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**LOGAN COUNTY SOLAR
FINAL ENVIRONMENTAL ASSESSMENT**
Logan County, Kentucky

Prepared for:
Tennessee Valley Authority
Knoxville, Tennessee

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Symbols, Acronyms, Abbreviations, and Glossary of Terms

AADT	Average annual daily traffic
AC	Alternating current
ACS	American Community Survey
APE	Area of Potential Effect
BESS	Battery energy storage system
BG	Block group
BMP	Best management practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon monoxide
CO ₂	Carbon dioxide
CT	Census tract
CWA	Clean Water Act
dB	Decibel
dBA	A-weighted decibel
DC	Direct current
EA	Environmental assessment
EIS	Environmental impact statement
EMF	Electromagnetic field
EO	Executive Order
ESA	Endangered Species Act
°F	Fahrenheit
FEMA	Federal Emergency Management Agency
FPPA	Farmland Protection Policy Act
FR	Federal Register
FY	Fiscal year
GHG	Greenhouse gas
HDR	HDR Engineering, Inc.
HUC	Hydrologic unit code
IPaC	Information for Planning and Consultation
IRP	Integrated Resource Plan
KDEP	Kentucky Department of Environmental Protection

KEEC	Kentucky Energy and Environment Cabinet
KHC	Kentucky Heritage Council
KNP	Office of Kentucky Nature Preserves
KPDES	Kentucky Pollutant Discharge Elimination System
kV	Kilovolt
KYBAT	Kentucky Biological Assessment Tool
KYTC	Kentucky Transportation Cabinet
L _{dn}	Day-night average sound
LEAD	Logan Economic Alliance for Development
MBTA	Migratory Bird Treaty Act
MP	Milepost
MPT	Main power transformer
MVT	Mid-voltage transformer
MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NLCD	National Land Cover Database
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO _x	Nitrogen oxides
NRHP	National Register of Historic Places
NWP	Nationwide Permit
O ₃	Ozone
OHGW	Overhead ground wire
OPGW	Fiber-optic overhead ground wire
OSA	Kentucky Office of State Archaeology
OSHA	Occupational Safety and Health Act
Pb	Lead
PGA	Peak ground acceleration
Phase I ESA	Phase I Environmental Site Assessment
PM _{2.5}	Particulate matter whose particles are less than or equal to 2.5 micrometers
PM ₁₀	Particulate matter whose particles are less than or equal to 10 micrometers

PPA	Power purchase agreement
PPE	Personal protective equipment
PRECC	Pennyrile Rural Electric Cooperative Corporation
PV	Photovoltaic
RCRA	Resource Conservation and Recovery Act
RFP	Request for proposal
RNHD	Regional Natural Heritage Database
ROW	Right-of-way
SO ₂	Sulfur dioxide
SPCC	Spill Prevention, Countermeasure, and Control
SRC	Silicon Ranch Corporation
SWPPP	Stormwater Pollution Prevention Plan
TL	Transmission line
TVA	Tennessee Valley Authority
U.S.	United States
U.S.C.	U.S. Code
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WOIUS	Waters of the U.S. ^{[BJL1][SW2][RH3]}

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CHAPTER 1 – PURPOSE AND NEED FOR ACTION

Tennessee Valley Authority (TVA) entered into a power purchase agreement (PPA) with Russellville Solar LLC (Russellville Solar), a wholly owned subsidiary of Silicon Ranch Corporation (SRC), on January 8, 2021, to purchase the electric power generated by a proposed solar photovoltaic (PV) facility in Logan County, Kentucky. The solar facility, known as Logan County Solar, would be owned by SRC and operated by Russellville Solar. The facility would have an installed generating capacity of 173 megawatts (MWs) alternating current (AC) and a battery energy storage system (BESS) of 30 MW capacity. The solar facility would connect to TVA's adjacent existing Springfield-Logan Aluminum 161-kilovolt (kV) transmission line (TL). To interconnect to TVA's existing electrical grid, Russellville Solar would build the Russellville Solar 161-kV substation (also called the Project substation) and TVA would build the Cave Springs 161-kV switching station (also called the Project switching station) in the northeastern portion of the solar facility site. Under the terms of the PPA, TVA would purchase the electric output from the solar facility for a term of 20 years, subject to satisfactory completion of all applicable environmental reviews. Together, the associated construction and operation of Logan County Solar and the TVA interconnection facilities are herein referred to alternately as the "Project" and the "Proposed Action."

The proposed solar PV facility would occupy approximately 1,100 acres of a 1,569-acre Project site located approximately two miles southwest of the city of Russellville. The solar facility would consist of arrays of either crystalline silicon or thin-film PV panels attached to ground-mounted single-axis trackers, central inverters, transformers, a substation and BESS, a switching station, an operations and maintenance building, access roads, and all associated cabling and safety equipment.

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. Since 1933, TVA’s mission has been to serve the people of the Tennessee Valley region to make life better.

TVA produces or obtains electricity from a diverse portfolio of energy sources, including solar, hydroelectric, wind, biomass, fossil fuel, and nuclear. The 2019 Integrated Resource Plan (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 while reducing environmental impacts. The 2019 IRP anticipates growth of solar in all scenarios analyzed, with most scenarios anticipating 5,000-8,000 MW AC and one anticipating up to 14,000 MW AC (TVA 2019).

Customer demand for cleaner energy prompted TVA to release a request for proposal (RFP) for renewable energy resources, the 2020 Renewable RFP. In response to this RFP, TVA received multiple proposals from solar developers, including Russellville Solar. The resulting PPAs, including the Russellville Solar PPA, will help TVA meet immediate needs for additional renewable generating capacity in response to customer demand, and help fulfill the renewable energy goals established in the 2019 IRP (TVA 2019). The Proposed Action would provide cost-effective renewable energy consistent with the IRP and TVA goals.

1.2 Scope of this Environmental Assessment

This Environmental Assessment (EA) was prepared consistent with 2020 Council on Environmental Quality’s (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) at 40 Code of Federal Regulations (CFR) 1500-1508 (85 Federal Register [FR] 43304-43376, July 16, 2020). TVA’s 2020 NEPA regulations at 18 CFR 1318 were also applied (85 FR 17434, Mar. 27, 2020). Further, the EA is consistent with CEQ’s recently finalized rule (87 FR 23453, April 20, 2022) amending certain provisions of its 2020 regulations. 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 impact 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.

TVA’s Proposed Action would result in the construction and operation of the Logan County Solar facility by Russellville Solar, as well as the construction and operation by TVA of a new switching station and connection to the TVA transmission system. The scope of this EA covers the impacts of the construction and operation of the solar facility and associated transmission system components.

This EA (1) describes the existing environment in the Project area that would be affected by the Proposed Action and (2) analyzes the potential effects of the No Action Alternative and the Proposed Action Alternative on the environment. The “Project area” is the potentially affected area within and beyond the Project site and varies by each resource area as defined in Chapter 3. Based on internal scoping and identification of applicable laws, regulations, executive orders (EOs), and policies, TVA identified the following resource areas for analysis in this EA: land use; geology, soils, and prime farmland; water resources; biological resources; visual resources; noise; air quality and greenhouse gas (GHG) emissions; cultural resources; utilities; waste management; public and occupational health and safety; transportation; socioeconomics; and environmental justice.

This EA consists of five chapters discussing the purpose and need for the Proposed Action, public and agency involvement, necessary permits and approvals, the alternatives considered, mitigation measures to be employed by the Project, reasonably foreseeable environmental trends and planned actions in the area, resources potentially affected, and analyses of impacts on affected resources. Additionally, the document presents the list of EA preparers and references cited and includes appendices that contain supporting information.

1.3 Public and Agency Involvement

Russellville Solar hosted two community meetings to describe the Project at the Logan County Cooperative Extension Office in Russellville. The first of these meetings was held between 6:00 PM and 8:00 PM on July 29, 2021, and the second meeting was held between 5:45 PM and 8:00 PM on December 14, 2021. The July meeting was advertised on July 13, 2021, in the *News Democrat-Leader*, a local newspaper published in Russellville, and letters were mailed to adjacent landowners to notify them of the upcoming meeting. The December meeting was a dinner meeting advertised via invitations to surrounding landowners, which included a larger distribution to landowners than the July meeting mailings. Shared Project details during both meetings included the Project site acreage and anticipated disturbance footprint, key components of the Project, the electrical output, an explanation of the ongoing NEPA process, and the potential economic benefits to the local community. Maps showing the Project site location and the preliminary design, as well as computer renderings of the Project were on display for the public to view. The December meeting presented computer renderings of the Project from major residential receptor areas surrounding the Project site. Approximately 23 and 24 individuals or local officials attended the July and December meetings, respectively.

TVA has issued a draft of this EA on April 4, 2022, for a 30-day public and agency review and comment period. TVA notified the public of the availability of the draft EA via an advertisement in the *News Democrat-Leader* (Appendix E). TVA also notified appropriate local, state, and federal agencies and federally recognized tribes of the availability of the draft EA. During the 30-day public review and comment period of the draft EA, a total of 71 comments were received from the public and agencies, including 14 representatives of state agencies or a nearby airport and 33 individuals. TVA has reviewed the comments received on the draft EA, provided responses to substantive comments, and revised the text of this EA in response to the comments. The comments on the draft EA and responses to those comments are included in

Appendix E. TVA has also consulted on the effects of the Project with appropriate regulatory agencies and tribes.

1.4 Permits and Approvals

Construction of Logan County Solar would require federal and state permits and/or coordination, as well as certification for the proper installation of some Project components (Table 1-1). Adherence to permit or certification conditions helps to avoid or minimize environmental impacts, as discussed in relation to specific resource areas in Chapter 3.

Table 1-1. Permits and Approvals List

Permit/Approval/Coordination	Justification	Lead Agency
Clean Water Act (CWA) Section 404 Nationwide Permit (NWP) or Individual Permit	NWPs would be required for impacts to jurisdictional waters that are less than 0.5 acre. An Individual permit would be required if the impacts were to exceed 0.5 acre.	United States Army Corps of Engineers (USACE)
CWA Section 401 Water Quality Certification	Required for work under federal license or permit that would result in a discharge to waters of the U.S. (WOTUS).	Kentucky Department of Environmental Protection (KDEP) Division of Water
Endangered Species Act (ESA) Section 7 Consultation	In compliance with Section 7 of ESA, TVA consulted with the USFWS in relation to Project effects on federally listed species (Appendix C). USFWS concurred with TVA determinations in a letter dated June 6, 2022.	USFWS
Kentucky Pollutant Discharge Elimination System (KPDES) Stormwater Construction General Permit	As the construction disturbance would be greater than 1 acre, the Project would be required for discharges into WOTUS to obtain a KPDES Stormwater Construction General Permit. This would include submission of a Notice of Intent (NOI), erosion and sediment control plants, and a stormwater pollution prevention plan (SWPPP).	KDEP Division of Water
Kentucky Transportation Cabinet (KYTC) Encroachment Permit	Required for direct access to a state-maintained highway. This would include an evaluation of the proposed commercial entrance by the local district (KYTC District 3) to determine if a Traffic Impact Study is necessary.	KYTC District 3

National Historic Preservation Act (NHPA) Section 106 Consultation	In compliance with Section 106 of NHPA, TVA consulted with the Kentucky Heritage Council (KHC), acting as the Kentucky State Historic Preservation Officer (SHPO), and federally recognized tribes with interests in the Project area in relation to Project effects on historic properties (i.e., eligible for the National Register of Historic Places [NRHP]) and other cultural resources (Appendix D). KHC concurred with TVA's NRHP eligibility determinations, findings of effect, and avoidance and minimization efforts in a letter dated December 20, 2022.	KHC and federally recognized tribes
Open Burning Permit	May be required for the open burning of any vegetation cleared from the site.	KDEP
Septic System Permit	Required if a septic system were to be installed. The permit would involve on-site evaluations to determine if site and soil conditions are suitable for on-site wastewater systems.	Kentucky Cabinet for Health and Family Services
State Siting Board Approval	Project must submit a detailed application to the Kentucky State Board on Electric Generation and Transmission Siting to show that the Project is adhering to local ordinances and describe the anticipated Project effects to aspects of the human environment and how the Project will mitigate those.	Kentucky State Board on Electric Generation and Transmission Siting

CHAPTER 2 – DESCRIPTION OF THE ALTERNATIVES

This chapter describes the two alternatives evaluated in this EA, the No Action Alternative and the Proposed Action Alternative, explains the rationale for identifying the alternatives to be evaluated, provides a comparison of the potential environmental impacts of the evaluated alternatives, and identifies the Preferred Alternative.

2.1 No Action Alternative

The No Action Alternative provides a baseline of conditions against which the impacts of the Proposed Action Alternative are measured. Under the No Action Alternative, TVA would not purchase the power generated by the Project (i.e., TVA would not be involved with the Project), and the proposed solar PV facility in Logan County would not be constructed. Existing conditions (e.g., land use, natural resources, visual resources, physical resources, and socioeconomics) in the Project area would not change as a result of the Proposed Action; however, the Project site could be affected by other future developments. TVA would continue to rely on other sources of generation as described in the 2019 IRP (TVA 2019) to ensure an adequate energy supply and to meet its goals for increased renewable energy and low GHG-emitting generation.

2.2 Proposed Action

Under the Proposed Action Alternative, Russellville Solar would construct and operate a 173-MW AC single-axis tracking PV solar power facility and 30-MW AC BESS on a 1,569-acre site located approximately two miles southwest of the city of Russellville in Logan County. TVA would connect the facility to TVA's adjacent existing Springfield-Logan Aluminum 161-kV TL via a proposed substation and switching station in the northeastern portion of the solar facility site and purchase the facility's energy output under a 20-year PPA with Russellville Solar. The solar facility would consist of multiple solar arrays using either crystalline silicon or thin-film PV panels attached to ground-mounted single-axis tracking metal supports, central inverters, several medium voltage transformers (MVTs) and one or two main power transformers (MPTs), a substation and BESS, a switching station, an operations and maintenance building, internal site 16-foot-wide access roads, and all associated cabling and safety equipment. Concrete foundations may be required for inverters, transformers, the switching station, the substation, and/or the BESS. The placement of the facility components would avoid and minimize impacts to environmental resources, including cultural resources, to the maximum extent possible. The proposed Project and associated interconnection components would occupy approximately 1,100 acres of the approximately 1,569-acre Project site (Figures 2-1 and 2-2). The Project site is comprised of nine tracts of land leased by Russellville Solar from four landowners.

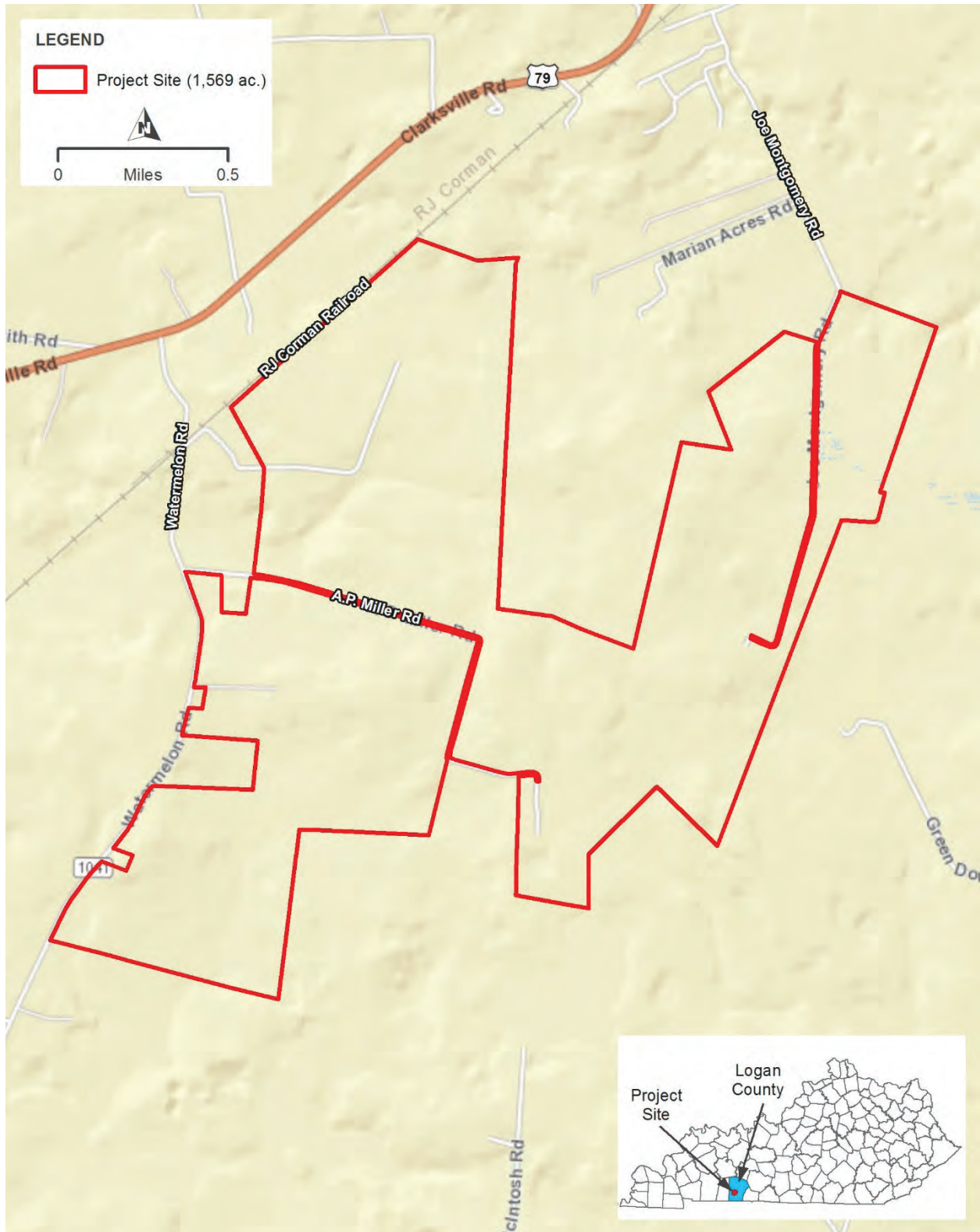


Figure 2-1. The 1,569-acre Project site

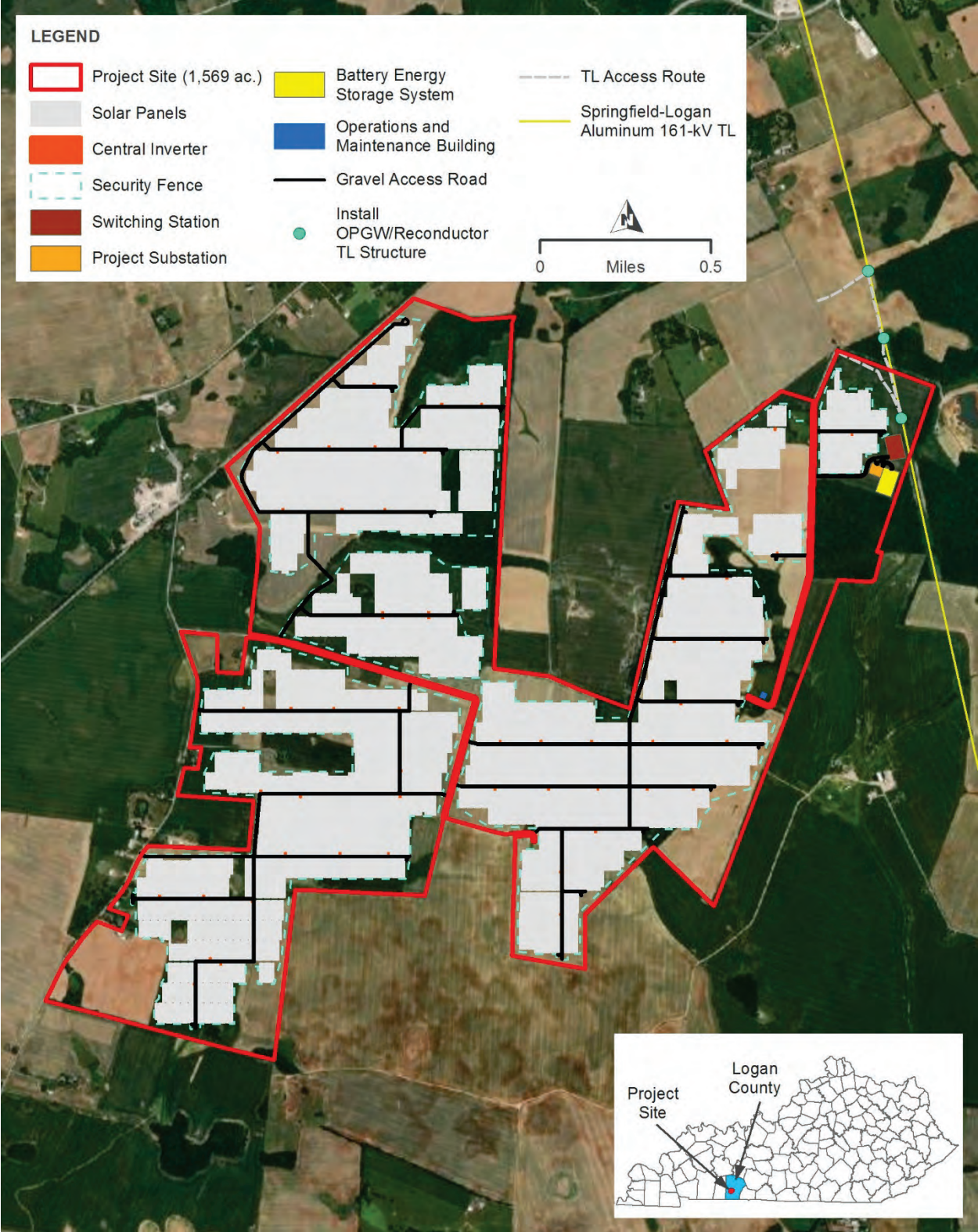


Figure 2-2. Aerial photo showing the proposed layout of the Logan County Solar facility components

The Project site is in a rural agricultural area and is bounded on the west by Watermelon Road and the RJ Corman Railroad, which roughly parallels U.S. 79 approximately a quarter mile south of the highway. A.P. Miller Road traverses western and central portions of the Project site, and Joe Montgomery Road traverses eastern portions of the Project site. The Project site is predominantly flat to gently sloping agricultural land with scattered forested areas and wetlands, streams, ponds, and karst features. Several residences and agricultural buildings are scattered across the Project site. The PV panel and inverter blocks in close vicinity and not separated by public roads would be enclosed together by chain-link security fencing.

2.2.1 Project Description

Logan County Solar would convert sunlight into direct current (DC) electrical energy within PV panels (modules) (Figure 2-3). 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 (TVA 2014).

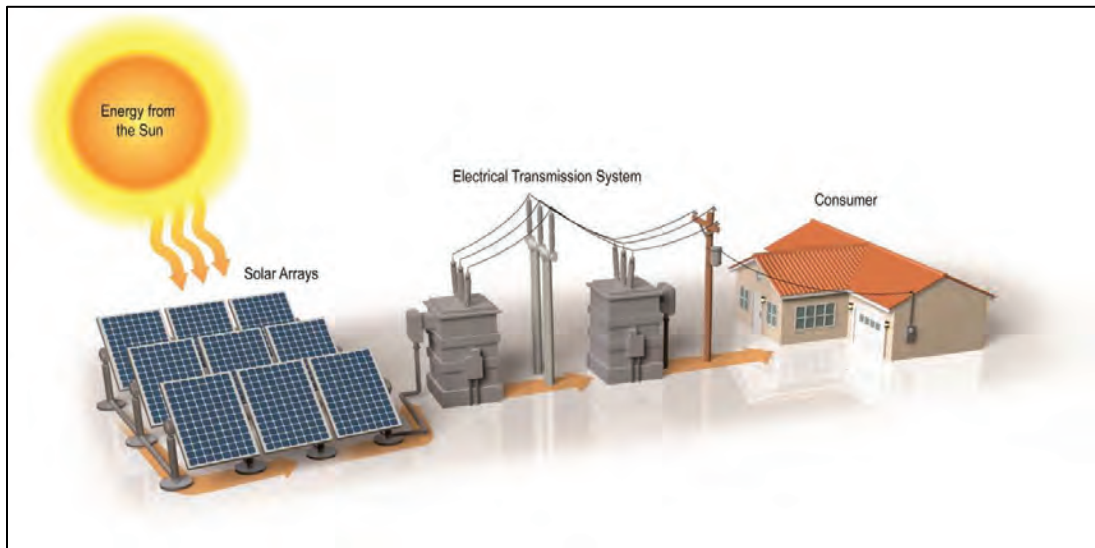


Figure 2-3. General energy flow diagram of PV solar system (not to scale)

The Project would be composed of anti-reflective PV modules mounted together and connected electrically in series to form arrays or “strings” of modules, with the maximum string size chosen to ensure that the maximum inverter input voltage is not exceeded by the string voltage at the Project site’s high design temperature. The modules, estimated to be approximately 6.6 feet by 4 feet, would be located in individual blocks consisting of the PV arrays and an inverter station on a concrete pad or steel piles, to convert the DC electricity generated by the modules into AC electricity. The PV module and inverter blocks in close vicinity to and not separated by public roads would be enclosed together by chain-link security fencing. The perimeter of the facility would be landscaped to provide a visual buffer in accordance with Logan County requirements.

The modules would be attached to single-axis trackers that follow the path of the sun from the east to the west across the sky (Figure 2-4). The inverter specification would fully comply with the applicable requirements of the National Electrical Code and Institute of Electrical and Electronics Engineers standards. Each inverter would be collocated with a MVT, which would step-up the AC voltage to minimize the AC cabling electrical losses between the central inverters and the proposed on-site Project substation. Underground AC power cables would connect all of the MVTs to the MPT(s) located within the substation.

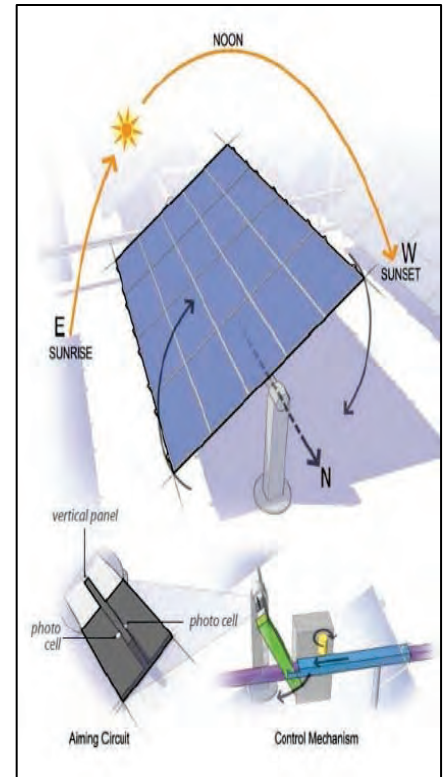


Figure 2-4. Diagram of single-axis tracking system (not to scale)

The solar facility may also include a BESS that would occupy an approximately 2.3-acre area adjacent to and connected to the Project substation. The multiple battery containers and inverter and transformer skids associated with the BESS would be installed on concrete pads, and gravel would cover the remainder of the BESS location. Other temporary or permanent Project components include construction laydown areas and security and communications equipment. Compacted gravel or dirt access roads would provide access to each inverter block and the proposed substation and switching station. An operations and maintenance building would be constructed along Joe Montgomery Road in the eastern portion of the Project site. Also, if determined necessary, the Project would include Project water wells and a septic system or pump-out septic holding tank. Figure 2-2 shows the Project site with and major Project components.

2.2.2 Solar Facility Construction

As part of KPDES permit authorization (see Section 1.4), the site-specific SWPPP would be finalized with the final grading and civil design and would address all construction-related activities prior to construction commencement. The solar facility site would be prepared by surveying, staking, and installing six-foot-tall chain-link security fencing topped with three strands of barbed wire around the Project site. Entrances to the solar facility would be protected by locked, double-swing gates. The Project site would be accessible only to TVA, Russellville Solar, and their agents and contractors.

Construction assembly areas (laydown areas) would be established for worker assembly, safety briefings, vehicle parking, and material storage during construction. The laydown areas would likely be graveled. Temporary construction trailers for material storage and office space would be parked on site. In accordance with TVA requirements (see Section 2.5.1), minimum 50-foot buffers surrounding wetlands and intermittent and perennial streams and minimum 100-foot buffers surrounding the five identified sinkhole fissures/karst features would be established as avoidance measures prior to any clearing, grubbing, grading, or utility line installation activities conducted by the construction contractor. Apart from removal of tall vegetation through nonmechanical means and leaving the roots in place, these buffered areas would be avoided during construction to the greatest extent practicable. The buffered areas would be marked and protected by silt fences and sediment traps in strategic drainage areas, and other erosion prevention and sediment control BMPs would be implemented, as detailed in the site-specific SWPPP.

Construction activities would be sequenced to minimize the time that bare soil in disturbed areas is exposed. Construction areas would be cleared of debris and tall vegetation, mowed, and lightly graded, as needed, for construction and placement of the solar modules, gravel access roads, substation, BESS, switching station, accompanying electrical components, and other Project components. Pennyriple Rural Electric Cooperative Corporation (PRECC) would relocate portions of their distribution lines in the western portion of the Project site to avoid PV module locations. The relocations would be within previously surveyed areas or previously disturbed public road ROW. While most on-site buildings would likely be demolished, some buildings are anticipated to remain to support the sheep grazing operation established as part of the Project, as described in Section 2.2.3. Clearing of trees and other tall vegetation would be accomplished with chain saws, skidders, bulldozers, tractors, and/or low-ground pressure feller-bunchers. Because the area to be cleared is primarily open agricultural land, minimal vegetative debris would accumulate during site preparation. Any that does accumulate on site would be disposed of by open burning. Only vegetation and untreated wood would be burned, and no burning of other construction debris is anticipated. Prior to burning, Russellville Solar would obtain any necessary permits, as presented in Section 1.4. Mowing would continue as needed to contain growth during construction.

Russellville Solar would work with the existing landscape (e.g., slope, drainage, utilization of existing roads) where feasible and minimize or eliminate grading work to the greatest extent possible. Grading activities would be performed with earthmoving equipment and would result in a consistent slope. Prior to any major grading, efforts would be made to preserve native topsoil, which would be removed from the area to be graded and stockpiled on site for redistribution over the disturbed area after the grading is completed. Off-site sediment migration would be minimized by the placement of silt fences around each area of ground disturbance within the Project site. Other appropriate 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. To manage stormwater during construction, on-site temporary sedimentation basins, sediment traps, or diversion berms would be constructed within the disturbed area of the Project site. Any necessary sedimentation basins and traps would be compliant with KEEC requirements and

would be constructed either by impoundment of natural depressions or by excavating the existing soil.

The floor and embankments of the sedimentation basins would be allowed to naturally revegetate after construction or replanted as necessary to provide natural stabilization and minimize subsequent erosion. Other disturbed areas would be seeded after construction using a mixture of certified weed-free, low-growing native and/or noninvasive grass and herb seeds containing species that would tend to attract pollinators and would be used as sheep fodder during operations. If conditions require, soil may be further stabilized by mulch or sprayable fiber mat. Hydroseeding may be employed as an alternative measure for areas with steep slopes. Where required, hay mulch would be applied at three tons per acre and well distributed over the area. Erosion control measures would be inspected and maintained until vegetation in the disturbed areas is stable.

During construction, water would be used as needed for soil compaction and dust control and for sewer treatment, if determined necessary. Water in sufficient quantity and quality would be made available through the use of on-site groundwater wells or by delivery via water trucks. If selected, wells would be located to provide access for construction water and to reduce the potential for any significant water level drawdown. If water quality is unsuitable for potable use without disinfection at a minimum, a potable water treatment system would be installed. If needed, Russellville Solar would perform initial groundwater drilling and testing to gather information on aquifer characteristics and develop a plan for the production well design. Wells would be constructed using conventional well drilling techniques. A truck-mounted drilling rig would set up at the identified location(s). If necessary, gravel would be used to temporarily stabilize the surface at these location(s). Water-based drilling muds would be collected and dewatered, with runoff occurring locally into nearby field areas. Dewatered muds would be non-toxic and may be spread as subsoil during site grading. If determined necessary, sewer treatment would be accomplished through use of a pump-out septic holding tank.

The design of the tracker support structures could vary depending on the final PV technology and vendor selected. The trackers would likely be attached to driven galvanized steel pile foundations, depending on results of the upcoming geotechnical survey. The piles are driven with a hydraulic ram to a depth typically less than 10 feet. Surface disturbance is typically limited to areas in which the small tractor-sized hydraulic ram machinery operates, including the pile insertion location. Screw piles are another option for PV foundations; these are drilled into the ground with a truck-mounted auger. Screw piles create a similar soil disturbance footprint as driven piles.

The PV modules would be manufactured off-site and shipped to the Project site ready for installation. The AC collection cables would be installed underground throughout the solar facility in trenches three- to four-feet deep and one- to four-feet wide. The trenches would be backfilled with the excavated soil and then compacted. AC collection cables would be installed by boring beneath jurisdictional streams and wetlands and paved roads or as overhead lines mounted on poles. These methods would avoid impacts to jurisdictional waters.

