolio described in the 2019 IRP and would contribute to reductions in CO_2 emissions projected between 2019 and 2038 within the TVA service area (TVA 2019a). While the reductions in air pollutants and CO_2 emissions attributable to the solar facility would be relatively minor, they would be a component of TVA's projected significant overall reductions, the associated beneficial impacts to air quality, and the reduced impacts from climate change.

Agricultural practices, which currently raise dust and combustion byproducts, would be discontinued at the Project Site. Therefore, operations could ultimately result in a minor beneficial impact to local air quality.

3.8 CULTURAL RESOURCES

This section describes an overview of existing cultural resources within the Project area and the potential impacts on these cultural resources that would be associated with the No Action Alternative and the Proposed Action. Components of cultural resources that are analyzed include prehistoric and historic archaeological and architectural resources.

3.8.1 Affected Environment – Cultural Resources

Cultural resources include archaeological sites, standing structures, objects, districts, traditional cultural properties, and other properties that illustrate important aspects of prehistory or history or have important and long-standing cultural associations with established communities and/or social groups.

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. 470) is specifically designed to address the effects of Federal and/or Federally funded projects on both built resources (such as buildings, bridges, and levees) and underground (archaeological) resources. The NHPA provided for a national program to support both public and private efforts to identify, evaluate, and protect the nation's important historic and archaeological resources. These resources, collectively called "cultural resources," are evaluated for their eligibility for inclusion in the National Register of Historic Places (NRHP) maintained by the National Park Service. The NRHP is a list of buildings, districts, sites, structures, and objects significant to local, state, or national history and prehistory. Cultural resources may qualify for inclusion in the NRHP under one of four primary criteria:

- *Criterion A*: association with events that have made a significant contribution to the broad patterns of American history. This criterion includes literature, ethnic heritage, health/medicine, transportation, and many others.
- *Criterion B*: association with the life of significant persons. Examples of National Register properties nominated under Criterion B include George Washington's Mt. Vernon estate.
- *Criterion C*: embodiment of the distinctive characteristics of a type, period, or method of construction. This inclusion also includes the works of a master or buildings that possess high artistic value.
- *Criterion D*: cultural resources that have yielded or may be likely to yield information important in history or prehistory. This category is typically the most relevant criterion for archaeological resources.

Cultural resources that are listed, or considered eligible for listing, on the NRHP are called "historic properties." Federal agencies are required by the NHPA and by NEPA to consider the possible effects of their undertakings on historic properties. "Undertaking" means any project, activity, or program that has the potential to have an effect on a historic property and that is under the direct or indirect jurisdiction of a federal agency or is licensed or assisted by a federal agency. Considering an undertaking's possible effects on historic properties is accomplished through a four-step review process outlined in section 106 of the NHPA (36 CFR Part 800). These steps are:

1. Initiation (defining the undertaking and the area of potential effect [APE] and identifying the parties to be consulted in the process);
2. Identification (studies to determine whether cultural resources are present in the APE and whether they qualify as historic properties);

3. Assessment of adverse effects, if any (determining whether the undertaking would damage the qualities that make the property eligible for the NRHP); and
4. Resolution of adverse effects (by avoidance, minimization, or mitigation).

Throughout the process, the lead NEPA agency must consult with the appropriate State Historical Preservation Officer (SHPO), Federally recognized American Indian tribes that have an interest in the undertaking, and any other party with a vested interest in the undertaking.

As part of the evaluation process for this Project, an archaeological survey and architectural survey were conducted to determine the presence of prehistoric and historic cultural resources that are listed on or potentially eligible for the NRHP. The archaeological APE consists of the approximately 2,454.6-acre Project Area and the approximately 19.4-acre transmission line ROW. The architectural APE includes the 0.5-mi radius surrounding the Project Site and transmission line within the viewshed for historic structures. A cultural resources survey of archeological sites and historic structures was conducted within the respective APEs.

3.8.1.1 Previous Surveys

In May 2020, AECOM conducted a literature review of the available archival data of the Project Area and vicinity. The following archival sources were examined: NRHP-listed properties and districts; Tennessee Archaeological Site File at the Tennessee Division of Archaeology (TDOA) Historic properties on file with the Tennessee Historical Commission (THC); Previous Cultural Resources Management-related reports and surveys (filed with the TDOA and THC); and, Historic-era mapping of the Project location. Research focused on the proposed limits of the Project, as well as a 1.6-kilometer (1.0-mi) study area around the Project, which represents a standard literature review search area consistent with the Tennessee SHPO Standards and Guidelines for Archaeological Resource Management Studies.

Two previous surveys were conducted within or in the vicinity of the Project Area. In 2007, Nance completed An Archaeological Survey of World War II Military Sites in Tennessee. This report included examination of the Ridgely Precision Bombing Range (site 40LK92) located southeast of the Project Area. In 2011, McKee completed a Phase I Archaeological Survey of the Proposed TVA Tiptonville-Ridgely 161-kV Transmission Line Project. This survey encompassed the entirety of the transmission line portion of the current proposed actions. The McKee survey identified four archaeological sites (40LK-117-40LK120) all recommended as not eligible for the NRHP (AECOM 2020a)

Five previously inventoried archaeological sites occur within the proposed Project Area and transmission line ROW (40LK72, 40LK92, 40LK117, 40LK118 and 40LK119). Additionally, site 40LK71 is immediately adjacent to the Project Area. Within 1 mi of the project boundary are 12 additional archaeological sites. The status of the known archaeological sites within and adjacent to the APE are listed in Table 3.8-1.

Table 3.8-1. TDOA-Listed Archaeological Sites within 1-mi of the Project Area

Resource ID	Cultural Affiliation and Site Type	Temporal Component	NRHP Status	Location Relative to the Project
40LK72	Precontact- Open Habitation	Precontact- Mississippian	Unknown	Within (listed as destroyed)
40LK92	Historic- World War II Bombing Range	Historic- World War II (1940s)	Not Assessed	Adjacent and on TVA Transmission Line

Table 3.8-1. TDOA-Listed Archaeological Sites within 1-mi of the Project Area

Resource ID	Cultural Affiliation and Site Type	Temporal Component	NRHP Status	Location Relative to the Project
40LK117	Historic- Rural Domestic Scatter	Historic- 1901-Present	Not Eligible	Adjacent and on TVA Transmission Line
40LK118	Historic- Rural Domestic Scatter	Historic- 1901-Present	Not Eligible	Within
40LK119	Historic- Rural Domestic Scatter	Historic- 1901-Present	Not Eligible	Within
40LK71	Precontact- Woodland Open Habitation	Precontact- Woodland	Unknown	Adjacent
40LK124	Historic- Rural Domestic Scatter	Historic- 1901-Present	Not Eligible	Over 50 meters distant
40LK73	Precontact- Open Habitation	Precontact- Indeterminate	Unknown	Over 300 meters distant
40LK123	Historic- Rural Domestic Scatter	Historic- 1901-Present	Not Eligible	Over 300 meters distant
40LK44	Precontact- Mound Complex	Precontact- Woodland/ Late Woodland	Unknown	Over 500 meters distant
40LK62	Precontact- Open Habitation	Precontact- Woodland	Unknown	Over 500 meters distant
40LK55	Precontact- Open Habitation; Historic- Rural Domestic House	Precontact- Woodland, Mississippian, Early Mississippian; Historic- 1933-Present	Unknown	Over 1000 meters distant
40LK122	Historic- Rosenwald (Ridgely) School	Historic- 1901-Present	Not Eligible	Over 1000 meters distant
40LK5	Precontact- Open Habitation	Precontact- Indeterminate	Unknown	Over 1000 meters distant
40LK57	Precontact- Open Habitation, Cemetery	Precontact- Woodland, Late Woodland	Unknown	Over 1000 meters distant
40LK77	Precontact- Open Habitation	Precontact- Mississippian, Early Mississippian	Unknown	Over 1000 meters distant
40LK120	Historic- Rural Domestic Scatter	Historic- 1901-Present	Not Eligible	Over 1500 meters distant

Source: AECOM 2020a

A total of 43 previously surveyed architectural resources are present within 1 mi of the Project Area; all but one was recommended as not eligible for the NRHP. The one NRHP-listed property occurs is the Caldwell-Hopson House, situated approximately 0.66 mi northwest of the proposed replacement transmission line in

the village of Tiptonville (Figure 3.8-1). Of the previously identified resources, 35 of the 43 are either no longer extant or have been replaced by non-historic structures. The remaining eight previously surveyed structures, (LK-98, LK-108, LK-112,LK-113, LK-278, LK-269, and LK-258) are not located within the Project Area. Table 3.8-2 presents the previously identified historic resources within 1 mi of the Project Area (AECOM 2020b)

Table 3.8-2. Previously Identified Architectural Resources within 1-mi of the Project Area

TN Survey #	Name	Address	Date of Construction	Recommended Eligibility
LK-98	New Haven Cemetery	Madie Road, Ridgely, TN 38080	1889-present	Not Eligible
LK-108	Allen Sullivan	815 Madie Road, Ridgely, TN 38080	1931	Not Eligible
LK-112	Fuqua Brothers Tenant House/ J.C. Clark	435 Mooring Road, Ridgely, TN 38080	1940	Not Eligible
LK-113	Fuqua Brothers Tenant House/Kent Patterson	375 Mooring Road, Ridgely, TN	1940	Not Eligible
LK-278	Angela Agee & Mathis Page	SR 78-1000 ft south of Clay Winn Road, Ridgely, TN	ca. 1950	Not Eligible
LK-269	Rhodes House/David Rhodes	45 Lower Wynnburg Road, Wynnburg, TN 38077	1910/1950	Not Eligible
LK-258	Parker House/Terry McClain	3520 SR 78, Wynnburg, TN 38077	1905	Eligible, Criterion A
LK-257	Sam Wynn House Demolished, Barn & Metal Shop extant	Wynnburg Bluebank Road, Wynnburg, TN 38077	1928	Not Eligible

3.8.1.2 Survey Results

Fieldwork began with a windshield and pedestrian reconnaissance in May 2020 designed to evaluate the terrain, examine environmental features such as soils, ground cover, and drainage, and identify potential areas of previous disturbance. The reconnaissance provided the basis for refining the relative archaeological sensitivity of the Project area and establishing the research strategy. AECOM conducted archaeological and historic resources surveys from May through July 2020. The archaeological survey included field inspections of the Project area via visual examination of exposed ground surfaces at 5-meter (16-ft) intervals and systematic shovel testing at 30-meter (100 ft) intervals. The architectural survey included all structures within 0.5 mi of the project area.