The MPT(s) would be supported on a concrete foundation. An underground or aboveground transmission cable would be constructed to connect the MPT through a circuit breaker. As the solar arrays are installed, the balance of the facility would continue to be constructed and installed, and the instrumentation would be installed. After the equipment is electrically connected, electrical service would be tested, motors would be checked, and control logic would be verified. Once the individual systems have been tested, integrated testing of the Project would occur. Electrical interconnection details are provided in Section 2.2.4.

Vegetative buffer composed of a double row of eight-foot-tall trees would be planted in a staggered pattern around the perimeter of the site approximately 10 feet from the Project site boundaries, where existing natural buffers are not sufficient in shielding views of the facility. A screen would be attached to the security fence for additional visual buffering. Both the vegetative buffer and screen can be waived by landowners having at least 1,000 continuous feet of property adjacent to the Project site, as approved by the Logan County Fiscal Court.

Subject to weather, construction activities would take approximately 14 to 18 months to complete using a crew of up to 450 workers sourced locally to the greatest extent possible. Work would generally occur during daylight hours, Monday through Saturday. Night-time construction could be necessary to make up schedule deficiencies or to complete critical construction activities and would require temporary lighting.

2.2.3 Solar Facility Operations

During operation of the solar facility, no major physical disturbance would occur. Moving parts of the solar facility would be restricted to the east-to-west facing tracking motion of the solar modules, which amounts to a movement of less than a one degree angle every few minutes. This movement maximizes the collection of solar energy by rotating with the sun and is barely perceptible. In the late afternoon, module rotation would start to move from west-to-east in a similar slow motion to minimize row-to-row shading. At sunset, the modules would track to a flat or angled stow position. Permanent lighting on site would be required at the substation, operations and maintenance building, and the BESS facility and electrified via the existing PRECC distribution line along Joe Montgomery Road or the TVA TL, per a potential agreement between TVA and PRECC for TVA to supply the power. The lighting would be downward-facing and timer- and/or motion-activated to minimize impacts to surrounding areas. If needed, permanent lighting at the on-site TVA switching station would be fully shielded or would have internal low-glare optics, such that no light is emitted from the fixtures at angles above the horizontal plane, as described in TVA's *Substation Lighting Guidelines* (TVA 2020b).

During operations, the Project may require small groups of workers to be on site occasionally to manage the facility and conduct regular inspections, maintenance, and repairs, as well as some shepherds to manage the on-site sheep herd. Inspections would include identifying any physical damage of panels, wiring, central inverters, transformers, and interconnection equipment, and drawing transformer oil samples. Near the solar facility infrastructure, vegetation would be managed to prevent shading of the PV panels. As part of SRC's Regenerative Energy program (SRC 2021), sheep would be used to maintain low-growing vegetation on most of the fenced solar facility. The sheep would graze the native and/or noninvasive grass and herbaceous

vegetation and be moved between fenced paddocks to maintain appropriate vegetation height and maximize plant and animal diversity. Creation of pollinator and ground-nesting bird habitat would be encouraged by allowing seed heads to reach maturity wherever possible. The sheep would disperse seeds, both on their coats and through their manure, and their movement around the site would establish new plant growth and greater diversity in species composition. This would eliminate much of the need for mowing and selective herbicide application to manage vegetation growth, although these techniques would still be used as necessary, particularly in areas not suitable for grazing. Shepherds would be hired directly or under contract and would be sourced locally, if possible. The sheep would be bred and sold to regional farmers as registered seedstock for breeding or as market lambs.

Precipitation in the region is typically adequate to remove dust and other debris from the PV modules while maintaining energy production; therefore, manual panel washing is not anticipated unless a site-specific issue is identified. If necessary, module washing would occur no more than twice a year and would comply with proper BMPs to prevent any soil erosion and/or stream and wetland sedimentation. The washing is not expected to produce a discharge waste stream.

The proposed solar facility would be monitored remotely to identify any security or operational issues. If a problem is discovered during nonworking hours, a local repair crew or law enforcement personnel would be contacted if an immediate response were warranted.

2.2.4 Electrical Interconnection

Under the Proposed Action, the solar facility would connect to TVA's Springfield-Logan Aluminum 161-kV TL, which crosses the northeast corner of the Project site (Figure 2-5). To interconnect to TVA's existing electrical grid, Russellville Solar would construct the Russellville Solar 161-kV substation, and TVA would initially install a temporary connection tap on the Springfield-Logan Aluminum 161-kV TL and later construct the TVA Cave Springs 161-kV switching station. Together, the substation and switching station would encompass approximately five acres in the northeastern portion of the Project site. Russellville Solar may also construct an approximately 2.3-acre BESS with an estimated rated power capacity of 30 MW and a storage duration of four hours, for a total storage capacity of 120 MW-hours. TVA also proposes to install fiber-optic overhead ground wire (OPGW) along approximately 2,500 feet of the existing Springfield-Logan Aluminum 161-kV TL, to connect existing OPGW at Structure 175 to Structure 173, where the TL meets the Project site. These are referred to herein as the TL upgrade areas.

Russellville Solar and TVA would clear vegetation, remove the topsoil, and grade approximately five acres for the substation and switching station sites. To clear trees and other tall vegetation, Russellville Solar would follow the practices outlined in Section 2.2.2., and TVA would follow its *Site Clearing and Grading Specifications* (TVA 2017a). TVA's work would require use of chain saws, skidders, bulldozers, tractors, and/or low ground-pressure feller-bunchers. As necessary, any woody debris and other vegetation would likely be piled and burned, chipped, or taken off-site. Prior to burning, Russellville Solar and TVA would obtain any necessary permits for the substation and switching station, respectively. In some instances, vegetation may be windrowed

along the edge of the Project site to serve as sediment barriers. Further guidance for TVA's clearing and construction activities can be found in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities – Revision 3* (TVA's BMP manual; TVA 2017b). Three 161-kV breakers would be installed in a ring bus configuration along with associated metering, communication, and protective equipment. The substation and switching station locations would be fenced and graveled and would have lighting to facilitate night access, as described in Section 2.2.3 (TVA 2020b).

Installation of OPGW would be performed either using ground equipment or by helicopter. A lineman would work from structure to structure unclipping the existing OHGW and installing a pulley. Equipment would be placed at either the north or south end of the TL upgrade areas, including the one anticipated OPGW reel (enough to extend 2,500 feet). The OHGW would be removed while a rope is pulled through the newly installed pulleys. Afterward, the lineman would revisit each structure to clip the OPGW to the structure and remove the pulley. Using this method, the OPGW would be installed in approximately two working days, weather permitting.

TL upgrades would require improvements to existing access roads and creation of new temporary access routes. Typically, new permanent or temporary access roads/routes used for TLs are located on the TL ROW wherever possible and are designed and located to avoid severe slope conditions and to minimize impacts to environmental resources such as streams. TL access roads are typically about 12- to 16-foot wide and are surfaced with dirt, mulch, or gravel. Permanent access to the Project substation and switching station would be within the Project site, via Joe Montgomery Road. Matting, culverts and other drainage devices, fences, and gates would be utilized or installed, as necessary. Although not anticipated as a need due to the lack of streams in the TL upgrade areas, culverts installed in any perennial or intermittent streams would be removed following construction, while culverts installed in any ephemeral streams would be either left or removed, depending on the wishes of the landowners or any permit conditions that might apply. If desired by the property owner, TVA would restore new temporary access routes associated with the TL upgrades to previous conditions.

In the temporary connection tap process, TVA would perform electric system modifications to existing TVA substations in support of the additional generation capacity provided by the Project. These modifications, mostly consisting of upgrades to telecommunications equipment, would be performed at Lost City, KY 161-kV substation (S5448), Logan Aluminum, KY 161-kV substation (S5299), Adairsville, KY 161-kV substation (S5801), and Springfield, TN 161-kV substation (S5284). These activities may require an outage of up to a few days on the Springfield-Logan Aluminum 161-kV TL. If this or other TLs are required to be temporarily removed from service, TVA would work with PRECC to ensure there is no interruption of electrical service. This would be achieved by providing a temporary back-feed from another power service. TVA would also make an effort to perform these outages at low-impact times, such as overnight, in order to maintain power service to PRECC. TVA would also install a temporary connection tap located in proximity to Structure 173 on the Springfield-Logan Aluminum 161-kV TL. This temporary tap would be utilized until the TVA Cave Springs 161-kV Switching Station could be constructed.

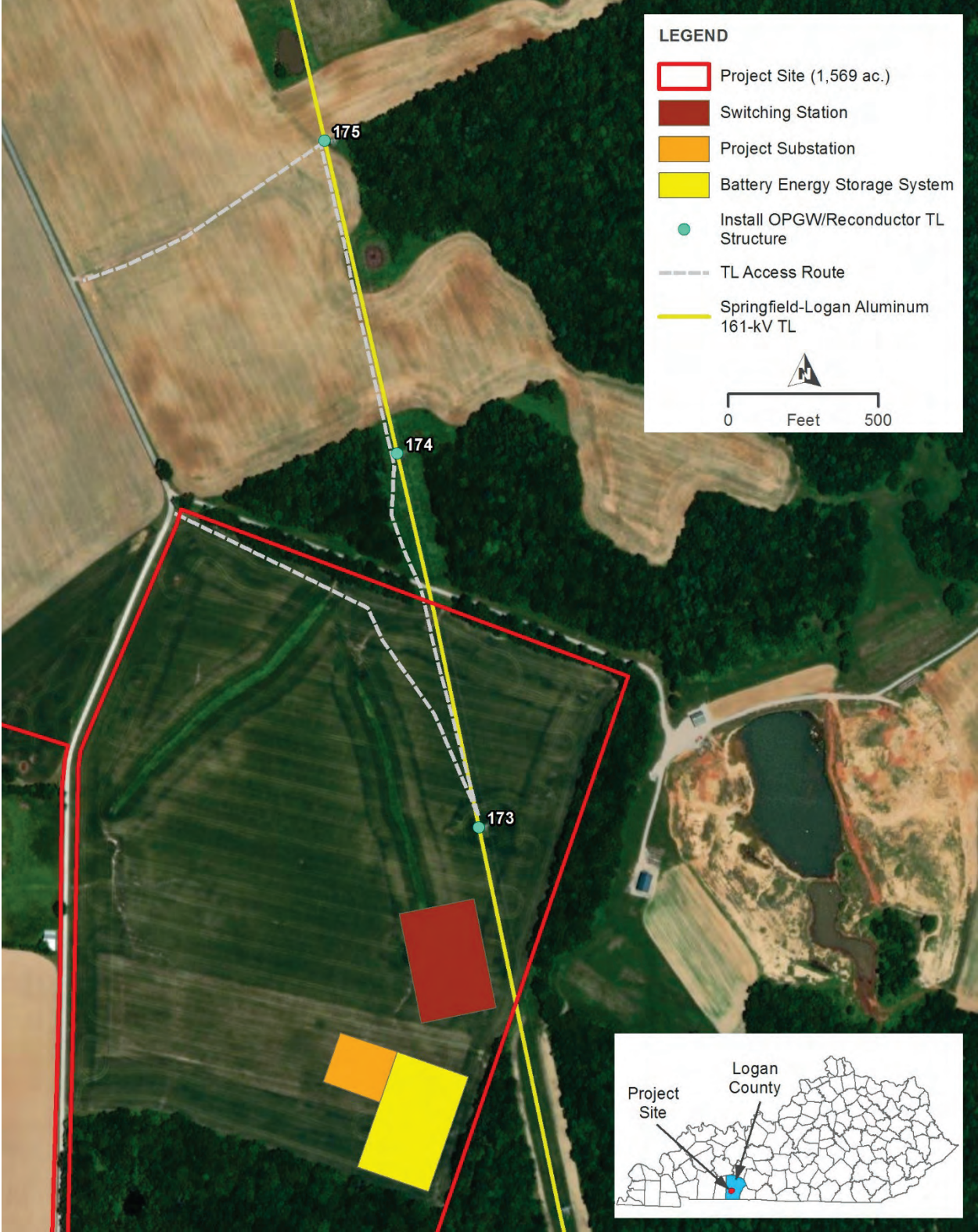


Figure 2-5. Detail of the proposed work areas along the existing Springfield-Logan Aluminum 161-kV TL

2.2.5 Decommissioning and Reclamation

Russellville Solar would operate the Project and sell power to TVA under the terms of a 20-year PPA. As the lease agreement with the landowners is for 40 years, site control would be maintained for longer than a 20-year period. At the end of the 20-year PPA, Russellville Solar would assess whether to cease operations at the solar facility or to replace equipment, if needed, and attempt to enter into a new PPA with TVA or make some other arrangement to sell the power. If the solar facility has not surpassed its useful life, operations and maintenance beyond the 20-year period, additional operations under a new PPA with TVA would be evaluated through separate NEPA review.

When operations cease, the facility would be decommissioned and dismantled, and the Project site would be restored per Project decommissioning requirements. The decommissioning process would be coordinated with Logan County. Decommissioning actions would include the removal of aboveground and below-ground components to a depth of at least three feet. The majority of decommissioned equipment and materials would be recycled. Materials that cannot be recycled would be disposed of at an approved facility in accordance with federal, state, and local laws and regulations. Other wastes, including batteries, will be disposed of off-site and/or recycled in accordance with manufacturer recommendations and appropriate federal, state, and local laws and regulations and industry BMPs. Following component removal and if requested by the landowner, holes would be filled with local soil types, and roads and large excavated rocks would be removed. Overall, the Project site would be returned to a tillable state and revegetating.

2.3 Alternatives Eliminated from Further Consideration

In determining the suitability for development of a site within TVA's service area that would meet customer needs and the goals of expanding TVA's renewable energy portfolio, multiple factors were considered. This process involved screening potential locations and ultimately eliminating those sites that did not have the needed attributes. This process of review and refinement ultimately led to the consideration of the Project site.

The site screening process involves several iterations beginning with the general solar resource (the amount of insolation) and the availability of nearby appropriately sized electric infrastructure for interconnection with sufficient available transmission capacity for the proposed solar facility. This is followed by screening for suitable large-scale landscape features that would allow for utility-scale solar development including:

- 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, with minimal and/or avoidable floodplains or large forested or wetland areas;
- Large contiguous parcels of land with compatible local zoning and located away from densely populated areas; and

- Ability to avoid and/or minimize impacts to known sensitive biological, visual, and cultural resources.

As a result of this screening process, the current Project in Logan County was selected for potential solar development.

2.4 Comparison of Alternatives

This EA evaluates the potential environmental effects that could result from implementing the No Action Alternative or the Proposed Action Alternative on the Project site in Logan County, Kentucky. The analysis of impacts in this EA is based on the current and potential future conditions on the properties and the surrounding Project area. A comparison of the impacts of the alternatives is provided in Table 2-1.

Table 2-1. Comparison of Impacts by Alternative

Resource area	Impacts from No Action Alternative	Impacts from Proposed Action Alternative
Land Use	<p>No direct or indirect Project-related impacts on land use.</p> <p>No impacts if existing land uses remained a mix of agricultural and forested land.</p>	<p>Minor, temporary direct impacts on land use due to change from agricultural to solar during construction.</p> <p>Long-term, minor beneficial impacts due to regenerative agricultural practices that would allow for dual land use.</p>
Geology, Soils, and Prime Farmland	<p>No direct or indirect Project-related impacts on geology, soils, and prime farmland.</p> <p>Geology/Soils: Minor impacts if the current land use practices changed or proper BMPs were not followed.</p> <p>Prime Farmland: Minor impacts if agricultural practices continued and proper conservation practices were not followed.</p>	<p>Geology: Minor to moderate direct impacts resulting from implementation of on-site sedimentation basins and utilization of existing terrain with minor or no excavation. The five identified sinkhole fissures/karst features would be avoided by minimum 100-foot buffers.</p> <p>Soils: Minor direct impacts resulting from minor increases in erosion and sedimentation during construction and operations; while in operation, the Project would have beneficial effects to soil health with the use of native and/or noninvasive vegetation.</p> <p>Prime Farmland: Minor direct impacts from removal of 973 acres of prime farmland from row cropping for the duration of the Project. This represents approximately 0.4 percent of farmland in the county. Site can be utilized for row cropping after decommissioning.</p>
Water Resources	<p>No direct Project-related impacts on water resources.</p> <p>Groundwater: Minor indirect impacts if the local aquifers were recharged from runoff containing chemical fertilizers and pesticides.</p> <p>Surface Water and Wetlands: Minor indirect impacts if agricultural practices continued and were not accomplished with proper BMPs.</p> <p>Floodplains: Impacts associated with current land uses would continue.</p>	<p>Groundwater: No direct adverse impacts anticipated; minor beneficial indirect impacts to groundwater due to reduction in fertilizer and pesticide use and planting of native vegetation.</p> <p>Surface Water: Minor direct impacts to one non-jurisdictional intermittent stream (Stream 2) (16 linear feet) and one linear emergent wetland (Wetland L) (0.01 acre) due to the construction of road crossings with culverts. The use of BMPs to properly maintain vehicles will reduce the risk of fuel, lubricant, and hydraulic fluid leaks and spills.</p> <p>Floodplains: Minor direct impacts due to construction of the TL access road.</p>

Resource area	Impacts from No Action Alternative	Impacts from Proposed Action Alternative
Biological Resources	<p>No direct or indirect Project-related impacts to natural areas, vegetation, wildlife, or rare, threatened and endangered species. Over time, the open-field areas on the Project site could become developed by other entities, and the forested areas could become cleared if the population in the area increases or land uses change.</p>	<p>Natural Areas: No direct impacts due to distance from Project site.</p> <p>Vegetation: Minor direct impacts to vegetation by clearing up to approximately 93 acres of trees and other tall vegetation within the 1,100-acre portion of the Project site proposed for development, and some small trees and limb trimming along existing access roads associated with the existing Springfield-Logan Aluminum I 161-kV TL. The effects would be partially offset by revegetating the Project site with native and/or noninvasive vegetation, which would convert large areas of current cropland to more diverse, managed grassland.</p> <p>Wildlife: Minor direct and indirect impacts to common wildlife due to changes to habitat and existence of Project components; the Project is not anticipated to significantly affect populations of migratory bird species of concern. Vegetation management of the site, intended to provide fodder for the sheep, would help maximize animal diversity by creating pollinator habitat and encouraging ground-nesting bird habitat by allowing seed heads to reach maturity wherever possible.</p> <p>Rare, Threatened and Endangered Species: implementation of the Proposed Action is not likely to significantly affect federally listed species, including the three federally listed bat species that have potential in the Project area, and would result in minor to minimal impacts to state-listed species. USFWS concurred with TVA's "may affect but not likely to adversely affect" determinations regarding impacts to federally listed species during Section 7 ESA consultation.</p>
Visual Resources	<p>No direct or indirect Project-related impacts on visual resources.</p> <p>Minor impacts to visual resources as nearby community grows or if vegetation were altered by other entities or changed over time.</p>	<p>Temporary, minor impacts on visual resources due to altering the visual character of the Project area and increased activity during construction.</p> <p>During operations, minor direct impacts in the immediate vicinity due to substantial tree buffers in some areas and the installation of a vegetative buffer along the security fence perimeter where existing natural buffers are not sufficient in shielding visual resources; minimal on a larger scale, due to variation of the visual attributes of the Project area as distance from the Project increases.</p> <p>The TL upgrade work would likely result in temporary, minimal to minor impacts to the vantage points near the northeast portion of the Project site due to the use of a helicopter during the installation of OPGW for approximately two days.</p>

Resource area	Impacts from No Action Alternative	Impacts from Proposed Action Alternative
Noise	No direct or indirect Project-related impacts on noise.	Temporary, minor adverse impacts to the ambient noise environment in the Project area would occur during construction; minimal to negligible impacts during operation and maintenance.
Air Quality and GHG Emissions	<p>No direct or indirect Project-related impacts on air quality and GHG emissions.</p> <p>Minor impacts if the Project site were developed by other entities into an industrial or other energy production facility with emissions.</p>	<p>Air quality: Minor, direct impacts to air quality would be anticipated as a result of construction of the Project.</p> <p>GHG emissions: Temporary impacts to GHG emissions expected during construction would be negligible; beneficial effects would also occur, due to the nearly emissions-free power generated by the solar facility, offsetting the need for new power that would otherwise be generated by the combustion of fossil fuels.</p>
Cultural Resources	<p>No direct or indirect Project-related impacts on cultural resources.</p> <p>Potential minor impacts if Project site were developed by other entities in the future without AHC or tribal consultation.</p>	<p>Archaeological Resources: No adverse impacts on any NRHP-listed or eligible archaeological sites.</p> <p>Architectural Resources: No adverse effects on NRHP-listed or eligible architectural resources.</p>
Utilities	<p>No direct or indirect Project-related impacts on utilities.</p> <p>Potential short-term, minor impacts if the Project site were developed by other entities in the future.</p>	<p>Potential short-term, minor impacts to local utilities (electricity and telecommunication connections) when bringing the solar facility on-line, the additional electric system modifications to existing TVA substations, or during routine maintenance of the facility.</p> <p>Long-term, minor beneficial impacts to electrical services across the region due to additional renewable energy resources.</p>
Waste Management	<p>No direct or indirect Project-related impacts on waste management.</p> <p>Potential minor impacts if the Project site were developed by other entities in the future with no waste management BMPs.</p>	<p>Minor and temporary impacts during construction due to on site storage and use of petroleum-based oils, fuels, and general construction waste.</p> <p>Minor and long-term beneficial impacts to wastewater due to installation of permanent toilets.</p>

Resource area	Impacts from No Action Alternative	Impacts from Proposed Action Alternative
Public and Occupational Health and Safety	<p>No direct or indirect Project-related impacts on public health and safety.</p> <p>Potential minor impacts if the Project site were developed by other entities with no health and safety BMPs.</p>	<p>Minor, temporary impacts during construction that would be minimized with adherence to Occupational Safety and Health Act (OSHA) regulations and health and safety plans.</p> <p>Long-term, minor beneficial impacts to public health and safety during operations due to some permanent staff and/or contract employees required on site to manage the sheep operations and the land, which would help deter squatters from occupying the Project site.</p>
Transportation	<p>No direct or indirect Project-related impacts on transportation.</p>	<p>Minor, temporary direct impacts to transportation during construction that would be minimized through appropriate mitigation.</p>
Socioeconomics	<p>No direct or indirect Project-related impacts on socioeconomics.</p> <p>Potential minor beneficial or adverse impacts if the Project site were developed by other entities in the future.</p>	<p>Short-term beneficial economic impacts would result from construction, including the purchase of materials, equipment, and services and a temporary increase in employment, income, and population.</p> <p>Positive, long-term, direct impacts to economics and population from Project operations. The local tax base would increase from construction of the solar facility and would be beneficial to Logan County and the vicinity.</p> <p>Positive, long-term direct impacts to the local agricultural economy due to the sheep operations.</p>
Environmental Justice	<p>No direct or indirect Project-related impacts on minority or low-income populations.</p>	<p>No disproportionately high or adverse direct or indirect impacts on minority or low-income populations.</p>

2.5 Best Management Practices and Mitigation Measures

Russellville Solar would implement minimization and mitigation measures in relation to resources potentially affected by the Project. These have been developed with consideration to BMPs, permit requirements, and adherence to the SWPPP.

In association with the proposed electrical interconnection, TVA would employ standard practices and specific routine measures to avoid and minimize impacts to resources. These practices and measures are summarized in this section.

2.5.1 Standard Practices and Routine Measures

Russellville Solar would implement the following minimization and mitigation measures in relation to potentially affected resources:

- Geology and soils
 - Utilize standard BMPs, as described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities – Revision 3*, the TVA's BMP manual (TVA 2017b) to minimize erosion during construction, operation, and maintenance activities,
 - Install silt fences along the perimeter of vegetation-cleared areas,
 - Implement other soil stabilization and vegetation management measures to reduce the potential for soil erosion during site operations,
 - Make an effort to balance cut-and-fill quantities to alleviate the transportation of soils off-site during construction;
- Water resources
 - Comply with the terms of the SWPPP prepared as part of the KPDES permitting process,
 - Use BMPs for controlling soil erosion and runoff, such as the use of 50-foot buffer zones surrounding intermittent and perennial streams and wetlands and the installation of erosion control silt fences and sediment traps,
 - Implement other routine BMPs as necessary, such as nonmechanical tree removal within surface water buffers, placement of silt fences and sediment traps along buffer edges, selective herbicide treatment to restrict application near receiving water features, and proper vehicle maintenance to reduce the potential for adverse impacts to surface water and groundwater as identified in TVA (2017a),
 - Use only U.S. Environmental Protection Agency (USEPA)-registered and TVA approved herbicides in accordance with label directions designed in part to restrict applications near receiving waters and to prevent unacceptable aquatic impacts in areas requiring chemical treatment,
 - Protect intermittent streams by implementing Standard Stream Protection (Category A), Protection of Important Streams, Springs, and Sinkholes (Category B), or Protection of Unique Habitat (Category C) as defined by TVA (2017a),
 - Ensure construction and maintenance activities occur during dry periods as much as possible,
 - For new TLs, construction would adhere to the TVA subclass review criteria for TL location in floodplains,

- Improve access roads within the 100-year floodplain in such a manner that upstream flood elevations would not be increased by more than 1.0 foot,
- If hauled off site for disposal, dispose of excavated material outside the 100-year floodway,
- When the facility is decommissioned and dismantled, deposit deconstruction debris outside the 100-year floodway;
- Biological resources
 - Revegetate with native and/or noninvasive vegetation, including plants attractive to pollinators, to reintroduce habitat, reduce erosion, and limit the spread of invasive species consistent with EO 13112 (Invasive Species) for revegetating with noninvasive plant species as defined by TVA (2017a),
 - Follow U.S. Fish and Wildlife Service (USFWS) recommendations regarding biological resources, including pollinator species,
 - Avoid, to the extent practicable, siting generation equipment and associated infrastructure in areas that support state-listed plant species and rare plant habitats,
 - Use downward facing and timer- and/or motion-activated lighting to limit attracting wildlife, particularly migratory birds and bats,
 - Instruct personnel on wildlife resource protection measures, including (1) applicable federal and state laws such as those that prohibit animal disturbance, collection, or removal, (2) the importance of protecting wildlife resources, and (3) avoiding vegetation disturbance in undisturbed and buffer areas,
 - Minimize impacts to federally listed bat species by maintaining 100-foot avoidance buffers around sinkhole fissures/karst features,
 - Implement Avian Power Line Interaction Committee guidelines to minimize impacts to birds during design and construction of TL system upgrades;
- Visual resources
 - Use downward-facing and timer- and/or motion-activated lighting to minimize impacts to surrounding areas. Use fully shielded and/or low-glare lighting at the operations and maintenance building and the BESS facility as described in TVA's *Substation Lighting Guidelines* (TVA 2020b);
- Noise
 - Limit construction activities primarily to daytime hours and ensure that heavy equipment, machinery, and vehicles utilized at the Project site meet all federal, state, and local noise requirements;
- Air quality and GHG emissions
 - Comply with local ordinances or burn permits if burning of vegetative debris is required and use BMPs such as periodic watering, covering open-body trucks, and establishing a speed limit to mitigate fugitive dust;
- Waste management
 - Develop and implement a variety of plans and programs to ensure safe handling, storage, and use of hazardous materials;
- Public and occupational health and safety
 - Implement BMPs for site safety management to minimize potential risks to workers; and

- Transportation
 - Implement staggered work shifts during daylight hours if needed to manage traffic flow near the Project site, and
 - Implement mitigation measures identified in the Traffic Impact Study, if needed for a KYTC Encroachment Permit for site entrances off of Watermelon Road.

2.5.2 Non-Routine Mitigation Measures

- Biological resources
 - Remove the four abandoned structures that are proposed for demolition (eight of the total 12 structures on site would not be removed) between October 15 and March 31, when bat species are not likely to be using the structures and per commitments to USFWS during Section 7 ESA consultation;
- Land use and soils
 - Utilize SRC's regenerative energy program, including native and pollinator-attractive plantings, biological vegetation management (e.g., grazing sheep), and other measures that improve the land within the Project area;
- Visual and cultural resources
 - Install vegetative buffer along the security fence perimeter where existing natural buffers are not sufficient in shielding visual resources as described in Ordinance No. 19-920-06, *An Ordinance Establishing Minimum Setback Requirements for Solar Farm Installations in Logan County* (Logan County 2022), and as amended prior to construction start; and
- Cultural resources
 - Install vegetative buffer around the historic architectural resource known as the Brown House (LO 245), and
 - Maintain 250-foot solar-panel and 65-foot ground-disturbance setbacks from known cemeteries and gravesites on the Project site.
 - Exclude eight archaeological sites identified within the Project site from development or disturbance, in accordance with an Avoidance Agreement between TVA and Russellville Solar.

2.5.3 TVA Transmission Best Management Practices

TVA utilizes standard practices for transmission and interconnection-related construction activities. These guidance and specification documents are considered when assessing the effects of the Proposed Action and include:

- *TVA Environmental Quality Protection Specifications for Transmission Line Construction,*
- *TVA Transmission Construction Guidelines Near Streams,*
- *TVA Environmental Quality Protection Specifications for Transmission Substation or Communications Construction,* and
- *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities – Revision 3* (TVA's BMP manual; TVA 2017b).

These documents are available on TVA's transmission system projects web page (TVA 2020c). TVA transmission projects also utilize BMPs to provide guidance for clearing and construction activities and for lighting for substations and similar facilities, such as the on-site switching station (TVA 2017a and 2020b).

2.6 The Preferred Alternative

TVA's preferred alternative for fulfilling its purpose and need is the Proposed Action Alternative. This alternative would generate renewable energy for TVA and its customers with only minor direct and indirect environmental impacts due to the implementation of BMPs and minimization and mitigation efforts, as described in Section 2.5. Implementation of the Project would help meet TVA's renewable energy goals and would help TVA meet customer-driven energy demands on the TVA system.

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CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the existing environmental, social, and economic conditions of the Project area and the potential environmental effects that could result from implementing the No Action Alternative or Proposed Action Alternative.

Desktop research of potential past, present, and reasonably foreseeable future actions (RFFAs) in the Logan County, Kentucky area was conducted. Resources examined included:

- local and regional news sources;
- Logan County government websites, including the Chamber of Commerce (Logan County Chamber of Commerce 2022), Logan Economic Alliance for Development (LEAD) (LEAD 2022), and planning commission websites (Logan County 2022); and
- KYTC websites (KYTC 2020, 2022).

One federally funded project was identified in Logan County, the US 79 Bridge Replacement project involving replacement of four existing bridges with wider bridges on US 79 between Guthrie and Russellville. Two of the bridges are located in Logan County, south of Russellville; one of these extends over Whippoorwill Creek and the other, over Vick's Branch Creek, approximately two miles and 3.4 miles, respectively, from the Project site. The Whippoorwill Creek bridge replacement involves work from US 79 milepost (MP) 4.35 to 4.85 and the Vick's Branch Creek bridge replacement involves work from US 79 MP 2.912 to 2.93. Both are active KYTC projects in the design phase.

In May 2021, KYTC District 3 published a scoping study for a US 79 widening project between MP 3.00 in Todd County and the intersection of US 79 and the Russellville Bypass at MP 10.71 in Logan County, a total project length of 18.319 miles. Construction is slated to occur in 2026. The primary purpose of this project is to improve freight mobility along this corridor. The project, which would widen the stretch of US 79 in the Project area, is anticipated to stay on the existing highway alignment but require additional ROW acquisition.

For both the US 79 Bridge Replacement project and the US 79 widening project, impacts to the following resource areas would likely be evaluated under NEPA: land use; geology, soils, and prime farmland; water resources; biological resources; visual resources; noise; air quality and GHG emissions; cultural resources; utilities; waste management; public and occupational health and safety; transportation; socioeconomics; and environmental justice. Timewise, the construction of Logan County Solar would potentially coincide with the US 79 Bridge Replacement project but not the US 79 widening project, which is scheduled to begin construction no earlier than 2026.

In addition, there are seven properties in Logan County identified by the TVA Economic Development staff as suitable for industrial development in the near future. These properties consist of the following, all located in Logan County:

- Auburn Hosiery Mills-Auburn, located in Auburn,
- Auburn Industrial Site, located in Auburn,
- Lewisburg Industrial Site, located in Lewisburg,
- Shelton Lane Industrial Park, located in Russellville,
- Camp Property, located near Russellville,
- West Industrial Park, located in Russellville, and
- General Products Building, located in Russellville.

The available industrial sites located nearest the Project site are the West Industrial Park (175 acres) located between US 79 and US 68 near the Russellville Bypass and the Camp Property (376 acres) located along US 79 adjacent to western city limits of Russellville. Both of these sites are also listed as build-ready available property by LEAD. These two sites are owned by the Logan Industrial Development Authority and are currently vacant.

3.1 Land Use

3.1.1 Affected Environment

Land use is defined as the way people use and develop land, including leaving land undeveloped or using land for agricultural, residential, commercial, and industrial purposes. The area surrounding the Project site consists of agricultural, forested, and rural-residential land. Consistent with the surrounding area, imagery data collected from the National Land Cover Database (NLCD) show the Project site as primarily cultivated crops with scattered areas of deciduous forest (MRLC 2016; Table 3-1; Figure 3-1). The 1,569-acre Project site generally consists of flat to gently sloping land that ranges in elevation from approximately 577 to 663 feet above mean sea level. Elevation is higher in the northeastern and central portions of the Project site, decreasing toward the southwest. According to historical aerial imagery and topographic quadrangle maps obtained for a Phase I Environmental Site Assessment (Phase I ESA; Appendix A) completed for the Project site, land use in the Project area has remained relatively unchanged and dominated by agriculture since at least 1950. No parks or other public outdoor recreation facilities occur in the Project area.

Table 3-1. Land cover types within the Project site

NLCD Land Cover Type	Approximate Area (acres)	Percentage of Project Site
Cultivated Crops	1,375	88
Deciduous Forest	123	8
Developed, Open Space	32	2
Hay/Pasture	27	<2
Mixed Forest	5	<1
Woody Wetlands	4	<1
Developed, Low Intensity	2	<1
Open Water	1	<1
Total	1,569	100

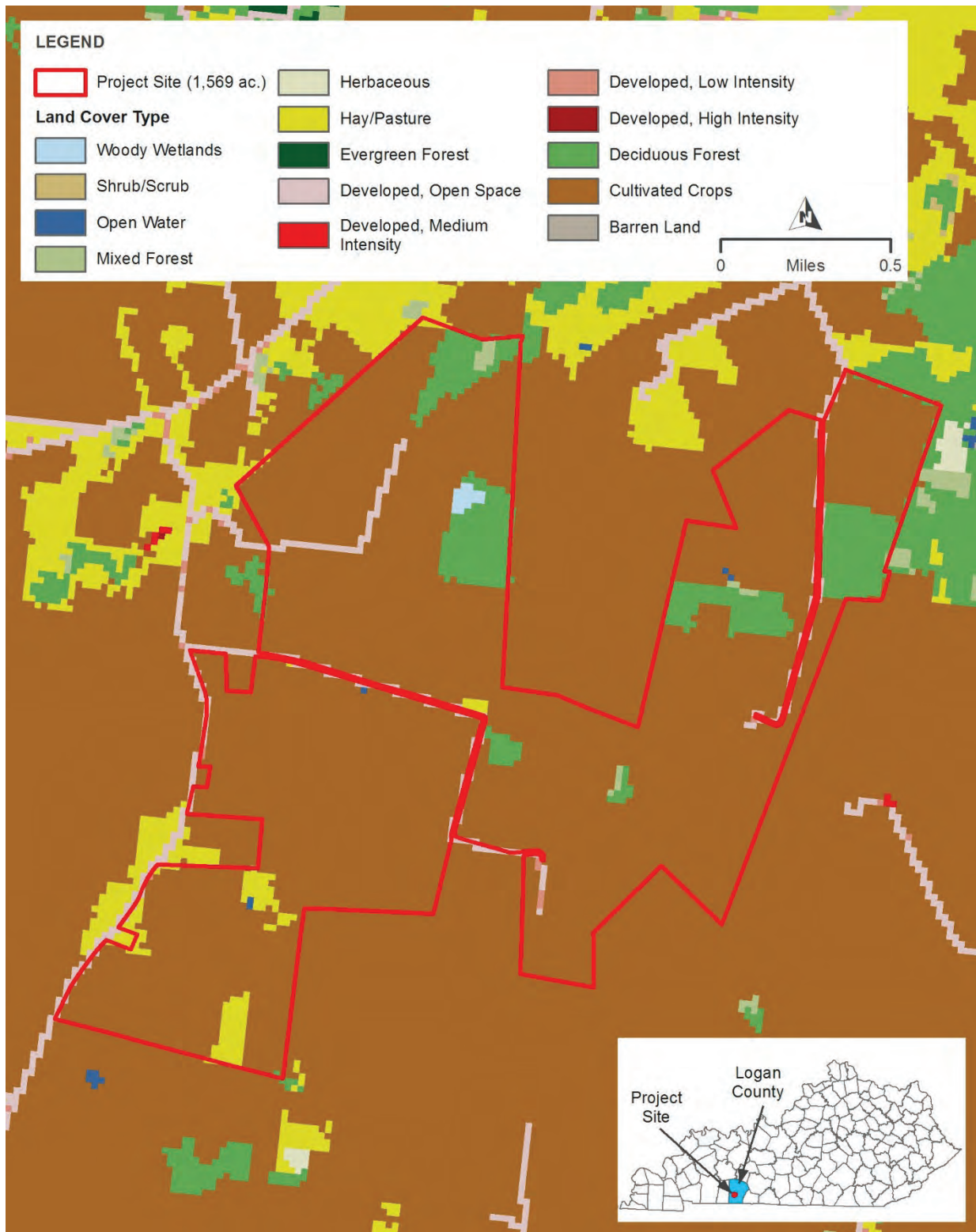


Figure 3-1. Land cover in the Project area

3.1.2 Environmental Consequences

3.1.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed; therefore, no Project-related impacts to land use would result. Existing land use would be expected to remain a mix of agricultural and forested land for the foreseeable future.

3.1.2.2 Proposed Action Alternative

Under the Proposed Action Alternative, the development of the solar facility would result in the long-term change in land use from primarily agricultural dominated by cultivated crops to a combination of industrial and pastoral agricultural land uses. A small portion of the facility site comprising the substation, switching station, and BESS would change to industrial-only land use. The effect of these changes on adjacent land uses will be minimized by compliance with Logan County Ordinance No. 19-920-06, as amended and adopted on February 22, 2022, in the establishment of vegetative buffers and/or fence screening, where not waived by adjacent landowners, and the Kentucky State Board on Electric Generation and Transmission Siting approval and required minimization and mitigation process (Kentucky Public Service Commission 2022; Logan County 2022). The upgrades to the Springfield-Logan Aluminum 161-kV TL would not change current land uses.

Since the Project is proposed on primarily agricultural land, and there are no outdoor recreation areas in the vicinity, development of the Project would have no impact on public recreation activities or facilities.

3.1.2.3 Cumulative Impacts

The RFFAs, such as the proposed industrial developments of West Industrial Park and the Camp Property, would contribute to additional changes in land use from agricultural and forested land to industrial in the area. Logan County does not have a land use plan for the unincorporated portions of the county, nor are lands subject to zoning restrictions. The Proposed Action, when considered with the past, present, and RFFAs, could have minor, cumulative impacts on land use in the area.

3.2 Geology, Soils, and Prime Farmland

3.2.1 Affected Environment

3.2.1.1 Geology

The Project site lies in the Mississippian (Pennyroyal) Plateau Physiographic Region of Kentucky, which consists of a limestone plain characterized by karst terrain (Sauer 1927). The Project area is primarily underlain by Ste. Genevieve and St. Louis limestones, which are characterized as very light to medium gray and brownish gray, dense and fine-grained to coarsely fragmental, thin- to very thick bedded, locally cross-bedded, oolitic, cherty, argillaceous, fossiliferous limestone of Mississippian age (USGS 1968, 1988). In the Project area, some bedrock outcroppings are present, while in the sinkhole depression locations, the bedrock is likely substantially deeper. Typical depth to bedrock in the Project area is approximately 20 feet (KGS 2022a).

The Project site is located on carbonate bedrock geology and karst landforms associated with a high risk for sinkholes. Sinkholes are common where the rock below the land surface is

limestone, carbonate rock, salt beds, or rocks that can naturally be dissolved by groundwater circulating through them. The Kentucky Geological Survey shows four sinkhole depressions and portions of six additional sinkhole depressions, together totaling approximately 20 acres, on the Project site (see State Level Sinkhole Data in Figure 3-2; KGS 2022b). Most of these occur in currently farmed land. Five small sinkhole fissures/karst features appearing like caves in the ground were observed within forested areas during field investigations (see Field Karst Feature Data in Figure 3-2).

3.2.1.2 Paleontology

Kentucky was covered by a shallow, warm sea during the Ordovician age. By the Pennsylvanian age, Kentucky was drier with swamps. Significant paleontological resources are present in Kentucky and the carbonate rocks deposited during the Ordovician age are considered world class sources of fossils. Brachiopods are the most prevalent fossil from this period in Kentucky, but bryozoans are also common (Murray 1974).

3.2.1.3 Geological Hazards

Geological hazards can include landslides, volcanoes, earthquakes/seismic activity, and subsidence/sinkholes. The Project site is located on low undulating terrain. No significant slopes are present within several miles; therefore, landslides are not a potential risk. No volcanoes are present within several hundred miles of the Project site.

Given the geology of the site, sinkholes can form as the rock below the surface dissolves, spaces and caverns develop underground. Land over sinkholes may stay intact until there is not enough support for the land above the spaces. Then a sudden collapse of the land surface can occur. These collapses can vary greatly in size and shape (Kaufmann 2007).

Seismic activity at the site could cause surface faulting, ground motion, ground deformation, and conditions including liquefaction and subsidence. The Modified Mercalli Scale is used within the United States 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. The higher numbers of the scale are based on observed structural damage. This value is translated into a peak 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 probability of exceedance in 50 years (one in 475-year event). The potential ground motion for the Project area is 0.14 g, for a PGA with a two-percent probability of exceedance within 50 years (Figure 3-3; USGS 2014). A 0.14 g earthquake would have a strong perceived shaking with light potential for damage. Based on the USGS 2014 seismic hazard map, the Project site has low risk for earthquakes that would cause structural damage.

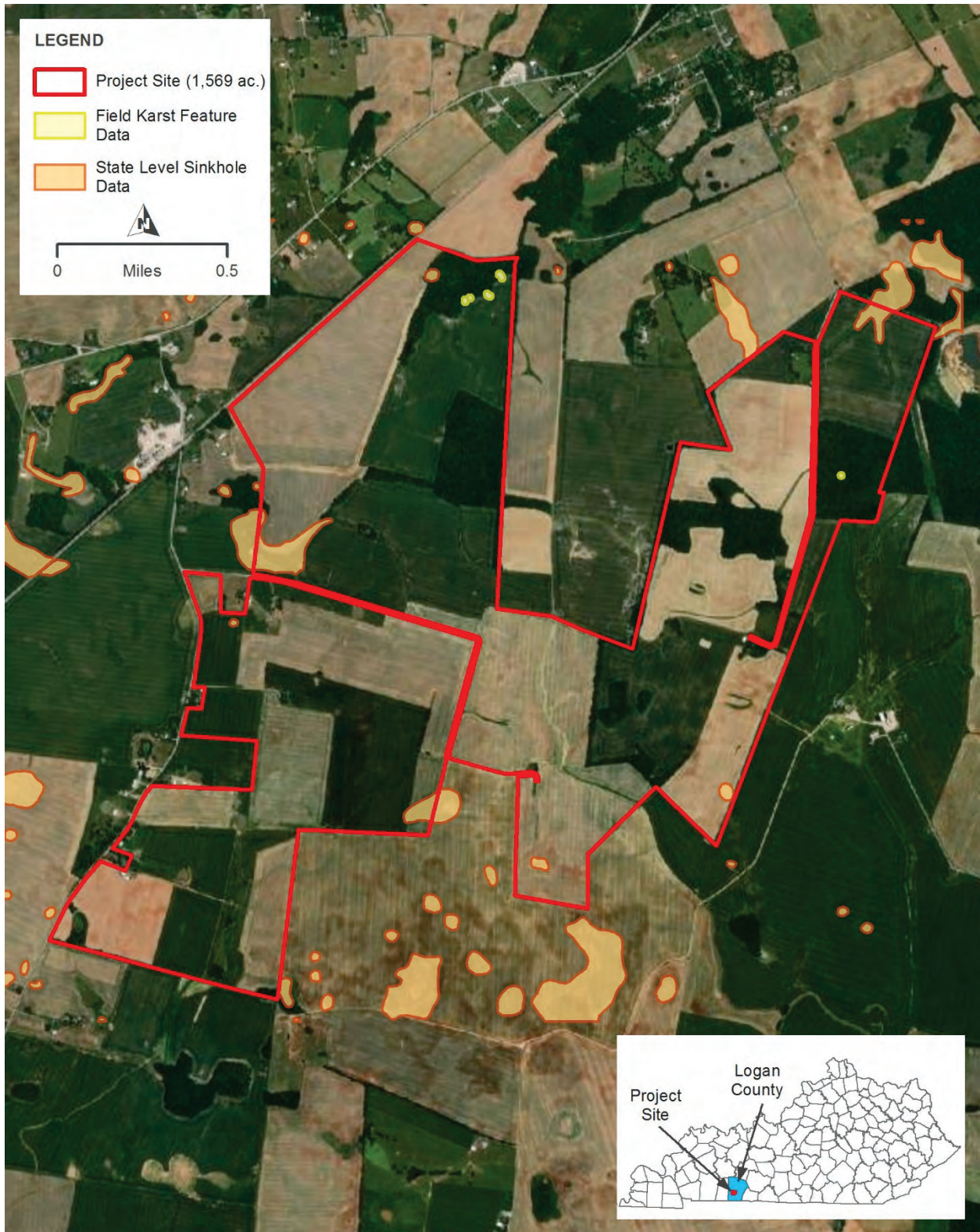
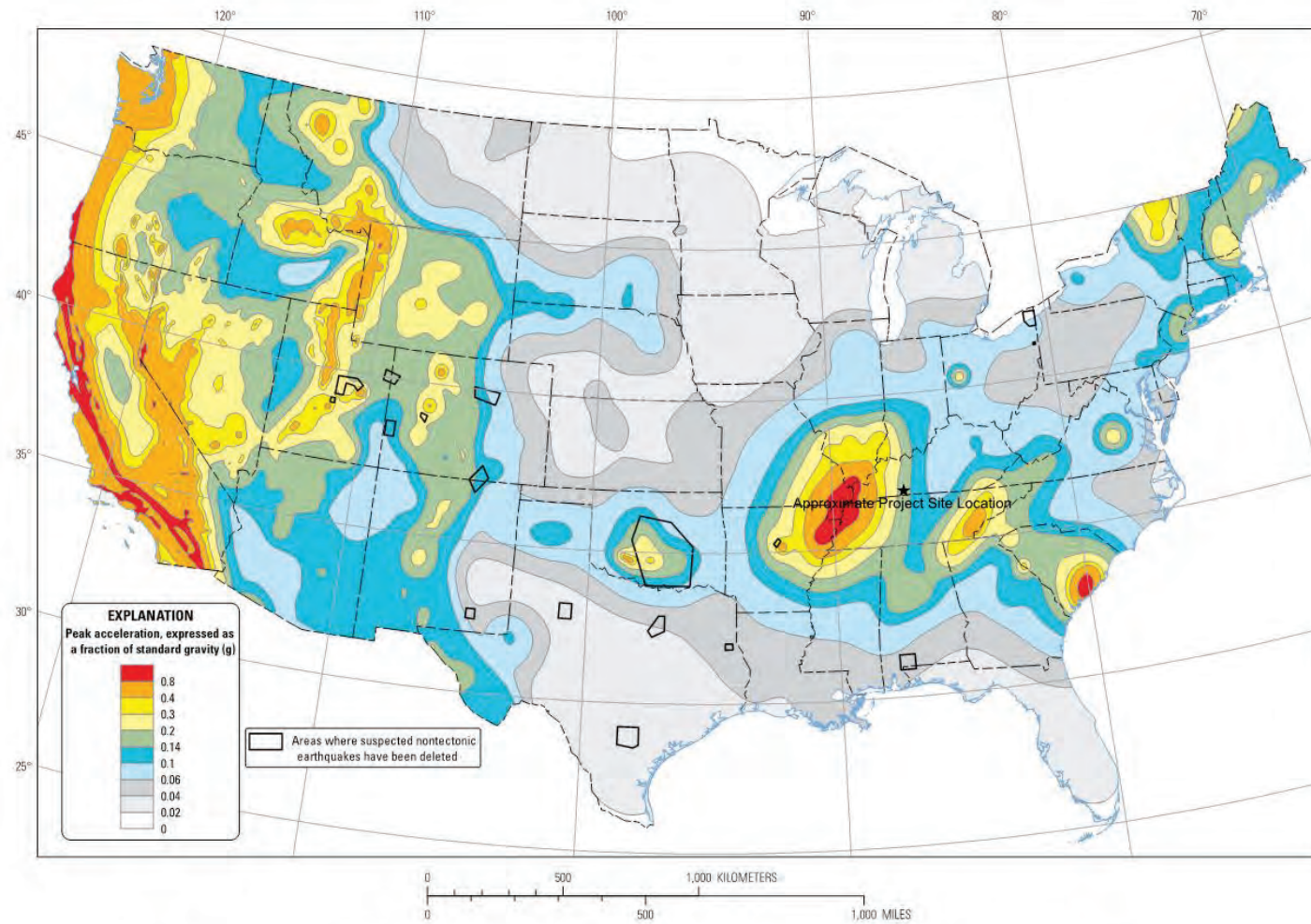


Figure 3-2. Karst features and sinkholes on the Project site



Two-percent probability of exceedance in 50 years map of peak ground acceleration

Figure 3-3. Closest seismic hazard areas to the Project site (USGS 2014)

3.2.1.4 Soils

The Project site contains 16 soil types. The majority of the soils on the Project site are composed of Pembroke silt loams (49.7 percent), Nicholson silt loams (28.5 percent), and Crider silt loams (7.1 percent), with other soil types consisting of less than five percent each (Table 3-2 and Figure 3-4). Most areas (66 to 99 percent) mapped by USDA as Melvin silt loam are considered hydric, while relatively small areas (one and 33 percent, respectively) mapped as Lawrence and Newark silt loams are considered hydric. Hydric soils are formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (USDA 2019).

The Pembroke series consists of very deep, well drained soils formed in a thin silty mantle of loess underlain by older alluvium or residuum of limestone or both. Primary uses are for growing corn, small grains, tobacco, hay, truck crops, fruits, and pasture. The Nicholson series consists of very deep, moderately well drained soils with a slowly permeable fragipan in the subsoil. Nicholson soils are formed in a mantle of loess or silty material underlain by residuum of limestone, calcareous shale, and siltstone. Primary uses are for growing corn, burley tobacco, small grains, truck and fruit crops, hay, pasture, and for urban-suburban development. The Crider series consists of very deep, well drained, moderately permeable soils on uplands. Primary uses are for growing corn, small grains, soybeans, tobacco, hay, truck crops, and pasture (USDA 2021).

3.2.1.5 Prime Farmland

Prime farmland is land that is the most suitable for economically producing sustained high yields of food, feed, fiber, forage, and oilseed crops. Prime farmlands have the best combination of soil type, growing season, and moisture supply and are available for agricultural use (i.e., not water or urban built-up land). The Farmland Protection Policy Act (FPPA; 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 FPPA is “to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses.” Prime farmland soils and farmland of statewide importance occur on approximately 1,547 acres, constituting approximately 98.6 percent of the 1,569-acre Project site (USDA 2019; Table 3-2; Figure 3-5).

Table 3-2. Soils on the Project site

Soil type	Farmland classification	Hydric Rating	Area (acres)	Percentage of Project Site
Baxter gravelly silt loam, 12 to 20 percent slopes	Not prime farmland	0	2.0	0.1
Crider silt loam, 0 to 2 percent slopes	All areas are prime farmland	0	58.7	3.7
Crider silt loam, 2 to 6 percent slopes	All areas are prime farmland	0	49.0	3.1

Soil type	Farmland classification	Hydric Rating	Area (acres)	Percentage of Project Site
Crider silt loam, 6 to 12 percent slopes	Farmland of statewide importance	0	4.7	0.3
Lawrence silt loam	Prime farmland if drained	6	36.2	2.3
Lindside silt loam	Prime farmland if protected from flooding or not frequently flooded during the growing season	0	15.7	1.0
Melvin silt loam	Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season	97	27.4	1.7
Newark silt loam	Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season	2	75.4	4.8
Nicholson silt loam, 0 to 2 percent slopes	All areas are prime farmland	0	115.7	7.4
Nicholson silt loam, 2 to 6 percent slopes	All areas are prime farmland	0	330.7	21.1
Nolin silt loam	Prime farmland if protected from flooding or not frequently flooded during the growing season	0	54.6	3.5
Pembroke silt loam, 0 to 2 percent slopes	All areas are prime farmland	0	40.6	2.6
Pembroke silt loam, 2 to 6 percent slopes	All areas are prime farmland	0	598.7	38.2
Pembroke silt loam, 6 to 12 percent slopes	Farmland of statewide importance	0	140.0	8.9
Pembroke silty clay loam, 6 to 12 percent slopes, severely eroded	Not prime farmland	0	4.0	0.3%
Pickwick silty clay loam, 6 to 12 percent slopes, severely eroded	Not prime farmland	0	12.3	0.8
Total Prime Farmland			1,402.7	89.4
Total Farmland of Statewide Importance			144.7	9.2

Source: USDA 2019

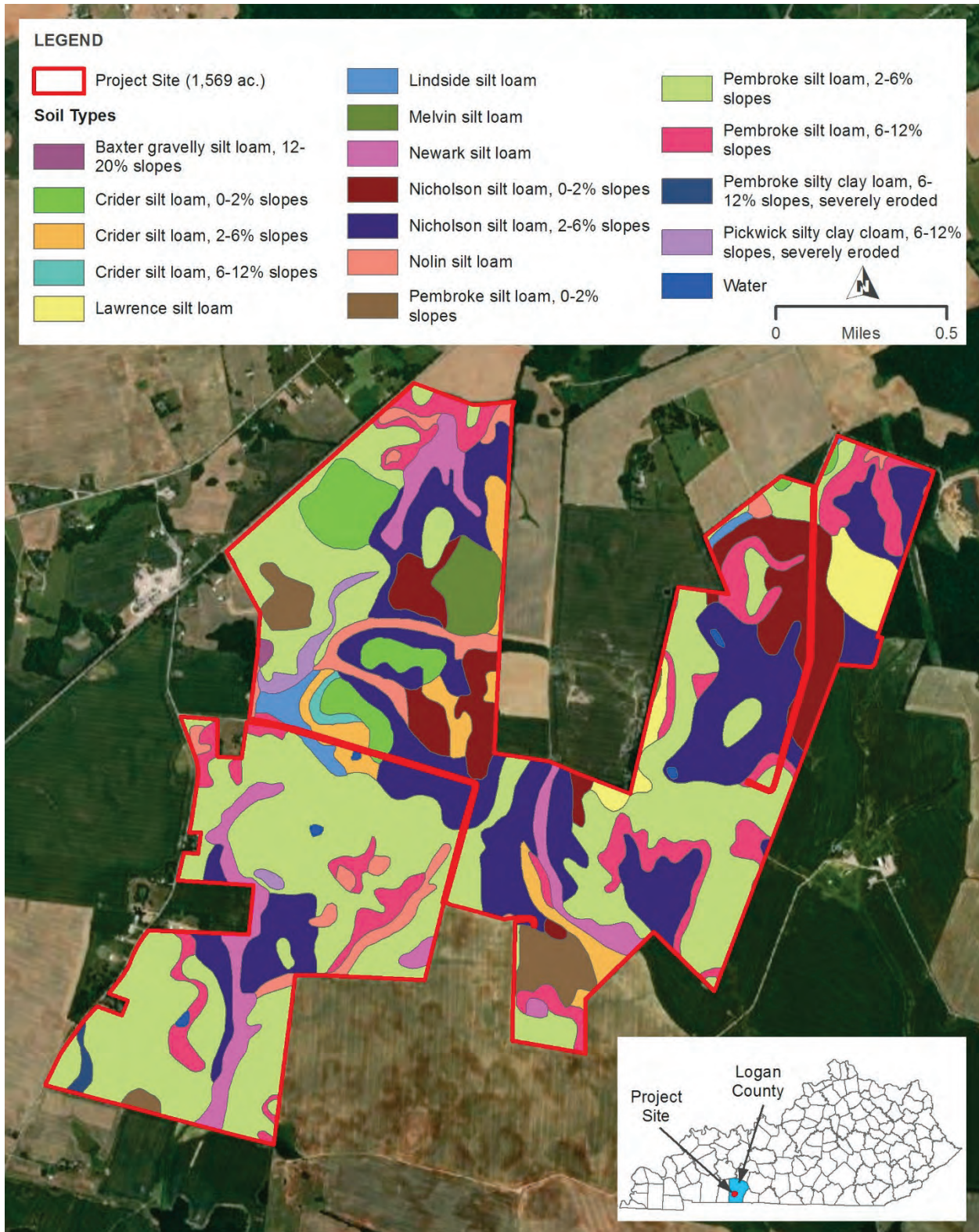


Figure 3-4. Soils on the Project site

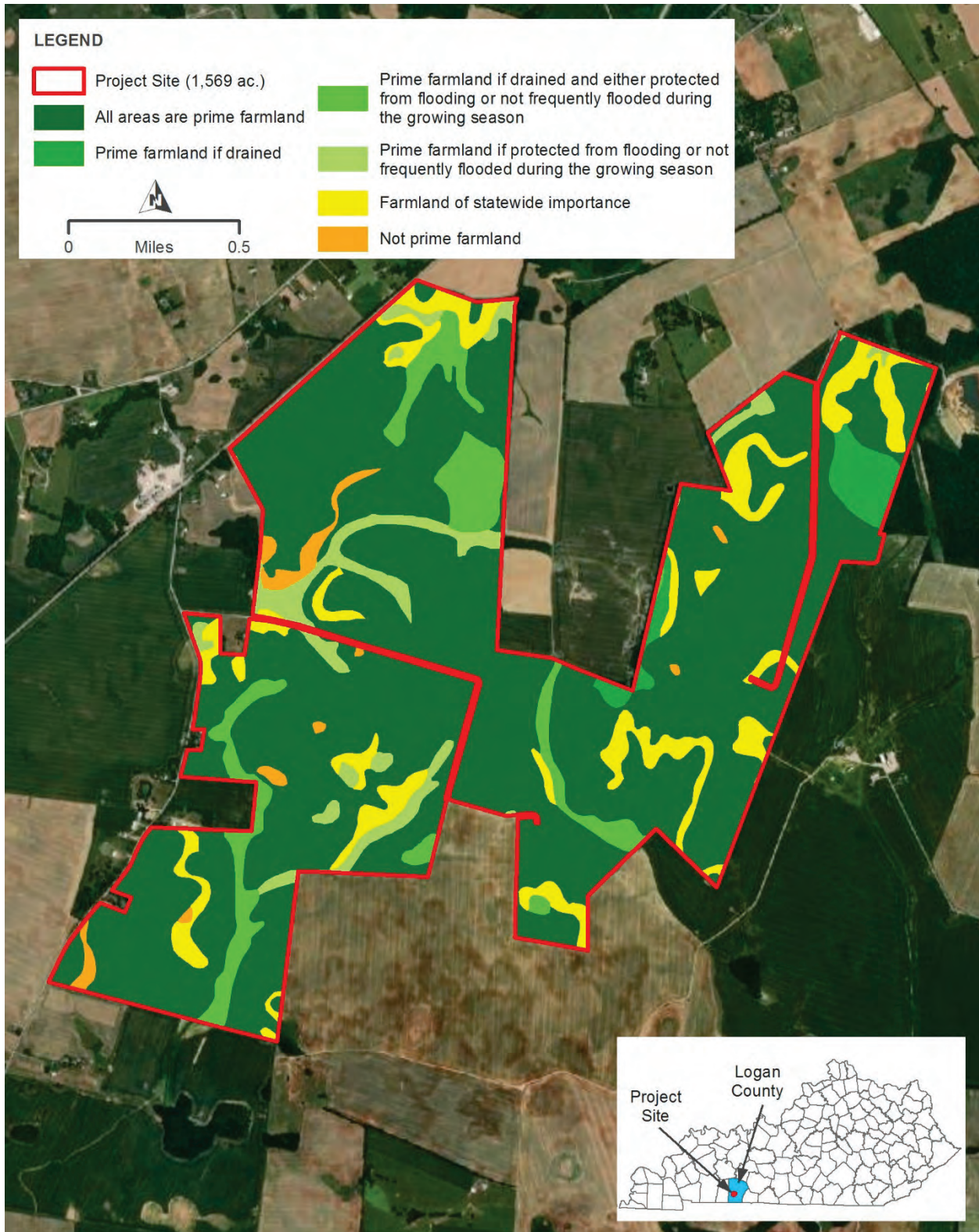


Figure 3-5. Soils classified as prime farmland on the Project site

3.2.2 Environmental Consequences

3.2.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed; therefore, no direct or indirect Project-related impacts on geological, paleontological, soil resources, or prime farmlands would result. Existing land use on the Project site would remain a mix of agricultural and undeveloped land. Over time, impacts to soils and geology could occur if the current land use practices are changed. If the Project site were to be developed by other parties, changes to the soils on site would occur.

3.2.2.2 Proposed Action Alternative

Under the Proposed Action, direct impacts to geology, soil, and prime farmland resources would occur as a result of construction and operation of the Project. Approximately 70 percent (1,100 acres) of the 1,569-acre Project site would be cleared and/or graded for the solar facility and associated interconnection facilities. Grading and clearing for the solar facility would cause minor, localized increases in erosion and sedimentation, resulting in minor impacts to geology and soils.

3.2.2.2.1 Geology and Paleontology

Under the Proposed Action, minor to moderate impacts to geological resources could occur with placement of Project components. If needed, on-site sedimentation basins would be shallow and, to the extent feasible, utilize the existing terrain without requiring extensive excavation. Minor excavations would also be required for construction of the Project substation, switching station, each medium voltage transformer, and the BESS. The Project would not likely site these atop rock outcroppings present on the Project site, and these Project components would not overlap with known sinkhole features.

The solar arrays would be supported by steel piles, which would either be driven or screwed into the ground to a depth typically less than 10 feet. The PV panels would be connected with underground wiring placed in trenches approximately three- to four-feet deep. Except for very small areas of overlap of the steel piles, fencing, and access roads, as described in the next section in more detail, the Project component disturbance footprint would avoid sinkholes mapped by the Kentucky Geological Survey, and no impacts to the five identified sinkhole fissures are anticipated, as these would be avoided by minimum 100-foot protective buffers. Some of the steep piles may penetrate bedrock, given the existence of some rock outcroppings on the Project site; however, depth to bedrock in the vicinity is typically 20 feet, and sinkhole depressions are likely underlain by deeper bedrock. Thus, given the small areas of overlap, only minimal to minor effects to sinkhole features are anticipated. These are expected to be minimized and mitigated with regular maintenance activities.

Should paleontological resources be exposed during site construction (i.e., grading and foundation placement) or operation activities, a paleontological expert would be consulted to determine the nature of the paleontological resources, recover these resources, analyze the potential for additional impacts, and develop and implement a recovery plan/mitigation strategy.

3.2.2.2.2 Geologic Hazards

Hazards resulting from geological conditions may be encountered in the case of sinkholes. The Project site is located over limestone bedrock that is susceptible to erosion and the creation of sinkholes. The Project site contains five sinkhole fissures/karst features observed in the field and four whole and portions of six additional sinkhole depressions mapped by the Kentucky Geological Survey. Portions of the security fencing, solar panel block, and access roads would be constructed in the locations of three mapped sinkhole depressions. The overlapped areas range from 0.3 to 0.95 acre and together amount to approximately 2.5 acres. The Project site has a low risk for earthquakes that may cause structural damage. A geotechnical study has been conducted on the site (Appendix A), and more detailed studies are planned. The Project would be designed to comply with applicable standards to minimize issues pertaining to sinkholes and seismic activity. Geological hazard impacts on the site would be unlikely to impact off-site resources.

3.2.2.2.3 Soils

During construction, soils on the 1,100 acres proposed for development of the solar facility would be disturbed from site preparation and construction activities. The construction of access routes for TL upgrades would also affect soils; these impacts would be temporary and mitigated through BMPs identified in Section 2.5. Any stockpiled soils from the area where vegetation clearing and grading occurs, including topsoils, would be replaced following cut-and-fill activities to the extent practical and, therefore, likely not require off-site hauling of soils. However, some minimal off-site hauling may be necessary. Although not anticipated, should borrow material such as sand, gravel, rip rap, or other aggregate, such as large rocks, be required for Project site activities, these resources may be obtained either from on-site sources, if available, or from nearby permitted off-site sources.

The creation of small areas of new impervious surface (individual surface areas ranging from 0.01 to 2 acres, together amounting to approximately 10 acres), in the form of foundations for the central inverters and the Project substation, switching station, the BESS, and associated components, would result in a minor increase in stormwater runoff and potential increase in soil erosion. Planting of native and/or noninvasive vegetation, including plants attractive to pollinators, within the limits of disturbance along with use of BMPs described in the SWPPP (see Section 1.3), such as soil erosion and sediment control measures, would minimize the potential for increased soil erosion and runoff. Following construction, implementation of soil stabilization and vegetation management measures would reduce the potential for erosion impacts during facility operations.

During operation and maintenance of the solar facility and associated interconnection facilities, minor disturbance could occur to soils. Routine maintenance would include periodic motor replacement; inverter air filter replacement; fence repair; vegetation control; and periodic PV array inspection, repairs, and maintenance. The Project would use grazing sheep to manage vegetation within most of the fenced-in, developed solar facility area. Selective spot applications of herbicides may be employed around facilities and structures to control weeds. Herbicides would be applied by a professional contractor or a qualified Project technician. These maintenance activities would not result in any adverse impacts to soils during operations.

3.2.2.2.4 Prime Farmland

Approximately 70 percent (1,100 acres) of the 1,569-acre Project site would be developed into the solar facility and would no longer be suitable for row crops. This would affect approximately 973 acres of prime farmland and 69 percent of the total prime farmland soils at the Project site. This represents approximately 0.4 percent of farmland in Logan County (USDA 2017). Because the construction and operation of the solar facility would have little effect on the productivity of soils on the site and most of the site would be utilized for grazing sheep, which would be shepherded by local or regional contract or direct personnel and sold as seedstock or market lambs, impacts to prime farmland would be minimal. Following decommissioning of the solar facilities, the site could be utilized for a greater variety of types of agricultural production, including row cropping.