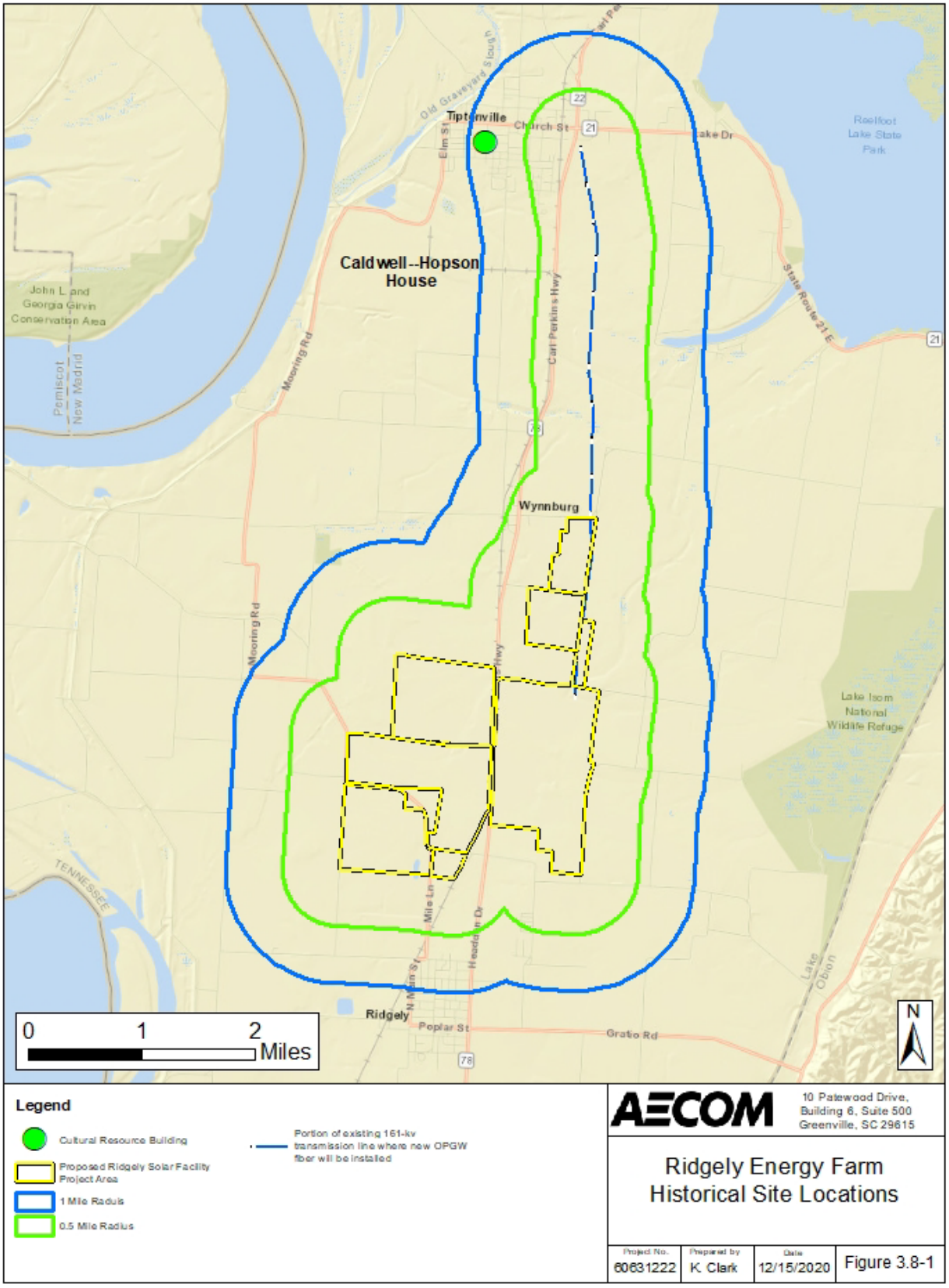

Figure 3.8-1. Historic Site Locations

Archaeological Survey Results

The Project area was subdivided into 21 fields by utilizing aerial photography and visual reconnaissance to determine the most logical separation of the Project area into sub-fields. Road networks, agricultural patterns, and vegetation were some of the most common criteria used. AECOM identified a total of 55 archaeological resources during the archaeological survey, two identified at the same location as previously-inventoried archaeological sites (40LK71 and 40LK73) (AECOM 2020a). The TDOA assigned permanent site IDs to 41 of the 53 newly-identified sites; the remaining 12 represent isolated/ephemeral findspots of cultural material that did not meet the threshold for permanent inventory with the TDOA. Of the 55 archaeological resources AECOM identified during the archaeological survey, seven sites are recommended as potentially eligible for the NRHP. The remaining archaeological resources are recommended as not eligible and no further work at these locations is recommended. Table 3.8-3 presents a summary of the sites recorded during the current survey and the NRHP eligibility recommendations for each. On January 20, 2021, TVA initiated consultation with the SHPO and federally-recognized Indian tribes with respect to the findings of the archaeological survey. On February 16, 2021, the Cherokee Nation responded that the project does not intersect or adjoin Cherokee Nation cultural resources. They asked to be consulted should unexpected discoveries occur. The SHPO concurred with TVA's findings on February 19, 2021.

Table 3.8-3. Summary of Sites recorded and/or re-examined during survey and NRHP Recommendations

Permanent ID	Field ID	Field	Site Type	Temporal Association	NRHP Status
40LK125	RSP-01	1	Precontact- Isolated findspot; Historic- Artifact scatter	Precontact- Indeterminate; Historic- Late nineteenth and early twentieth centuries	Not Eligible
40LK126	RSP-02	1	Historic- Artifact scatter	Historic- Late nineteenth and early twentieth centuries	Not Eligible
40LK164	RSP-76	1	Precontact- Artifact scatter	Precontact- Probable Woodland Period	Not Eligible
40LK165	RSP-77	1	Precontact- Isolated findspot	Precontact- Probable Woodland Period	Not Eligible
40LK127	RSP-05	2	Historic- Artifact scatter	Historic- Nineteenth and early twentieth centuries	Not Eligible
40LK128	RSP-04, RSP-06, RSP-07, RSP-08, RSP-09, RSP-10	2	Precontact- Artifact scatter	Precontact- Middle Woodland, Late Woodland/Mississippian	Potentially Eligible
40LK129	RSP-11	2	Precontact- Isolated findspot	Precontact- Probable Woodland Period	Not Eligible
N/A	RSP-03	2	Precontact- Isolated findspot	Precontact- Indeterminate	Not Eligible
N/A	RSP-12	2	Precontact- Isolated findspot	Precontact- Indeterminate	Not Eligible
40LK130	RSP-13	3	Precontact- Artifact scatter	Precontact- Woodland; Late Woodland through Contact Period	Potentially Eligible

Table 3.8-3. Summary of Sites recorded and/or re-examined during survey and NRHP Recommendations

Permanent ID	Field ID	Field	Site Type	Temporal Association	NRHP Status
40LK131	RSP-15	3	Precontact- Artifact scatter	Precontact- Late Woodland through Mississippian Periods	Potentially Eligible
40LK132	RSP-16	3	Precontact- Artifact scatter; Historic- Artifact scatter	Precontact- Woodland; Historic- Mid- to late nineteenth and early twentieth centuries	Not Eligible
40LK133	RSP-18	3	Historic- Artifact scatter	Historic- Late nineteenth and early twentieth centuries	Not Eligible
40LK134	RSP-19	3	Precontact- Artifact scatter	Precontact- Indeterminate	Not Eligible
N/A	RSP-14	3	Precontact- Isolated findspot	Precontact- Indeterminate	Not Eligible
N/A	RSP-17	3	Precontact- Isolated findspot	Precontact- Indeterminate	Not Eligible
40LK147	RSP-42	4	Precontact- Isolated findspot; Historic- Artifact scatter	Precontact- Late Archaic/Early Woodland; Historic- Late nineteenth and early twentieth centuries	Not Eligible
40LK148	RSP-43	4	Historic- Artifact scatter	Historic- Early to mid-twentieth century	Not Eligible
40LK149	RSP-44	4	Precontact- Isolated findspot	Precontact- Probable Mississippian Period	Not Eligible
40LK150	RSP-45, RSP-46, RSP-47, RSP-48	5	Precontact- Artifact scatter	Precontact- Woodland to Mississippian	Not Eligible
40LK151	RSP-50	5	Precontact- Artifact scatter	Precontact- Probable Woodland	Not Eligible
40LK152	RSP-51	5	Precontact- Artifact scatter	Precontact- Probable Woodland	Not Eligible
40LK153	RSP-52, RSP-53, RSP-54, RSP-55, RSP-56, RSP-57	5	Precontact- Artifact scatter	Precontact- Early Woodland Period	Not Eligible
40LK154	RSP-58	5	Precontact- Artifact scatter	Precontact- Woodland - Mississippian	Not Eligible
40LK155	RSP-59	5	Precontact- Artifact scatter	Precontact- Woodland - Mississippian	Not Eligible
40LK156	RSP-60	5	Historic- Artifact scatter	Historic- Early to mid-twentieth century	Not Eligible
N/A	RSP-49	5	Precontact- Isolated findspot	Precontact- Indeterminate	Not Eligible

Table 3.8-3. Summary of Sites recorded and/or re-examined during survey and NRHP Recommendations

Permanent ID	Field ID	Field	Site Type	Temporal Association	NRHP Status
40LK157	RSP-61	6	Precontact- Artifact scatter	Precontact- Early Woodland to Mississippian	Potentially Eligible
40LK158	RSP-62, RSP-63, RSP-64, RSP-65, RSP-67	6	Precontact- Artifact scatter	Precontact- Late Archaic to Mississippian	Not Eligible
40LK159	RSP-66, RSP-68	6	Precontact- Artifact scatter	Precontact- Probable Woodland	Not Eligible
40LK160	RSP-69	6	Historic- Artifact scatter	Historic- Early to mid-twentieth century	Not Eligible
40LK141	RSP-34	7	Precontact- Artifact scatter, Historic- Artifact scatter	Precontact- Woodland, Historic- Nineteenth to twentieth centuries	Not Eligible
40LK142	RSP-35	7	Precontact- Artifact scatter	Precontact- Woodland	Potentially Eligible
40LK143	RSP-36	7	Precontact- Artifact scatter	Precontact- Probable Woodland Period	Not Eligible
N/A	RSP-37	7	Precontact- Isolated findspot	Precontact- Indeterminate	Not Eligible
40LK135	RSP-20, RSP-21, RSP-22, RSP-23	8	Precontact- Artifact scatter	Precontact- Probable Woodland Period	Not Eligible
40LK137	RSP-29	8	Historic- Artifact scatter	Historic- Early to mid-twentieth century	Not Eligible
40LK138	RSP-30	8	Historic- Artifact scatter	Historic- Late nineteenth to mid-twentieth centuries	Not Eligible
40LK139	RSP-32	8	Historic- Artifact scatter	Historic- Late nineteenth to early twentieth centuries	Not Eligible
40LK140	RSP-33	8	Historic- Artifact scatter	Precontact- Indeterminate; Historic- Late nineteenth to early/mid-twentieth centuries	Not Eligible
40LK144	RSP-38	9	Precontact- Artifact scatter	Precontact- Indeterminate	Not Eligible
40LK145	RSP-40	9	Historic- Artifact scatter	Historic- Early to mid-twentieth century	Not Eligible
40LK146	RSP-41	9	Historic- Artifact scatter	Historic- Early to mid-twentieth century	Not Eligible
N/A	RSP-39	9	Precontact- Isolated findspot	Precontact- Indeterminate	Not Eligible
40LK73	RSP-28	14	Precontact- Artifact scatter	Precontact- Woodland	Not Eligible
40LK136	RSP-26	14	Precontact- Artifact scatter	Precontact- Late Archaic/Early Woodland	Not Eligible

Table 3.8-3. Summary of Sites recorded and/or re-examined during survey and NRHP Recommendations

Permanent ID	Field ID	Field	Site Type	Temporal Association	NRHP Status
N/A	RSP-24	14	Precontact- Isolated findspot	Precontact- Indeterminate	Not Eligible
N/A	RSP-25	14	Precontact- Isolated findspot	Precontact- Indeterminate	Not Eligible
N/A	RSP-27	14	Precontact- Isolated findspot	Precontact- Indeterminate	Not Eligible
N/A	RSP-78	18	Precontact- Isolated findspot	Precontact- Indeterminate	Not Eligible
40LK71	RSP-70	20	Precontact- Artifact scatter; Historic- Artifact scatter	Precontact- Middle Woodland; Historic- Indeterminate	Potentially Eligible
40LK161	RSP-71, RSP-72	20	Precontact- Artifact scatter	Precontact- Middle Woodland	Potentially Eligible
40LK162	RSP-73	20	Precontact- Isolated findspot	Precontact- Indeterminate	Not Eligible
40LK163	RSP-74	21	Precontact- Isolated findspot	Precontact- Probable Woodland Period	Not Eligible
N/A	RSP-75	21	Precontact- Isolated findspot	Precontact- Indeterminate	Not Eligible

Architectural Survey Results

During the architectural survey, no new structures were identified that are recommended as eligible for the NRHP. A total of 38 newly identified aboveground resources are present within the architectural APE which have not been previously inventoried. Nearly all the extant aboveground resources (seven previously inventoried and 38 newly identified) represent rural domestic dwellings and farmsteads and are recommended as not eligible for the NRHP. One previously recorded aboveground resource, the Parker House (THC ID# LK-258) is recommended as eligible for listing in the NRHP under Criterion A. The house is located approximately 800 ft west of the proposed Project limits within the unincorporated community of Wynnburg near the northern extent of the Project. The viewshed of the Project from this property will be partially obstructed by vegetation and other structures in Wynnburg, and a No Adverse Effect finding is therefore recommended for this property" (AECOM 2020b). All other identified historic resources lack the integrity and/or significance required for NRHP listing. Table 3.8-4 summarizes the resources AECOM identified within the architectural APE (AECOM 2020b). On January 20, 2021, TVA initiated consultation with the SHPO with respect to the findings of the architectural survey. The SHPO concurred on February 19, 2021.

Table 3.8-4. Summary of Architectural Resources recorded during the Current Survey and NRHP Recommendations

AECOM Field ID	TN Survey #	Name	Date of Construction	NRHP Recommendation
1	Not Assigned	Betty Feltus	1945	Not Eligible

Table 3.8-4. Summary of Architectural Resources recorded during the Current Survey and NRHP Recommendations

AECOM Field ID	TN Survey #	Name	Date of Construction	NRHP Recommendation
2	Not Assigned	Joshua Barns	1920	Not Eligible
3	Not Assigned	Madie Cemetery	1891-2015	Not Eligible
4	Not Assigned	Glen Bargery	1959	Not Eligible
5	Not Assigned	Joyce Benson	1966	Not Eligible
6	Not Assigned	Robert & Suzanne Mathis	1948	Not Eligible
7	Not Assigned	Ruth Franklin	ca. 1950	Not Eligible
8	Not Assigned	Ronnie Warner	1962	Not Eligible
9	Not Assigned	Don Moore	1959	Not Eligible
10	LK-98	New Haven Cemetery	1889-present	Not Eligible
11	Not Assigned	Donna Moore	1947	Not Eligible
12	Not Assigned	Donna Clark Decker	1964	Not Eligible
13	Not Assigned	Peggy McClain	1954	Not Eligible
14	Not Assigned	Nance House	1957	Not Eligible
15	LK-108	Allen Sullivan	1931	Not Eligible
16	Not Assigned	Douglas Robertson	1950	Not Eligible
17	LK-112	Fuqua Brothers Tenant House/ J.C. Clark	1940	Not Eligible
18	LK-113	Fuqua Brothers Tenant House/Kent Patterson	1940	Not Eligible
19	Not Assigned	Andrew Stanfill	1945	Not Eligible
20	Not Assigned	John Hillsman Leeper	1950	Not Eligible
21	Not Assigned	Staulcup Tenant House	1900	Not Eligible
22	LK-278	Angela Agee & Mathis Page	ca. 1950	Not Eligible
23	Not Assigned	Angela Lee Agee	1935	Not Eligible
24	Not Assigned	William Curlin	1940	Not Eligible
25	LK-269	Rhodes House/David Rhodes	1910/1950	Not Eligible
26	LK-258	Parker House/Terry McClain	1905	Eligible, Criterion A
27	Not Assigned	Charlie Lamb	1932	Not Eligible
28	Not Assigned	Suzanne Davis, et. al.	1950	Not Eligible
29	Not Assigned	Tommie Manion	1956	Not Eligible
30	Not Assigned	Alvin R. Quick	1950	Not Eligible
31	Not Assigned	Mark Elwood Rhodes	1958	Not Eligible
32	Not Assigned	Leroy Cook	1965	Not Eligible
33	Not Assigned	Wynn Land Company	1966	Not Eligible

Table 3.8-4. Summary of Architectural Resources recorded during the Current Survey and NRHP Recommendations

AECOM Field ID	TN Survey #	Name	Date of Construction	NRHP Recommendation
34	Not Assigned	Henry Goodman	1930	Not Eligible
35	Not Assigned	House	1951	Not Eligible
36	Not Assigned	Mildred Long, Michael Long, Brent Long	1962	Not Eligible
37	Not Assigned	House	1951	Not Eligible
38	Not Assigned	Harold Rhodes	1962	Not Eligible
39	Not Assigned	Robert Neal	1938	Not Eligible
40	Not Assigned	Harold Rhodes	1962	Not Eligible
41	Not Assigned	Wynnburg Baptist Church	1962	Not Eligible
42	Not Assigned	Harold Russell Mills	1940	Not Eligible
43	Not Assigned	Lou Wynn	1939	Not Eligible
44	LK-257	Sam Wynn House Demolished, Barn & Metal Shop extant	1928	Not Eligible
45	Not Assigned	Edmund J. Sumara	1960	Not Eligible

3.8.2 Environmental Consequences – Cultural Resources

This section describes the potential impacts to cultural resources should the No Action Alternative or the Proposed Action be implemented.

3.8.2.1 No Action Alternative

Under the No Action Alternative, existing land use would be expected to remain unchanged. Ground disturbing agricultural practices at the Project Site would continue to have the potential to impact intact cultural resources at the surface or within the first 8 to 10 inches of soil. Therefore, impacts to cultural resources associated with the No Action Alternative would be anticipated to be minor.

3.8.2.2 Proposed Action

Ridgely Solar has identified 55 archaeological resources within the Project APE, seven of which are recommended as potentially eligible, with the remaining 48 recommended as not eligible for the NRHP. Ridgely Solar and TVA would execute a legal agreement documenting the avoidance of the following potentially eligible sites 40LK71,40LK128, 40LK130, 40LK131, 40LK142, 40LK157, 40LK161 during the term of the power purchase agreement. These seven sites within the Project Area recommended as potentially eligible would be avoided during the construction and operation of the Ridgely Solar Project. Therefore, the Project as currently designed would not pose direct or indirect impacts to significant archaeological or historic resources. On January 20, 2021 TVA initiated consultation with the SHPO and federally recognized Indian tribes with an interest in the area with respect to these findings of both the archaeological and architectural surveys. On February 16, 2021, the Cherokee Nation responded that the

project does not intersect or adjoin Cherokee Nation cultural resources. They asked to be consulted should unexpected discoveries occur. The SHPO concurred with TVA's findings on February 19, 2021.

Should previously undiscovered cultural resources be identified during Site construction or operations, a Secretary of the Interior qualified archaeologist and the SHPO will be consulted before any further action is taken.

3.9 NATURAL AREAS AND RECREATION

This section describes an overview of existing natural areas and recreation areas surrounding the Project Area and potential impacts to these areas associated with the No Action Alternative and the Proposed Action.

3.9.1 Affected Environment – Natural Areas and Recreation

Natural areas include managed areas such as Wildlife Management Areas, National Wildlife Refuges and Habitat Protection Areas, ecologically significant sites, and river segments listed in the Nationwide Rivers Inventory. Recreation areas provide recreational activities and opportunities to the public at the federal, state, or local level. Figure 3.9-1 shows natural and recreation areas within a 5-mi radius of the Project Site.

Since the parcels of property that make up the Project Site are privately owned and consist primarily of agricultural lands, there are no natural areas or recreation areas within the Project Site. However, there are three natural areas and recreation areas located within a 5-mi radius of the Project Site. Approximately 3 mi to the northwest and southwest of the Project Site is one of the world's major river systems, the Mississippi River which flows 2,350 mi long from its source in Minnesota through the continental US to the Gulf of Mexico (NPS 2018). Recreational activities that occur on the Mississippi River includes fishing and boating. About 2 mi to the east of the Project Site is Lake Isom National Wildlife Refuge spanning approximately 1,850 acres (USFWS 2015). Visitors can participate in numerous activities at Lake Isom National Wildlife Refuge like hunting, wildlife viewing, environmental education, and photography (USFWS 2017). Finally, Reelfoot Lake's Blue Basin is located approximately 2.5 mi northeast of the Project Site. In the winter of 1811, a series of shocks known as the New Madrid earthquake created Reelfoot Lake, located within the Reelfoot National Wildlife Refuge and Reelfoot Lake State Natural Area (NPS n.d.). The Reelfoot National Wildlife Refuge is about 25,100 acres, and visitors can participate in canoeing, hiking, fishing, hunting, and wildlife viewing (USFWS 2020d). Reelfoot Lake State Wildlife Management Area and State Park overlaps with the Reelfoot National Wildlife Refuge and encompasses about 24,000 acres (Tennessee Wildlife Resource Agency 2020). Reelfoot Lake State Park also offers kayaking and canoeing rentals, lake tours, boating, hiking, fishing, birding, camping, and cabin rentals (Tennessee State Parks 2020).

3.9.2 Environmental Consequences – Natural Areas and Recreation

This section describes the potential impacts to natural areas and recreation areas should the No Action Alternative or the Proposed Action be implemented.

3.9.2.1 No Action Alternative

Under the No Action Alternative, the area within the proposed Project Site and vicinity would remain in its current condition. As a result, adoption of the No Action Alternative would not affect natural areas or recreation areas because no project-related activities would occur. While natural ecological processes and anthropogenic disturbances would continue, changes would not result from the proposed Project.

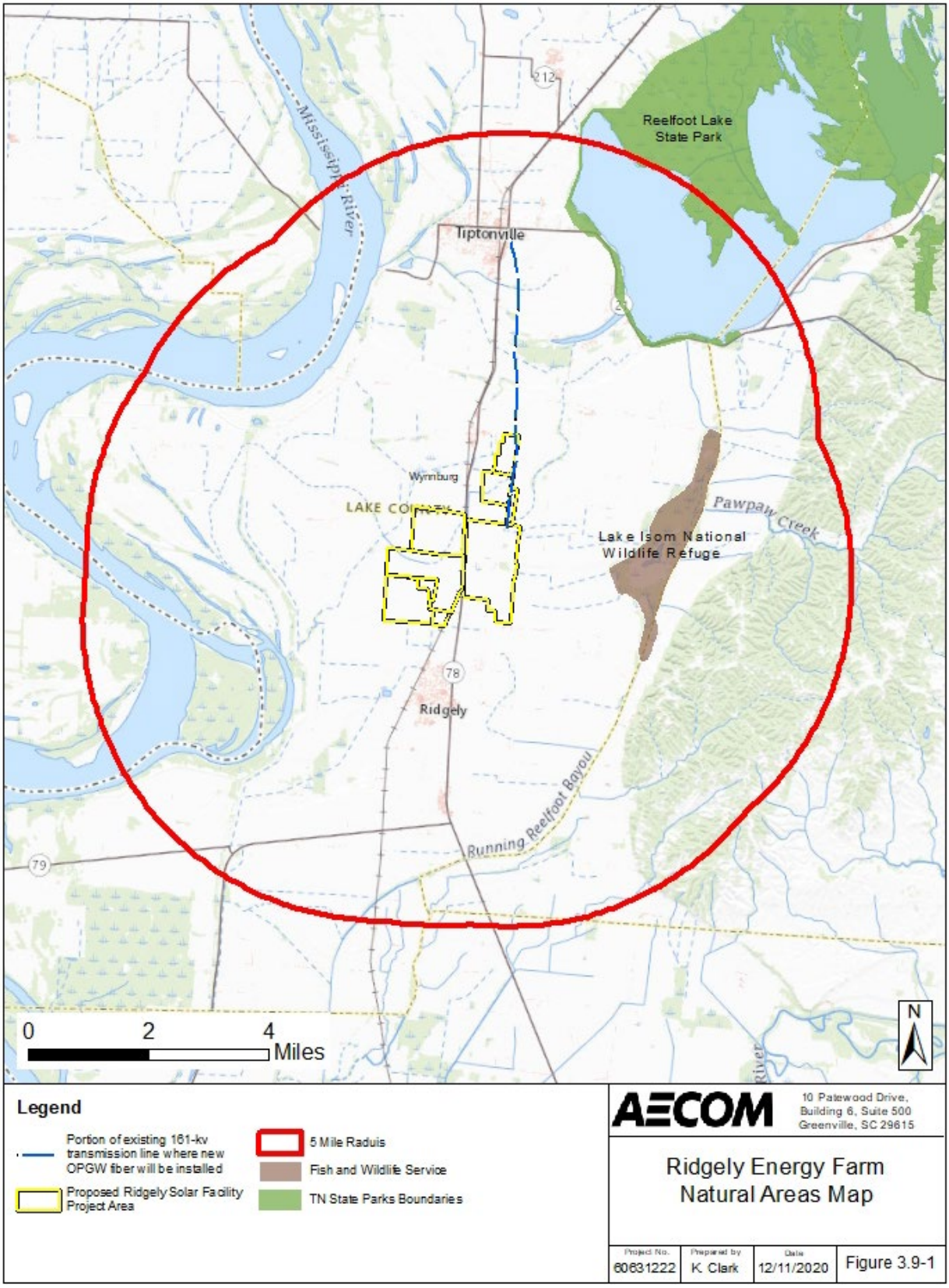

Figure 3.9-1. Natural Areas and Recreation

3.9.2.2 Proposed Action

Because work would not produce any significant impacts affecting areas outside of the immediate Project Site, adoption of the Proposed Action would not have any direct or indirect impact on any natural areas or recreational areas within a 5-mi radius.

3.10 UTILITIES

This section describes an overview of existing utilities within and near the Project Site and the potential impacts on these utilities that would be associated with the No Action Alternative and Proposed Action. Specific utility components analyzed below include electrical service, natural gas, water supply, and communications.

3.10.1 Affected Environment – Utilities

Gibson Electric Membership Corporation (Gibson EMC) distributes electric power from TVA to Lake County through the Lake County Utility District (Lake County 2018a). Gibson EMC is a member-owned electric cooperative providing electricity to nearly 39,000 homes and businesses in rural northwestern Tennessee and western Kentucky (Gibson EMC 2020a, Gibson EMC 2020b). Based in Tiptonville, the Lake County Utility District provides natural gas, water, and electric services throughout Lake County (Lake County 2018a, THS 2018, West TN Industrial Association 2019).

Review of Bowman Consulting Group's July 2020 survey of land titles reveals overhead utility lines along with telephone lines and underground gas lines present in the proposed Project Site area. Overhead utility lines are located along Mooring Road, Madie Crossing Road, Mile Lane, State Route 78, Madi Keefe Road, and Clay Winn Road. Telephone easements are located along State Route 78. Underground gas lines are located along State Route 78 (Bowman Consulting 2020).

3.10.1.1 Electrical Service

Electrical service to the Project Site is provided through Gibson EMC by Lake County Utility District. TVA's existing 161-kV transmission line between Highway 412 and Tiptonville traverses the eastern side of the Project Site (Figure 2-1, TVA 2020b).

3.10.1.2 Natural Gas

Natural gas in the area is provided by Lake County Utility District from the Williams Gas Pipeline Company (Lake County 2018a, WTIA 2019, RAC 2020a, RAC 2020b).