3.2.2.3 Cumulative Impacts

Land use changes from agricultural to industrial, due to the small amount of new impervious surface, would likely not inhibit groundwater infiltration and recharge to the local aquifer. The RFFAs such as the proposed industrial developments of West Industrial Park and the Camp Property, together with the Proposed Action, would remove approximately 2,035 acres of farmland, some of which is designated as prime farmland, from potential use for row cropping. While the Project site would support grazing sheep, these changes to farmland in the form of lack of potential for row cropping, would affect approximately 0.7 percent of the farmland in Logan County (USDA 2017), resulting in minor, cumulative impacts on prime farmland in the area.

3.3 Water Resources

3.3.1 Affected Environment

3.3.1.1 Groundwater

Groundwater is water located beneath the ground surface, within soils and subsurface formations known as hydrogeological units or aquifers. Aquifers have sufficient permeability to conduct groundwater infiltration and to allow economically significant quantities of water to be produced by man-made water wells and natural springs. One water well was noted on the Project site during a Phase I ESA field visit, at the southern extent of Joe Montgomery Road.

According to USGS, the Project area overlies the Kentucky karst Midwest Paleozoic Carbonate aquifer system. Groundwater in the area can be affected by agricultural pumping and local surface water bodies but is expected to flow southwest toward the Red River. Multiple small ponds occur within the Project area and are expected to serve as groundwater recharge points.

Karst aquifer drainage patterns resemble the branching pattern formed by streams flowing over insoluble rocks, which differentiates the karst aquifer from a granular or fractured bedrock aquifer. A karst spring is a discharge point for an underground watershed that is filled by water drainage of sinkholes and sinking streams. Because of the nature of the underground stream formation, karst aquifers have little relationship to topographic highs and lows of the surface (Kentucky Geological Survey 2021).

3.3.1.2 Surface Water and Wetlands

Surface water is any water that flows above ground and includes, but is not limited to, streams, ditches, ponds, lakes, and wetlands. Streams are classified as either perennial, intermittent, or ephemeral based on the occurrence of surface flow. Wetlands are those areas inundated by surface water or groundwater such that vegetation adapted to saturated soil conditions is prevalent. Examples of wetlands include swamps, marshes, bogs, and wet meadows.

Surface waters with certain physical and hydrologic characteristics (defined bed and bank, ordinary high water mark, or specific hydrologic, soil, and vegetation criteria) are considered waters of the U.S. (WOTUS or jurisdictional waters) and are under the regulatory jurisdiction of USACE. The CWA is the primary federal statute that governs the discharge of pollutants and fill materials into WOTUS under Sections 402, 404, and 401. The limits on activities affecting WOTUS are defined through a jurisdictional determination accepted by USACE. State agencies have jurisdiction over water quality.

The Project site is located in the Dry Fork-Whippoorwill Creek Watershed (12-digit Hydrologic Unit Code [HUC] 051302060303) and the Pleasant Grove Creek-Red River Watershed (12-digit HUC 051302060205) of the Lower Cumberland-Red River watershed (8-digit HUC 05130206) (USGS 2022a). The on-site surface waters in the western portions of the site drain to an unnamed intermittent tributary and then into Whippoorwill Creek, while the on-site surface waters in the eastern portions of the site drain to an unnamed ephemeral tributary and then into Pleasant Grove Creek (USGS 2022b). Both of these named streams drain to the Red River. On-site streams are all intermittent or ephemeral streams.

Field surveys were conducted July 9 and 10, 2019, to determine the presence of jurisdictional wetlands and streams across the Project site (Appendix B). Wetlands were identified in accordance with methodologies described in the 1987 *Corps of Engineers Wetlands Delineation Manual* (1987 Manual) (USACE 1987) and the 2012 Eastern Mountains and Piedmont regional supplement to the 1987 Manual (USACE 2012). Streams were classified utilizing the methodology and guidance provided in Regulatory Guidance Letter 05-05. Descriptions of the on-site water resources identified during the field survey on July 9 and 10, 2019, were initially submitted to USACE for confirmation of their jurisdictional status in July 2019. Following a site visit by USACE staff to verify the survey results on October 10, 2020, descriptions of the on-site water resources identified during the field survey were resubmitted to USACE, and the changes were confirmed in an Approved Jurisdictional Determination from USACE (Appendix B). A total of 12 wetlands (11 acres), 15 ponds (7.8 acres), two intermittent streams (6,135.1 linear feet), and 9 ephemeral streams (4,233 linear feet) were identified during the field surveys (Table 3-3; Table 3-4; Table 3-5; Figure 3-6). Three ephemeral streams (Stream 11, 12, and 13) and two wetlands (Wetland A and H) were verified by USACE to be jurisdictional waters. A subsequent field survey was conducted on October 25, 2021, to determine the presence of jurisdictional wetlands and streams in the TL upgrade areas. No additional jurisdictional waters were delineated during the October survey. A memorandum report was written to update the delineation findings for the Project (Appendix B).

TVA is subject to EO 11990, Protection of Wetlands. Wetlands were classified by hydrologic regime and vegetation cover type in accordance with the Cowardin Classification System (Cowardin et al. 1979). Table 3-3 lists the classification for each wetland. See Cowardin et al. 1979 for further descriptions on each classification type.

Table 3-3. Wetlands on the Project site

Wetland Identifier	Type¹	USACE Jurisdictional	Acres
Wetland B	PEM	No	1.11
Wetland D	PEM	No	0.15
Wetland F	PFO	No	1.84
Wetland H	PEM/PSS	Yes	0.45
Wetland K	PFO	No	0.97
Wetland N	PFO	No	0.35
Total Acres			11.03

¹ Classification codes as defined in Cowardin et al. (1979)

PEM = Palustrine emergent; PFO = Palustrine forested; PSS = Palustrine Scrub Shrub

Table 3-4. Ponds on the Project site

Pond Identifier	Acres
Pond 1	0.92
Pond 2	0.71
Pond 3	0.42
Pond 4	0.46
Pond 5	0.70
Pond 6	0.25
Pond 7	0.81
Pond 8	0.23
Pond 9	0.70
Pond 10	0.31
Pond 11	0.26
Pond 12	0.26
Pond 13	0.29
Pond 14	0.76
Pond 15	0.74
Total Acres	7.82

Table 3-5. Streams on the Project site

Stream Identifier	Type	USACE Jurisdictional	Linear Feet
Stream 1	Ephemeral	No	207.24
Stream 2	Intermittent	No	4,598.61
Stream 3	Intermittent	No	1,536.52
Stream 4	Ephemeral	No	186.46
Stream 5	Ephemeral	No	365.25
Stream 10	Ephemeral	No	170.77
Stream 11	Ephemeral	Yes	778.40
Stream 12	Ephemeral	Yes	1,466.20
Stream 13	Ephemeral	Yes	685.24
Stream 14	Ephemeral	No	325.13
Stream 15	Ephemeral	No	47.85
Total Linear Feet			10,367.67

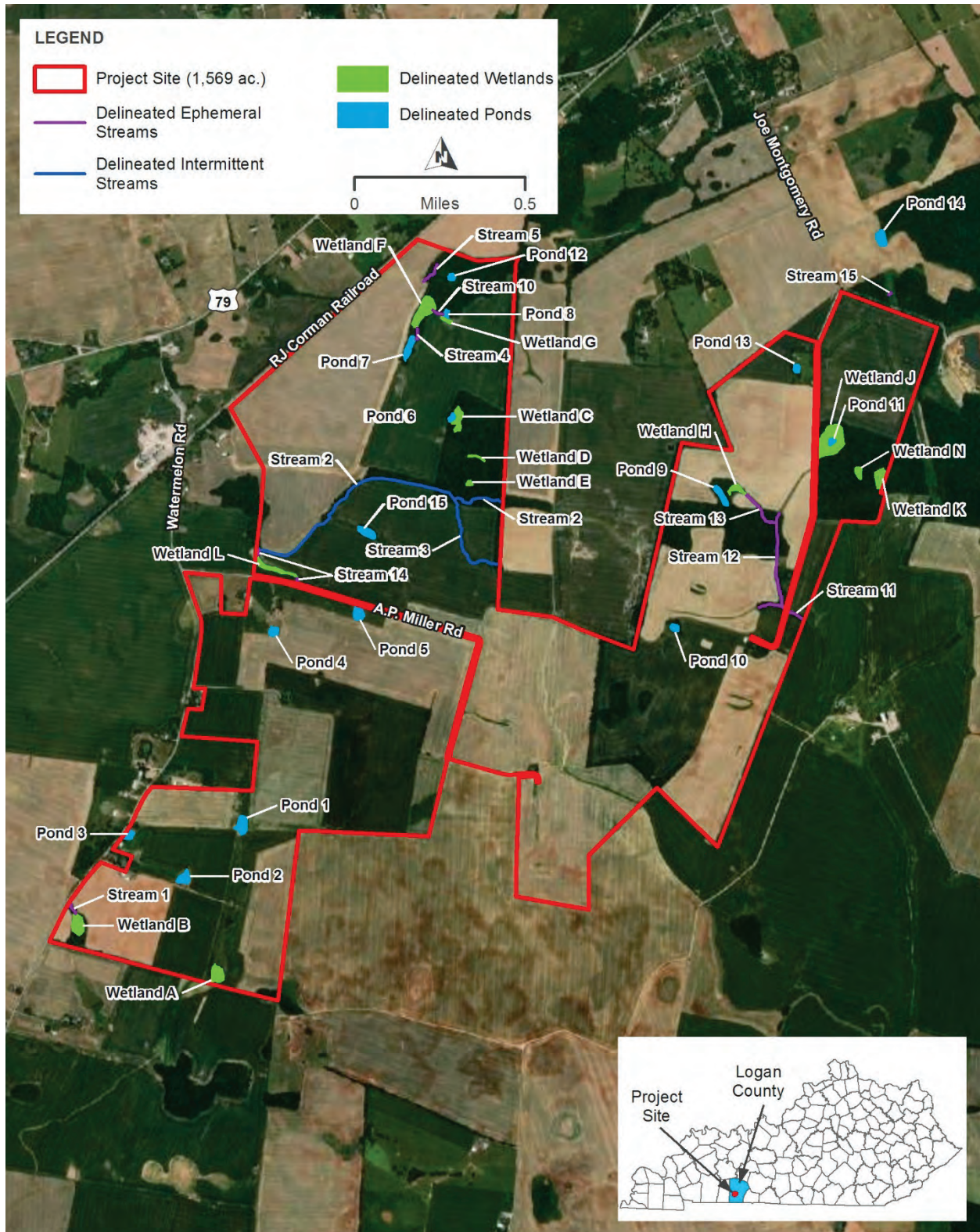


Figure 3-6. Delineated wetlands, streams, and ponds on the Project site

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 a floodplain to ensure that the Project is consistent with EO 11988, Floodplain Management.

Based on Flood Insurance Rate Map Panels 21141C0275D and 21141C0270D (effective date October 2, 2012), most of the Project site is outside the Federal Emergency Management Agency (FEMA)-identified 100-year and 500-year floodplains (Figure 3-7; FEMA 2017). A small section of a 100-year floodplain, associated with a karst feature as shown on topographic maps, lies within the northeastern portion of the Project site and overlaps the TL upgrade areas.

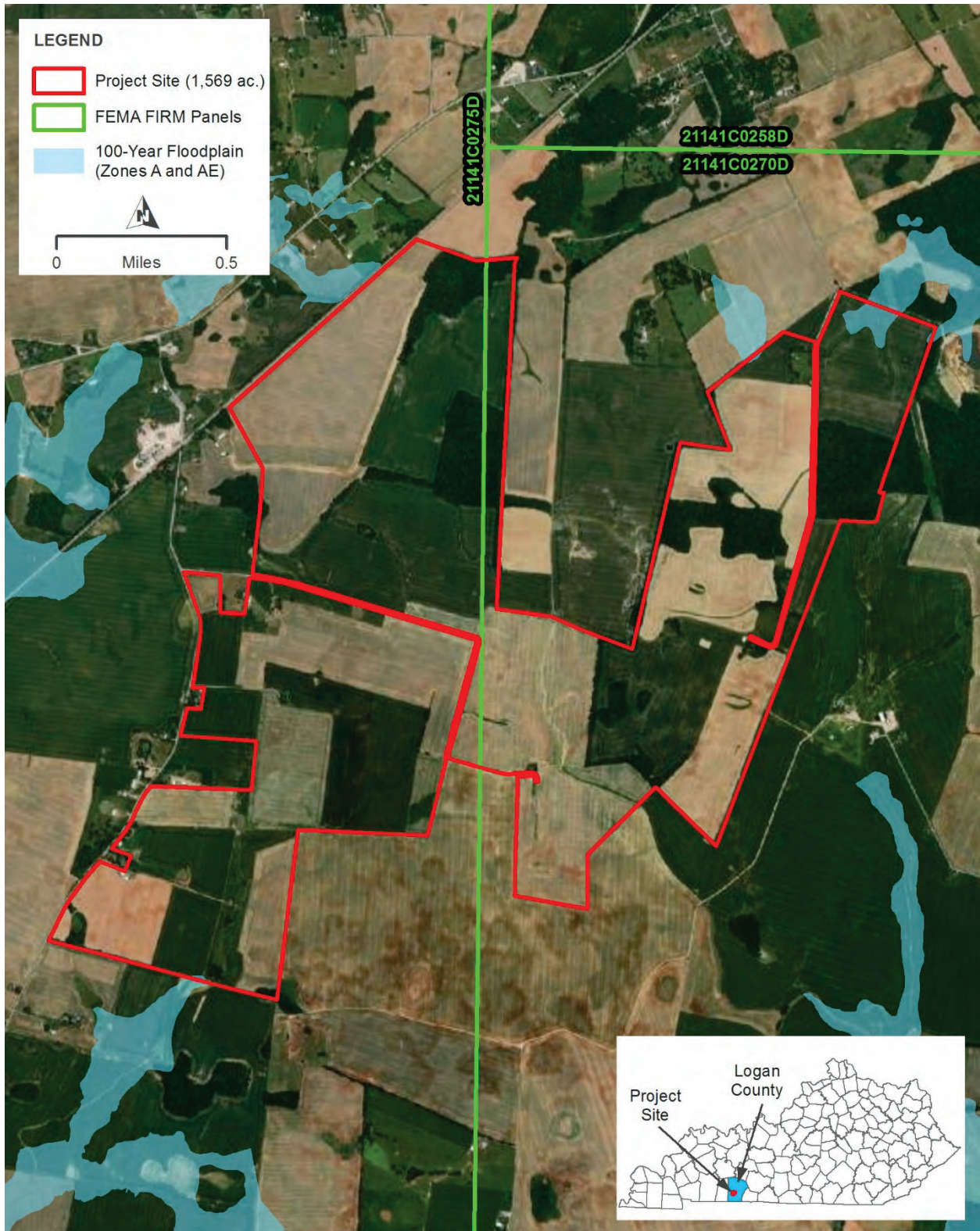


Figure 3-7. Floodplains in the Project area

3.3.2 Environmental Consequences

3.3.2.1 No Action Alternative

Under the No Action Alternative, the proposed Project would not be constructed; therefore, no direct Project-related impacts to water resources would be expected to occur. Existing land use would remain a mix of agricultural and forested land, and water resources would remain as they are at the present time. Indirect impacts to water resources could occur due to continuing agricultural use of the Project site. Erosion and sedimentation on site could alter runoff patterns on the Project site and impact downstream surface water quality. In addition, if the local aquifers are recharged from surface water runoff, chemical fertilizer and pesticide use could impact both the surface water and groundwater.

3.3.2.2 Proposed Action Alternative

Under the Proposed Action, minor direct impacts to streams and wetlands would result from construction and operation of the Project. Beneficial, indirect impacts to groundwater and surface water could result from the change in land use and establishment of permanent vegetative cover on 1,100 acres of the 1,569-acre Project site, including a reduction in fertilizer and pesticide runoff and the improvement of water quality by filtering through vegetation.

3.3.2.2.1 Groundwater

No direct adverse impacts to groundwater would result from the Proposed Action. The PV panels would have a little effect on groundwater infiltration and surface water runoff because the panels would not include a runoff collection system. Rainwater would drain off the panels to the adjacent vegetated ground. Hazardous materials that could potentially contaminate groundwater would be stored on the Project site during construction and operations. The minimal use of petroleum fuels, lubricants, and hydraulic fluids during construction and by maintenance vehicles during operations would result in the potential for small on-site spills. However, the use of BMPs to properly maintain vehicles to avoid leaks and spills and procedures to immediately address any spills that did occur would minimize the potential for adverse impacts to groundwater. If a Groundwater Protection Plan is determined to be necessary for the proposed project under 401 KAR 5:037, then the Project would comply with all requirements of that plan and any additional requirements determined to be necessary by the KDEP Division of Water.

Project activities could cause erosion resulting in the movement of sediment into groundwater infiltration zones. BMPs, such as those described in TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (TVA 2017b), would be used to avoid contamination of groundwater from Project activities. Fertilizers and herbicides would be used sparingly and in accordance with manufacturer's recommendations to avoid contamination of groundwater. Additionally, beneficial indirect impacts to groundwater could result from the change in land use.

3.3.2.2.1.1 Construction-related Water Needs

Water and sewer treatment services are currently not available at the Project site. However, both are anticipated as on-site needs during construction. Construction-related water use would support site preparation (including dust control) and grading activities. During earthwork for the grading of access roads, foundations, equipment pads, and other components, the primary use

of water would be for compaction and dust control. Smaller quantities would be required for preparation of the equipment pads and other minor uses.

Water used during construction would be provided via proposed Project groundwater wells or by delivery via water trucks. If wells are selected, Russellville Solar would conduct groundwater drilling and testing to gather information on aquifer characteristics and develop a plan for the production well design. If required, water-based drilling muds would be collected and dewatered, with runoff occurring locally into nearby field areas. Dewatered muds would be non-toxic and could be distributed as subsoil during site grading. If determined necessary, sewer treatment would be accomplished through use of a pump-out septic holding tank.

If installed, groundwater wells and the septic holding tank would be appropriately permitted and constructed to avoid impacts to groundwater. None of the proposed options for water and water-related needs would adversely affect available groundwater resources.

3.3.2.2.1.2 Operation- and Maintenance-related Water Needs

The primary uses of water during operation and maintenance-related activities would be for possible dust control (the proposed PV technology requires no water for the generation of electricity) and bathrooms, if needed, for on-site staff. The internal access roads would not be heavily traveled during normal operations, and consequently, water use for dust control is not expected. Equipment washing and any potential dust control discharges would be handled in accordance with BMPs for water-only cleaning. Precipitation in the area is typically adequate to minimize the buildup of dust and other matter on the PV panels that would reduce energy production; therefore, no regular panel washing is anticipated.

Water needs during operations and maintenance would be provided either via the proposed Project wells also used during construction or by delivery via water trucks and would not adversely affect groundwater resources.

3.3.2.2.1.3 Decommissioning and Site Reclamation-related Water and Wastewater Needs

Because conditions can change during the course of the Project, a final Decommissioning and Closure Plan would be based on conditions as found at the time of facility closure.

The Project would comply with the requirements of the KPDES through preparation and implementation of a SWPPP and filing of a NOI to comply with the General Construction Stormwater KPDES Permit. The plan would include procedures to be followed during decommissioning to prevent erosion and sedimentation, non-stormwater discharges, and contact between stormwater and potentially polluting substances.

Decommissioning and site reclamation would likely 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. See Section 2.2.5 for additional information on the decommissioning process.

3.3.2.2.1.4 Overall Groundwater Impacts

Due to the small volume of groundwater anticipated as necessary for the Project in comparison to the anticipated withdrawal rate for the Kentucky karst Midwest Paleozoic Carbonate aquifer, impacts to the local aquifer and groundwater in general are not anticipated. The use of BMPs and a SWPPP would reduce the possibility of any on-site hazardous materials reaching the groundwater during operations or maintenance. Overall, impacts to groundwater are not anticipated.

Indirect beneficial impacts to groundwater could occur if panel placement and/or the use of buffer zones lead to fewer pollutants entering groundwater. Currently, most of the on-site land use is agricultural, which provides for the possibility of fertilizer and pesticide runoff entering groundwater. Thus, the conversion of the Project site from cropland to native and/or noninvasive vegetative cover would eliminate a source of these impacts, resulting in a beneficial, though minor, indirect impact to groundwater.

3.3.2.2.1.5 Cumulative Impacts

The RFFAs such as the West Industrial Park and the Camp Property would contribute to additional changes in land use from agricultural and forested land to industrial in the area. This change may inhibit groundwater infiltration and recharge to the local aquifer. According to USGS, the Project area overlies the Kentucky karst Midwest Paleozoic Carbonate aquifer system. If the industrial land use includes paving the land surface and diverting surface water, then groundwater recharge would be expected to be lowered in the area. Cumulative impacts of past, present, and RFFAs, together with the Proposed Action, would be expected to be minor.

3.3.2.2.2 Surface Water and Wetlands

Under the Proposed Action, minor, direct adverse impacts to surface waters are expected to occur, with the use of BMPs, including maintenance of avoidance buffers around intermittent streams and all wetlands, to minimize sediment runoff during construction. Figure 3-8 illustrates stream, wetland, and pond locations relative to Project components. During the facility design process, impacts to on-site streams were avoided or minimized to the extent practicable. Care was also taken to avoid impacts to wetlands, where practicable; therefore, this Project is consistent with the requirements of EO 11990, Protection of Wetlands. However, complete avoidance of surface waters was not feasible, and the construction and operation of the Project would permanently affect approximately 16 linear feet of one non-jurisdictional intermittent stream (Stream 2) and approximately 0.01 acre of one non-jurisdictional emergent linear wetland (Wetland L) due to the construction of road crossings using culverts. The construction of the road crossings in the on-site waters would be conducted with adherence to BMPs to minimize effects. Work in the linear wetland would be completed in compliance with wetland mandates that deter significant effects. Impacts to jurisdictional waters are not anticipated from the installation of buried cables due to the use of boring or overhead methods to install these Project elements.

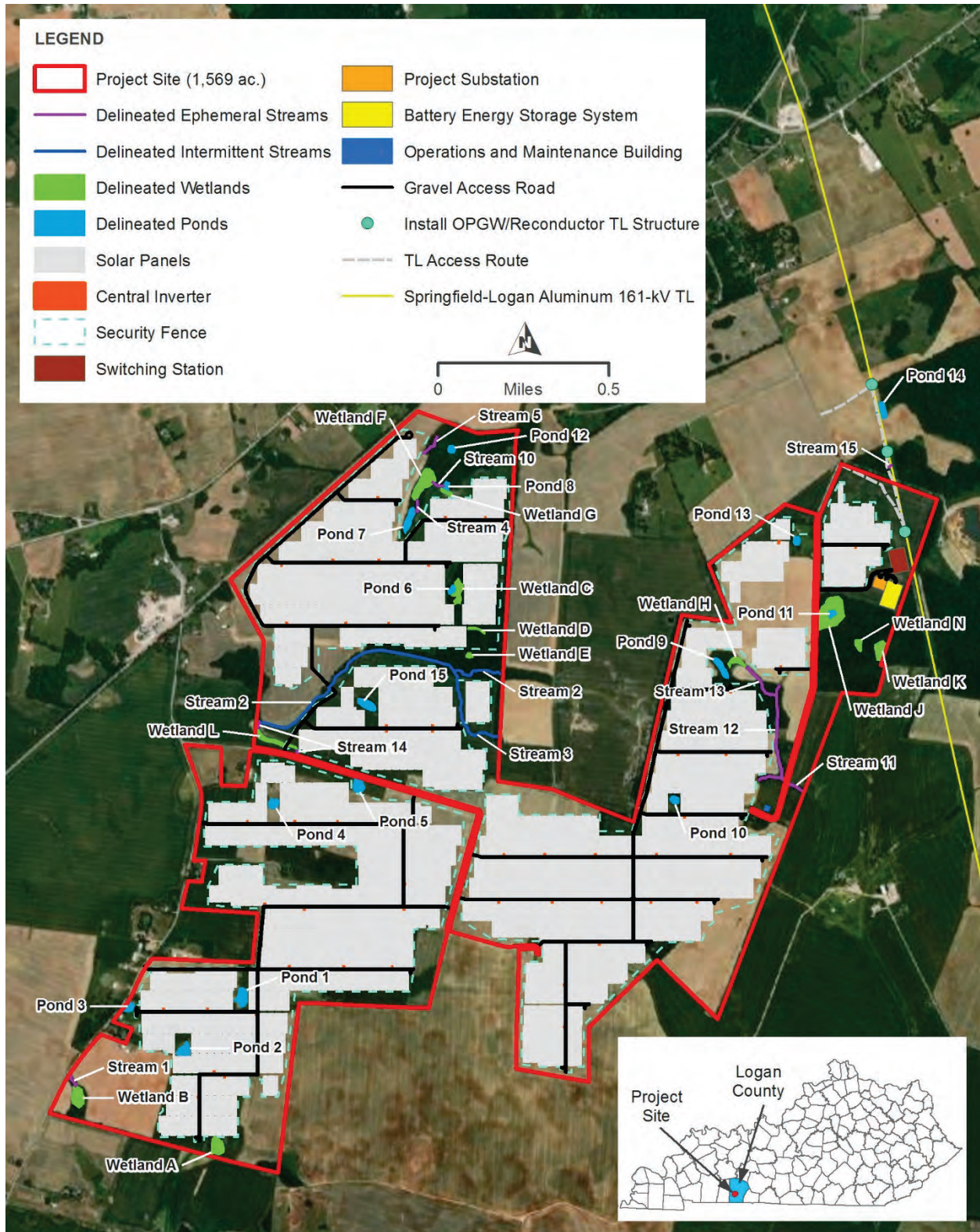


Figure 3-8. Proposed Project components in relation to delineated wetlands, streams, and ponds on the Project site and Transmission Line Upgrade Areas

3.3.2.2.1 Cumulative Impacts

As depicted on Figure 3-8, the Project is anticipated to result in impacts to approximately 16 linear feet of a non-jurisdictional intermittent stream and the fill of approximately 0.01 acre of a non-jurisdictional wetland for road crossings, and no direct impacts to jurisdictional streams or wetlands. Following construction of the facility, the existing functional capacity of the overall wetland area where the fill would occur is anticipated to be sustained, continuing to contribute similar functions and values to downstream waters. While none are anticipated at this time, if jurisdictional stream or wetland impacts could not be avoided by the Project, these would be permitted through USACE, as discussed in Section 1.4, and the work would be conducted with adherence to BMPs and compliance with wetland mandates that deter cumulative effects.

Cumulative impact analysis of wetland and stream effects takes into account waterbody loss at a watershed scale currently and within the reasonable and foreseeable future. The RFFAs within the affected watersheds would affect approximately 551 acres and approximately 18 miles of road right-of-way. These developments consist of road improvement projects and industrial complexes. Similar to the Project, these developments would also be subject to CWA jurisdiction, ensuring current and foreseeable wetland impacts are considered, permitted, and/or mitigated in accordance with wetland regulations. This regulatory oversight ensures maintenance of the chemical, biological, and physical integrity of the aquatic environment, including wetlands, within these watersheds for the long term. Cumulative effects are considered in the CWA permitting process to ensure individual waterbody impacts do not collectively result in degradation to WOTUS, including jurisdictional wetland and stream resources. Due to implementation of BMPs and adherence to NWP conditions and wetland mandates, the Project is not anticipated to contribute to cumulative stream and wetland impacts at the watershed scale.

3.3.2.2.3 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 solar facility components, Project substation, BESS, switching station, and operations and maintenance building would be located outside FEMA-identified 100-year floodplains, which would be consistent with EO 11988. Portions of the access road associated with the TL upgrades would be located within 100-year floodplains. Consistent with EO 11988, access roads are considered to be repetitive actions in the 100-year floodplain that would result in minor impacts. OPGW would be installed on one existing transmission structure that is located within the 100-year floodplain. Installing OPGW is considered to be a repetitive action in the 100-year floodplain and would result in minor impacts (TVA 1981).

With implementation of the following mitigation measures, which would also serve to minimize adverse impacts, the Proposed Action would be consistent with EO 11988 and have no significant impacts on floodplains and their natural and beneficial values:

1. Standard BMPs would be used during construction activities;
2. To the extent practicable, TL construction and maintenance activities would be scheduled during dry periods;
3. Any road improvements within the 100-year floodplain would be done in such a manner that upstream flood elevations would not be increased by more than one foot;
4. If hauled off site for disposal, excavated material would be disposed of outside the 100-year floodway;
5. When the facility is decommissioned and dismantled, deconstruction debris would be deposited outside the 100-year floodway;
6. The TL ROW would be revegetated if vegetation is removed; and
7. Construction activities would employ other standard measures for TL upgrades in floodplains, per TVA's 1981 review of repetitive actions occurring in floodplains.

3.3.2.2.3.1 Cumulative Impacts

Considering the activities and facilities described in the Chapter 3 Introduction, along with the Project, cumulative impacts to floodplains and their natural and beneficial values are expected to be minor because the only facilities, structures, and activities that would be located within the floodplain are a portion of the TL access road and OPGW on the existing TL structure. Other development that could result from construction and operation of the Project would be subject to Logan County floodplain regulations.

3.4 Biological Resources

3.4.1 Affected Environment

The Project area lies in the Interior Plateau Level III ecoregion, while the Project site is located within the Western Pennyroyal Karst Plain Level IV ecoregion (USEPA 2022a). This ecoregion is underlain by Middle Mississippian limestones and is extensively farmed. Sinkholes, ponds, springs, sinking streams, and dry valleys occur. Potential natural vegetation is mapped as a mosaic of bluestem prairie and oak–hickory forest. Barrens (i.e., bluestem prairies) were once more widespread than elsewhere in Kentucky.

Desktop surveys were performed prior to field investigations on the Project site and in TVA's TL upgrade areas. Potential vegetation, wildlife, and threatened and endangered species were researched during the desktop surveys, and habitat assessments were conducted by HDR and Austin Peay State University biologists, between May 17 and 19, 2021, and October 17 and 25, 2021, to verify whether habitat for these species occurs on the Project site and TL upgrade areas (Appendix C; HDR 2022). Field investigations included bat habitat assessments to determine the potential for bat habitat and mapped results. The findings of the desktop surveys and field investigations are described in this section.

Biological resources are regulated by several federal laws. The laws and EOs potentially relevant to the Proposed Action are described below in Table 3-6.

Table 3-6. Laws and executive orders potentially relevant to the Proposed Action

Law and/or Rule	Definition
Bald and Golden Eagle Protection Act of 1940 (BGEPA; 16 U.S.C. 668-668d)	Under the BGEPA, it is illegal to kill, harass, possess (without a permit), or sell bald and golden eagles and their parts.
Endangered Species Act (ESA; 16 U.S.C. §§ 1531-1544)	Prohibits importing, exporting, taking, possessing, selling, and transporting endangered and threatened species. The ESA also provides for designation of critical habitat and prohibits the destruction of that habitat.
EO for Invasive Species (EO 13112)	EO 13112 was issued to increase federal coordination and responses to addressing invasive species concerns. The EO established the National Invasive Species Council (NISC) and requires that a Council of Departments dealing with invasive species be created. EO 13312 revokes the preceding EO 11987 of May 24, 1977.
EO for Migratory Birds (EO 13186 of January 10, 2001) – for actions of federal agencies	This EO directs federal departments and agencies to take certain actions to conserve migratory birds and implement the MBTA. This EO requires that each federal agency taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations is directed to develop and implement, with 2 years, a Memorandum of Understanding with the Fish and Wildlife Service that shall promote the conservation of migratory bird populations.
Migratory Bird Treaty Act of 1918 (MBTA; 16 U.S.C. §§ 703-712) – for actions of non-federal entities	The MBTA establishes a federal prohibition against the following activities, unless permitted by regulations: to pursue, hunt, take, capture, kill, attempt to take, attempt to capture or kill, offer for sale, sell, offer to purchase, purchase, deliver, transport any migratory bird. This includes any part, nest, or egg of migratory birds.

To identify federally and state-listed threatened and endangered species potentially occurring in the Project area, lists obtained from TVA’s Regional Natural Heritage Database (RNHD), USFWS Information for Planning and Consultation (IPaC), and Office of Kentucky Nature Preserves (KNP) Kentucky Biological Assessment Tool (KYBAT; KNP 2021) were compiled between March and June 2021 and reviewed.

3.4.1.1 Natural Areas

According to the TVA RNHD, three natural areas are known to exist within three miles of the Project site. Baker Natural Area is located approximately three miles northeast of the Project site and is a 66-acre remnant grassland and glade ecosystem owned and managed by the Logan County Conservation District (KEEC 2022). This area is used for environmental education and is open to the public. The 14-acre Katie White Barrens Natural Area (Luckett) is located approximately 0.7 mile northeast of the Project site. Approximately 1,097 acres within three miles of the Project site have been set aside as agricultural conservation easements

through the state’s Purchase of Agricultural Easement Corporation (Kentucky Department of Agriculture 2022). There are no known natural areas located within the Project site.

3.4.1.2 Vegetation

In the Project area, including the entirety of Logan County, forested areas encompass approximately 38,493 acres, or 10.8 percent of the overall county area. Most of these are mixed forests (53.6 percent of forested areas in county), with some deciduous forest (39 percent) and some evergreen forest (7.4 percent).