3.10.1.3 Water Supply

Sandwiched between the Mississippi River and Reelfoot Lake, the primary public water supply system in Lake County is the Tiptonville Water System with four wells in the Alluvial aquifer capable of providing more than 2 million gallons per day (GPD). Current public water demand is 0.8 million GPD. Other public water suppliers in Lake County include the Ridgely Water System and the Reelfoot Utility District, both supplied using groundwater wells, with an average demand of 0.2 million GPD each (WTIA 2019, USGS 2000).

The former residence located within the Project Site is not connected to municipal sewer system and has a septic system.

3.10.1.4 Communications Resources

Gibson EMC provides telecommunications resources, both wireless broadband and fiber, in the vicinity of the Project Site through agreements with various service providers including Aeneas Internet and Telephone, AT&T, Gibson EMC, Ken-Tenn Wireless, Time Warner, and Verizon Wireless (Gibson 2020a, Gibson 2020b, RAC 2020b).

3.10.2 Environmental Consequences – Utilities

This section describes the potential impacts to utilities should the No Action Alternative or the Proposed Action be implemented.

3.10.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility and transmission line would not be constructed; therefore, there would be no project-related impacts to utilities. Existing land use would be expected to remain unchanged as predominantly disturbed agricultural land with agricultural activities. Existing on-site utilities would likely remain unchanged, with the exception of potential upgrades and maintenance.

3.10.2.2 Proposed Action

Under the Proposed Action, TVA would connect the solar facility to the existing Tiptonville to Hwy 412/Dyersburg 161-kV transmission line that runs through the northeast corner of the Project Site using a line-tap and upgrade the 5.5 mi of the existing transmission line from the Ridgely Solar interconnection to the Tiptonville switching station. An on-site Ridgely Solar, TN 161-kV Substation, an O&M Building, and one TVA-owned Lake County, TN 161-kV Switching Station would also be constructed in close proximity to each other in the northeast corner of the Project Site (Figure 2-2). Distribution-voltage retail electrical service to the Project Site is available from Gibson EMC through the Lake County Utility District; a service drop would be installed during construction to provide construction power. Once the Project enters the operation phase, Gibson EMC or an on-site station service transformer would provide the auxiliary AC back-up power for controls and operating the solar array tracking motors. Given the low-level of retail electric demand needed, no changes to the Lake County distribution system would be expected, and there would be no impacts to the local utility or its customers. Implementation of the Proposed Action would result in additional renewable energy resources in the region which would constitute a beneficial impact to electrical services in the region.

Water would be needed for soil compaction and dust control during construction and to a lesser extent for domestic use during operations (i.e., washing solar panels). The O&M Building would also include a small leach field and a potable water well. This small habitable on-site building would typically be utilized during operation of the facility by two or three workers during the workweek. Portable toilets would be available on-site for the duration of the construction period. Water in sufficient quantity and quality would be made available through use of on-site groundwater wells, or delivery via water trucks. Ridgely Solar would determine daily water requirements based on the preliminary grading plan and size the new on-site wells accordingly. Ridgely Solar will perform groundwater drilling and testing work prior to full construction to generate data on aquifer characteristics and develop a plan for the production well design. In addition to the small potable water well near the O&M Building, two to four on-site groundwater supply wells would be utilized for the Project (depending on flow capacity of each well). The exact location of the wells would be identified in the final design. The wells would be spaced around the Project Site to provide easy access for construction water and to reduce the potential for any significant water level drawdown. The well field would

include a sufficient number of standby wells to provide water in the event the primary wells are shut down for maintenance.

Because conditions may change during the course of the Project, a final Decommissioning and Closure Plan would be submitted for review and approval based on conditions as of the time of facility closure. It is anticipated that the decommissioning and site reclamation would be staged in phases, allowing for a minimal amount of disturbance and requiring minimal dust control and water usage. It is anticipated that water usage during decommissioning and site reclamation would not exceed operational water usage.

Natural gas service would not be required during the construction or operation of the Project.

No communication resources are anticipated to be acquired through the local providers. Ridgely Solar would have a dedicated communications system to remotely monitor the Project facility and operations. Additionally, to facilitate the operation of the solar site and transmission line connection, TVA proposes to also undertake the following additional activities:

- Installation of OPGW fiber on approximately 5.5 mi of the Tiptonville to Hwy 412/Dyersburg transmission line from the Ridgely Solar interconnection to the Tiptonville Switchyard;
- Installation of splice cases on Structures 199, 208, and 219, addition of steel X-braces on Structures 200, 202-203, 205, 207, 209-212, 217-222, and 224-227, and addition of OPGW dead-end at Structures 208 and 219 on the Tiptonville to Hwy 412/Dyersburg 161-kV transmission line to accommodate the installation of the OPGW;
- Installation of two new 3-pole structures along with 161-kV transmission line and OPGW at the Ridgely Solar interconnection;
- Installation of telecommunications connections at the Tiptonville and Hwy 412/Dyersburg 161-kV substations and South Nashville and South Jacksonville 161-kV substations; and
- Modification of TVA system map boards to include names and numbers of the updated transmission line and the new Lake County, TN 161-kV Switching Station.

These additions to the transmission lines or the existing communication system would not have an adverse impact to telecommunications in the local area.

Overall, no impacts to utilities would be anticipated as a result of implementation of the Proposed Action. No indirect impacts to utilities would occur under the Proposed Action.

3.11 WASTE MANAGEMENT

This section describes an overview of existing waste management within the Project Area and the potential impacts to waste management that would be associated with the No Action Alternative and the Proposed Action. Components of waste management that are analyzed include solid and hazardous waste and materials.

3.11.1 Affected Environment – Waste Management

“Hazardous materials” and “hazardous waste” are substances, which because of their quantity, concentration, or characteristics (physical, chemical, or infectious), may present a significant danger to public health and/or the environment if released. These substances are defined by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; 42 U.S.C. §§ 9601 *et seq*.) and the

Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act ([RCRA]; 42 U.S.C. §§ 6901 *et seq*.). Regulated hazardous wastes under RCRA include any solid, liquid, contained gaseous, or semisolid waste or combination of wastes that exhibit one of more of the hazardous characteristics of ignitability, corrosivity, toxicity, or reactivity, or is listed as a hazardous waste under Title 40, CFR, Part 261. Storage and use of hazardous materials and wastes are regulated by local, state, and federal guidance including the Emergency Planning and Community Right-to-Know Act (42 U.S.C. 116 *et seq*.) and RCRA.

Currently, land use on the Project Site is mainly agricultural with a former residential homestead. The Project Site consists of agricultural cropland with portions of undeveloped woodland and a former residential homestead. The surrounding area consists of agricultural cropland, agricultural barns, scattered residential homesteads, and a cemetery (ESE 2020).

In 2020, as part of the property purchase evaluation process, Environmental Science and Engineering Partners, LLC (ESE) conducted a Phase I Environmental Site Assessment for the proposed Project Site. ESE reviewed historical and regulatory agency records and performed site inspection and reconnaissance of the surrounding area to identify any recognized environmental conditions (REC) including historical or controlled RECs. ESE performed site reconnaissance on June 22, 2020, accessing the site from multiple area roads. Reconnaissance of the site revealed two agricultural barns, two on-site above ground storage tanks (ASTs), and 14 pole-mounted electrical transformers. One of the ASTs was an empty 500-gallon AST apparently associated with a former diesel engine used to power irrigation pumping; no surface staining or stressed vegetation was discovered in the vicinity. The other AST was an agricultural chemical AST in an irrigation station; again, no surface staining or stressed vegetation was discovered in the vicinity. In addition, no indications of polychlorinated biphenyls were discovered. There was no evidence of transformer leaking or corrosion. The Phase I assessment concluded that no evidence of RECs, controlled RECs, or historical RECs exists in connection with the subject property (ESE 2020).

The Project Site is located near the town of Ridgely in Lake County, Tennessee. While solid waste in Ridgely and in Tiptonville are managed by their municipality, solid waste in Lake County may use the convenience center in Tiptonville for collection of solid waste and recyclables. On Upper Wynburg Road, this Tiptonville facility also houses the waste tire collection site and the Lake County incinerator (TDEC 2020d, TDEC 2020e). Problem wastes including lead acid batteries, used oil, transmission fluid, and other automotive fluids are collected at Perkins Tire and Service Center, a private entity in Tiptonville (TDEC 2005). Lake County municipal solid waste is disposed in the ECM of Ridgely, LLC Class I landfill in Obion County.

3.11.2 Environmental Consequences – Waste Management

This section describes the potential impacts to waste management should the No Action Alternative or Proposed Action be implemented.

3.11.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility and transmission line upgrades would not be constructed; therefore, no project-related impacts to waste management resources would occur. Existing land use would be expected to remain a mix of farmland and undeveloped land, and existing waste management conditions would be expected to remain as they are at present.

3.11.2.2 Proposed Action

Construction of the Proposed Action would result in the generation of hazardous and nonhazardous solid and liquid waste in the form of construction debris, grading spoils, wastewater, packaging materials, and general construction waste. Under the Proposed Action, every effort would be made to minimize the amount of solid and liquid waste generated during and after construction of the Project, including upgrades to the existing transmission ROW.

Materials suitable for soil compaction activities such as gravel and soils would be brought to the Project Site as needed and off-loaded at the designated road or building location for immediate dispersion. Materials unsuitable for compaction, such as mowed debris, would be removed and loaded immediately for subsequent disposal at an acceptable off-site location. Contaminated grading and mowing materials are not anticipated; however, if any such materials are encountered during excavation, they would be disposed of at the nearest appropriate facility in accordance with applicable laws, ordinances, regulations, and standards. It is estimated that not more than 20 cubic yards of construction debris and material waste would be generated each week (during heavier periods of construction), which would be accumulated in a construction debris container and hauled off monthly. A list of acceptable waste facilities is listed in Table 3.11-1.

Table 3.11-1. Waste Facilities near the Ridgely Solar Project Site

Landfill	Address	Website	Description
Upper Wynnburg Road Convenience Center	Upper Wynnburg Road Tiptonville, TN	N/A	Non-hazardous household and commercial waste, tires Incinerator and recycling
ECM of Ridgely, LLC Class I Landfill	2633 Inman Hollow Road Obion, TN	https://garbagedisposalservices.com/	Non-hazardous household and commercial waste
City of Newbern Class III Landfill	Ro Ellen – Newbern Road, Newbern, TN	N/A	Construction and Demolition Debris shredded tires, Landscaping and farming waste

Hazardous Materials Management

During construction, hazardous materials would be stored on-site in storage tanks, vessels, or other appropriate containers specifically designed for the characteristics of the materials to be stored. The storage facilities would include secondary containment in case of tank or vessel failure. Construction- and decommissioning-related hazardous materials used for development of the Proposed Project would include gasoline, diesel fuel, oil, lubricants, and small quantities of solvents and paints. Material Safety Data Sheets for applicable materials present on-site would be made readily available to on-site personnel.

Fueling of some construction vehicles would occur in the construction area. Other mobile equipment would return to the laydown area for refueling. Special procedures would be identified to minimize the potential for fuel spills, and spill control kits would be carried on refueling vehicles for activities such as refueling, vehicle or equipment maintenance procedures, waste removal, and tank clean-out. Fuel for construction equipment could be provided by a fuel truck or could be stored in aboveground double-walled storage tanks

with built-in containment. The volume of each individual tank would not exceed 1,320 gallons, the threshold above which a Spill Prevention, Countermeasure and Control (SPCC) Plan would be required (40 CFR 112). However, because there will be fuel in reserve for diesel generators, in addition to the volume of oil contained in the main electrical transformers, the total volume of regulated materials may exceed the threshold. In that case, an SPCC Plan would be prepared.

The SPCC Plan would include procedures, methods, and equipment supplied during construction to prevent discharges from reaching navigable waters. The plan would be certified by a Registered Professional Engineer and a complete copy maintained on-site. The administering agency is the EPA; however, TDEC is the local Certified Unified Program Agency that is responsible for inspections and approvals related to the SPCC program.

No chemicals or hazardous materials would be stored on-site during operations. They would be transported in for immediate use during maintenance visits. The transport, storage, handling, use and disposal of chemicals would be conducted in accordance with applicable laws, ordinances, regulations, and standards.

At the end of its useful life, the Project facilities would be decommissioned and dismantled, restoring the Project Site. During decommissioning, above ground equipment and below ground electrical connections would be removed from the Project Site. In addition, concrete pads and foundations would be broken and removed, underground utilities would be abandoned, compacted areas would be scarified, and soils would be stabilized. The majority of decommissioned materials and equipment would be recycled. Ridgely Solar recycling attains high recycling rates with their state-of-the-art recycling facilities, achieving up to 90 percent reuse of semiconductor materials and 90 percent reuse of glass. Materials that cannot be recycled would be disposed at approved facilities.

Alternatively, the Project facilities may be repurposed for new solar technologies available at the end of the plant lifecycle, where equipment, cabling, and foundations would be re-used where possible.

Chemicals that could be present during construction and decommissioning of the Proposed Action are included in Table 3.11-2.

Table 3.11-2. Summary of Special Handling Precautions for Large Quantity Hazardous Materials

Hazardous Material	Use	Relative Toxicity[1] and Hazard Class[2]	Permissible Exposure Limit	Storage Description; Capacity	Storage Practices and Special Handling Precautions
Diesel Fuel	Equipment Generator refueling and emergency diesel fire pump	Low toxicity; Hazard class – Combustible liquid	PEL: none established TLV: 100 mg/m^3	Carbon steel tank (3,600 gallons)	Secondary containment, overfill protection, vapor recovery, spill kit.
Hydraulic fluid (if applicable)	Tracker drive units	Low to moderate toxicity; Hazard class – Class IIIB combustible liquid	TWA (oil mist): 5 mg/m^3 STEL: 10 mg/m^3	Hydraulic drive tank, approximately 20 gallons per tracker drive unit (if applicable) throughout solar field. Carbon steel tank, maintenance inventory in 55-gallon steel drums.	Found only in equipment with a small maintenance inventory. Maintenance inventory stored within secondary containment; alternative measures to secondary containment for equipment would be implemented at the project.

Table 3.11-2. Summary of Special Handling Precautions for Large Quantity Hazardous Materials

Hazardous Material	Use	Relative Toxicity[1] and Hazard Class[2]	Permissible Exposure Limit	Storage Description; Capacity	Storage Practices and Special Handling Precautions
Lube Oil	Lubricate rotating equipment (*e.g.,* tracker drive units)	Low toxicity Hazard class – NA	None established	Carbon steel tank, maintenance inventory in 55-gallon steel drums.	Secondary containment for tank and for maintenance inventory.

PEL – permissible exposure limit
TLV – threshold limit value
TWA – time weighted average
STEL – short-term exposure limit

[1] Low toxicity is used to describe materials with a National Fire Protection Association (NFPA) Health rating of 0 or 1. Moderate toxicity is used describe materials with an NFPA rating of 2. High toxicity is used to describe materials with an NFPA rating of 3. Extreme toxicity is used to describe materials with an NFPA rating of 4.
[2] NA denotes materials that do not meet the criteria for any hazard class defined in the 1997 Uniform Fire Code.

Water needs for the Proposed Action would be met using groundwater or water trucks. Although the O&M Building would require a small potable water well, the need for a water treatment system is not anticipated. Permanent on-site sanitary facilities will be provided for the O&M Building by a small leach field. During construction, portable chemical toilets would be used, and groundwater or trucked-in water would be used for dust suppression. During operation, modules would be cleaned using trucked-in purified water, free of detergents and additives. Module cleaning would occur two or fewer times a year. During decommissioning, portable chemical toilets would be used by workers, and either groundwater or trucked-in water would be used for dust suppression.

Ridgely Solar would develop and implement a variety of plans and programs to ensure safe handling, storage, and use of hazardous materials (e.g., Hazardous Material Business Plan). Facility personnel would be supplied with appropriate personal protective equipment (PPE), would be properly trained in the use of PPE as well as the handling, use, and cleanup of hazardous materials used at the facility, and would be properly trained on the procedures to be followed in the event of a leak or spill. Adequate supplies of appropriate cleanup materials would be stored on-site.

Hazardous Waste

Small quantities of hazardous wastes would be generated during construction, operation and maintenance, and decommissioning. Hazardous wastes generated during the construction phase would include substances such as paint and primer, thinners, and solvents. Hazardous solid and liquid waste streams that would be generated during operation of the Project include substances such as used hydraulic fluids, used oils, greases, filters, etc., as well as fluorescent light bulbs, spent cleaning solutions, and spent batteries. Hazardous wastes generated during decommissioning would include substances such as carbon dioxide, diesel fuel, hydraulic fuel, and lube oil. To the extent possible, hazardous wastes would be recycled. Waste collection and disposal would be conducted in accordance with applicable regulatory requirements to minimize health and safety effects.

Ridgely Solar (or its contractor) would obtain a hazardous waste generator identification number from the State of Tennessee prior to generating any hazardous waste; spills would be reported to the TDEC. A sampling and cleanup report would be prepared and sent to the agency to document each spill and clean

up. Each spill, regardless of amount, would be cleaned up within 48 hours and a spill report completed. Copies of spill and cleanup reports would be kept on-site.

Minimal amounts of petroleum fuel would be kept on-site during construction. BMPs would be implemented in order to minimize the potential of a spill and to instruct on-site workers on how to contain and clean up any potential spills. The Project Site would be surrounded by security fencing during both construction and operational phases and access gates would normally remain locked. General public health and safety would not be at risk in the event of an accidental spill on-site.

Solid (Non-Hazardous) Waste

Construction, operation and maintenance, and decommissioning would generate non-hazardous solid wastes. Facility-related wastes generated during all phases of the Proposed Action would include soiled rags, worn or broken metal and machine parts, defective or broken electrical materials, other scrap metal and plastic, insulation material, empty containers, paper, glass, and other miscellaneous solid wastes including the typical refuse generated by workers. These materials would be disposed of by means of contracted refuse collection and recycling services. Waste collection and disposal would be in accordance with applicable regulatory requirements to minimize health and safety effects.

Information on universal wastes anticipated to be generated during Project construction and decommissioning activities is provided in Table 3.11-3. Universal wastes and unusable materials would be handled, stored, and managed per General Universal Waste requirements.

Table 3.11-3. Summary of Construction Waste Streams and Management Methods

Waste Stream and Classification	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	On-site Treatment	Waste Management Method/Off-site Treatment
Construction waste - Hazardous	Empty hazardous material containers	1 cubic yard per week (cy/wk)	Intermittent	None. Accumulate on-site for <90 days	Return to vendor or dispose at permitted hazardous waste disposal facility
Construction waste – Hazardous	Solvents, used oil, paint, oily rags	175 gallons	Every 90 days	None. Accumulate on-site for <90 days	Recycle or use for energy recovery
Spent batteries - Universal Waste	Lead acid, alkaline type	20 in 2 years	Intermittent	None. Accumulate on-site for <90 days	Recycle
Construction waste – Non-hazardous	Scrap wood, concrete, steel, glass, plastic, cardboard, paper	5 cy/week	Intermittent	None	Recycle wherever possible, otherwise dispose to Class III landfill
Sanitary waste – Non-hazardous	Portable chemical toilets - sanitary waste	200 gallons/ day	Periodically pumped to tanker truck by licensed contractors	None	Ship to sanitary wastewater treatment plant

Table 3.11-3. Summary of Construction Waste Streams and Management Methods

Waste Stream and Classification	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	On-site Treatment	Waste Management Method/Off-site Treatment
Office waste – Non-hazardous	Paper, aluminum, food	1 cy/week	Intermittent	None	Recycle or dispose to Class III landfill

The operation of the solar facility is expected to generate non-hazardous wastes and small quantities of hazardous wastes. Operation of the transmission line would generate minimal quantities of waste. The types of waste and their estimated volumes are summarized in Table 3.11-4.

Table 3.11-4. Summary of Operation Waste Streams and Management Methods

Waste Stream and Classification	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Waste Management Method	
				On-site	Off-site
Used Hydraulic Fluid, Oils and Grease – Non-RCRA Hazardous	Tracker drives, hydraulic equipment	1000 gallons/year	Intermittent	Accumulated for <90 days	Recycle
Oily rags, oil absorbent, and oil filters – Non RCRA Hazardous	Various	One 55-gallon drum per month	Intermittent	Accumulated for <90 days	Sent off-site for recovery or disposed at Class I landfill
Spent batteries – Universal Waste	Rechargeable and household	<10/month	Continuous	Accumulate for <1 year	Recycle
Spent batteries – Hazardous	Lead acid	20 every 2 years	Intermittent	Accumulated for <90 days	Recycle
Spent fluorescent bulbs – Universal Waste	Facility lighting	< 50 per year	Intermittent	Accumulate for <1 year	Recycle

Wastewater

During construction, portable chemical toilets would be provided for workers in the solar fields. No adverse effects are anticipated from wastewater treatment and disposal. No portable chemical toilets will be on-site during operations and maintenance; sanitary facilities in the O&M Building will connect to a small leach field. Portable chemical toilets would also be provided during decommissioning of the Project.

Under the Proposed Action, hazardous materials would be utilized, and hazardous waste would be generated during construction, operation, and decommissioning activities. However, with the use of industry standards, best management practices, and use of the Spill Prevention plan, direct impacts would be temporary and minor. No indirect impacts are anticipated.

3.12 PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY

This section describes an overview of existing public health and safety, and the potential impacts associated with the Proposed Action and No Action Alternatives. Public health issues include emergency response and preparedness to ensure Project construction and operation do not pose a threat to public health and safety. Safety issues include occupational (worker) safety in compliance with the Occupational Safety and Health Administration (OSHA) standards.

3.12.1 Affected Environment – Public and Occupational Health and Safety

The Project Site is currently private property. Land uses on the Project Site are primarily agricultural with a small amount of residential use, though no persons currently live within the proposed Site footprint. Since the land occupied by the Project Area is not used by, or accessible to, the general public, there are no current public health and safety issues.

Public emergency services in the area include regional hospitals, law enforcement services, and fire protection services. Lake County Primary Care has a branch location in Ridgely. Regional hospitals include West Tennessee Healthcare (225 beds) 25 mi away in Dyersburg, Baptist Memorial Hospital (137 beds) 30 mi away in Union City, and Volunteer General Hospital (100 beds) 40 mi away in Martin (Lake County 2018b, TDEH 2020, Baptist Memorial HCC 2020, West TN Healthcare 2020a, West TN Healthcare 2020b). Law enforcement services in Ridgely, Tennessee are provided by the Ridgely Police Department, located at 140 North Main Street in Ridgely (MTAS 2020, TBI 2020). In addition, Lake County law enforcement services are provided by the Lake County Sheriff's Department, located at 109 South Court Street in Tiptonville (County Office 2020, TBI 2020). Fire protection services are provided by the Ridgely Fire Department (138 North Main Street in Ridgely) and the Tiptonville Fire Department (221 Kentucky Street in Tiptonville) (Google Map 2020, Claims Pages 2020). The Tennessee Emergency Management Agency (TEMA) has the responsibility and authority to coordinate with state and local agencies in the event of a release of hazardous materials in association with Project activities (TEMA 2020).

3.12.2 Environmental Consequences – Public and Occupational Health and Safety

This section describes the potential impacts to public and occupational health and safety should the No Action Alternative or the Proposed Action be implemented.

3.12.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility and transmission line upgrades would not be constructed; therefore, no project-related impacts on public health and safety would result. Existing land use would be expected to remain a mix of farmland and unused land, and existing public health and safety issues would be expected to remain as they are at present.

3.12.2.2 Proposed Action

Workers in the Project Area would have an increased safety risk associated with the construction activities. However, because construction work has known hazards, standard practice is for contractors to establish and maintain health and safety plans in compliance with OSHA regulations. Such health and safety plans emphasize BMPs for Project Site safety management to minimize potential risks to workers. Examples of best practices include employee safety orientations; establishment of work procedures and programs for site activities; use of equipment guards; emergency shut-down procedures; lockout procedures; site

housekeeping; personal protective equipment; regular safety inspections; and plans and procedures to identify and resolve hazards.

Potential public health and safety hazards could result in association with the flow of construction traffic along the public roadways. Construction traffic will access the Project Site using State Highway 78. Entrances for the site are located on State Highway 78, Clay Winn Road, Ray Shelton Road, Harry George Road, and Mile Lane (Figure 2-2). Dominated by agricultural cropland, the areas surrounding the site also include a few residential homesteads. In addition, New Haven Cemetery is located to the south of the site. Health and safety plans established and adhered to by the construction team would include traffic procedures to minimize potential safety concerns.

There are no federal standards for public exposure to electromagnetic fields (EMFs) from power facilities, and little information is available in published literature concerning EMF measurements from solar PV facilities. EMFs are generated from transmission lines, like all other types of electrical wiring. The voltage on the conductors of a transmission line generates an electric field that occupies the space between the conductors and other conducting objects such as the ground, transmission line structures, or vegetation. For this project, the proposed transmission line would be designed to minimize the potential for shocks by maintaining sufficient clearance between the conductors and objects on the ground, and most of the energy would dissipate on the ROW. Additionally, objects in the ROW would be grounded by TVA to prevent them from being a source of shock. Additionally, public concern exists over the potential for adverse health effects that may be related to long-term exposure to EMF. Research has been ongoing for several decades, but the consensus of the scientific panels reviewing the research is that the evidence does not support a cause-and-effect relationship between EMFs and any adverse health outcomes. TVA follows medical and health research related to EMFs**,** along with media coverage and reports that may not have been peer reviewed by scientists or medical personnel. Therefore, the Proposed Action would have negligible direct impacts on public safety from potential EMF generated by electrical components associated with the Proposed Action, including inverters/transformers, interconnecting electrical lines, and new interconnection line.

Emergency response for the Project Area would be provided by the local, regional, and state law enforcement, fire, and emergency responders described in Section 3.12.1. TEMA would coordinate state and local agencies in a hazardous material release event.