The field survey of the Project site, conducted between May 17 and 19, 2021, focused on documenting plant communities, invasive plants, and conducting habitat assessments for rare, non-forest plant species and all other state and federally listed species in the Project site. The majority of the Project site is agricultural land used for corn and winter wheat production that lies on gently rolling karst plain underlain by limestone. Using the National Vegetation Classification System (Grossman et al. 1988), the field survey documented three forest types in the Project site, including four large, forested areas representative of the Appalachian-Interior-Northeastern Mesic Forest macrogroup (M883). Forested areas comprise approximately 11 percent of the Project site, and the majority of large contiguous forested areas are located in the northern portion of the Project site. Other small, forested areas are located along field margins and drainage ways and in upland areas.

Table 3-7 provides a summary of the vegetation community types as defined by Grossman et al. (1988), with five of the community types occupying less than one percent of the Project site. Dominant tree species within the forested areas include common hackberry, mockernut hickory, pignut hickory, shagbark hickory, sugar maple, red maple, tulip poplar, white ash, American elm, black walnut, black locust, honey locust, southern red oak, eastern cottonwood, post oak, black oak, eastern red cedar, and black walnut. The small flower baby blue eyes occurs in the Appalachian-Interior-Northeastern Mesic Forest vegetation community and the cypress-knee sedge occurs in the Central Hardwood Swamp Forest and the Eastern North American Marsh, Wet Meadow and Shrubland vegetative communities.

Table 3-7. Vegetation communities on the Project site and TL upgrade areas

Macro Group Level Vegetation Community Code	Vegetation Community	Area (acres)	Percentage of Project Site
CFO04	Row and Close Grain Crop Cultural Formation	1365.7	87
M883	Appalachian-Interior-Northeastern Mesic Forest	139.6	9
M013	Eastern North American Ruderal Forest	33.7	2
CSC02	Herbaceous Agricultural Vegetation Cultural Subclass	18.1	1
M503	Central Hardwood Swamp Forest	8.2	>1

Macro Group Level Vegetation Community Code	Vegetation Community	Area (acres)	Percentage of Project Site
CSC04	Agricultural & Developed Aquatic Vegetation Cultural Subclass	6.7	>1
CFO09	Lawn, Garden, & Recreational Vegetation Cultural Formation	3.5	>1
M303	Eastern-Southeastern North American Ruderal Marsh, Wet Meadow & Shrubland	1.9	>1
M069	Eastern North American Marsh, Wet Meadow and Shrubland	1.8	>1

See Grossman et al. 1988 for a description of each vegetation community.

3.4.1.2.1 Non-Native and Invasive Plants

No federal-noxious weeds (USDA 2012) were observed, but many non-native invasive plant species were observed throughout the Project site. In addition to tall fescue, invasive species observed within the Project site include Japanese honeysuckle, wintercreeper, Japanese stiltgrass, musk thistle, Johnson grass, Oriental lady’s thumb, Chinese privet, beefsteak plant, garlic mustard, poison hemlock, Asiatic dayflower, and multiflora rose. These species were most often found in ruderal forested areas, along field edges, and in areas prone to disturbance. Japanese honeysuckle, wintercreeper, Japanese stiltgrass, Oriental lady’s thumb, Chinese privet, and multiflora rose were found scattered in some of the forested stands. These species represented less than five percent of the vegetation communities they were present within on the Project site.

3.4.1.3 Wildlife

Each of the vegetative communities described in the prior section offers suitable habitat for animal species common to the region, both seasonally and year-round. Individual species and/or evidence of species observed during field investigations are listed in Table 3-8. Likely due to the fact that the Project site and vicinity are largely farmland, most species observed during the field investigations are widespread and relatively common in the area.

Table 3-8. Wildlife Species Observed on the Project Site

Species Observed (Common Name)	Notes/Habitat Observed in Study Area
Birds	
American Crow	Observed flying and perching on power poles
American Robin	Observed widely across site, home sites
Barn Swallows	Observed inside farm barns throughout
Eastern Bluebird	Observed flying over cropland
Blue Grosbeak	Observed in shrub areas
Northern Cardinal	Observed in forested stands
Common Grackle	Observed widely across site

Species Observed (Common Name)	Notes/Habitat Observed in Study Area
Common Nighthawk	Observed flying off ground nest in wheat field
Downy Woodpecker	Observed and heard in forested stands
Eastern Wood-Pewee	Observed in forested stands
Eastern Phoebe	Observed in forested stands
Eastern Towhee	Observed in forested stands
Great Blue Heron	Observed flying over site
Indigo Bunting	Observed in forested stands
Mallard	Observed in pond in the SW portion of site
Mourning Dove	Observed and heard widely across site
Northern Bobwhite	Observed flying over cropland
Pileated Woodpecker	Observed and heard in forested stands
Prothonotary Warbler	Observed in large forested stands
Red-winged Blackbird	Observed foraging in winter wheat fields
Savannah Sparrow	Observed on utility poles and over ag. fields
Tufted Titmouse	Observed near a home site
Wild Turkey	Observed at edge of forest
Black Vulture	Observed in barns where likely nesting, and flying over site
Wood Duck	Observed in a few ponds on site
<i>Amphibians</i>	
Cricket Frog	Heard near sinkhole pond wetlands in NE
Bullfrog	Heard and observed in a few ponds on site
Spring Peeper	Heard in a few wetlands
American Toad	Observed throughout forested stands
<i>Reptiles</i>	
Common Snapping Turtle	Observed in pond
<i>Insects</i>	
Carpenter bee	Observed in many barns on site
Swallowtail Butterfly	Observed in forested edges throughout site
Monarch Butterfly	Observed in northeast forested/powerline edge
<i>Mammals</i>	
Cottontail Rabbit	Observed near where forested edge meet corn field
Big Brown Bat	Captured by mist net within forested area
Eastern Red Bat	Captured by mist net within forested area
Evening Bat	Captured by mist net within forested area
<i>Tracks/Scat/Remains</i>	
Deer Track	Observed along streams and drainageways
Raccoon Track	Observed along streams and drainageways

Deciduous forests, which comprise approximately 11 percent of the Project site, provide habitat for an array of terrestrial animal species (National Geographic 2002). Birds found in this habitat

include the pileated woodpecker, red-tailed hawk, blue jay, cardinal, and American robin, all of which were observed during field investigations. Some forested areas also provide foraging and roosting habitat for several species of bats, particularly in areas where live trees exhibit exfoliating bark and/or dead-tree snags with crevices are present. Some examples of common bat species potentially found in this habitat are the big brown, eastern red, evening, hoary, and silver-haired. The coyote, eastern chipmunk, eastern woodrat, North American deer mouse, and woodland vole are other mammals potentially present in such deciduous forests (Kays and Wilson 2002). Common reptiles include the gray ratsnake, midland brownsnake, and eastern black kingsnake (Powell et al. 2016). In forested portions with water features, amphibians may include the dusky, marbled, or spotted salamanders, as well as Cope's gray tree frog (Powell et al. 2016).

Wetlands and associated vegetation areas, which compose approximately two percent of the Project site, provide habitat for such birds as the prothonotary warbler, northern harrier, red-winged blackbird, song sparrow, swamp sparrow, and white-throated sparrow (National Geographic 2002). Mammals that may utilize this habitat include the American beaver, eastern harvest mouse, marsh rice rat, muskrat, and swamp rabbit (Kays and Wilson 2002). The eastern black kingsnake, eastern ribbonsnake, common gartersnake, midland watersnake, and gray ratsnake are all potential wetland reptiles (Powell et al. 2016). The eastern red-spotted newt and three-lined salamander, as well as the American bullfrog, green frog, northern cricket frog, pickerel frog, and southern cricket frog are examples of some amphibians that may be present in wetlands on the Project site (Powell et al. 2016).

Croplands, hayfields/pastureland, and other herbaceous areas such as lawns, which together comprise approximately 89 percent of the 1,569-acre Project site and the approximately 10-acre TL upgrade areas, offer habitat to such bird species as the blue grosbeak, brown-headed cowbird, brown thrasher, common grackle, common yellowthroat, dickcissel, eastern bluebird, eastern kingbird, eastern meadowlark, eastern towhee, field sparrow, grasshopper sparrow, house finch, and northern mockingbird among others (National Geographic 2002). Mammals potentially present in fields or pasture include the eastern cottontail, eastern harvest mouse, eastern woodrat, hispid cotton rat, red fox, and striped skunk (Kays and Wilson 2002). Reptiles with the potential to occur in agricultural portions of the Project site include the eastern milk snake, gray ratsnake, and southern black racer. (Powell et al. 2016).

Review of the TVA RNHD indicated that no caves were documented within a three-mile radius of the Project site. Although no caves were observed within the Project site, five limestone sinkhole fissures/karst features, appearing like caves in the ground, were present during the field investigations, indicating the potential for bat roosting habitat.

3.4.1.3.1 Migratory Birds

EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds) directs federal agencies to take certain actions to conserve migratory birds and implement the MBTA. The MBTA prohibits the "take" of migratory birds. The regulatory definition of "take" as defined by 50 CFR § 10.12, "means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue hunt, shoot, wound, kill, trap, capture, or collect." The following prohibitions apply to

migratory bird nests: “possession, sale, purchase, barter, transport, import and export, take, and collect.” The MBTA is executed and enforced by USFWS. Logan County Solar and its contractors would act in compliance with the MBTA.

The previous discussion of wildlife lists many migratory birds known or likely to occur on the Project site. The Project site is located within the Bird Conservation Region 24 (BCR 24), Central Hardwoods (NABCI 2020), where 23 species are identified as birds of conservation concern (USFWS 2021b). These species are not listed under ESA but are a high conservation priority of the USFWS, and without additional conservation action, are likely to become candidates for listing under ESA. Thirteen of the 23 species are likely to occur within the Project site based on the presence of their suitable habitat as described in Table 3-9 below.

Both bald and golden eagles are protected by the MBTA and the Bald and Golden Eagle Protection Act of 1940 (BGEPA, 16 U.S.C. 668-668d). Under the BGEPA it is illegal to kill, harass, possess (without a permit), or sell bald and golden eagles and their parts. The suitability of the Project site as habitat for the bald eagle is not likely due to the absence of large water bodies, where nest sites concentrate (KDFWR 2021). The golden eagle is a rare winter resident in south-central Kentucky, and most reports of it have been in the vicinity of reservoirs. Wintering habitat includes a mix of forest, open habitats for foraging. The Project area encompasses suitable winter roosting and foraging habitat; therefore, the golden eagle could potentially occur in the Project area.

Table 3-9. Migratory bird species of concern potentially occurring in the Project area

Common Name	Scientific Name	General Habitat Description	Habitat on Project Site?
Migrant Species (present as spring and fall migrant and/or during winter)			
Bald Eagle	<i>Haliaeetus leucocephalis</i>	Nest in forested areas adjacent to large bodies of water. For perching they prefer tall coniferous or deciduous trees.	Not likely
Golden Eagle	<i>Aquila chrysaetos</i>	Winters in a mix of forest. Forages over open habitats.	Yes, limited
Lesser Yellowlegs	<i>Tringa flavipes</i>	Winters and migrates along mudflats, sandy beaches, shores of lakes and ponds, and wet meadows.	Yes, limited
Bobolink	<i>Dolichonyx oryzivorus</i>	Grasslands, meadows, and hayfields.	Yes, limited
Rusty Blackbird	<i>Euphagus carolinus</i>	Winters in swamps, wet woodlands, and pond edges.	Yes, limited
Semipalmated Sandpiper	<i>Calidrus pusilla</i>	Winters and migrates along mudflats, sandy beaches, shores of lakes and ponds, and wet meadows.	Yes, limited
Breeding Season Migrants (may occur only during the breeding season)			
Eastern Whip-poor-will	<i>Antrostomus vociferus</i>	Woodlands with open understory.	Yes
Chimney Swift	<i>Chaetura pelagica</i>	Forages over variety of habitats, requires chimneys or large hollow tree snags with open tops for nesting	Yes
Bewick’s Wren (Eastern)	<i>Thryomanes bewickii</i>	Overgrown fields, fencerows, woodland edges, often around buildings.	Yes, limited

Common Name	Scientific Name	General Habitat Description	Habitat on Project Site?
Prairie Warbler	<i>Dendroica discolor</i>	Various shrubby habitats, including regenerating forests, brushy fields, and Christmas tree farms	Yes
Wood Thrush	<i>Hylocichla mustelina</i>	Breeds in mature deciduous and mixed forests, forests with dense understory, and forest edges.	Yes
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	Grasslands, meadows, and hayfields.	Yes, limited
Resident Species (may occur year-round)			
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	Deciduous woodlands with oak or beech, groves of dead or dying trees, river bottoms, recent clearings, farmland, grasslands, forest edges and roadsides	Yes
Field Sparrow	<i>Spizella pusilla</i>	Old fields and brushy areas.	Yes

Source: USFWS 2021b

3.4.1.4 Rare, Threatened, and Endangered Species

Threatened and endangered species are regulated by both the federal and state governments. Database research identified three federally listed bats and two federally listed mollusk species with the potential to occur in the Project area. Two additional federally listed mollusks are known to be historic for the county. No designated critical habitats are present on the Project site. Thirty-seven species have state protective statuses or were identified by the botanist conducting the plant field survey as locally rare species. The tables in the subsections that follow describe the preferred habitat of each federally listed and state-status species and whether potential habitat is present on the Project site.

3.4.1.4.1 Federally Listed Species

Federally listed species identified during database research as having the potential to occur in Project area are shown in Table 3-10 (KNP 2021; TVA 2021, USFWS 2021a). These consist of seven species, consisting of three bats and four aquatic species, all mollusks, that are federally listed as either threatened or endangered. According to the USFWS IPaC database, no federally listed plants occur within Logan County (USFWS 2021a). Additionally, KYBAT has no records of any federally listed plants within five miles of the Project site (KNP 2021). The presence of such species is unlikely due to the predominance of highly managed agricultural land and the presence of significant populations of nonnative invasive plants in the forested areas. Moreover, a mist net survey for federally listed bats conducted on site in May and June 2021 resulted in no listed bat species being caught (Appendix C).

Table 3-10. Federally listed species potentially occurring in the Project area

Common Name	Scientific Name	Federal Status ¹	Preferred Habitat	Habitat on Project Site?
Mammals				
Gray Bat	<i>Myotis grisescens</i>	E	Roosts in caves year-round and connecting sinkhole fissures/karst features. Various foraging habitats including wet meadows, damp woods, and uplands.	Yes

Common Name	Scientific Name	Federal Status ¹	Preferred Habitat	Habitat on Project Site?
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	T	Spend winter hibernating in caves and mines, called hibernacula. Suitable summer migratory tree-roosting bat habitat consists of the presence of suitable (i.e., open enough for bats to access) drinking and foraging areas with potential roost trees (PRT). A PRT has exfoliating bark, cracks, crevices or cavities that are greater than or equal to 3-inch diameter at breast height (DBH). May also roost in abandoned buildings.	Yes
Indiana Bat	<i>Myotis sodalis</i>	E	Spend winter hibernating in caves and mines, called hibernacula. Suitable summer migratory tree-roosting bat habitat consists of the presence of suitable (i.e., open enough for bats to access) drinking and foraging areas with PRT. A PRT has exfoliating bark, cracks, crevices or cavities that are greater than or equal to 5-inch DBH. May also roost in abandoned buildings.	Yes
Mollusks				
Snuffbox Mussel	<i>Epioblasma triquetra</i>	E	Small to medium sized rivers in areas with a swift current	No
Little-wing Pearlymussel	<i>Pegias fabula</i>	E ²	Inhabits cool, clear, and relatively high gradient streams where it is found lying on a rocky stream bed in shallow water	No
Smooth Rabbitsfoot	<i>Quadrula cylindrica cylindrica</i>	T	Typically, in small to medium rivers with moderate to swift currents	No
Slabside Pearlymussel	<i>Pleuroaia dolabelloides</i>	E ²	Found primarily in large creek to moderately sized rivers. Generally observed in gravel substrates within interstitial sand, with moderate current.	No

Sources: KNP 2021, TVA 2021, USFWS 2021a; also USFWS 1997, 2006, 2015

¹ E= Endangered, T= Threatened, SSC= Species of Special Concern

² Historic for County; not listed on ECOS IPAC range shapefile (USFWS 2021a)

3.4.1.4.2 State-Listed Species

State-listed species, species of special concern, and potentially locally rare species identified during database research or in preparation of field surveys as having the potential to occur in Project area are shown in Table 3-11 (KNP 2019, 2021; TVA 2021). These consist of 19 plants; 15 aquatic species, including six mollusks, four fish, four snails, and one lamprey; and three terrestrial species, all birds. KNP provided species with potential to occur within one mile of the Project site, while the TVA RNHD database search encompassed a three-mile radius for terrestrial wildlife species and a five-mile radius for plant species. One species, small flower baby blue eyes, was not in the KNP database results for the Project area; however, this species is included in the statewide list of threatened, endangered, and special concern species (KNP 2019).

Table 3-11. State-listed species potentially occurring in the Project area

Common Name	Scientific Name	State Status	Preferred Habitat	Habitat on Project Site
Birds				
Loggerhead Shrike	<i>Lanius ludovicianus</i>	SSC	Old field, grassland/herbaceous, savanna, cropland/hedgerows, perches on fence posts.	Yes
Bachman's Sparrow	<i>Peucaea aestivalis</i>	E	Early successional areas with scattered saplings (often pines), bushes, or understory, brushy or overgrown hillsides, overgrown fields with thickets and brambles.	Yes
Common Barn Owl	<i>Tyto alba</i>	SSC	Herbaceous wetlands, riparian areas, grasslands, cropland, caves, human habitation.	Yes
Fish				
Blotched Chub	<i>Erimystax insignis</i>	E	Medium to large clear streams with moderate flow over clean gravel and coble substrates.	No
Smallscale Darter	<i>Etheostoma microlepidum</i>	E	Small rivers with shallow riffles and gravel substrates in the Lower Cumberland River drainage.	No
Flame Chub	<i>Hemitremia flammea</i>	E	Springs, shallow seepage waters, and spring-fed streams usually over gravel in areas where aquatic vegetation is abundant.	No
Redspotted Sunfish	<i>Lepomis miniatus</i>	T	Swamps, oxbow lakes, creeks, and small to moderately sized rivers. Usually associated with vegetation as well as muddy and sandy benthic.	No
Mollusks				
Elktoe	<i>Alasmidonta marginata</i>	T	Small creeks and streams.	No
Tennessee Clubshell	<i>Pleurobema oviforme</i>	E	Moderate flow streams.	No
Purple Lilliput	<i>Toxolasma lividus</i>	E	Riffle habitats in small to medium-sized rivers and creeks.	No
Mountain Creekshell	<i>Villosa vanuxemensis</i>	T	Endemic to Tennessee and Cumberland River systems.	No
Mammoth Cave Crayfish	<i>Orconectes pellucidus</i>	SSC	Subterranean streams, cave systems.	Yes
Mud River Crayfish	<i>Orconectes ronaldi</i>	No Status	Subterranean streams, cave systems, small rivers with cobble and gravel.	No
Lamprey				
Chestnut Lamprey	<i>Ichthyomyzon castaneus</i>	SSC	Medium and large rivers, large reservoirs, larvae burrow in bottom of smaller streams with moderate current.	No
Snails				
Onyx Rocksnail	<i>Leptoxis praerosa</i>	SSC	Medium sized rivers, on rocks in riffles with good flow.	No
Rugged Hornsnail	<i>Pleurocera alveare</i>	SSC	Restricted to large rivers with solid substrates.	No
Shortspire Hornsnail	<i>Pleurocera curta</i>	SSC	Smaller rivers and streams.	No

Common Name	Scientific Name	State Status	Preferred Habitat	Habitat on Project Site
Whitewashed Rabdotus	<i>Rabdotus dealbatus</i>	T	Open glades and meadows.	No
Plants				
Broadwing Sedge	<i>Carex alata</i>	T	Open wet prairies and sinkhole swamps.	Yes
Cypress-knee sedge	<i>Carex decomposita</i>	T	Swamps, sinkhole ponds, often on floating logs or cypress knees.	Yes
Carolina Larkspur	<i>Delphinium carolinianum</i>	T	Dry woods, prairies, and sandhills.	No
Hairy Fimbristylis	<i>Fimbristylis puberula</i>	T	Only glades and dry rocky prairies.	No
Upland Swamp privet	<i>Forestiera ligustrina</i>	T	Soils near/on rocky slopes and along streams in barrens and glades.	No
Sharp-scaled Manna-grass	<i>Glyceria acutiflora</i>	E	Wetlands and pond fringes.	Yes
Plain's Rush	<i>Juncus filipendulus</i>	T	Wet limestone glades.	No
Necklace Glade-cress	<i>Leavenworthia torulosa</i>	T	Limestone glade outcrops.	No
Small Flower Baby Blue Eyes	<i>Nemophila aphylla</i>	T	High-nutrient rich forest with history of disturbance.	Yes
Sundrops	<i>Oenothera triloba</i>	T	Limestone glades and dry gravelly outcrops.	No
Soft False Gromwell	<i>Onosmodium molle</i> ssp. <i>molle</i> (<i>Lithospermum molle</i>)	H	Dry prairies, glades, and limestone bluffs.	No
Limestone Fame-flower	<i>Phemeranthus calcaricus</i>	E	Limestone glade outcrops.	No
White Heath Aster	<i>Symphyotrichum priceae</i>	E	Limestone and glade outcrops.	No
Blue Wild-indigo	<i>Baptisia australis</i> var. <i>minor</i>	SSC	Glades, barrens, prairie patches and open woodlands.	No
Purple Prairie-clover	<i>Dalea purpurea</i>	SSC	Dry prairies and limestone barrens.	No
Hair Grass	<i>Muhlenbergia glabrifloris</i>	SSC	Mesic to wet prairie remnants, occurs in areas of repeated disturbance.	Yes
Prairie-dock	<i>Silphium pinnatifidum</i>	SSC	Dry prairies and glades and occasionally found in mesic prairies.	No
Barrens Silky Aster	<i>Symphyotrichum pratense</i>	SSC	Dry prairies and glades.	No
Eggleston's Violet	<i>Viola egglestonii</i>	SSC	Limestone glade outcrops.	No

Sources: Office of Kentucky Nature Preserves 2019, 2021 (Rare Species by County); TVA 2021

E= Endangered, T= Threatened, H=Historic, -- = Not Listed/recently discovered, SSC= Species of special concern

Two state-listed plant species was documented on the Project site. A small population of cypress-knee sedge was found in a high-quality sinkhole swamp community. Specimens of this sedge were found growing on bases of emergent trees and also as free-standing tussocks in

shallow water. This sedge was absent from other ponds on site, as most onsite ponds are either man-made or affected by agricultural practices. This plant community is vulnerable, with relatively few populations or occurrences known. The other state-listed species, the small flower baby blue eyes, was found in several locations with some occurrences consisting of large colonies. Kentucky is at the northern edge of the range of this species and has been previously documented in Fulton and Hickman counties in western Kentucky (Shaw et al. 2021). Habitat for this species includes nutrient-rich forests with a history of disturbance, and it is generally a weedy species with broad ecological tolerance. On the Project site, the plant occurred in the Appalachian-Interior-Northeastern Mesic Forest community in areas with trees that appear to be less than 40 years old. The survey report concluded that this species has likely been widely overlooked in prior botanical surveys and is fairly common in the Project vicinity.

Two other state-listed plants were found just outside the Project site, but suitable habitat for them exists on the Project site. The broadwing sedge occurs in open wet prairies and sinkhole swamps. Specimens were identified within 750 feet of the Project site and suitable habitat exists on the Project site around the sinkhole pond east of Montgomery Road and along thin wet woods on the eastern site border. The sharp-scaled manna grass was also collected approximately 750 feet from the Project site. Suitable habitat exists around the sinkhole pond east of Joe Montgomery Road where it could occur in the seedbank.

3.4.2 Environmental Consequences

3.4.2.1 No Action Alternative

Under the No Action Alternative, there would be no Project-related impacts to natural areas, vegetation, wildlife, or rare, threatened and endangered species. Existing agricultural areas on the Project site would likely remain in agricultural production, and prairie species would continue to use the area for habitat. Over time, the open-field areas on the Project site could become developed, and the forested areas could become cleared if the population in the area increases or land uses change.

3.4.2.2 Proposed Action Alternative

Under the Proposed Action, direct impacts to vegetation and wildlife would result from construction and operation of the Project.

3.4.2.2.1 Natural Areas

The Proposed Action is not anticipated to have any impacts on the biological resources associated with natural areas in the vicinity because of the nature of the Proposed Action and the distance of these areas from the Project site.

3.4.2.2.2 Vegetation

Under the Proposed Action, the solar facility would have direct impacts to vegetation. With the exception of avoidance buffers surrounding wetlands, intermittent streams, and sinkhole fissures/karst features, trees within the fenced-in area of the solar facility would be removed for grading and to prevent shading of the solar arrays. These trees total about 93 acres of forested land. Vegetation would also be removed for the construction of the proposed Project substation,

switching station, BESS, and associated access roads. Tree clearing for the TL upgrades would be limited to removal of small trees and tree limbs along existing access roads.

Following construction, disturbed portions within the fenced-in area of the solar facility would be seeded with native grasses and/or noninvasive vegetation, including plants that tend to attract pollinators. Vegetation on developed portions of the Project site would be maintained to control growth through occasional mowing but primarily by grazing sheep. The sheep would graze the vegetation and be moved between fenced paddocks to maintain appropriate vegetation height. The sheep would help maximize plant and animal diversity on the Project site. The sheep would disperse seeds, both from their coats and through their manure, and their movement around the site would establish new plant growth and greater diversity in species composition. Routine management of vegetation within non-agricultural portions of the TL upgrade areas would be conducted under an integrated vegetation management approach designed to encourage the low-growing plant species and discourage tall-growing plant species.

Invasive species on the Project site would be removed or graded and cleared during construction and managed with selective herbicides as needed during operations. To minimize the introduction and spread of invasive species, standard operating procedures would be consistent with EO 13112 (Invasive Species) for revegetating the area with noninvasive plant species. Construction of the Project would likely result in localized increases of invasive plants, but the plants most likely to colonize the area are distributed widely throughout the region. Effects would be further reduced because revegetation of the site would be accomplished using native and/or noninvasive species. The Project would not significantly contribute to the spread of exotic or invasive species.

Planned tree removal associated with the Project has been minimized to the extent possible in the design process. Approximately 93 acres of forested land, about half of the existing forested land on the Project site, would be cleared for the Project. Except for the impacted portion of the jurisdictional waters as described in Section 3.3.2., Project components would not be constructed within a 50-foot buffer of wetlands and intermittent streams and within a 100-foot buffer of sinkhole fissures/karst features, and the buffered areas would generally be avoided during construction, as described in Section 2.2.2.

Taking into consideration the total of about 38,500 acres of forested land in Logan County, clearing the existing vegetation, including 93 acres or approximately 50 percent of existing forest on the Project site, and light grading would be considered minor impacts. Approximately 1,394 acres (89 percent) of the 1,569-acre Project site are agricultural fields, pastures, or otherwise cleared, open land, while approximately 188 acres (11 percent) of the Project site are forested. The loss of 93 acres of forested land would amount to approximately 0.24 percent of overall forested land countywide. The surrounding area consists of similar vegetation communities of mostly agricultural land and some forested areas; therefore, the effects of the conversion of portions of the Project site in this context would be relatively minor.

3.4.2.2.3 Wildlife

The construction and operation of the solar facility would impact the wildlife on the Project site through the removal of about 93 acres of forest and conversion of most of the site to a mix of grasses and herbaceous plants, including those that tend to attract pollinators, growing under and around the solar arrays. The forest that would be removed generally occurs in small patches within the agricultural landscape and in linear patches along field borders or streams and consists of mixed deciduous forests. Several nonnative invasive plant species were observed in the forested areas, particularly in the bottomland areas of the Project site adjacent to the larger stream channels. Although these areas may be in small patches or linear, they represent areas of refuge or corridors for movement for forest-dependent wildlife. The removal of forested habitat from the site would have direct and indirect adverse effects on the wildlife species that utilize this habitat. This would result in the temporary to long-term displacement of wildlife (primarily common native or naturalized species) using the area. Less mobile species would likely be eliminated, as would species that are unable to find nearby suitable habitats. The Project site would allow for movement through the area, as the Project fences would not surround the entire site and, thus, would allow wildlife movement between the fences. Overall, the proposed action would have minor adverse impacts on populations of common wildlife species. These impacts would be partially offset by minor beneficial effects from the Project sheep grazing operation. Vegetation management of the site, intended to provide fodder for the sheep, would help maximize animal diversity on the Project site by creating pollinator habitat and encouraging ground-nesting bird habitat by allowing seed heads to reach maturity wherever possible.

3.4.2.2.3.1 Migratory Birds

Thirteen of the 23 birds of conservation concern are likely to occur on the Project site based on suitable habitat. The clearing of forest would eliminate potential habitat for the wood thrush, Kentucky warbler, eastern whip-poor-will, chimney swift, and red-headed woodpecker as well as other more common migratory birds inhabiting forests. The removal of wooded and brushy fencerows and scattered large trees would eliminate potential habitat for the Bewick's wren, prairie warbler, and field sparrow. Areas of the TL ROWs that are not maintained as grassland or cropland would provide habitat for the prairie warbler and, when adjoining woodland, particularly near the end of their vegetation management cycles when shrubs and tree saplings would be most prevalent. The Project would establish 50-foot avoidance buffers surrounding wetlands and intermittent streams and would maintain the existing riparian vegetation for the most part. Therefore, the Project effects to wetlands and riparian vegetation would result in a negligible to minor impact to populations of migratory birds.

Although construction and operation of the Project may reduce the foraging potential on the Project site and in the TL upgrade areas, the Project is not anticipated to have an effect on populations of migratory birds that require open country with scattered trees and shrubs, such as the prairie warbler. Similar habitat type is available adjacent to the Project site, including approximately 38,493 acres for forested lands across the county, and would likely absorb displaced individuals.

With the maintenance of 50-foot buffers surrounding wetlands and intermittent streams, 100-foot buffers surrounding sinkhole fissures/karst features, and approximately 50 percent of the existing forest areas, the Project would minimize impacts on mature, deep, and shady bottomland forest, which provides habitat for species such as the wood thrush and Kentucky warbler. Therefore, the Project would have minor adverse effects on these species. Any effects would be limited in scale relative to the surrounding available habitat.

Overall, while the implementation of the Project would reduce habitat for some migratory bird species, particularly those occupying woodlands, the effect on migratory birds, while adverse, will be localized and minor.

Bald eagles are unlikely to nest or forage on the Project site due its distance from large waterbodies. In addition, no bald eagle nests have been documented within three miles of the Project site. Therefore, the Project is not anticipated to have an impact on bald eagles. Due to the rarity of golden eagles in the region and the availability of suitable roosting and foraging in nearby similar habitat, the Project is not expected to impact golden eagles.

3.4.2.2.4 Rare, Threatened and Endangered Species

Suitable habitat exists for the federally listed northern long-eared bat, Indiana bat, and gray bat and for the state-listed mud crayfish, mammoth cave crayfish, loggerhead shrike, Bachman's sparrow, and the common barn owl. Forested areas, one of the five sinkhole fissures/karst features, one abandoned well, and 12 buildings on the Project site provide potential bat roosting and/or foraging habitat for federally listed bat species. However, no listed bat species were caught during an onsite mist net survey conducted in late May through early June. In addition, no signs of bat use (i.e., staining, guano, bats themselves) were observed in and around the abandoned well. Ninety-three acres of trees and shrubby vegetation, representing half of the forested areas on the Project site, and four of the 12 buildings on site would be removed for the Project. The Project would avoid impacts to the five identified sinkhole fissures/karst features by maintenance of minimum 100-foot buffers. Building removal would occur between October 15 and March 31 in order to avoid potential impacts to roosting bats. In compliance with Section 7 of ESA, TVA consulted with USFWS on the potential effects of the Proposed Action on gray bat, Indiana bat, and northern long-eared bat, and USFWS concurred with TVA's "may affect but not likely to adversely affect" determinations in a letter dated June 6, 2022 (Appendix C).

Impacts to potential habitat for the mud crayfish and mammoth cave crayfish would be avoided since there are no road crossings over the stream channels that may provide subterranean stream habitat for these crayfish species. Therefore, the Project would likely not impact these species.

Three state-listed bird species are likely to occur on the Project site based on suitable habitat. Although the implementation of the Project will reduce habitat for some species, particularly those occupying woodlands, the effect on bird species will be localized and minor.

Impacts to the population of the cypress-knee sedge would be avoided by the maintenance of a buffer area around its sinkhole swamp habitat. Six of the 11 occurrences of the small flower

baby blue eyes would be impacted by tree clearing. The other five occurrences, including the largest and most vigorous occurrence in a mature beech/maple forest in the northeast portion of the Project site, would not be affected. While this species would be adversely affected, the impacts would not be significant at the regional or state level. Its discovery in the Project area represents a major increase in the range and number of occurrences in Kentucky, and the loss of some of these newly discovered occurrences would not affect its viability in the state or the vicinity of the Project area.

Overall, implementation of the Proposed Action is not likely to adversely affect federally listed species, including the three federally listed bat species that have potential in the Project area, and would result in minor and insignificant impacts to state-listed species. (Appendix C).