No public health or safety hazards would be anticipated as a result of operations. Overall, impacts to public health and safety in association with implementation of the Proposed Action would be considered temporary and minor.

3.13 TRANSPORTATION

This section describes an overview of existing transportation resources and the potential impacts on these transportation resources that would be associated with the No Action Alternative and the Proposed Action. Components of transportation resources that are analyzed include roads, traffic, railroads, and airports.

3.13.1 Affected Environment – Transportation

3.13.1.1 Roads

The proposed solar energy facility would be in Lake County, Tennessee, less than 1 mi southeast of Wynnburg, approximately 2 mi north of Ridgely, and approximately 5 mi south of Tiptonville. Lake County is located in the northwest corner of the State, on the Kentucky-Missouri-Tennessee border. There are no interstate highways, U.S. numbered highways, or principal arterials in Lake County (TDOT 2018). The

Project Site is located south of SR-21 and SR-22 (both two-lane roads), and north of SR-79, which intersects SR-78 at its eastern terminus, and the Mississippi River at its western terminus (TDOT 2018, Pate 2020). Interstate 55 (I-55) is the nearest major highway, approximately 14 mi west of the Project Site.

SR-78/Headden Drive is a minor arterial that runs north-south (through Kentucky) and bisects the Project Site. SR-78 is a paved two-lane undivided highway that becomes a four-lane undivided highway in the town of Ridgely (Pate 2020). Minor collector roads intersect the Project Site to the north (Clay Winn Road), south (Old Maddie Crossing Road, Mile Lane), east (Harry George Road and Lillie May Road), and west (Paschall Road, Mooring Road, and Ray Shelton Road).

As shown in Figure 3.13-1, SR-21, SR-22, and SR-78 provide access to Interstate (I)-55 (west of the Mississippi River) and I-155 (south of the Project Area), which are within a 20-mi radius from the Project Site, but outside the boundaries of Lake County. I-55 is a major cross-country north-south route connecting the Great Lakes to the Gulf of Mexico. The major cities that I-55 connects to are Chicago IL, St. Louis MO, Memphis TN, Jackson MS, and New Orleans LA. I-155 is located in the adjacent Obion County (Interstate-Guide.com 2020).

The immediate area is agricultural in nature. The majority of the smaller county roads within and around the Project Site are utilized by agricultural workers, homeowners, and/or their visitors, and provide vehicular access to the agricultural fields and farm buildings. The surfaces of these roads are typically tar and chip (TDOT 2018, Pate 2020).

An active rail line (Tennken Railroad Company/Canadian National) bisects the Project Site. The rail line runs parallel to Old Ridgely Road south of the Project Site and then runs parallel to Old Ridgely Road and SR-78 through the Project Site into Wynnburg (TNECD 2020a).

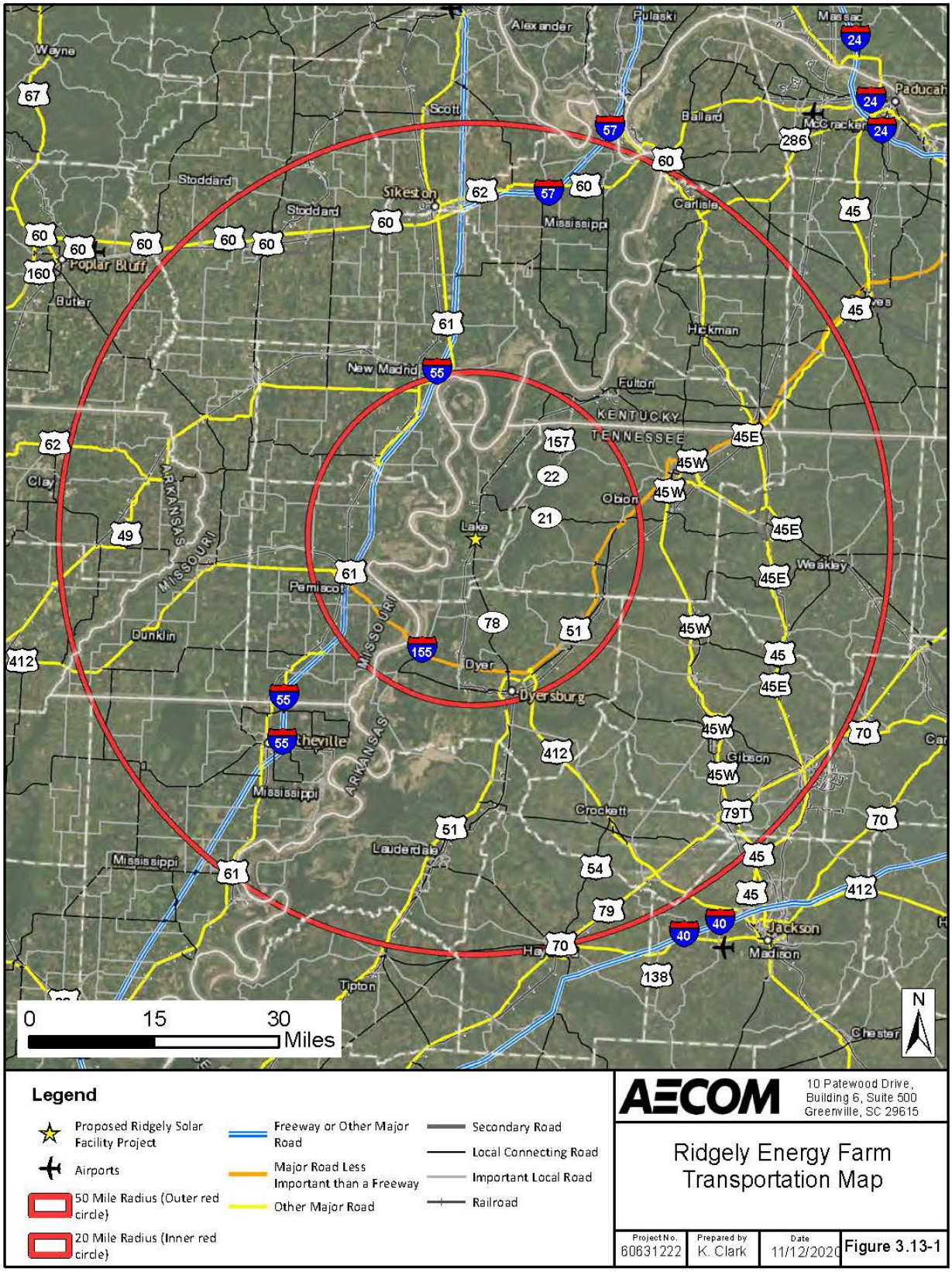

Figure 3.13-1. Transportation Map

3.13.1.2 Traffic

Existing traffic volumes were determined using Average Annual Daily Traffic (AADT) counts measured at existing TDOT stations. The 2018 AADT for roads in the immediate vicinity of the Project Site are tabulated in Table 3.13-1 below (TDOT 2020).

Table 3.13-1. 2018 Average Annual Daily Traffic near Proposed Project Site

Location	Descriptor	Station	AADT Count
Wynnburg Bluebank Road	North of Site; near Wynnburg, South of Tiptonville	000024	739
State Route 78	North of Site; South of Tiptonville near Lake County Regional Park	000014	3,005
State Route 21	North of Site, intersects with Tiptonville	000012	2,730
State Route 22	North of Site; intersects with SR-78 in Tiptonville	000011	332
State Route 78	South of Site; north of Gratio Road; near the elementary school	000043	3,878
Hoecake Road	South of Site, ; west edge of Ridgely	000030	97
State Route 79	South west of Site; south of Ridgely	000036	620
Robinson Bayou Road	West of Site	000053	90
Madie Keefe Road	East boundary of Site; near Obion County line	000023	103
State Route 78	South of the Site, at the intersection of SR78 and I-155.	000119	6,576
State Route 181	South of the Site; near Dyer County Line	000050	432
State Route 412 / Interstate 155	South of the Site; near Mississippi River; in Dyer County	000149	11,240

Source: TDOT 2020

In 2018, SR-78 had a traffic count of 3,878 AADT at a station immediately south of the Project Site in Ridgely. This was the highest traffic count in the immediate area. The nearest interstate highway south of the Project Site is I-155. It is less than 20 mi away and may be accessed from the Project Site by taking SR-78 north to Tiptonville, then heading east on SR-21, which had an AADT of 2,730 in 2018. SR-21 is considered a major collector road by TDOT. The Port of Cates Landing, operated by the Northwest Tennessee Regional Port Authority, is less than 10 mi north of the Project Site. The port may be accessed by taking SR-78 north to SR-21, located just west of Tiptonville, then heading north on SR-22. The traffic station on SR-22 just north of its intersection with SR-21 had an AADT of 332 (TDOT 2020).

The nearest interstate highway west of the Project Site is I-55, but there is no direct route from the Project Site. One route would be from Robinson Bayou Road, Hoecake Road to Great River Road (SR-181) to SR-

412/I-155 which ultimately intersects with I-55 in Missouri. Traffic counts on local and state roads are low, but increase to 11,240 on I-155 as shown on Table 3.13-1 (TDOT 2020)

3.13.1.3 Rail, Water and Air Traffic

Lake County has access to railroads, water ports, and airports (TNECD 2020a).

The Tennken Railroad, which interchanges with Canadian National in Dyersburg, provides rail freight transportation services from Dyersburg, Tennessee to Hickman, Kentucky (West Tennessee Rail Group 2020). The Tennken transports steel and agricultural products (TNECD 2020a).

The new multimodal Port of Cates Landing is located approximately 5 mi north of Tiptonville on the Mississippi River and is accessible to barge traffic year-round on a 9,000 linear foot harbor. The port's expandable intermodal port dock also serves rail and truck shipping. The port sits above the 100-year floodplain and is in an Opportunity Zone and Foreign Trade Zone. Tennessee is part of the four-state region of the Tennessee-Tombigbee Waterway, which provides the state access of the Gulf of Mexico harbors and international markets (TNECD 2020a).

The closest major airport is Memphis International, located approximately 100 mi southwest of the Project Site. The closest regional airport is Reelfoot Lake Airport, located 12 mi northeast of Tiptonville, near the Kentucky-Tennessee state line (Flightpedia 2020).

3.13.2 Environmental Consequences – Transportation

This section describes the potential impacts to transportation resources should the No Action Alternative or the Proposed Action be implemented.

3.13.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar project would not be constructed. Therefore, no project-related impacts to transportation resources would result. Existing land use would be expected to remain predominantly disturbed agricultural land, and the existing transportation network and traffic conditions would be expected to remain as they are at present.

3.13.2.2 Proposed Action

Due to the additional traffic generated by worker and delivery vehicles to roads currently used by agricultural workers, residents, and visitors, construction traffic would impact roads in the immediate vicinity of the Project Site. Minor traffic impacts would occur along the arterial SR-78/Headden Drive, which connects the surrounding towns of Ridgely and Wynnburg, and bisects the Project Site. As shown on Figure 2-2, four of the 11 planned entrances to the Project Site are located along SR-78.

During construction of the proposed solar project, an average crew of between 200 and 300 workers would be present at the Project Site from approximately 7 am to 7pm, Monday through Friday, for approximately 12 months. Additional hours could be necessary to make up schedule deficiencies or to complete critical construction activities. During the Project startup phase, equipment and system testing and similar activities could continue 24 hours per day, 7 days a week. A majority of workers would likely commute from the local or regional area. National and international subcontractors may be required to supplement local resources. Many would likely stay in local hotels in the vicinity and commute in their own vehicles or carpool to the Project Site. Vehicle parking for construction workers would be located near the construction yard/laydown

area on Ray Shelton Road. As shown on Figure 2-2, this site entrance would be located on the west side of the Project Site. Work teams would be released during lunch break and some would likely visit local restaurants and businesses at this time. Impacts to traffic flow resulting from commuting workers would be heaviest during weekdays at the beginning of the workday, at lunch, and at the end of the workday. These impacts would occur around the Project Site in general, and the parking area located near the Ray Shelton Road site entrance specifically.

The location of eleven site entrances as well as the construction yard/laydown area are shown in Figure 2-2. Minor traffic impacts at the construction yard/laydown area located on Ray Shelton Road are likely as this area would also be utilized for job office trailers, equipment and material storage, and employee parking, Traffic to these site entrance would be generated by material deliveries and waste removal. Approximately 15 semi-tractor trailer trucks or other large vehicles per day would use these site entrances during a 6-month portion of the construction activities for these purposes. The total number of deliveries to the Project Site is estimated at approximately 2,500 over the entire 12-month construction period.