3.4.2.3 Cumulative Impacts

RFFAs may occur at multiple locations near the Project site, and these other projects would affect vegetation and wildlife habitat. However, given that agriculture is the dominant land use in the areas suited for development, future development would likely not result in significant impacts to important terrestrial habitats. While RFFAs in the surrounding region will likely remove available habitats for wildlife in the foreseeable future, the impacts of the Project would not result in significant cumulative impacts to vegetation and wildlife due to the relatively small area of forest to be removed (93 acres; 0.24 percent of forested land within Logan County) and maintenance of the site as grassland/pasture that would encourage pollinator and ground-nesting bird habitat. The Project is not expected to result in significant cumulative impacts to threatened and endangered terrestrial wildlife and plant species, as the Project is not likely to adversely affect federally listed species and would result in minimal impacts to state-listed species.

There are several RFFAs in the Project area that include the use of undeveloped lands to support industrial or other intensive developments. These projects and their associated direct and indirect impacts would likely gradually degrade existing streams and threatened and endangered aquatic species within the Project area over the next several decades. Negative Project impacts resulting from cumulative impacts may be lessened by the proposed mitigation measures outlined in Section 2.5. Cumulatively, the Project would contribute to the long-term conversion of agricultural and disturbed lands to industrial uses. However, this cumulative impact would not be significant because of the marginal value of these lands for species and habitat protection.

3.5 Visual Resources

3.5.1 Affected Environment

Visual resources compose the visible character of a place and include both natural and human-made attributes. Visual resources influence how an observer experiences a particular location and distinguishes it from other locations. Such resources are important to people living in or traveling through an area and can be an essential component of historically and culturally significant settings. For this analysis, the scenery management system and associated analytical assessment procedures developed by the U.S. Forest Service are adapted for use within a natural and human-built environment and integrated with planning methods used by

TVA (after TVA 2016; USDA 1995). The general Project area viewshed is evaluated based on its scenic attractiveness and scenic integrity. Scenic attractiveness is a measure of the scenic beauty of a landscape based on perceptions of the visual appeal of landforms, waterways, vegetation, and the human-built environment. Scenic attractiveness is assessed as either distinctive, typical/common, or indistinctive. As adapted for this analysis, scenic integrity measures the degree of visual unity of the natural and cultural character of the landscape. Scenic integrity is evaluated as either low, moderate, or high. This analysis also considers the existing character of the Project site as an important factor in understanding the affected environment.

The Project site is in a rural agricultural area with isolated single-family homes and agricultural buildings scattered across the site. A few small rural-residential concentrations and businesses adjacent to highways are present in the Project area. The Project site is predominantly flat to gently sloping agricultural land with scattered forested areas and some wetlands, streams, ponds, and karst features. Scenic attractiveness of the general Project area viewshed is rated as typical or common of a rural agricultural and rural residential area. Scenic integrity is assessed as moderate to high due to the relative unity of the surrounding natural and cultural character. Photo 3-1 and Photo 3-2 show general views of the Project site.



Photo 3-1. Agricultural land and wooded field border on the Project site



Photo 3-2. Forested area on the Project site

Locations surrounding the Project components would be visible (i.e., viewpoints or vantage points) include small rural-residential concentrations along Watermelon Road, US 79, Joe Montgomery Road, and Green Downs Road; isolated single-family homes along A.P. Miller Road, Marian Acres Road, and Kees Road; four businesses, two along Watermelon Road two along US 79; a church along US 79; and the RJ Corman Railroad (Table 3-12; Figure 3-9).

Table 3-12. Viewpoints in the vicinity of the Project site

Receptor Location	Description	Receptor Type	Views to Project Site
Watermelon Road	Two-lane paved public road that extends north-south along the western boundary of the Project site.	Rural residential concentration Businesses Road travelers	Partially obscured by mature deciduous trees
A.P. Miller Road	Two-lane gravel road that traverses east-west through western and central portions of the Project site. Provides access to the Project site through its connection with Watermelon Road.	Isolated single-family home	Unobstructed

Receptor Location	Description	Receptor Type	Views to Project Site
Joe Montgomery Road	Two-lane road with paved and gravel portions that traverses north-south through eastern portions of the Project site. Provides access to the Project site through its connection with US 79.	Rural residential concentration Road travelers	Partially obscured by mature trees
US 79	Two-lane undivided federal highway that extends northeast-southwest, approximately a quarter mile from the northwestern terminus of the Project site.	Rural residential concentration Businesses Church Road travelers	Partially obscured by mature deciduous trees
Marian Acres Road	Two-lane road that extends east-west near the northeastern portion of the Project site that connects to Joe Montgomery Road.	Isolated single-family homes	Partially obscured by mature deciduous trees
Green Downs Road	Two-lane road that extends northwest-southeast near the southeastern portion of the Project site.	Isolated single-family homes	Unobstructed
Kees Road	Two-lane road that extends northwest-southeast near the southeastern portion of the Project site.	Isolated single-family home	Partially obscured by mature deciduous trees
RJ Corman Railroad	Short line railroad that extends north-south adjacent to the western boundary of the Project site.	Train personnel	Unobstructed

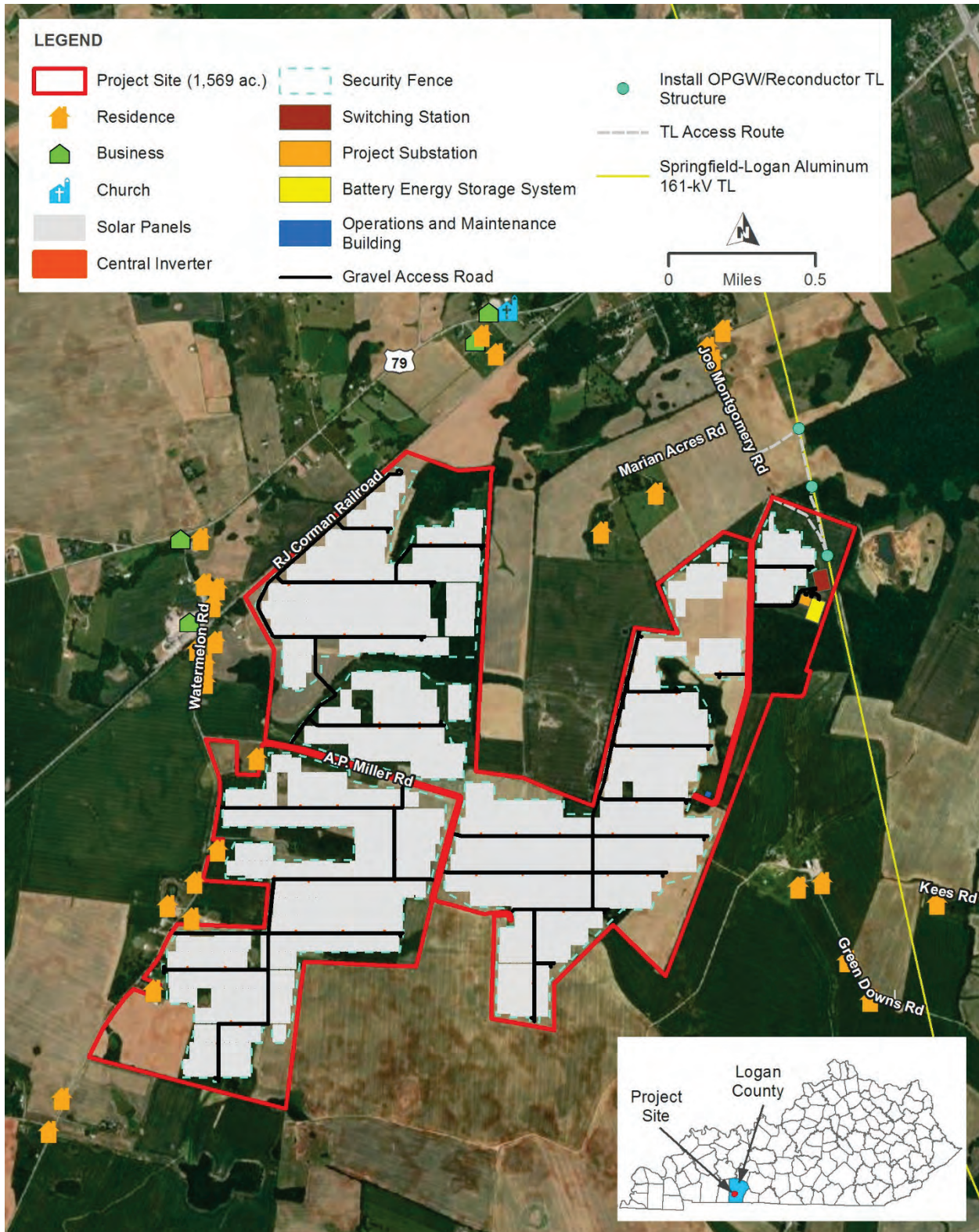


Figure 3-9. Viewpoints in the vicinity of the Project site

Long-range views from viewpoints near the Project site, primarily along or off of Watermelon Road, Joe Montgomery Road, US 79, Marian Acres Road, and Kees Road, are generally

partially obscured by mature deciduous trees, as well as those framing fields and/or roads nearby. However, some portions of Watermelon Road have relatively unobstructed views to the Project site (Photo 3-5). Long-range views from visual resources near the Project site along A.P. Miller Road, Green Downs Road, and RJ Corman Railroad are relatively unobstructed (Photo 3-6).



Photo 3-3. View to Project site looking east from 1209 Watermelon Road



Photo 3-4. View to Project site looking east along AP Miller Road, about 100 yards east of Watermelon Road

3.5.2 Environmental Consequences

3.5.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed; therefore, no Project-related impacts to visual resources would result. Existing views of the Project site would remain relatively unchanged from the predominant mix of agricultural and forested land. However, if the Project site were to be developed by other parties and the city of Russellville were to expand southward, impacts to visual resources in the Project area would be likely. Visual changes may occur over time as vegetation on the Project site changes. For example, if the Project site were no longer cultivated or mowed, vegetation would change from low-profile plants to shrubs and trees.

3.5.2.2 Proposed Action Alternative

Under the Proposed Action Alternative, Russellville Solar would construct and operate a 173-MW AC single-axis tracking PV solar power facility. Visual concerns are often associated with both large- and small-scale solar facilities and their electrical infrastructure. The Project site is predominantly flat to gently sloping terrain, and the Project would convert what is currently agricultural and forested lands to an industrial use mostly consisting of low-profile PV arrays. Figure 3-9 shows the proposed Project elements and the locations of nearby vantage points (receptors) from which Project elements may be visible. Photo 3-5 and Photo 3-6 show representative views of the type of solar panels proposed for the Project. In the evening, when panels would be facing west, the more pronounced visual effects would largely occur from vantage points to the west of the Project site, along Watermelon Road, A.P. Miller Road, Joe Montgomery Road, US 79, Marian Acres Road, and RJ Corman Railroad.



Photo 3-5. Single-axis, tracking photovoltaic system with panels near maximum tilt as viewed from the east or west



Photo 3-6. The backside of the solar panels in early morning or late afternoon configuration

Construction activities would temporarily alter the visual character of the Project area. During construction, heavy machinery would be present, changing the appearance from area vantage points. Within the 1,100-acre area to be developed for the Project, trees and other tall vegetation would be removed, and portions of the area would be graded, changing the contour, color, and texture of the scenery attributes. During and after grading, the Project site would appear as a mixture of neutral colors such as browns and grays due to earthmoving, road construction, and concrete activities. Water would be used to keep soil from aerosolizing; thus, dust clouds are not anticipated. Visual impacts from construction would be minimal at night, as most construction is anticipated to occur during the day. Overall, there would be minor direct and indirect impacts to visual resources in the Project area during the construction phase of the Proposed Action. However, these impacts would be temporary, lasting approximately 14 to 18 months, subject to weather.

Without the installation of visual screening such as planted trees or other visual buffers, the manufactured, structured appearance of the built facility would be most apparent from vantage points surrounding the Project site along Watermelon Road, A.P Miller Road, Marian Acres Road, Green Downs Road, and RJ Corman Railroad (Photos 3-7, 3-8). However, in following county requirements for solar facilities, the Project would include vegetative buffer composed of a double row of eight-foot-high trees would be planted in a staggered pattern around the perimeter of the site approximately 10 feet from the Project site boundaries, where existing natural buffers are not sufficient in shielding views of the facility (Photos 3-9 and 3-10). A screen would be added to the security fence for additional visual buffering. The installation of both the

tree buffer and screen can be waived by landowners having at least 1,000 continuous feet of property adjacent to the project site, as approved by the Logan County Fiscal Court. The Project would also adhere to county-required setbacks of Project components of 100 feet from adjacent property boundary lines and public road and railroad ROWs and 250 feet from residences, schools, churches, hospitals, nursing facilities, and cemeteries (Logan County 2022). By following these county requirements, views to the Project site from surrounding viewpoints would be minimized.

Where the screening plan is waived by affected landowners or topography reduces the efficacy of the buffer and depending on the direction of views to the Project site, the Project would be more visually intrusive in the morning and late afternoon, when the panels would be facing east or west, respectively, at their maximum tilt, with the upper edge of the panels about eight feet from the ground. This effect would be least at mid-day, when the panel profile would be flat and about five feet tall. The anti-reflective PV panel surfaces would minimize glare and reflection. Lighting associated with the Project would be downward-facing and/or low glare to minimize impacts to surrounding areas.

The visual alteration from agricultural and forested land in an area where scenic integrity is rated as moderate to high due to the relative unity of the surrounding natural and cultural character to a large solar facility is expected to result in minor adverse visual impacts. Overall, the visual effects of the built facility are expected to be negligible to minor due to the visibility of relatively small portions of the Project elements due to Project adherence to the planting of tree buffers and fence screen. Visual effects from the Project would be minimal on a larger scale, due to variation of the visual attributes of the Project area as distance from the Project increases.



Photo 3-7. Unbuffered view of simulated PV arrays looking east from 1209 Watermelon Road.



Photo 3-8. Unbuffered view of simulated PV arrays looking east along AP Miller Road, about 100 yards east of Watermelon Road. The PV arrays are in the background to the left (north) of the road.



Photo 3-9. Buffered view of simulated PV arrays looking east from 1209 Watermelon Road.



Photo 3-10. Buffered view of simulated PV arrays looking east along AP Miller Road, about 100 yards east of Watermelon Road.

TVA would perform network upgrades to approximately 2,500 feet of its existing Springfield-Logan Aluminum 161-kV TL. If used, a helicopter would be visible to several residences and travelers along Joe Montgomery Road, Marian Acres Road, and US 79 during the installation of OPGW for approximately two days. Other equipment associated with the TL upgrades may also be visible for the two-day duration. Overall, the TL upgrade work would likely result in temporary, minimal to minor impacts to the scenery at viewpoints near the northeast portion of the Project site.

3.5.2.3 Cumulative Impacts

The Proposed Action would alter the visual character of the Project site by converting a large area of agricultural and forested land to numerous low-profile parallel rows of PV panels, an electrical substation, switching station, and a BESS. Much of the developed Project site would be screened from nearby public roads and residences. The visual impacts at other locations around the site perimeter would be low to moderate and mostly at middle-ground distances. The potential industrial development of the RFFAs in the Project area could result in greater visual impacts due to the size of the buildings and supporting infrastructure. Because the visual impacts of the Proposed Action would be comparatively low and localized, the Proposed Action has little potential to result in adverse cumulative visual impacts.

3.6 Noise

3.6.1 Affected Environment

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). The human ear does not perceive all sound frequencies equally well. Therefore, measured sound levels are adjusted or weighted to correspond more closely to noise perceived by human hearing. The adjusted noise metric that most closely duplicates human perception of noise is known as the A-weighted decibel (dBA). The threshold of human hearing is 0 decibels (dB), and the threshold of discomfort or pain is around 120 dB.

A day-night average sound level (L_{dn}) is a 24-hour noise descriptor used to assess noise impacts for land uses where people sleep and there is a heightened sensitivity to nighttime noise. The L_{dn} noise metric is recommended by USEPA and has been adopted by most federal agencies (USEPA 1974). An L_{dn} of 65 dBA is the threshold level most commonly used for noise planning purposes, representing compromise between community impact and the need for activities such as construction. The dBA is the adjusted noise metric that most closely duplicates the human perception of noise. Areas exposed to an L_{dn} above 65 dBA are generally not considered suitable for residential use. An L_{dn} of 55 dBA was identified by USEPA as a level below which there is no adverse impact (USEPA 1974). For reference, approximate noise levels (measured in dBA) of common activities/situations are provided in Table 3-13.

Table 3-13. Noise Levels of Common Activities/Situations

Activity/Event	dBA
Lowest audible sound to person with average hearing	0
Quiet rural, nighttime	25
Quiet urban, nighttime	45
Large business office	60
Normal speech at 3 feet	70
Noisy urban area, daytime	75
Food blender at 3 feet	90
Gas lawn mower at 3 feet	100
Jet flyover at 1,000 feet	110

Source: Caltrans 2018

The Project site is primarily agricultural and rural-residential, with scattered forest, wetlands, streams, and ponds. Ambient noise at the Project site consists mainly of agricultural sounds, such as noises from farm machinery; natural sounds, such as from wind and wildlife; and moderate traffic sounds. Noise levels of these types generally range from 45 to 55 dBA (USDOT 2015).

The Project site and a surrounding 0.5-mile radius were examined to identify potential noise-sensitive receptors. Noise-sensitive receptors are defined as those locations or areas where dwelling units or other fixed, developed sites of frequent human use occur. Approximately 113 noise-sensitive receptors are within the area examined (Figure 3-10). These primarily consist of residences, residential farm complexes, associated outbuildings, and nonresidential agricultural complexes, with each building generally counted as one receptor. Agricultural outbuildings and rural-residential concentrations of noise-sensitive receptors occur around the perimeter of the Project site, ranging from less than 250 feet to approximately 2,640 feet from proposed PV array locations. Residential concentrations are primarily located near the western portion of the Project site, while a few residences and associated outbuildings are scattered along the eastern and northern boundaries of the Project site.

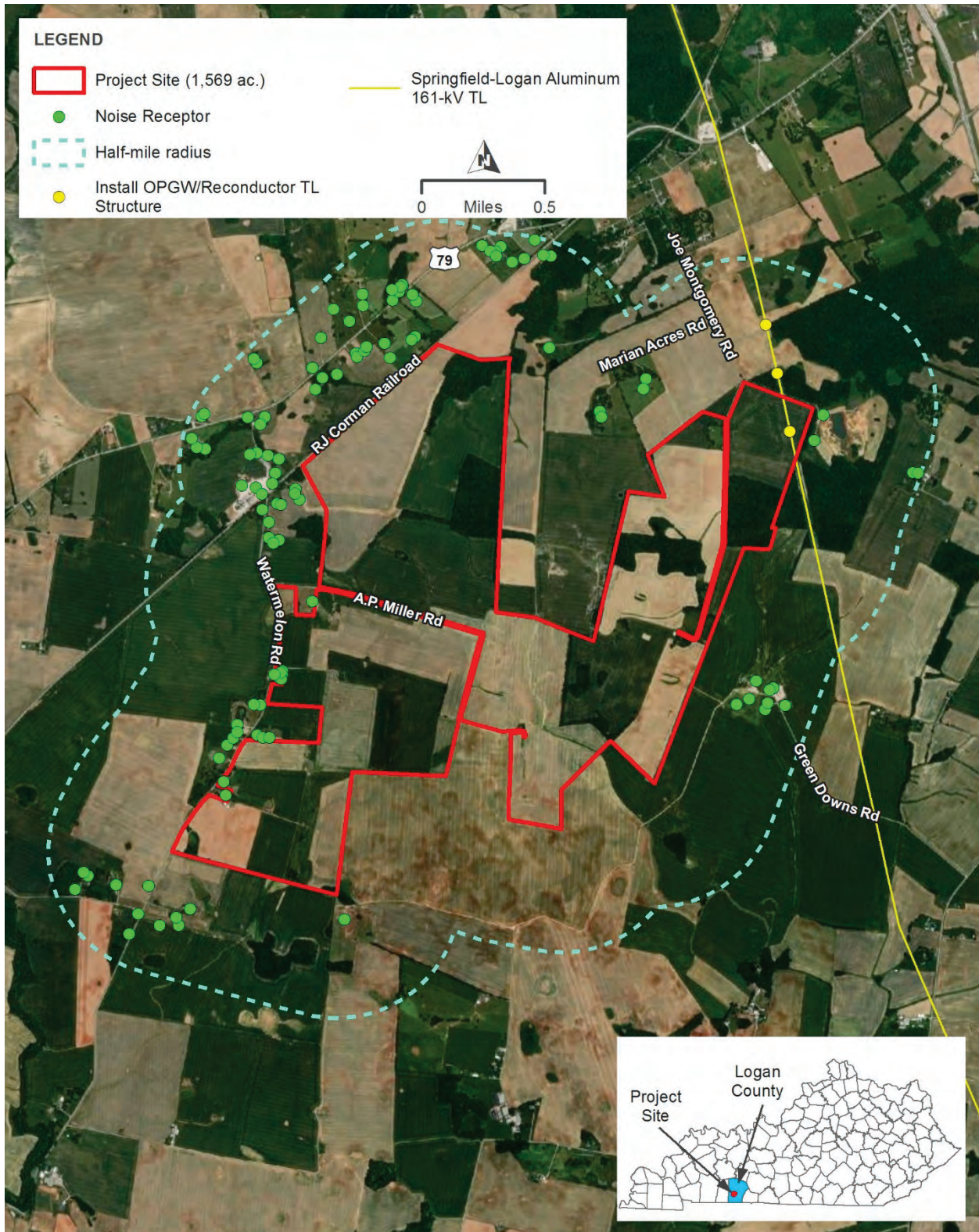


Figure 3-10. Noise-sensitive receptors in the Project area

3.6.2 Environmental Consequences

3.6.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed and no Project-related impacts on the ambient sound environment would occur. Existing land use would remain a mix of agricultural and rural-residential and undeveloped, forested land; therefore, the ambient sound environment would be expected to remain as it is at present. However, if the Project site were to be developed by other parties and the city of Russellville were to expand southward, impacts to noise receptors in the Project area would be likely.

3.6.2.2 Proposed Action Alternative

Direct and indirect noise impacts associated with implementation of the Proposed Action would primarily occur during construction. Construction equipment produces a range of sounds. Noisy construction equipment, such as delivery trucks, dump trucks, water trucks, service trucks, bulldozers, chain saws, bush hogs, or other large mowers for tree clearing, produce maximum noise levels at 50 feet of approximately 84 to 85 dBA. This type of equipment would be used for approximately 14 to 18 months at the Project site.

Construction noise would cause temporary and minor adverse impacts to the ambient sound environment in the Project area. Several residences and residential and nonresidential agricultural complexes would experience heightened noise during construction, primarily from pile-driving activities. However, when agricultural activities are more active in the fall and early winter, ambient sounds in the Project area are often higher than the typical 45 to 55 dBA in the Project area, and these existing noises would help offset effects from the Project. Additionally, construction would primarily occur during daylight hours, between sunrise and sunset; therefore, the Project would not affect ambient noise levels at night during most of the construction period. Most of the proposed equipment would not be operating on site for the entire construction period but would be phased in and out according to the progress of the Project.

The activity likely to make the most noise for an extended period would be pile driving during the construction of the array foundations, which would be completed in approximately six months. Standard construction pile drivers are estimated to produce between 90 to 95 dBA at a distance of 50 feet (USDOT 2015). The piles supporting solar panels are anticipated to be driven into on-site soils and potentially into limestone, depending on the depths of piles and on the underlying residuum of limestone in areas where piles would be installed; however, overburden soil thickness will not be confirmed until geotechnical studies occur prior to construction.

Construction workers would wear appropriate hearing protection in accordance with OSHA regulations. Noise-sensitive receptors near the TL upgrade areas would temporarily experience heightened noise primarily during the approximately two-day installation of OPGW by helicopter.

Existing ambient noise in the Project area generally ranges from 45 to 55 dBA and consists mainly of agricultural sounds, such as noises from farm machinery; natural sounds, such as from wind and wildlife; and moderate traffic sounds. Within 50 feet of US 79, traffic sounds may reach 70 to 80 dBA during high traffic periods (Corbisier 2003). Since construction would only occur during the day for most of the construction period, when other ambient sounds in the Project area would also occur, the noise effects from Project construction would be minor apart

from pile-driving activities during construction. Pile-driving activities would result in temporary, moderate noise effects.

Following completion of construction activities, the ambient sound environment would return to existing levels or below, by eliminating the seasonal use of some agricultural equipment. The moving parts of the PV arrays would be electric-powered and produce little noise. The central inverters would produce noise levels of approximately 65 dBA at 33 feet, and the Project substation would each emit approximately 50 dBA at 300 feet. The cooling units used in the Project BESS would emit noise levels of approximately 65 dBA at 10 feet (AKRF 2019). As no noise receptors are within 10 feet of the BESS, 33 feet of the proposed inverter locations, or 300 feet of the Project substation, noise impacts from these Project components are anticipated to be minimal to negligible. Thus, noise impacts from the Project are not anticipated. Due to sheep operations on the Project site during the operations and maintenance phase and minimal mowing or use of farm equipment, the Proposed Action would have similar to lower noise levels than are typical on the Project site currently with row crop operations.

Overall, implementation of the Proposed Action would result in minor, temporary adverse impacts to the ambient noise environment in the Project area during construction, and negligible to minimal impacts during operation and maintenance of the solar facility.

3.6.2.3 Cumulative Impacts

Past, present, and RFFAs are expected to result in noise impacts in the Project area. Two of the four bridges involved in the US 79 Bridge Replacement project are located within four miles from the Proposed Action, and the bridge replacement may coincide timewise with the Proposed Action. However, timing would not coincide with the US 79 widening project. Therefore, it is anticipated that activities associated with the Proposed Action and US 79 Bridge Replacement could contribute to cumulative impacts to noise receptors during the construction period. This would result in minor, short-term noise impacts. While the Proposed Action has the potential to contribute to cumulative impacts on noise, these impacts would be minor and short term.

3.7 Air Quality and Greenhouse Gas Emissions

3.7.1 Affected Environment

Ambient air quality is determined by the type and concentration of pollutants emitted into the atmosphere, the size and topography of the air shed in question, and the prevailing meteorological conditions in that air shed. Through its passage of the Clean Air Act of 1970 and its amendments, Congress mandated the protection and enhancement of our nation's air quality. USEPA established the National Ambient Air Quality Standards (NAAQS) for the following criteria pollutants to protect the public health and welfare: sulfur dioxide (SO₂), ozone (O₃), nitrogen dioxide, particulate matter whose particles are less than or equal to 10 micrometers (PM₁₀), 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. Areas in compliance with the NAAQS are designated “attainment” areas. Areas in violation of the NAAQS are designated as “nonattainment” areas, and new sources being located in or near these areas may be subject to more stringent air permitting requirements. Nonattainment areas are usually defined by county. Areas that cannot be classified on the basis of available information for a particular pollutant are designated as “unclassifiable” and are treated as attainment areas unless proven otherwise. Finally, areas that were formerly designated as nonattainment for a pollutant and later come into attainment are then categorized as “maintenance” for that pollutant for the next 20 years, assuming they continue to meet the NAAQS for that pollutant. If an area remains in attainment for a 20-year maintenance period, the status reverts back to normal attainment.

3.7.1.1 Regional Air Quality

The Project site is within a rural agricultural area of Logan County, Kentucky, approximately two miles southwest of the city of Russellville. Several residences and agricultural buildings are scattered across the Project site. Logan County has no active air quality monitoring sites listed in USEPA’s national database for NAAQS-regulated pollutants and is considered to be in attainment for all NAAQS. There are active monitoring sites for some pollutants (SO₂ and PM_{2.5}) in the Clarksville Metropolitan area, which is comprised of Christian and Trigg counties in Kentucky and Stewart and Montgomery counties in Tennessee. The Clarksville Metropolitan area is designated as in attainment for all NAAQS.

3.7.1.2 Regional Climate

Weather conditions determine the potential for the atmosphere to disperse emissions of air pollutants. Based on climate data from Russellville, approximately two miles northeast of the Project area, the coldest month is January, with average maximum and minimum temperatures of approximately 44 degrees Fahrenheit (°F) and 26°F, respectively. The warmest month is July, with average maximum and minimum temperatures of approximately 89°F and 67°F, respectively. Precipitation is highest in May, and averages approximately 51 inches per year (NOAA 2021a). On average, approximately 21 tornados occur in Kentucky each year (NOAA 2021b).

3.7.1.3 Greenhouse Gas Emissions

According to USEPA, greenhouse gases are those gases that trap heat in the atmosphere (USEPA 2022b). These consist of carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and fluorinated gases. GHG emissions include natural and man-made compounds that disperse throughout the earth’s atmosphere. GHGs act as insulation and contribute to the maintenance of global temperatures. As the levels of GHG emissions in the atmosphere increase, the result is an increase in temperature on earth, commonly known as global warming.

Apart from water vapor, the primary GHG emitted by human activities in the U.S. is carbon dioxide (CO₂), representing approximately 82 percent of total GHG emissions in the U.S. The largest source of CO₂ and of overall GHG emissions is fossil fuel combustion (USEPA 2021). GHG emissions from the TVA power system are described in the IRP (TVA 2019).

3.7.2 Environmental Consequences

3.7.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed. Therefore, no Project-related impacts on climate or air quality would result. Existing land use is expected to remain a mix of agricultural fields and forested land, and the existing habitat would be expected to remain as it is at present, with little effect on climate and air quality. However, development by other parties could occur on the Project site in the absence of the Project. The main source of emissions in the Project area would continue to be from mobile sources such as automobiles and agricultural equipment.

3.7.2.2 Proposed Action Alternative

Under the Proposed Action, minor direct impacts to air quality would result from the construction of the Project and no to minimal impacts during operations. Temporary impacts to GHG emissions expected during construction would be negligible. The Proposed Action would have longer term, minor beneficial impacts to air quality by increasing the capacity of non-emitting generating facilities providing power to the TVA system and offset the need for new fossil-fuel power generation and its associated emissions rates.

3.7.2.2.1 Regional Air Quality

The majority of potential air quality impacts associated with the Proposed Action would occur during construction. Construction activities would create emissions from construction equipment and vehicles, contracted employees' personal vehicles, and fugitive dust suspension from clearing, grading, and other activities. Tree debris from clearing would be removed by either burning or chipping and grinding. Burning debris would generate temporary localized air quality impacts due to smoke particles and gases. Any such burning would be done in accordance with local ordinances or burn permits and is not expected to have any health consequences for this sparsely populated rural area.

Combustion of gasoline and diesel fuels by internal combustion engines (haul trucks and off-road vehicles) would generate local emissions of PM, NO_x, CO, volatile organic compounds, and SO₂. The total amount of these emissions would be small and, overall, would result in negligible air quality impacts.

Approximately 95 percent (by weight) of fugitive emissions from vehicular traffic over paved and unpaved roads would be composed mainly of particles that would be deposited near the roadways, along the routes taken to reach the Project site. As necessary, fugitive dust emissions from construction areas and paved and unpaved roads would be mitigated using BMPs including wet suppression. Wet suppression can reduce fugitive dust emissions from roadways and unpaved areas by as much as 95 percent. Therefore, direct impacts to air quality associated with construction activities would be expected to be minor.

3.7.2.2.2 Regional Climate

No noticeable direct or indirect impacts to the local or regional climate would be associated with the construction and operation of the proposed Project. Local or regional climate effects can occur, for example, with major changes in land use that affect the hydrological cycle, or that

create large impervious surfaces, thus changing the radiative heat balance over a large area. The Project would change the surface characteristics somewhat, but it would have little effect on soil permeability and hydrologic characteristics of the developed area. Vegetation would grow under and around the solar panels, tending to maintain a landscape with significant evapotranspiration of precipitation, as opposed to creating significant runoff of precipitation, as happens with urban development, which can create a “heat island” effect. Therefore, average temperatures of the developed area are not expected to change significantly due to the proposed development.

3.7.2.2.3 Greenhouse Gas Emissions

The use of construction equipment would cause a minor temporary increase in GHG emissions during construction activities. Combustion of gasoline and diesel fuels by internal combustion engines (trucks and off-road vehicles) at the site and combustion of jet fuel by a helicopter along the existing TL during the installation of OPGW would generate emissions of CO₂ and very small amounts of other GHG emissions such as methane and nitrous oxide. Additional GHG emissions would result from transporting materials and workers to the Project location, and elsewhere in the U.S. or globally from production and transportation of the facility components. The production of facility components is expected to represent the largest portion of the Project-related GHG emissions. The total GHG emissions due to construction should eventually be offset by Project operation over the long term, assuming that the electricity generated by the Project would offset the need for some new fossil-fuel-based electricity generation and its associated GHG emissions.

Tree and other tall vegetation removal during construction of the Project would represent a minor loss of potential carbon sequestration, especially given that the vast majority of the Project area is currently fields and open land. Trees and other tall vegetation currently remove CO₂ from the air and sequester it as biomass. The loss of this carbon sink would constitute a minor adverse direct and indirect impact as sequestration would have continued for the life of the vegetation and long into the future, assuming that other changes on the Project site did not result in any deforestation. The loss of the carbon sink from tree removal would be at least partially offset by the increased sequestration of CO₂ by the permanent grass-dominated vegetation that would be maintained on the solar facility site.

The operation of the Project is not anticipated to have any negative impacts to air quality or GHG emissions. No emissions would be produced by the operation of the solar facility or electrical lines. Minor emissions would occur during maintenance activities, including facility inspections and periodic mowing. Conversely, the nearly emissions-free power generated by the solar facility would offset the need for new power that would otherwise be generated, at least in part, by the combustion of fossil fuels. The reduction in GHG emissions resulting from the operation of the solar facility would have little noticeable effect on regional or larger scales. It would, however, be a component of the larger ongoing system-wide reduction in GHG emissions from the TVA power system through reducing the need for some fossil-fuel-based electricity generation. The adverse impacts of GHG emissions are described in the U.S. Global Change Research Program’s Fourth National Climate Assessment (USGCRP 2018), and the

beneficial impacts of TVA's reduction in GHG emissions are described in the TVA IRP (TVA 2019).

3.7.2.3 Cumulative Impacts

The construction of the Proposed Action could coincide with the US 79 Bridge Replacement project which could contribute to cumulative impacts to air quality and increase GHG emissions. However, impacts during construction would be short term and would be mitigated using construction BMPs, including wet suppression to reduce fugitive dust. During construction, coordination with the US 79 Bridge Replacement project could occur to minimize emissions from construction vehicles and commuter motor vehicles. The potential development of the West Industrial Park and Camp Property could also contribute to cumulative impacts depending on the timing of those projects. Overall, with implementation of minimization and mitigation measures, the Project is not expected to contribute to cumulative impacts to air quality and increase GHG emissions. By avoiding the emission of GHGs from electrical generation by fossil fuels, the Project would have a small but beneficial impact on the effects on climate change from GHG emissions.

3.8 Cultural Resources

3.8.1 Affected Environment

Cultural resources are properties and places that illustrate aspects of Precontact or historic times or have long-standing cultural associations with established communities and/or social groups. Cultural resources may include archaeological sites, unmodified landscapes and discrete natural features, modified landscapes, human-made objects, structures such as bridges or buildings, and groups of any of these resources, sometimes referred to as districts.

Section 106 of the NHPA, as amended (54 U.S.C. § 300101 et seq.), addresses the effects of federal and/or federally funded projects on tangible cultural resources—that is, physically concrete properties—of historic value. The NHPA provides for a national program to support both public and private efforts to identify, evaluate, and protect the nation's important cultural resources. Once identified, these resources are evaluated for inclusion in the National Register of Historic Places (NRHP) maintained by the National Park Service. Tangible cultural resources may qualify for inclusion in the NRHP if they are 50 years of age or older (unless in exceptional cases) and if found to embody one or more of four different types of values, or criteria, in accordance with 36 CFR § 60.4.

Cultural resources that are listed or considered eligible for listing in the NRHP are called "historic properties." Federal agencies are required by the NHPA to consider the possible effects of their undertakings on historic properties and take measures to avoid, minimize, or mitigate any adverse effects. "Undertaking" includes any project, activity, or program that has the potential to affect 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.

Evaluating an undertaking's effects on historic properties is accomplished through a four-step review process outlined in Section 106 of the NHPA (36 CFR § 800). These steps are initiation, identification, assessment of adverse effects, and resolution of any adverse effects. A project

may have effects on a historic property that are not adverse. However, if the agency determines that the undertaking's effect on a historic property would diminish any of the qualities that make the property eligible for the NRHP (based on the criteria for evaluation at 36 CFR § 60.4), the effect is said to be adverse. Examples of adverse effects would be ground disturbing activity in an archaeological site or erecting tall buildings or structures within the viewshed of a historic building in such a way as to diminish the historic building's integrity of feeling or setting and its ability to convey its historic and/or architectural significance. Adverse effects must be resolved. Resolution may consist of avoidance (such as redesigning a project to avoid impacts or choosing a project alternative that does not result in adverse effects), minimization (such as redesigning a project to lessen the effects or installing visual screenings), or mitigation. Adverse effects to archaeological sites are typically mitigated by means of excavation to recover the important scientific information contained within the site. Mitigation of adverse effects to historic buildings and structures sometimes involves thorough documentation of the resource by compiling historic records, studies, and photographs.

Agencies are required to consult with the appropriate SHPOs, federally recognized Indian tribes that have an interest in the undertaking, and any other party with a vested interest in the undertaking. Through various regulations and guidelines, federal agencies are encouraged to coordinate Section 106 and NEPA review to improve efficiency and allow for more informed decisions. Under NEPA, impacts to cultural resources that are part of the affected human environment but not necessarily eligible for the NRHP must also be considered. Generally, these considerations as well as those of NRHP-eligible traditional cultural resources (also called traditional cultural properties; see Parker and King (1998)) are accomplished through consultation with parties having a vested interest in the undertaking, as described above.

3.8.1.1 Identification Survey and Field Findings Summary

As part of the evaluation process, a Phase I cultural resources assessment was conducted by New South Associates (New South) on the Project site from May 25 to July 7, 2021, to determine the presence of archaeological and architectural cultural resources (Gregory et al. 2021; Schoof et al. 2022; Appendix C). Approximately 709 acres of the Project site were previously surveyed by AECOM for archaeological sites but not reported on by AECOM due to cessation of the work by the related client. New South completed the survey and revisited all archaeological sites identified by AECOM to confirm site boundaries and evaluate these for NRHP eligibility. The area examined for archaeological resources, referred to herein as the Area of Potential Effect (APE), encompassed the 1,585-acre Project site. The area examined for historic-age architectural resources included the 1,585-acre APE and the portions of a 0.5-mile radius surrounding the APE that are visually connected by direct line-of-sight, referred to herein as the Viewshed (Figure 3-11).

Cultural resources identification consisted of background research and architectural and archaeological field surveys; the associated reports provide preliminary NRHP evaluations and results summaries. New South identified or newly reported on a total of 97 archaeological sites, including three historic cemeteries or gravesites (Anderson Cemetery, Ogden Gravesite, and Miller Cemetery), and 66 isolated finds. Of the 97 archaeological sites, 89 sites, including all three cemeteries, lack integrity, significance, or both. As a result, New South recommended

these 89 sites not eligible for listing on the NRHP under any of the four criteria for eligibility and concluded that no further investigation was warranted for these 89 sites. The remaining eight sites (15LO297, 15LO332, 15LO357, 15LO358, 15LO367, 15LO405, 15LO410 and 15LO412) were recommended as having unknown NRHP eligibility.

During the architectural survey, New South documented 28 historic-age architectural resources within the APE or Viewshed. Three of these are cemeteries or gravesites either on the Project site or immediately adjacent to it, consisting of Anderson Cemetery (part of LO 245) and Miller Cemetery and Ogden Gravesite (LO 385), both located on the Project site, and Cave Spring Cemetery (LO 312), located just outside the Project site. The Brown Farm (part of LO 245), consisting of the Brown House and several outbuildings, and Montgomery Farm (LO 325), consisting of a farmhouse and five outbuildings, are also located on the Project site. The Brown House was previously designated by KHC as being worthy of preservation, and New South recommended the house portion of LO 245 be considered eligible for listing on the NRHP, while the associated outbuildings and the Anderson Cemetery were both not eligible for listing. The entirety of the Montgomery Farm was recommended by New South as not eligible for listing on the NRHP. Two eligible architectural resources are present in the Viewshed, outside the Project site. These consist of Harmony Hall Farm (LO 95) and the Watson House (LO 96).

Cultural resources identification consisted of background research and architectural and archaeological field surveys; the associated reports provide preliminary NRHP evaluations, a results summary, and the Precontact and historic context of the Project area (Gregory et al. 2022; Schoof et al. 2022).

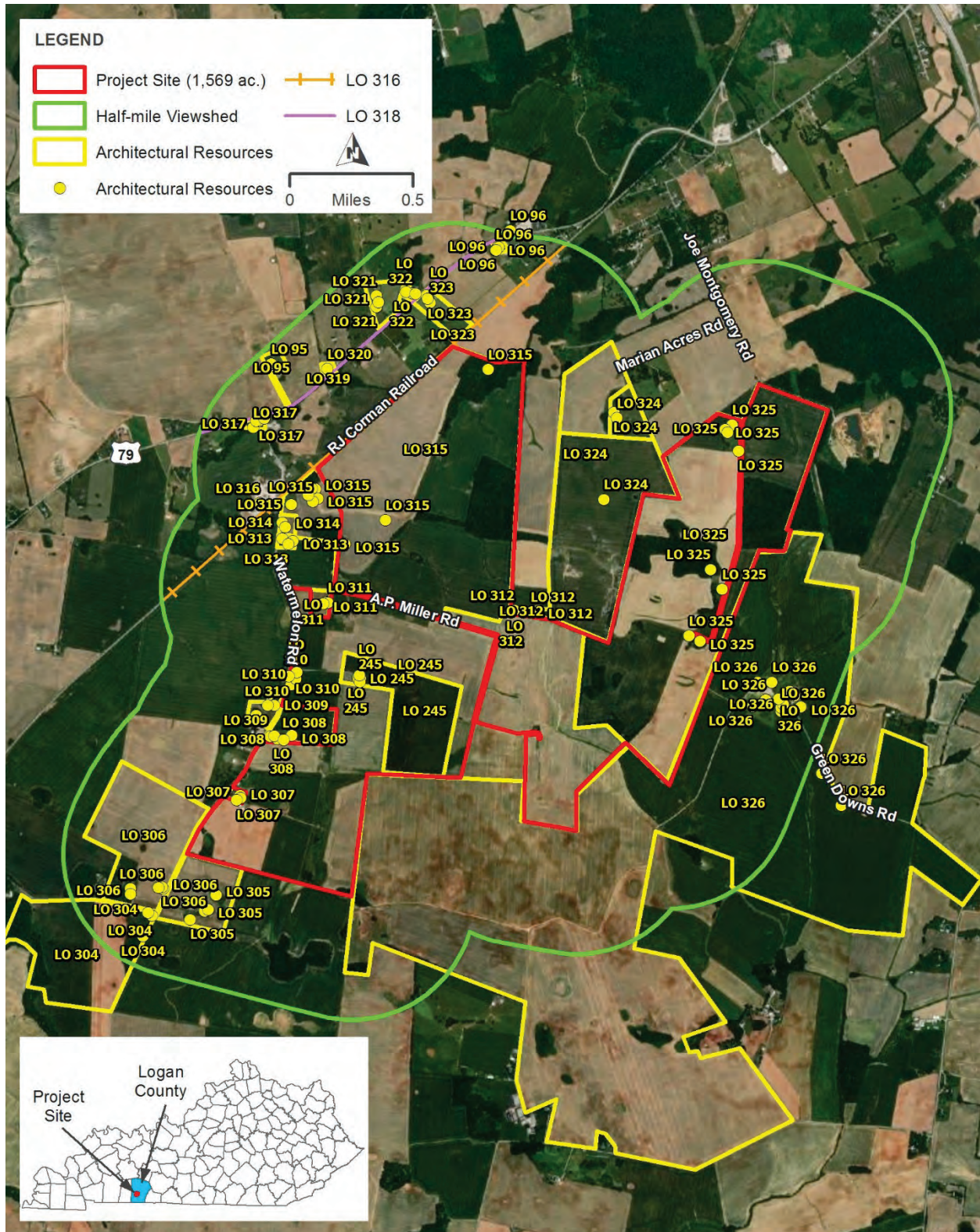


Figure 3-11. APE and Viewshed of historic-age architectural resources for the Project

3.8.1.2 Known Cultural Resources

On April 21, 2021, New South requested data from the site files and the GIS database maintained by the Kentucky Archaeological Site Files, the Kentucky Office of State Archaeology (OSA), and KHC, to identify previously cultural recorded resources within one mile of the Project, herein referred to as the research radius. Available historical maps were also georeferenced and reviewed to determine the location of potential historic resources within the research radius. The data from KHC was received on April 26, 2021, and the data from the OSA was received on May 11, 2021.

The KHC and OSA records indicated 10 previously recorded archaeological sites and three historic resources within a one-mile radius of the Project area (Table 3-14).

Table 3-14. Recorded Cultural Resources within One Mile of the Project

Resource Number	Temporal Association	Type	NRHP Recommendation
Archaeological Sites			
15LO182	Undetermined Precontact/1851-1950	Open habitation without mounds	Not Evaluated
15LO181	Undetermined Precontact/1851-1950	Open habitation without mounds	Not Evaluated
15LO194	1801-1900	Cemetery	Not Evaluated
15LO230	Undetermined Precontact/1851-1900	Open habitation without mounds	Not Eligible
15LO231	Undetermined Precontact/1851-1950	Open habitation without mounds	Not Eligible
15LO232	Undetermined Precontact	Open habitation without mounds	Not Eligible
15LO233	1851-1900	Cemetery	Not Evaluated
15LO234	Undetermined Precontact/1901-1950	Open habitation without mounds	Not Eligible
15LO235	Undetermined Precontact/1801-1950	Historic farm/residence	Not Eligible
15LO236	Undetermined Precontact/1851-1950	Open habitation without mounds	Not Eligible
Historic Resources			
LO95	1825-1849	Historic farm/residence	Eligible
LO96	1825-1849	Historic farm/residence	Eligible
LO245	1800-1824	Historic farm/residence	Eligible

During the archaeological survey, the entire APE was assessed via pedestrian walk-over and shovel testing. The archaeological survey included the re-examination of approximately 709 acres conducted by AECOM in 2019 and 2020. A total of 97 archaeological sites, 66 isolated finds, and three historic cemeteries were recorded within the APE. By definition, isolated finds

retain neither integrity or Precontact nor historic significance. New South, therefore, recommends that all 66 isolated finds are not eligible for listing in the NRHP under any of the four criteria.

Of the 97 archaeological sites, 68 are Precontact, seven are historic, and 22 contain both Precontact and historic components. Several sites also contained Precontact or historic isolated finds that were not assigned as components. Of the 90 sites with Precontact components, site types included 89 temporary campsites/lithic scatters and one lithic workshop. Site types among the 29 sites with historic components included three cemeteries, 25 artifact scatters, one well, and one building foundation.

Based on the survey findings, TVA determined that 89 of the archaeological sites are not eligible or are not contributing resources for the NRHP, and no further work is recommended at these sites prior to implementation of the Project. TVA concluded that eight sites have unknown NRHP eligibility (Table 3-15). TVA recommended that these eight sites be avoided or have additional testing to evaluate their NRHP eligibility. TVA consulted with KHC and federally recognized Indian tribes with an interest in the region on these determinations (Appendix D).

Table 3-15. Archaeological Sites with Unknown NRHP Eligibility Within the APE

State Site #	Field Site #	Site Type	Temporal Affiliation	NRHP Recommendation	Management Recommendation
15LO297	BC02	Multi-Component Scatter	Undetermined Precontact; Eighteenth-Twentieth Century	Unknown	Avoidance or Additional Testing
15LO332	BC06	Multi-Component Scatter	Undetermined Precontact; Nineteenth-Twentieth Century	Unknown	Avoidance or Additional Testing
15LO357	KAF04	Multi-Component Scatter	Undetermined Precontact; Nineteenth-Twentieth Century	Unknown	Avoidance or Additional Testing
15LO358	KAF05	Temporary Campsite	Early to Middle Archaic	Unknown	Avoidance or Additional Testing
15LO367	LEP01	Multi-Component Scatter	Late Archaic/Early Woodland; Nineteenth-Twentieth Century	Unknown	Avoidance or Additional Testing
15LO405	RS43	Temporary Campsite	Undetermined Precontact	Unknown	Avoidance or Additional Testing
15LO410	BC13	Lithic Workshop	Middle-Late Archaic Period	Unknown	Avoidance or Additional Testing
15LO412	JAN01	Temporary Campsite	Late Archaic-Early Woodland	Unknown	Avoidance or Additional Testing

The historic architecture survey resulted in fieldwork documentation of 28 architectural resources, three of which (LO95, LO96, and LO245) were previously surveyed. The 28 resources include 12 individual dwellings, 10 farmsteads consisting of a range of components (such as dwellings, outbuildings, gravesites, and cemeteries), one individual cemetery associated with a prior church, a roadside restaurant, a highway corridor, and a railroad corridor (Table 3-16). Seven of the 28 architectural resources are either located on or adjacent to the Project site or are within the Viewshed and eligible for listing on the NRHP. The remaining architectural resources documented during the field survey are located in the Viewshed and are not eligible for listing on the NRHP.

Table 3-16. Newly and Previously Recorded Historic-Age Architectural Resources

Survey #	Property Address	Resource Name	Preliminary NRHP Recommendation
LO 95	5394 Clarksville Road	Harmony Hall Farm	Eligible (Previously Determined)
LO 96	4321 Clarksville Road	Watson House	Eligible
LO 245	1040 Watermelon Road (<i>on the Project site</i>)	Brown Farm with House, Outbuildings, and Anderson Cemetery	Eligible (House); Not Eligible (Cemetery and Outbuildings)
LO 304	2245 Watermelon Road	Speck Farm	Not Eligible
LO 305	2140 Watermelon Road	King-Gotts Farm	Not Eligible
LO 306	2075 Watermelon Road	Dawson-Barnes Farm	Not Eligible
LO 307	1602 Watermelon Road	Dawson House	Not Eligible
LO 308	1324 Watermelon Road	Robert and Tina Dawson House	Not Eligible
LO 309	1209 Watermelon Road	Crawford House	Not Eligible
LO 310	1088 Watermelon Rd	Robertson House	Not Eligible
LO 311	195 A.P. Miller Road	Latham House	Not Eligible
LO 312	North side of A.P. Miller Road (<i>immediate adjacent to the Project site</i>)	Cave Spring Cemetery (associated with a prior church)	Not Eligible
LO 313	528 Watermelon Road	Coots House	Not Eligible
LO 314	456 Watermelon Road	Daniel and Ruth Cox House	Not Eligible

Survey #	Property Address	Resource Name	Preliminary NRHP Recommendation
LO 315	338 Watermelon Road	Cox Farm	Not Eligible
LO 316	Railroad Corridor from Watermelon Road, Extending 2.1 Miles East	RJ Corman Railroad	Not Eligible
LO 317	5521 Clarksville Road	Ed's Barbecue Restaurant	Not Eligible
LO 318	1.5-Mile Corridor from West of Watermelon Road to East of Old Smokey Road	U.S. 79/Clarksville Road	Not Eligible
LO 319	5173 Clarksville Road	Finch House	Not Eligible
LO 320	5170 Clarksville Road	Townsend House	Not Eligible
LO 321	4890 Clarksville Road	Miller House	Not Eligible
LO 322	4692 Clarksville Road	Scott House	Not Eligible
LO 323	4683 Clarksville Road	Scott Farm	Not Eligible
LO 324	515 Marian Acres Road	Marion Acres Farm	Not Eligible
LO 325	1969 Montgomery Road (on the Project site)	Montgomery Farm	Not Eligible
LO 326	1091 Green Downs Road	Green Downs Farm	Not Eligible
LO 385	338 Watermelon Road (on the Project site)	Miller Cemetery and Ogden Gravesite (part of Cox Farm)	Not Eligible
LO 386	515 Marian Acres Road	Whitaker Cemetery (part of Montgomery Farm)	Not Eligible

Five of the 28 architectural resources are located within the Project site or immediately adjacent to it: (1) the Brown Farm and Anderson Cemetery (LO 245); (2) Montgomery Farm (LO 325); (3) Cox Farm (LO 315); (4) Miller Cemetery and Ogden Gravesite (LO 385; also part of Cox Farm, LO 315); and (5) Cave Spring Cemetery (LO 312). The Brown House, part of the Brown Farm (LO 245), was designated by KHC as a Kentucky Landmark, an honorary designation that indicates the house is worthy of preservation. New South concluded that the Brown House should be considered eligible for listing on the NRHP under Criterion C for historic architectural significance from 1815 to 1938. The Anderson Cemetery and four outbuildings associated with the Brown Farm are not eligible under Criteria A, B, or C and are not recommended as contributing resources to the eligible Brown House. The three remaining resources within the Project site, Montgomery Farm (LO 325), Cox Farm (LO 315), and Miller Cemetery and Ogden Gravesite (LO 385), are considered not eligible for listing on the NRHP. However, Anderson

Cemetery (part of LO 245), Miller Cemetery and Ogden Gravesite (LO 385) and Cave Spring Cemetery (LO 312), immediately adjacent to the Project site, are all protected under Kentucky cemetery statutes.

Two NRHP-eligible architectural resources are located within the Viewshed, outside the Project site, (1) Harmony Hall Farm (LO 95) and (2) the Watson House (LO 96). Harmony Hall Farm (LO 95) was previously determined eligible for listing in the NRHP. New South recommended that the Harmony Hall Farm (LO 95) remains eligible for listing in the NRHP and concluded that its significance relates to Criteria A, B, and C in the areas of agriculture, exploration and settlement, and education. New South also defined a proposed NRHP boundary for the farm totaling 4.4 acres. KHC surveyed the Watson House (LO 96) in 1980 but did not evaluate the resource for listing in the NRHP. New South recommended that the Watson House be considered eligible for listing for the NRHP under Criterion A for significance under transportation. New South recommended an NRHP boundary of 0.5-acres surrounding the Watson House. The outbuildings associated with the house were recommended as not contributing to the significance of the Watson House.

TVA consulted with KHC on these NRHP eligibility determinations (Appendix D).

3.8.2 Environmental Consequences

3.8.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed; therefore, there would be no Project-related impacts to cultural resources. However, if the Project site were to be developed by other parties without consultation with KHC and federally recognized tribes, adverse effects could occur to cultural resources.

3.8.2.2 Proposed Action Alternative

Under the Proposed Action Alternative, Russellville Solar would construct and operate a 173-MW AC single-axis tracking PV solar power facility.

The Brown House and Anderson Cemetery (part of LO 245) would be avoided by the Project. The house and cemetery are both surrounded by mature trees that would remain as visual buffer. However, the Project would result in the installation of solar panels to the north, west, east, and south of the house. The solar panels would be eight feet in height when they are fully upright in the early morning and late afternoon and five feet high at midday, when they are lying flat. The Project would avoid the Brown House and Anderson Cemetery by minimum setbacks of 250 feet. The house would be maintained by its current owner and occupied, and the cemetery would retain access to the public. While the solar panels would diminish the integrity of setting and feeling of the Brown House, the Project would plant an evergreen buffer around the Brown House that would provide a visual buffer between the house and the solar panels. These efforts would minimize the visual effects of the Project (Photos 3-11 and 3-12). The Brown House would continue to retain its NRHP-qualifying characteristics, as the house would remain intact as a representative example of a log hall-and-parlor house. Therefore, with these mitigation measures, the Project would not have an adverse effect on the Brown House.

The Project would install solar panels on the Project site located 0.4 miles south and west of the recommended NRHP boundary for Harmony Hall Farm (LO 95). The current use of the Harmony Hall Farm would not be impacted by the Project, nor would any of its physical features within the recommended NRHP boundary. Upon completion of the proposed undertaking, the farmhouse at the Harmony Hall Farm would remain an excellent example of Greek Revival-style architecture. The private owner would retain ownership of the Harmony Hall Farm, and the Project would not take any right-of-way or easements from within the recommended NRHP boundary. The distance from the Project and the rolling hills that exist between Harmony Hall Farm and the Project would prevent any change to the visual, audible, or atmospheric character surrounding the Harmony Hall Farm. These impacts would be further diminished by the installation of an eight-foot-high evergreen buffer planted in a double row and staggered pattern around the Project where natural vegetation is inadequate to shield views. Due to the distance of Harmony Hall Farm from the Project and these mitigation measures, the facility would not be visible from the historic farm and, therefore, would have no adverse effect on it.

The Watson House (LO 96) is located approximately 0.43 miles south from the Project, and its views to the Project are partially obscured by existing vegetation. The Project would plant an eight-foot-high evergreen buffer planted in a double row and staggered pattern around the Project where natural vegetation is inadequate to shield views, thus further diminishing the visual effects from the Project. With these mitigation measures, the Project would not have an adverse effect on it.

Based on the recommendations on effects, TVA determined that the Project would not result in adverse effects on the Brown House, Harmony Hall Farm, or Watson House. TVA also determined that the eight archaeological sites with unknown NRHP eligibility (15LO297, 15LO332, 15LO357, 15LO358, 15LO367, 15LO405, 15LO410 and 15LO412) would not be affected by the Project, in accordance with an Avoidance Agreement between TVA and SRC. Anderson Cemetery, Miller Cemetery, Ogden Gravesite, and Cave Spring Cemetery all contain intact human burials and would be avoided by minimum 65-foot buffers. Solar panels associated with the Project would not be installed within 250 feet of these cemeteries or gravesites. TVA consulted with KHC and federally recognized Indian tribes regarding its determinations (Appendix D). TVA also consulted with federally recognized Indian tribes regarding properties of religious or cultural importance to their tribe. KHC provided its concurrence in a letter dated December 20, 2022.



LOGAN COUNTY SOLAR
KOP-10b Unbuffered view looking North from North side of Brown House

Date issued: August 22, 2022
Horiz. Field of View: 29mm / 63.6°



Photo 3-11. Unbuffered rendering of the Project from north side of Brown House



LOGAN COUNTY SOLAR
KOP-10b Buffered view looking North from North side of Brown House

Date issued: August 22, 2022
Horiz. Field of View: 29mm / 63.6°



Photo 3-12. Buffered rendering of the Project from north side of Brown House

3.8.2.3 Cumulative Impacts

The Project would avoid all of the NRHP-undetermined eligibility archaeological sites on the Project site, as well as the three cemeteries. The Project would have no visual effects on the three eligible architectural resources in the vicinity. While the RFFAs may have adverse effects on cultural resources, the Project would not contribute to cumulative effects due to the Project effects being avoided or not considered adverse. TVA consulted with KHC and federally recognized Indian tribes on its NRHP eligibility determinations, findings of effect, and avoidance, minimization, and mitigation measures.

3.9 Utilities

3.9.1 Affected Environment

The Project site is within a rural agricultural area of Logan County, Kentucky, approximately two miles southwest of the city of Russellville. This section describes utility services in the Project area and the effects of the alternative actions on those services.

3.9.1.1 Telecommunications

In addition to various mobile providers, telecommunication services are provided by AT&T, Logan Telephone Cooperative, Suddenlink Communications, Russellville Electric Plant Board, Velocity Networks of Kentucky, and Viasat (LEAD 2021).

3.9.1.2 Electricity

Electrical service is provided by PRECC and Russellville Electric Plant Board, both of which purchase power generated by TVA (LEAD 2021). PRECC also has an existing distribution line that runs along Joe Montgomery Road and connects to TVA's existing Springfield-Logan Aluminum 161-kV TL, which crosses the northeastern portion of the Project site in a north-south orientation.

3.9.1.3 Natural Gas

Natural gas service is provided by Atmos Energy (LEAD 2021). There are no known natural gas pipelines in the Project site.

3.9.1.4 Water and Sewer

Water and sewer service are provided either by Logan Todd Regional Water Commission or through private wells and private septic systems (LEAD 2021).

3.9.2 Environmental Consequences

3.9.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed; therefore, there would be no Project-related impacts to utilities. Existing land use would remain a mix of agricultural and forested land for the foreseeable future, and existing on-site utilities would likely remain unchanged, with the exception of potential upgrades and maintenance. However, if the Project site were to be developed by other parties, impacts to utilities could occur.

3.9.2.2 Proposed Action Alternative

Modifications to existing utilities would occur with implementation of the Proposed Action Alternative. PRECC would relocate portions of their existing distribution lines in the western

portion of the Project site to avoid PV module locations. This would include installation of approximately 0.4 mile of OPGW and reconductoring on Springfield-Logan Aluminum 161-kV TL between Structure 173 and Structure 175. Electrical service for the Project would be provided by either PRECC or the adjacent TVA TL and the Project distribution power system. If utilized, PRECC would coordinate with customers if outages were necessary. If the TVA TL is utilized, TVA would negotiate an agreement with PRECC to supply the power to the solar facility. The Project would obtain water by groundwater wells or by delivery via water trucks.

The Project-related TL upgrades may result in short-term adverse impacts to local utilities such as electrical service due to brief outages. The additional electric system modifications to existing TVA substations may require a temporary electric service outage of the Springfield-Logan Aluminum 161-kV TL, lasting a minimum of a few days. If outages on this or other TLs are required, TVA would work with PRECC to provide alternative means of providing electrical service to the area in order to avoid service interruptions. TVA would also make an effort to perform these outages at low-impact times, such as overnight, in order to maintain power service to PRECC.

No long-term adverse impacts are expected to be associated with the Project. Implementation of the Proposed Action Alternative would result in additional renewable energy resources in the region and would, thus, constitute a beneficial impact to electrical services across the region.

3.9.2.3 Cumulative Impacts

The Project could cause occasional, short-term adverse impacts to local utilities such as electricity connections when conducting the TL upgrades, the additional electric system modifications to existing TVA substations, bringing the solar PV facility on-line, or during routine maintenance of the facility. Thus, the Project, along with the past, present, and RFFAs, may contribute to some minor short-term outages in the Project area as these facilities are constructed or maintained. Given the nature of the Proposed Action, long-term cumulative adverse impacts to utilities are not anticipated.

3.10 Waste Management

3.10.1 Affected Environment

“Hazardous materials” and “hazardous waste” are substances that, 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 (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 or more of the hazardous characteristics of ignitability, corrosivity, toxicity, or reactivity, or is listed as a hazardous waste under 40 CFR part 261. Storage and use of hazardous materials and wastes are regulated by local, state, and federal laws and regulations including the Emergency Planning and Community Right-to-Know Act (42 U.S.C. §§ 116 *et seq.*) and RCRA.

Available historical maps obtained from a Phase I ESA document that land use in the Project area has remained relatively unchanged at least since 1952 but likely earlier based on historical trends. Throughout this time, land uses in the Project area have been primarily agricultural and rural-residential with some wooded areas. Primary changes since the 1950s include the addition and removal of homesteads, the addition of the TL across the northeast corner of the Project site, and the development of agricultural land and the addition of farm ponds.

Collection and disposal of solid waste outside of incorporated municipalities in Logan County is conducted by private trash collecting companies and by county residents via a drop-off facility. Nonhazardous wastes are transferred and hauled to an operating Class I facility in Madisonville, Kentucky. Construction/demolition materials are disposed of at a Class III landfill in Beaver Dam, Kentucky or White Plains, Kentucky. Various vendors offer hazardous waste removal.

3.10.2 Environmental Consequences

3.10.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed; therefore, no Project-related waste would be generated and no impacts to waste management resources would occur. Existing land use would remain a mix of agricultural and undeveloped land, and existing waste management conditions would remain as they are at present. However, if the Project site were to be developed by other parties and waste management BMPs were not followed, impacts to waste management resources could occur.

3.10.2.2 Proposed Action Alternative

Under the Proposed Action, storage and use of liquid materials in the form of petroleum-based oils and fuels, and generation of liquid and solid wastes in the form of used oil, construction debris, packing materials, and general construction waste would occur during construction and would be minor and temporary.

3.10.2.2.1 Materials Management

During construction of the proposed solar facility, materials would be stored on site in storage tanks, vessels, or other appropriate containers specifically designed for the characteristics of these materials. The storage facilities would include secondary containment in case of tank or vessel failure. Construction- and decommissioning-related materials stored on site would primarily be liquids such as used oil, diesel fuel, gasoline, hydraulic fluid, and other lubricants associated with construction equipment. Safety Data Sheets for all 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 on-site laydown areas for refueling. Special procedures would be identified to minimize the potential for fuel spills, and spill control kits would be carried on all refueling vehicles for activities such as refueling, vehicle or equipment maintenance procedures, waste removal, and tank clean-out. A fuel truck may be stored on site for approximately 14 to 18 months during construction of the Project. The total volume of the on-site tanks would exceed 1,320 gallons, the threshold above which a Spill Prevention, Countermeasure, and Control (SPCC) plan may be required (40 CFR part 112). The facility would fall under USEPA's SPCC

requirements of “oil-filled operational equipment” and a Tier I Qualified Facility; therefore, no double-walled protection would be required, and the SPCC plan would not have to be certified by a Professional Engineer (USEPA 2006, 2011). The SPCC plan would be prepared prior to construction to prevent oil discharges during facility operations.

During operations, bulk chemicals would be stored in storage tanks; other chemicals would be stored in returnable delivery containers. Chemical storage areas would be designed to contain leaks and spills. The transport, storage, handling, and use of chemicals would be conducted in accordance with applicable laws, ordinances, regulations, and standards. While the various transformers would contain oil, there would be no separate transformer oil stored on site related to transformers. The quantities of these materials stored on site would be evaluated to identify the required usage and to maintain sufficient inventories to meet use rates without stockpiling excess chemicals.

In addition to the chemicals listed above, small quantities (less than 55 gallons, 500 pounds or 200 cubic feet) of janitorial supplies, office supplies, laboratory supplies, paint, degreasers, herbicides, pesticides, air conditioning fluids (chlorofluorocarbons), gasoline, hydraulic fluid, propane, and welding rods typical of those purchased from retail outlets may also be stored and used at the facility. Flammable materials (e.g., paints, solvents) would be stored in flammable material storage cabinet(s) with built-in containment sumps. Due to the small quantities involved and the controlled environment, a spill could be cleaned up without significant environmental consequences.

Russellville 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) and 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 the procedures to be followed in the event of a leak or spill. Adequate supplies of appropriate cleanup materials would be stored on site.