Overall, construction traffic will impact all roads in the immediate vicinity of the Project Site. Construction traffic may also impact traffic flow to and from the surrounding towns, as SR-78 is an arterial road connecting the towns. However, these impacts would be minor and short-term. In 2018, SR-78 had traffic counts of 3,005 and 3,878 at stations located immediately north and south of the Project Site, respectively (TDOT 2020). Since the proposed workforce would consist of a peak of 300 employees over the 12-month construction period, and some workers are likely to carpool, the addition of these vehicles to the existing traffic would be considered insignificant. The addition of approximately 15 semi-tractor trailer trucks or other large delivery vehicles per day mentioned above should be easily accommodated by existing roadways; therefore, only minor impacts to transportation resources in the local area would be anticipated as a result of construction vehicle activity. Should traffic flow be a problem, Ridgely Solar would consider staggered work shifts to space out the flow of traffic to and from the Project Site. Ridgely Solar would also consider posting a flag person during heavy commute periods to manage traffic flow and to prioritize access for local residents. Use of such mitigation measures would minimize potential adverse impacts to traffic and transportation to negligible levels.

Several internal on-site maintenance access roads would be maintained on the Project Site. Permanent access roads would consist of 12 inches of compacted native subgrade material and surfaced with 6 inches of compacted gravel. A dirt perimeter road would also be constructed and maintained inside the Project Site fence to allow periodic access for Site inspection and maintenance. The Project Site will be fenced and remain closed to through traffic.

During operation of the solar facility, one to three employees would visit the Project Site as needed for scheduled/preventative maintenance and for unscheduled maintenances or outages. Periodic washing of the solar panels would increase this number by 12 employees and water trucks would be present on-site temporarily for approximately 30 days no more than twice a year. This increased traffic should not have a significant impact on the local roadways.

The construction and operation of the proposed solar project would have little to no effect on rail traffic or the operation of the airports in the region. During construction, rail may be utilized to transport some materials and air may be utilized to transport some workers. The operation of the solar facility would not affect commercial air passenger or freight traffic in the region and would not adversely affect any crop dusters operating in the vicinity of the Project Site. Impacts to rail or air traffic are anticipated to be minor and insignificant.

Overall, with the implementation of mitigation measures if necessary, direct impacts to transportation resources associated with the Proposed Action would be minor. The Proposed Action would not result in any indirect impacts to transportation.

3.14 SOCIOECONOMICS

This section describes an overview of existing socioeconomic conditions within the Project area and the potential impacts that would be associated with the No Action Alternative and the Proposed Action. Components of socioeconomic resources that are analyzed include population, employment, and income.

3.14.1 Affected Environment – Socioeconomics

The Project Area is in the northwestern part of Lake County, Tennessee, approximately 1 mi southeast of the Town of Wynnburg, 2 mi north of the City of Ridgely, and 5 mi south of the City of Tiptonville, TN. Lake County is the impact area for socioeconomic resources. The county is rural (USDA 2013).

3.14.1.1 Population

Population trends and projections are presented in Table 3.14-1. In 2018, Lake County's population was 7,526. Block Group 1, Census Tract 9601 and Block Group 1, Census Tract 9602 which contain the proposed solar Project Area, as well as the surrounding area, had a total population of 1,128. Between 2000 and 2018, population decreased in Lake County and the Block Group 1, Census Tract 9601 by 5.4 percent and 77.9 percent, respectively, but increased 1.3 percent in Block Group 1, Census Tract 9602. Population decreased 33.9 percent in Block Group 3, Census Tract 9602, which lies south of the aforementioned block groups, and contains portions of the transmission line (USCB 2000, USCB 2018a).

Conversely, population of the United States and the state of Tennessee increased 14.7 percent and 16.9 percent, respectively, during the same period (USCB 2000, USCB 2018a). By 2030, the County's population is projected to continue its slight downward trend, decreasing 4.9 percent to 7,154. Population is projected to increase 11.2 percent in Tennessee and 10.1 percent in the US between 2018 and 2030, continuing its growth trend at a slower rate (TSDC 2019, USCB 2020).

Table 3.14-1. 2000 – 2030 Population Data

Area	2000	2010	2018	Projection 2030	Percent Change 2000 – 2018 (%)	Percent Change 2018 – 2030 (%)
Lake County, TN	7,954	7,832	7,526	7,154	-5.4	-4.9
Block Group 1, Census Tract 9601	2,245	563	496	N/A	-77.9	N/A
Block Group 1, Census Tract 9602	624	652	632	N/A	1.3	N/A
Block Group 3, Census Tract 9602	709	692	469	N/A	-33.9	N/A
Tennessee	5,689,283	6,346,105	6,651,089	7,393,069	16.9	11.2
United States	281,421,906	308,745,538	322,903,030	355,501,000	14.7	10.1

Source: (TSDC 2019, USCB 2000, USCB 2010, USCB 2018a, USCB 2020)

3.14.2 Employment and Income

Employment and industry trends are presented in Table 3.14-2. In 2018, Lake County had a total employment of about 2,082 jobs. Approximately 6.2 percent were employed in farming, above both the national level of 1.3 percent and the state level of 1.8 percent. Government provided 33.1 percent of the jobs, more than the nation (12.2 percent) and the state (11.0 percent). Retail trade was lower in the County (8.5 percent) as compared to the state (10.2 percent) and nation (9.6 percent); however, the County had more Health and Social Assistance jobs (12.7 percent) than the state (10.4 percent) and nation (11.3 percent) (BEA 2018b, BEA 2018a)

The 2018 unemployment rate for Lake County was 5.7 percent, higher than the state (3.4 percent) and nation (3.7 percent) (BLS 2018a, BLS 2018b).

Table 3.14-3 presents 2018 per capita personal income. Lake County's per capita income was $23,230, significantly less than the state average of $46,900. The county's income level represented 42.7 percent of the national average (BEA 2018c, BEA 2018d).

3.14.3 Environmental Consequences – Socioeconomics

This section describes the potential impacts to socioeconomic resources should the No Action Alternative or the Proposed Action be implemented. Social and economic issues considered for evaluation within the impact area include change to current and projected population levels, change in expenditures for goods and services, and short-term or long-term impacts on employment and income.

3.14.3.1 No Action Alternative

Under the No Action Alternative, the proposed solar project would not be constructed; therefore, no project-related changes to population and job growth would occur. Under the No Action Alternative, current employment trends in the area would likely continue with most of the employment in the existing economic sectors of manufacturing and government. Therefore, no beneficial socioeconomic impacts from a change in population, employment, or expenditures would occur under the No Action Alternative.

Table 3.14-2. 2018 Employment Data

Area	Total Employment (number of jobs)	Farm (%)	Construction (%)	Manufacturing (%)	Retail Trade (%)	Health care and social assistance (%)	Accommodation and food services (%)	Government and government enterprises (%)
Lake County	2,082	6.2	N/A	N/A	8.5	12.7	N/A	33.1
Tennessee	4,119,516	1.8	5.5	8.9	10.2	10.4	8.0	11.0
United States	200,746,000	1.3	5.5	6.7	9.6	11.3	7.5	12.2

Sources: BEA 2018b, BEA 2018a

Table 3.14-3. 2018 Per Capita Personal Income Data

Area	Per Capita Personal Income	Percent of US
Lake County	$23,230	42.7
Tennessee	$46,900	86.1
United States	$54,446	100.0

Sources: BEA 2018c, BEA 2018d

3.14.3.2 Proposed Action

Implementation of the Proposed Action would entail a variety of operation and maintenance related activities and would directly affect employment, industry, and commerce. The direct impact to the economy associated with construction activities is expected to be short-term and beneficial to the local economy. The implementation of the proposed Project would directly cause the creation of between 200 and 300 full time equivalent construction jobs for approximately 12 months. Benefits associated with the Project include the purchase of materials, equipment, and services and a temporary increase in employment and income. This increase would be local or regional, depending on where the goods, services, and workers were obtained. It is likely some construction materials and services would be purchased locally in Lake, Dyer or Obion counties, as well as in adjacent counties and cities. The majority of the construction workforce would likely be from local or regional sources, mostly from construction contractors. Larger national and international subcontractors may be utilized if required to supplement local resources.

Indirect employment and income impacts would result from expenditure of the wages earned by the workforce involved in construction activities, as well as the local workforce used to provide materials and services. Materials, equipment, and services may be purchased locally in the three counties comprising the ROI, as well as in adjacent counties and the Union City, TN-KY metropolitan area. Revenue generated by income tax in Kentucky (Tennessee generally has no individual income tax) and sales tax from new workers associated with the construction activities would benefit the local economy. However, given the relatively small magnitude of the anticipated workforce, this impact is considered to be negligible relative to the size of the local economy.

Operation of the Project would have a small positive impact on employment in Lake County. One or two employees would visit the Project Site as needed for scheduled/preventative maintenance and for unscheduled maintenances or outages. A temporary workforce of 12 employees would be on-site twice a year for approximately 30 days for solar panel cleaning activities. Grounds maintenance and other specific contracts for Project operation would most likely be local and ongoing on a regular basis.

Overall, socioeconomic impacts for the operation of the Project are anticipated to be positive and long-term, although small relative to the total economy of the region. The local tax base would increase from construction of the solar energy farm would be most beneficial to the Lake County area. Additionally, the local government would not have to provide any of the traditional government services typically associated with a large capital investment, such as water and sewer.

3.15 ENVIRONMENTAL JUSTICE

This section describes an overview of environmental justice considerations within the Project area and the potential environmental justice impacts that would be associated with the No Action Alternative and the Proposed Action. Components of environmental justice that are analyzed include minority and low-income population.

3.15.1 Affected Environment – Environmental Justice

EO 12898 directs federal agencies to identify and address, as appropriate, potential disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. While TVA is not subject to this EO, TVA typically assesses environmental justice impacts in its NEPA reviews. The CEQ has provided guidance for addressing environmental justice in *Environmental Justice: Guidance under the National Environmental Policy Act* (CEQ 1997).

In identifying minority and low-income populations, the following CEQ definitions of minority individuals and populations and low-income populations were used:

- *Minority individuals.* Individuals who identify themselves as members of the following population groups: American Indian or Alaskan Native, Asian, Native Hawaiian or Other Pacific Islander, Black, Hispanic, or two or more races.
- *Minority populations.* Minority populations are identified where (1) the minority population of an affected area exceeds 50 percent or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. For the purposes of this analysis, "meaningfully greater" is defined as greater than 20 percent of the minority population percentage in the general population of the larger geographical region within which the affected area is located.
- *Low-income populations.* Low-income populations in an affected area are identified with the annual statistical poverty thresholds from the US Census Bureau's (USCB) Current Population Reports, Series P-60, on Income and Poverty. In this analysis, low-income populations are identified where (1) the population of an affected area exceeds 50 percent low-income based on the Census data or (2) the percentage of low-income population in the affected area is greater than 20 percent of the low-income population percentage in the larger geographical region within which the affected area is located.

According to CEQ guidance, U.S. Census data are typically used to determine minority and low-income population percentages in the affected area of a project in order to conduct a quantitative assessment of potential environmental justice impacts. The geographic unit used in the analysis to identify any environmental justice communities of concern is the census block group. For the purposes of this analysis, a census block group constitutes an environmental justice community if one of the two criteria described above for either minority or low-income populations are met.

The Project Area that would be affected by the Proposed Action is located in the central part of Lake County, Tennessee, near the City of Ridgely. Therefore, Lake County is the geographical impact area for environmental justice.

3.15.1.1 Minority Population

The analysis for minority populations in the ROI followed the CEQ guidance for identifying minority populations. Information was derived from the 2014-2018 American Community Survey 5-Year Estimates.

Table 3.15-1 presents the results of the minority population analysis for the area of interest. In 2018, minorities constituted 33.2 percent of the total population in Lake County. Block Group 1 Census Tract 9601, which contains 1 parcel of the Project Area, has no minority population. Block Group 1, Census Tract 9602, which contains the majority of the Project Area, has a lesser share of minority population (10.0 percent) than the state share (26.0 percent). These levels are also less than the national average of 38.9 percent (USCB 2018b). Based on this analysis, residents of the block groups in the area of the proposed Project Site are not considered an environmental justice community because the minority population does not exceed 50 percent of the total block population nor 20 percent greater than the comparable county minority population.

Table 3.15-1. 2013-2018 American Community Survey Minority Population Data

Area	Total Population	Minority Population	Percent Minority Population
Block Group 1, Census Tract 9601, Lake County, Tennessee	496	0	0.0
Block Group 1, Census Tract 9602, Lake County, Tennessee	632	63	10.0
Block Group 3, Census Tract 9602, Lake County, Tennessee	469	78	16.6
Lake County, Tennessee	7,526	2,500	33.2
Tennessee	6,651,089	1,726,944	26.0
United States	322,903,030	125,721,853	38.9

Source: USCB 2018b

3.15.1.2 Low-income Populations

The analysis for low-income populations in the ROI followed the CEQ guidance for identifying low-income populations. Information was derived from the 2013-2018 American Community Survey 5-Year Estimates.

Table 3.15-2 present the results of the low-income population for the area of interest. In 2018, the portion of the population in Lake County that had income below the poverty level was 26.9. In Block Group 1, Census Tract 9601, 4.8 percent of the population have incomes below the poverty level. In Block Group 1, Census Tract 9602, 17.9 percent of the population have incomes below the poverty level. Poverty levels in Block Group 1, Census Tract 9602 were slightly higher the state average of 16.1 percent (USCB 2018c). Based on this analysis, residents of the block group in the area of the proposed Project Site are not considered an environmental justice community because the number of individuals with incomes less than the poverty level does not exceed 50 percent of the total block population nor 20 percent of the comparable county low-income population.

Table 3.15-2. 2018 Poverty Level Data

Area	Total Population	Persons Below Poverty Level	Percent of Persons Below Poverty Level
Block Group 1, Census Tract 9601, Lake County, Tennessee	496	24	4.8
Block Group 1, Census Tract 9602, Lake County, Tennessee	632	113	17.9
Block Group 3, Census Tract 9602, Lake County, Tennessee	462	105	22.7
Lake County, Tennessee	4,714	1,268	26.9
Tennessee	6,488,786	1,046,508	16.1
United States	314,943,184	44,257,979	14.1

Source: USCB 2018c

3.15.2 Environmental Consequences – Environmental Justice

This section describes the potential environmental justice impacts should the No Action Alternative or the Proposed Action be implemented. According to the CEQ, adverse health effects to be evaluated within the context of environmental justice impacts may include bodily impairment, infirmity, illness, or death. Environmental effects may include ecological, cultural, human health, economic, or social impacts. Disproportionately high and adverse human health or environmental effects occur when the risk or rate of exposure to an environmental hazard or an impact or risk of an impact on the natural or physical environment for a minority or low-income population is high and appreciably exceeds the impact level for the general population or for another appropriate comparison group (CEQ 1997).

3.15.2.1 No Action Alternative

Under the No Action Alternative, there would be no changes to the Project Area since the Proposed Action would not be constructed or operated; therefore, there would not be any disproportionately high and/or adverse direct or indirect impacts to minority or low-income populations.

3.15.2.2 Proposed Action

As described above, the proposed Project Area does not contain minority or low-income populations subject to consideration as potential environmental justice communities of concern. Based on the analysis of impacts for all resource areas presented in this EA, it was determined that there would be no significant adverse health impacts on members of the public or significant adverse environmental impacts on the physical environment (water, air, aquatic, and terrestrial resources) and socioeconomic conditions. As there are no identified environmental justice communities in the block group within which the proposed Project is located, there would be no disproportionately high or any adverse direct or indirect impacts on minority or low-income populations due to human health or environmental effects resulting from the Proposed Action.

CHAPTER 4

4.0 ANTICIPATED IMPACTS AND CUMULATIVE IMPACTS

This chapter summarizes the anticipated adverse environmental impacts of the Project and considers the relationship between short-term uses and long-term productivity and whether the Project makes irreversible and irretrievable commitments of resources. This chapter also considers the cumulative impacts in relation to other ongoing or reasonably foreseeable proposed activities within the Project Area.

4.1 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

The Proposed Action could cause some unavoidable adverse environmental effects (see Table 2-1). Specifically, construction activities would temporarily increase noise, traffic, and health and safety risks, and temporarily affect air quality, GHG emissions, and visual aesthetics of the Project Site vicinity. Construction activities would primarily be limited to daytime hours, which would minimize overall noise impacts. Temporary increases in traffic would be minimized or mitigated by instituting staggered work shifts and/or posting a flag person during the heavy commute periods. Temporary increases in health and safety risks would be minimized by implementation of the Project health and safety plan. Construction and operations would have minor, localized effects on soil erosion and sedimentation that would be minimized by soil stabilization and vegetation management measures. Selective maintenance of tree buffers and/or fence screening along the perimeter of the Project Site would minimize effects to visual resources, during both construction and operation. The Project would change land use on the Project Site from primarily agricultural to solar use, where these practices are not presently occurring; however, solar power as a land use type is considered a special exception in this portion of Lake County.

With the application of appropriate BMPs, no unavoidable adverse effects to groundwater, streams, or wetlands are expected. Long-term habitat alteration would occur due to conversion of land cover on approximately 1,961 acres of the Project Site from active agricultural production to year-round coverage by grasses and other herbaceous vegetation. Revegetation of the Project Site with native and/or noninvasive grasses and herbaceous vegetation would help minimize wildlife and water-quality impacts by maintaining open, short-grass habitats beneath and between the solar arrays. The Project is not expected to significantly affect any federal or state-listed species. Minimal potential summer roosting habitat for the federally listed northern long-eared bat or Indiana bat were identified in the small wooded areas (total 1.7 acres) to be cleared for the Project Area. These areas would be cleared in seasons when bats are absent, and remaining forests on the Project Site are wetlands that would be excluded from development (see Section 3.4.2). Consultation with USFWS under Section 7 of the ESA regarding potential impacts to Indiana bat and northern long-eared bat concluded on January 25, 2021 with a letter from USFWS stating that “based on the proposed conservation measure and consideration of the best available information regarding the Indiana bat and northern long-eared bat, we [USFWS] concur with your determination that the action may affect, but is not likely to adversely affect these species” (Appendix F)

4.2 RELATIONSHIP OF SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Short-term uses are those that generally occur on a year-to-year basis. Examples are wildlife use of forage, timber management, recreation, and uses of water resources. Long-term productivity is the capability of the land to provide resources, both market and nonmarket, for future generations. In this context, long-term impacts to site productivity would be those that last beyond the life of the Project. The Proposed Action would affect short-term uses of the Project Site by converting it from agricultural and undeveloped land to a solar power generation facility. The effects on long-term productivity would be minimal, as existing land

uses could be readily restored on the Project Site following the decommissioning and removal of the solar facility.

4.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

An irreversible or irretrievable commitment of resources would occur when resources would be consumed, committed, or lost because of the Project. The commitment of a resource would be considered irretrievable when the Project would directly eliminate the resource, its productivity, or its utility for the life of the Project and possibly beyond. Construction and operation activities would result in an irretrievable and irreversible commitment of natural and physical resources. The implementation of the Proposed Action would involve irreversible commitment of fuel and resource labor required for the construction, maintenance, and operation of the solar energy system. Because removal of the solar arrays and associated on-site infrastructure could be accomplished rather easily, the facility would not irreversibly alter the Project Site. The Project Site could be returned to its original condition or used for other productive purposes once the solar facility is decommissioned. Most of the solar facility components could also be recycled after the facility is decommissioned.

4.4 CUMULATIVE IMPACTS

Cumulative impacts are defined as the effects of the Proposed Action when considered together with other past, present, and reasonably foreseeable future actions. Chapter 3, *Affected Environment and Environmental Consequences* presents information about past and present environmental conditions, as well as future trends, where appropriate. This chapter addresses the cumulative impacts of the Project and any reasonably foreseeable actions in the vicinity.

Desktop research of potential past, present, and future actions in the Lake County, Tennessee, area was conducted. Resources examined included:

- Local and regional news sources;
- Town of Ridgely and Town of Tiptonville websites; however, no public information was available.
- Lake County government website records, including planning commission meetings, county meeting minutes, and public notices; and
- Reelfoot Area Chamber of Commerce and Lake County Economic and Community Development websites.

The Proposed Action would result in minor or no direct impacts to land use, geology, soils and prime farmland, water resources (groundwater, surface water and floodplains), biological resources, visual resources, noise, air quality, cultural resources, natural areas and recreation, utilities, waste management, public health and safety, transportation, socioeconomics, and environmental justice. Desktop research did not identify any foreseeable future local projects that could combine with the Proposed Action to cause cumulative impacts that may significantly affect the environment.

4.4.1 Federal Projects

This section addresses other projects with possible effects to land use, geological resources and farmlands, water resources, biological resources, visual resources, noise, air quality, public health and safety, and transportation.

Only one federal project was identified in Lake County. In September 2020, the DOT awarded the Tennessee Department of Economic and Community Development (TNECD) a $7 million federal Better Utilizing Investment to Leverage Development (BUILD) grant to assist with rail construction (a 5.5-mi rail extension) to connect the TennKen Railroad, which interchanges to the Canadian National Railway in Dyersburg, to the Port of Cates Landing and the Lake County Industrial Park. A large portion of TennKen Railroad runs parallel to SR 78 and bisects the Project Ste (West Tennessee Rail Group 2020). The Port of Cates Landing Project Site would be approximately 5 mi north of Tiptonville (TNECD 2020b) and within 10 mi of the Ridgely Project Site.

Should the construction of both projects occur at the same time, the Proposed Action is unlikely to contribute to cumulative adverse effects to the same resources of the Port of Cates Landing rail project. However, if the two projects did occur simultaneously, minor impact on air emission, transportation, and waste management may occur. Equipment emissions from laying a rail extension at the Port of Cate would have, at most, a minor transient impact on off-site air quality, which would remain well below the applicable ambient air quality standard. Air emissions associated with the construction of the Project are also expected to be minor and temporary (lasting for a period of 12 months). Traffic impacts could include slowdowns and decreases in Level of Service in the area as the two projects are less than 10 mi apart and are both located off SR 78. Heavy equipment, trucks delivering supplies and hauling debris, and construction worker traffic may cause cumulative traffic delays on these roads. Additionally, large equipment on relatively small rural roads may cause damage to the roads if not carefully managed. However, adjustments to scheduling of deliveries, waste hauling, and construction worker shifts could be used to minimize any potential cumulative impacts to transportation in the area. Once these projects are complete, traffic would return to normal levels, as a large workforce is not anticipated at either project site. Therefore, the cumulative impacts would be minor and temporary.

4.4.2 State and Local Projects

The Project Area is north of the Town of Ridgely in Lake County, but it is in an area that is largely rural and agricultural. In 2019, approximately $1.35 million in Community Development Block Grants from HUD Exchange was awarded to the TNECD to provide housing rehabilitation in Lake County and to provide sewer system repairs and rehabilitations in Tiptonville. Aside from the State project with federal funding just discussed above, there are no known recent or planned State and local projects in the Project Site vicinity. Therefore, the Proposed Action would not contribute to cumulative adverse effects to the same resources affected by any state or local projects.

CHAPTER 5

5.0 LIST OF PREPARERS

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

Table 5-1. Environmental Assessment Project Team

Name/Education	Experience	Project Role
TVA		
Elizabeth Smith B.A., Environmental Studies and Geography	10 years in environmental policy and NEPA compliance	TVA NEPA Project Manager, TVA NEPA Coordinator, NEPA Compliance
Britta Lees M.S., Botany-Wetlands Ecology emphasis; B.A., Biology	14 years in wetlands assessments, botanical surveys, wetlands regulations, and/or NEPA compliance	Wetlands
Michaelyn Harle Ph.D., Anthropology; M.A. Anthropology; B.A. Anthropology	15 years in cultural resource management	Cultural Resources, NHPA Section 106 compliance
Elizabeth Hamrick M.S., Wildlife and Fisheries Science, University of Tennessee B.A. Biology, B.A. Anthropology, Grinnell College	19 years in biological field studies, 8 years in biological compliance, NEPA compliance, and ESA consultation for T&E terrestrial animals.	Terrestrial Zoology
Carrie Williamson, P.E., CFM M.S., Civil Engineering B.S. Civil Engineering	8 years in floodplains and flood risk, 3 years in River Forecasting, 11 years in compliance monitoring	Floodplains and Flood Risk
AECOM		
Roberta A. Hurley M.A., Chemistry; B.S., Chemistry; B.S., Biology	Over 30 years in regulatory and NEPA compliance, including project management and public outreach	EA Project Manager
Erika A. Grace M.S., Environmental Toxicology; B.S., Biological Sciences	15 years in NEPA coordination and document preparation; 13 years in environmental services and technical evaluations	NEPA Project Coordinator, Document Preparation Purpose and Need for Action, Alternatives

Table 5-1. Environmental Assessment Project Team

Name/Education	Experience	Project Role
Anneliesa Barta M.B.A. Finance	10 years of experience in Environmental and Sustainability planning, 2 years of experience in NEPA document preparation	Air Quality and GHG Emissions, Transportation, Socioeconomics, Environmental Justice
Kristen Beckhorn Ph.D., Environmental Toxicology M.S., Environmental Toxicology; B.S., Environmental Science	10 years of experience in NEPA document preparation	Visual Resources, Noise, Cumulative Impacts
Kathryn G. Clark Certificate in Geospatial Technology B.S. Geology	13 years of experience as an Environmental Professional and 5 years as a GIS Specialist supporting NEPA and environmental impact analyses	EA Figures
Steve Dillard M.S., Environmental Systems Engineering B.S., Zoology	Over 30 years of experience in NEPA document preparation	Biological Resources
Laura Owens B.S., Physics and Geology	4 years of experience in in NEPA document preparation; 15 years environmental services	Water Resources, Utilities, Waste Management, Public and Occupational Health and Safety
Katherine Winterstein B.S., Anthropology	1 year of experience in NEPA document preparation; 4 years academic experience in cultural resources.	Land Use, Geology, Soils and Prime Farmland, Cultural Resources, Natural Areas and Recreation

CHAPTER 6

6.0 LITERATURE CITED

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