3.10.2.2.2 Waste Management

Construction, operation, and decommissioning of the Project would generate solid waste. Construction of the Proposed Action is estimated to result in the generation of approximately 36,500 to 73,000 cubic yards of solid waste (912 to 1,824 loads at 40 cubic yards each) consisting of construction debris and general trash, including pallets and flattened cardboard module boxes. Logan County Solar estimates that approximately 2,600-5,200 flatbed truck loads would be required for hauling equipment and removing waste during construction.

Information on wastes anticipated to be generated during Project construction is provided in Table 3-17.

Table 3-17. Summary of construction waste streams and management methods

Waste stream	Origin and composition	Estimated frequency of generation	On-site treatment	Waste management method/off-site treatment
Construction waste – hazardous	Empty hazardous material containers	Intermittent	None	Return to vendor
Construction waste-hazardous	Used oil, hydraulic fluid, oily rags	Intermittent	None	Recycle, remove to off-site disposal location
Construction waste-nonhazardous	Steel, glass, plastic, wood/pallets, cardboard, paper	Intermittent	None	Recycle wherever possible, otherwise dispose to Class I landfill
Sanitary waste-nonhazardous	Portable chemical toilets – sanitary waste	Periodically pumped to tanker truck by licensed contractors	None	Ship to sanitary wastewater treatment plant

The anticipated quantities of waste produced during Project operations are summarized in Table 3-18. Universal wastes and unusable materials produced as a result of implementation of the Proposed Action would be handled, stored, and managed in accordance with Kentucky Universal Waste requirements.

Table 3-18. 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– petroleum-related wastes	Tracker drives, hydraulic equipment	1,000 gallons/year	Intermittent	Accumulate for <90 days	Recycle
Oily rags, oil absorbent, and oil filters– petroleum-related wastes	Various	One 55-gallon drum per month	Intermittent	Accumulate for <90 days	Sent off site for recovery or disposed at Class I landfill
Spent batteries	Lead acid/lithium ion	1,000	Every 10 years	Accumulate for <90 days	Recycle

The prevention of leaks at the BESS would be handled onsite through appropriate containment and spill prevention measures. Other wastes, including batteries that are replaced during facility

operation or when the system is decommissioned, will be disposed of offsite and/or recycled in accordance with manufacturer recommendations and appropriate regulations and industry BMPs.

Waste collection and disposal would be conducted in accordance with applicable federal, state, and local regulatory requirements to minimize health and safety effects. To the extent permissible, waste would be recycled. Materials that cannot be recycled would be disposed of at an approved facility to be determined by the designated contractor(s) in accordance with local, state, and federal laws and regulations. No waste oil would be disposed of on the Project site.

If necessary, Russellville Solar or its contractor would obtain a hazardous waste generator identification number from the State of Kentucky prior to generating any hazardous waste. Any spills related to the Project would be reported to KEEC. A sampling and cleanup report would be prepared for the solar facility and sent to KEEC to document each spill and clean up. Each spill, regardless of amount, would be cleaned up within 48 hours, and a spill report would be completed. Copies of any spill and cleanup reports would be kept on site.

Designated contractor and subcontractor personnel would be responsible for daily inspection, cleanup, and proper labeling, storage, and disposal of all refuse and debris produced. Disposal containers such as dumpsters or roll-off containers would be obtained from a proper waste disposal contractor. Records of the amounts generated would be provided to the designated Russellville Solar environmental specialist.

3.10.2.2.3 Wastewater

Permanent toilets would be installed to support full-time staff during operations. These toilets would be connected to a Project septic system. The septic system and toilets would not be located within 100 feet of any stream or wetland and would be designed based on other local requirements. No adverse effects are anticipated from wastewater treatment and disposal associated with the permanent toilets and associated septic system.

3.10.2.3 Cumulative Impacts

Past, present and RFFAs, together with the Proposed Action, would create new waste streams within the area. Storage and use of liquid materials in the form of petroleum-based oils and fuels, and generation of liquid and solid wastes in the work of used oil, construction debris, packing materials, and general construction waste would also occur. Overall, the Project effects, likely similar to the past, present, and RFFAs, would be mitigated through implementation of BMPs for waste and wastewater, SPCC plans, and hazardous material business plans. With proper planning and implementation of BMPs, adverse cumulative effects from the Project in relation to waste management would not occur.

3.11 Public and Occupational Health and Safety

3.11.1 Affected Environment

The Project site is currently private property, and agricultural and forested land uses dominate. Public emergency services in the area include urgent care clinics, hospitals, law enforcement services, and fire protection services.

The Fast Pace Health Urgent Care – Russellville Clinic, located on US 79, approximately two miles (four minutes) northeast of the Project site, is the closest urgent care center to the Project site. The Logan Memorial Hospital is the closest hospital, also located in Russellville, approximately five miles (10 minutes) northeast of the Project site.

Law enforcement services in the city of Russellville are provided by the Russellville Police Department, approximately four miles (nine minutes) northeast of the Project site. Law enforcement services in Logan County are provided by the Logan County Sheriff's Department in Russellville, approximately four miles (nine minutes) from the Project site. Fire protection services are provided by the Russellville Rural Fire Department and Russellville Fire Department, located approximately four miles (eight minutes) and five miles (10 minutes), respectively, from the Project site.

The KDEP has the responsibility and authority to coordinate with state and local agencies in the event of a release of hazardous materials.

3.11.2 Environmental Consequences

3.11.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed; therefore, no Project-related impacts on public health and safety would result. Existing land use would remain a mix of agricultural and forested land for the foreseeable future, and existing public health and safety issues would be expected to remain as they are at present. However, if the Project site were to be developed by other parties, impacts to public health and safety could occur if proper BMPs were not followed.

3.11.2.2 Proposed Action Alternative

Under the Proposed Action Alternative, workers on the Project site would have an increased safety risk during construction of the proposed solar facility. However, because construction work has known hazards, the standard practice is for contractors to establish and maintain health and safety plans in compliance with OSHA regulations. Health and safety plans emphasize BMPs for site safety management to minimize potential risks to workers. Examples of BMPs include employee safety orientations; establishment of work procedures and programs for site activities; use of equipment guards, emergency shutdown procedures, lockout procedures, site housekeeping, and personal protective equipment; regular safety inspections; and plans and procedures to identify and resolve hazards.

Potential public health and safety hazards could result from increased traffic on roadways due to construction of the Project. Residential and other human use areas along roadways used by construction traffic to access the construction areas would experience increased employee, commercial, and industrial traffic. Awareness of these residences and establishment of traffic procedures to minimize potential safety concerns would be addressed in the health and safety plans followed by construction contractor(s).

Approximately 2,500 gallons of fuel for vehicles would be kept on the Project site in storage tanks during construction of the proposed solar facility. An SPCC plan would be implemented to

minimize the potential of a spill and to instruct on-site workers on how to contain and clean up any potential spills. The perimeter of each grouping of Project elements would be securely fenced during construction and for the duration of operation, 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. Emergency response would be provided by the local, regional, and state law enforcement, fire, and emergency responders.

Public health and safety hazards could result from a fire during the construction of the BESS. If a fire were to occur, flammable and toxic gases could be released. Proper storage, handling, and ventilation would be employed to reduce the risk of potential hazards.

During operations, the Project would require some permanent staff and/or contract employees on site to manage the sheep operations and the land, which would help deter squatters from occupying the Project site and contribute to community safety.

During operation, solar PV systems generate electromagnetic fields (EMF). However, according to a study published by North Carolina State University (2017), solar PV technologies and solar inverters do not pose significant human health risks. EMF produced by electricity has enough energy to produce heat but not enough to remove electrons from a molecule or damage DNA. Distance from the EMF source, such as provided by the solar panel setbacks and security fencing proposed to surround separate portions of the Project, renders the exposure to EMF insignificant and, therefore, not harmful to human health. The strength of the EMF present at the perimeter of a solar facility within a building is substantially lower than the typical exposures to EMF from household sources such as refrigerators and microwave ovens (NIOSH 2014).

Overall, impacts to public health and safety in association with implementation of the Proposed Action would be considered temporary and minor.

3.11.2.3 Cumulative Impacts

As with the past, present, and RFFAs, the Project would comply with OSHA regulations and health and safety plans to prevent or minimize the negative effects of worker-related accidents. The Project would also comply with SPCC plans, hazardous material plans, and other waste management BMPs to avoid or minimize related health and safety issues. With proper planning and implementation of BMPs, cumulative impacts from the Project in relation to public health and safety would not occur.

3.12 Transportation

3.12.1 Affected Environment

3.12.1.1 Roads

The Project site is bounded on the west by Watermelon Road and the RJ Corman Railroad, which roughly parallels US 79 approximately a quarter mile south of the highway. Watermelon Road is a two-lane paved public road that extends north-south along the western boundary of the Project site. The two-lane gravel A.P. Miller Road traverses east-west through western and central portions of the Project site. A.P. Miller Road provides access to the Project site through its connection with Watermelon Road. Joe Montgomery Road, a two-lane road with paved and

gravel portions, traverses north-south through eastern portions of the Project site. Joe Montgomery Road provides access to the Project site through its connection with US 79. US 79 in the Project vicinity is a two-lane undivided federal highway that extends northeast-southwest, approximately a quarter mile from the northwestern terminus of the Project site. There are also a few unnamed private dirt roads that extend through the Project site.

3.12.1.1.1 Road Traffic

Existing traffic volumes on some of the roads in the Project area were determined using 2018 and 2019 Average Annual Daily Traffic (AADT) counts measured at existing KYTC stations (KYTC 2021). Three KYTC stations (Stations 506, B18, and B60) are located within one mile of the Project site. The 2018 AADT count for Station 506, located on Watermelon Road approximately one mile southwest of the Project site, was 377 vehicles. The 2018 AADT count for Station B18, located on US 79 approximately one mile north of the Project site, was 4,441 vehicles. The 2019 AADT count for Station B60, located on US 431 (Russellville Bypass) approximately one mile northeast of the Project site, was 4,380 vehicles.

3.12.1.2 Rail and Air Traffic

The closest rail line is the RJ Corman Memphis Line, a short line railroad that extends north-south adjacent to the western boundary of the Project site. The closest general aviation airport is the Russellville-Logan County Airport in Russellville, Kentucky, located approximately five miles east of the Project site. The closest regional airport is the Clarksville-Montgomery County Regional Airport in Clarksville, Tennessee, located approximately 28 miles southwest of the Project site. The closest major airport, and the only one in the vicinity with regular commercial passenger service, is the Nashville International Airport in Nashville, Tennessee, approximately 45 miles south of the Project site.

3.12.2 Environmental Consequences

3.12.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed. Therefore, no Project-related impacts on transportation resources would result. Existing land use would remain a mix of agricultural and forested land for the foreseeable future, and the existing transportation network and traffic conditions would be expected to remain as they are at present. However, if the Project site were to be developed by other parties and the city of Russellville were to expand southward, impacts to the existing transportation network and traffic conditions could occur.

3.12.2.2 Proposed Action Alternative

Under the Proposed Action Alternative, the development of the solar facility would result in minor direct impacts to road traffic due to an increase in construction related traffic in the vicinity of the Project site. Subject to weather, construction activities would take approximately 14 to 18 months to complete using a crew of approximately 450 workers maximum. Work would generally occur during daylight hours for five to seven days a week. A majority of these workers would likely come from the local area or region. Other workers could come from outside the region, and if so, many would likely stay in local hotels in the vicinity. It is anticipated that workers would drive personal vehicles to the Project area. Some of the individual workers and

work teams would likely visit local restaurants and other businesses during the construction phase of the Project.

Due to the proximity of the Project site to the city of Russellville, possible minor to moderate traffic impacts along Watermelon Road, US 79, and US 431 could occur, as a portion of the construction workers would likely commute to the Project site from and through Russellville. Effects could be moderate on portions of US 79, given that the road is currently experiencing high volumes in comparison with its capacity and is pending a widening project, as discussed in the introduction to Chapter 3. Traffic flow around the Project site would be heaviest at the beginning of the work day, at lunch, and at the end of the work day. Use of mitigation measures, such as posting a flag person during heavy commute periods to manage traffic flow, prioritizing access for local residents, and implementing staggered work shifts during daylight hours, would minimize potential adverse impacts to traffic and transportation to minor or negligible levels.

Construction of a site entrance from Watermelon Road would require a KYTC Encroachment Permit and an evaluation of the proposed commercial entrance by KYTC District 3 to determine if a Traffic Impact Study is necessary. If necessary, based on the final design, the Project would comply with this requirement and the terms and conditions of the permit and would implement mitigation measures identified in the Traffic Impact Study.

Construction and operation of the Project would have no effect on operation of airports in the region. The operation of the Project would not affect commercial air passenger or freight traffic in the region and would not adversely affect any aerial crop dusters operating in the vicinity of the Project site.

Overall, direct impacts to transportation resources associated with implementation of the Proposed Action would be anticipated to be minor during construction due to the influx of workers traveling to and from the Project site. These impacts would be temporary and minimized through appropriate mitigation. The Proposed Action would not result in any indirect impacts to transportation.

3.12.2.3 Cumulative Impacts

The Project would implement minimization and mitigation measures if Project construction is expected to disrupt normal traffic patterns; thus, Project effects to road traffic would be temporary, minor, and minimized or mitigated. While effects to local, regional, and major airports is not anticipated, TVA would coordinate with the Federal Aviation Administration regarding potential effects to the Russellville-Logan County Airport given its proximity. Past, present, and RFFAs are also expected to result in minor impacts to transportation. The construction of the Proposed Action could potentially coincide with the US 79 Bridge Replacement project which could contribute to cumulative impacts to traffic. The potential development of the West Industrial Park and Camp Property could also contribute to cumulative impacts to traffic depending on the timing of those projects. However, impacts would be short term and coordination could occur to minimize impacts to local commuters. Overall, with implementation of minimization and mitigation measures, the Project is not expected to contribute to cumulative impacts to area transportation.

3.13 Socioeconomics

3.13.1 Affected Environment

The Project site is in an unincorporated portion of central Logan County, Kentucky, approximately two miles southwest of the city of Russellville. The Project site falls entirely within the U.S. Census Bureau (USCB) 2010 Census Tract (CT) 9605, which encompasses 4.3 percent of the entire area of CT 9605 (Figure 3-12). Generally, CT 9605 encompasses the incorporated and unincorporated portions of the city of Russellville south of US 68 and US 79. Logan County is primarily rural and does not include any densely populated areas.

3.13.1.1 Population and Demographics

In 2020, the population of CT 9605 was 4,308, Logan County was 27,432, and Kentucky was 4,505,836, representing increases of 7.4 percent, 2.2 percent, and 3.8 percent, respectively, since 2010 (USCB 2021a). The Kentucky State Data Center (2016) projects that the population of Logan County will decrease by approximately 6.6 percent by 2040 while Kentucky will continue to increase by 8.5 percent by 2040 (Table 3-19).

Table 3-19. Population trends in the Project area

Geography	2010 Census¹	2020 Census²	Percent Change 2010-2020	Projection 2040	Percent Change 2020-2040
CT 9605	4,012	4,308	+7.4	--	--
Logan County	26,835	27,432	+2.2	25,618	-6.6
Kentucky	4,339,367	4,505,836	+3.8	4,886,381	+8.5

¹ 2010 USCB Decennial census

² 2020 USCB Decennial census

Sources: Kentucky State Data Center 2016; USCB 2021a

According to the 2015-2019 American Community Survey 5-Year Estimates (2019 ACS), the population of CT 9605 and Logan County had higher median ages (40.1 years and 40.7 years, respectively) than Kentucky (38.9 years) (USCB 2021a).

3.13.1.2 Employment and Income

According to the 2019 ACS, 52.8 percent of the CT 9605 population are in the labor force, slightly lower than the county and state percentages (55.5 percent and 59.3 percent, respectively) (Table 3-20). In CT 9605 and Logan County, more civilians are employed in manufacturing than in other industries. In the state, educational services, health care, and social assistance employs the highest percentage of civilian workers. The unemployment rate for CT 9605 (4.6 percent) was lower than the county and state unemployment rates during the same period (5.0 percent and 5.6 percent, respectively). According to the most recent monthly unemployment data, the December 2021 unemployment rates for the county and state were 2.7 percent and 3.9 percent, respectively (BLS 2022a, 2022b). According to the 2019 ACS, the median household income for CT 9605 was \$51,782, which was more than the county and state (\$48,014 and \$50,589, respectively).

Table 3-20. Employment and income in the Project area

Geography	% Civilian Labor Force, 2019 ACS	Unemployment Rate, 2019 ACS	Unemployment Rate, Dec. 2021	Median Household Income, 2019 ACS
CT 9605	52.8	4.6	--	\$51,782
Logan County	55.5	5.0	2.7	\$48,014
Kentucky	59.3	5.6	3.9	\$50,589

Sources: BLS 2021a; BLS 2021b; USCB 2021a

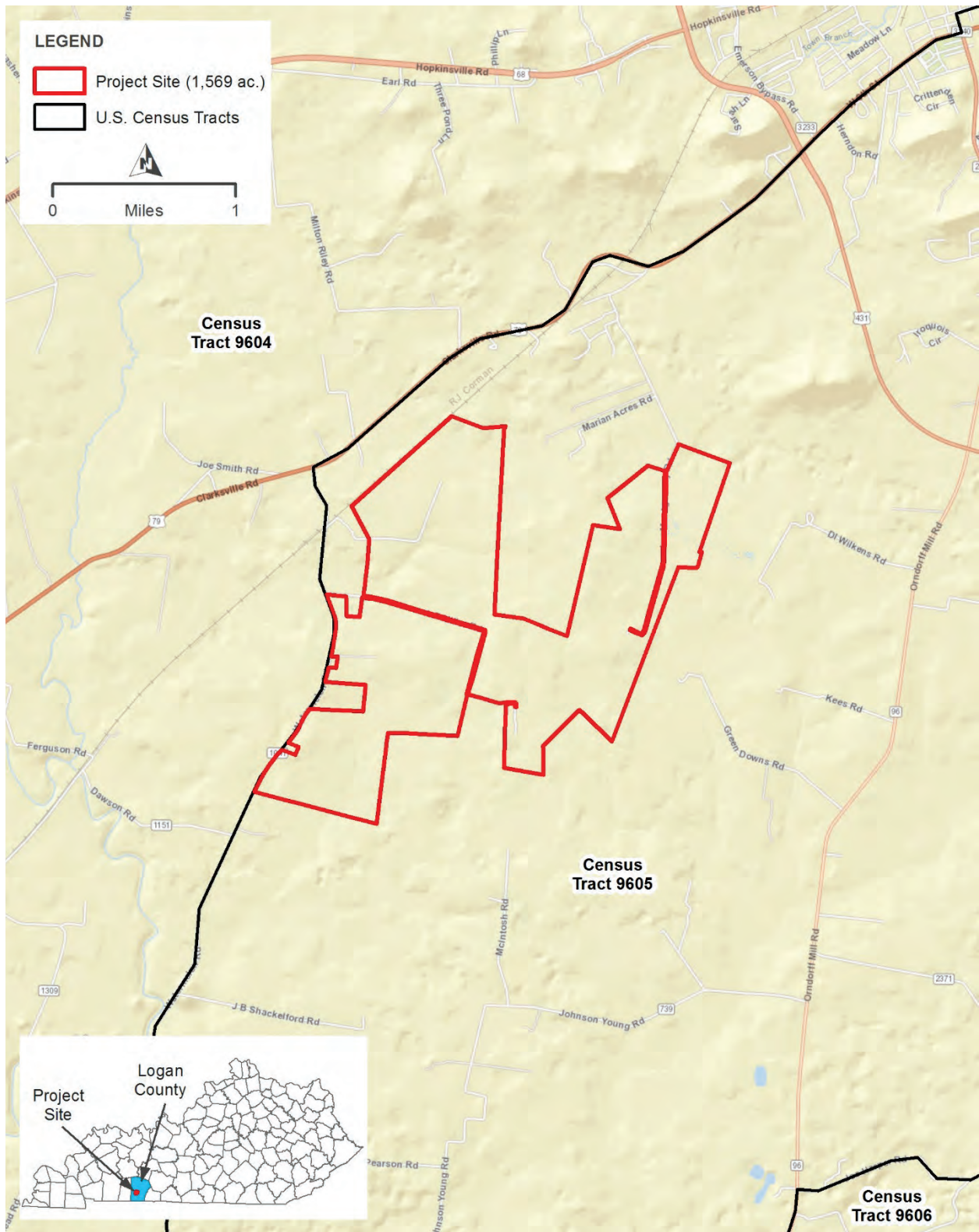


Figure 3-12. 2010 U.S. Census Bureau census tracts in the Project area

3.13.2 Environmental Consequences

3.13.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed; therefore, no Project-related impacts to socioeconomics would occur. Existing socioeconomic conditions would remain as they are at present or change at approximately the current rate. However, if the Project site were to be developed by other parties and the city of Russellville were to expand southward, beneficial or adverse effects to socioeconomics could occur.

3.13.2.2 Proposed Action Alternative

Under the Proposed Action Alternative, a new solar facility would be built in the Project area. Subject to weather, construction activities would take approximately 14 to 18 months to complete using a crew of approximately 450 workers maximum. Work would generally occur during daylight hours for five to seven days a week. Short-term beneficial economic impacts would result from construction activities associated with the Project, including 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 Logan County and/or in adjacent counties. Most of the other components of the solar and transmission facilities would be acquired from outside the local area. Also, many of the construction workforce would likely be sought locally or within the region. The direct impact to the economy associated with construction of the Project would be short-term and beneficial.

The majority of the indirect employment and income impacts would be 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. Construction of the proposed solar facility could have minor beneficial indirect impacts to population and short-term employment and to income levels in Logan County.

During operations, the Project may require small groups of staff to be on site occasionally to manage the facility and conduct regular inspections, as well as some shepherds to manage the on-site sheep herd on a regular basis. Therefore, operations of the solar facility would have a minor beneficial impact on employment and the population in Logan County.

The Project has been designed to minimize impacts to adjacent and nearby properties and is not expected to negatively affect area property values. Measures to minimize effects on property values include setbacks from the Project site perimeter and the maintenance and/or establishment of visual screening as required by Logan County.

Overall, socioeconomic impacts for the operation of the proposed solar facility would be beneficial and long-term, but minor relative to the total economy of the region. The local tax base would increase from construction of the solar facility and would be most beneficial to Logan County and the vicinity.

3.13.2.3 Cumulative Impacts

Economic benefits of the Proposed Action and the past, present, and RFFAs considered for this analysis include the purchase of materials, equipment, and services, and moderate short- to long-term increases in employment and income. These increases would be local or regional, depending on where the goods, services, and workers have been or are obtained. Overall, short- to long-term, moderate beneficial cumulative impacts to socioeconomics would result from implementation of the Proposed Action in combination with the other actions considered in the area. Indirect, cumulative impacts to socioeconomics would also occur from the expenditure of wages earned by the workforce involved in construction activities and facility operations.

3.14 Environmental Justice

3.14.1 Affected Environment

Environmental justice-related impacts are analyzed in accordance with EO 12898 to identify and address as appropriate disproportionately high and adverse human health or environmental effects of federal programs, policies, and activities on minority and low-income populations. While not subject to this EO, TVA routinely considers environmental justice in its NEPA review processes.

CEQ guidance directs identification of minority populations when either the minority population of the affected area exceeds 50 percent *or* the minority population percentage of the study area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis, such as the surrounding city or county (CEQ 1997). CEQ defines minority populations as people who identify themselves as Asian or Pacific Islander, American Indian or Alaskan Native, Black (not of Hispanic origin), Hispanic, or those indicating two or more races.

CEQ guidance specifies that low-income populations are to be identified using the annual statistical poverty threshold from the USCB Current Population Reports Series P-60 on Income and Poverty. The USCB-provided 2020 poverty threshold for individuals under age 65 was \$13,465 and the official poverty rate for the U.S. as a whole in 2020 was 11.4 percent (USCB 2021b).

Based on CEQ guidance, USCB data reported in the 2020 ACS were used to identify minority and low-income populations in the Project area. The Project site lies within block group (BG) 2, CT 9605 (Figure 3-12).

3.14.1.1 Minority Population

According to the USEPA EJSCREEN, an environmental justice screening and mapping tool, on the Project site and within a three-mile radius of the approximate center of the Project site, the minority population is estimated to be 14 percent (USEPA 2020).

Within BG 2, CT 9605, the USCB-estimated minority population was lower than the county and the state (Table 3-21). While the USCB and USEPA findings differ, both indicate a minority population in the Project area under the 50 percent threshold noted in CEQ guidance.

Table 3-21. Minority population in the Project area

Geography	Minority Population¹	% Minority Population
BG 2, CT 9605	118	7.8
Logan County	3,074	11.4
Kentucky	704,974	15.8

Source: USCB 2021a

¹ Those reporting White Alone, Not Hispanic are those counted as nonminorities. All others, including White Alone, Hispanic, are included in the minority population.

3.14.1.2 Poverty

According to the USEPA EJSCREEN, on the Project site and within a three-mile radius of the Project site, the low-income population is estimated at 36 percent (USEPA 2020).¹

Within BG 2, CT 9605, the USCB-estimated poverty rate for all people was lower than the county and the state (Table 3-22).

Table 3-22. Poverty in the Project area

Geography	Per Capita Income (\$)	Poverty Rate, All People (%)
BG 2, CT 9605	27,413	9.0
Logan County	24,221	17.0
Kentucky	28,178	17.3

Source: USCB 2021a

3.14.2 Environmental Consequences

According to 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).

3.14.2.1 No Action Alternative

Under the No Action Alternative, there would be no changes to the Project area attributable to the Proposed Action and, therefore, no disproportionately high and adverse direct or indirect impacts on minority or low-income populations. However, if the Project site were to be developed by other parties and the city of Russellville were to expand southward without protections against disproportionately high and adverse impacts on minority and low-income populations, potential impacts to environmental justice populations could occur.

¹ EJScreen defines low-income populations as "Percent of individuals whose ratio of household income to poverty level in the past 12 months was less than 2 (as a fraction of individuals for whom ratio was determined)." The source of the minority data in EJScreen is USCB 2014 to 2018 ACS 5-Year Estimates (2018 ACS).

3.14.2.2 Proposed Action Alternative

Based on the analyses, minority population and poverty rates are lower in the Project area than in Logan County or Kentucky. The overall impacts of the Project, as described in other sections in this chapter, most of which would occur during the 18-month construction period, would be minor, and off-site impacts would be negligible. As such, no disproportionately high or adverse direct or indirect impacts on environmental justice populations due to human health or environmental effects are expected to result from the Proposed Action. Rather, the Project is expected to have beneficial effects to the local economy that would potentially benefit low-income populations.

3.14.2.3 Cumulative Impacts

Based on the analysis conducted, it was determined that impacts resulting from construction of the Proposed Action Alternative would not result in disproportionately high and adverse impacts to any environmental justice populations in the Project area. It is acknowledged that minority and low-income populations are present within the Project area; however, there is not a disproportionately high and adverse effect to environmental justice populations when compared to the impacts borne by all populations in and around the Project area. As with the past, present, and RFFAs, the Project would consider impacts to environmental justice populations within the Project boundaries and surrounding area. With proper planning, cumulative impacts from the Project in relation to environmental justice would not occur.

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CHAPTER 4 – REASONABLY FORESEEABLE ENVIRONMENTAL TRENDS AND PLANNED ACTIONS

4.1 Unavoidable Adverse Environmental Impacts

The Proposed Action could cause some unavoidable adverse environmental effects. Specifically, construction activities would temporarily increase noise, traffic, and health and safety risks and temporarily affect air quality, GHG emissions, and visual aesthetics in the Project site vicinity. Construction activities would primarily be limited to daytime hours, which would minimize noise impacts. Temporary increases in traffic would be minimized or mitigated by instituting staggered work shifts during daylight hours. 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. The Project would result in minor, temporary direct impacts to land use due to the conversion of the Project site from agricultural and forest to industrial during construction. Long-term, minor beneficial impacts are anticipated due to regenerative agricultural practices that would allow for dual land use on the Project site.

With the application of appropriate BMPs, no unavoidable adverse effects to groundwater are expected. Minor unavoidable adverse impacts affecting approximately 16 linear feet of one non-jurisdictional intermittent stream and approximately 0.01 acre of one non-jurisdictional emergent linear wetland due to the construction of road crossings using culverts are anticipated. A long-term adverse effect would result from the clearing of 93 acres of forest the associated forest-dependent wildlife. Revegetation of the Project site with native and/or noninvasive vegetation would convert large areas of current cropland to more diverse, managed grassland. The Project would maintain minimum 100-foot buffers around the five identified sinkhole fissures/karst features. The Project is not likely to adversely affect any federally listed species and would have a minor adverse effect on state-listed species. USFWS concurred with TVA's determinations regarding potential impacts to federally listed bat species.

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 adversely affect current 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. See Section 2.2.5 for additional information on the decommissioning process.

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 Alternative would involve irreversible commitment of fuel and resource labor required for the construction, maintenance, and operation of the Solar system. Because removal of the solar arrays and associated on-site infrastructure could be accomplished rather easily, and the facility would not irreversibly alter the site, the Project site could be returned to its original condition or used for other productive purposes once it is decommissioned. Most of the solar facility components could also be recycled after the facility is decommissioned. See Section 2.2.5 for additional information on the decommissioning process.

CHAPTER 5 – LIST OF PREPARERS

5.1 Project Team

Table 5-1 presents the members of the Project team and summarizes the expertise of each member and their contributions to this EA.

Table 5-1. Project Environmental Assessment Project Team

Name/Education	Experience	Project Role
TVA		
<i>Elizabeth Smith</i> B.A., Environmental Studies and Geography	12 years in environmental policy and NEPA compliance	NEPA Project Manager and Coordinator, NEPA compliance
<i>Logan Barber</i> B.S., Wildlife and Fisheries Science	10 years of experience in field biology, 5 years of ESA and related biological compliance	Biological compliance
<i>Adam Dattilo</i> M.S., Forestry B.S., Natural Resource Conservation Management	22 years of experience in ecological restoration and plant ecology and 17 years in botany	Vegetation, Threatened and Endangered Species (Plants)
<i>Elizabeth B. Hamrick</i> M.S., Wildlife; B.S., Biology	21 years conducting field biology, 10 years in biological compliance, NEPA compliance, and ESA consultation for T&E terrestrial animals	Terrestrial zoology
<i>Michaelyn Harle</i> Ph.D., Anthropology; M.A., Anthropology; B.A., Anthropology	17 years in cultural resource management	Cultural Resources, NHPA Section 106 compliance
<i>Carrie Williamson, P.E., CFM</i> M.S., Civil Engineering B.S., Civil Engineering	9 years in floodplains and flood risk, 3 years in river forecasting, 12 years in compliance monitoring	Floodplains and Flood Risk
HDR		
<i>Harriet L. Richardson Seacat</i> M.A., Anthropology (Cultural); B.A., Anthropology (Native American Studies minor)	20 years in anthropology, archaeology, history, NHPA and NEPA documentation, and project management	General oversight and review of desktop and field-based analyses per project description/internal finalization, coordination with SMEs, Draft EA comment response review, SRC/TVA coordination

Name/Education	Experience	Project Role
<i>G. Noemi Castillo, P.E., PMP</i> B.S., Environmental Engineering M.S., Environmental Engineering	18 years in NEPA documentation, NEPA compliance, noise analyses and air quality analyses	Air quality and GHG, Chapter 4
<i>Mark P. Filardi, P.G.</i> M.S. and B.S., Geology	19 years in hydrogeology and contaminated site assessment and remediation	Geology, Groundwater, Waste
<i>Josh Fletcher, RPA</i> M.A., Anthropology (Archaeology); B.S., Architectural Design	24 years in cultural resources management, regulatory compliance, NEPA documentation, and project management	Cultural resource studies, document preparation
<i>Gracelyn Jones</i> B.A., Environmental Sociology	3 years in regulatory compliance, NEPA compliance, and document preparation	EA compilation and editing, Environmental Justice
<i>Amanda B. Mills</i> M.S., Marine Sciences B.S., Biology	15 years in geology, biology, geology	Biological site review, document preparation
<i>Al Myers</i> Credits toward B.S., Business Administration	24 years in administration	Overall formatting, appendices compilation, and PDF creation
<i>Charles Nicholson</i> B.S., Wildlife and Fisheries Science M.S., Wildlife Management PhD, Ecology and Evolutionary Biology	17 years in wildlife and endangered species research and management, 26 years in NEPA compliance	Overall advisor/QC review, TVA coordination
<i>Miles Spenrath</i> B.S., Environment and Natural Resources	10 years in NEPA compliance and documentation	GIS mapping, Chapter 1, Chapter 2, Socioeconomics, Land Use, Soils, Farmland, Visual, Utilities, Public H&S, Transportation, Draft EA TVA comment resolution; Draft EA comment management; Administrative record
<i>Kelly Thames. PWS</i> B.A., Environmental Science M.S., Plant Biology	7 years in ecology, biology, stream and wetland delineations, permitting, habitat evaluation and restoration, and GIS mapping	Water resources

Name/Education	Experience	Project Role
<i>Lyranda Thiem</i> M.S., Biology B.S., Biology	4 years in ecology and biology and 2 years in stream and wetland delineations, permitting, and habitat evaluation	Water and biological resources, References
<i>Jessica Tisdale, Certified Ecologist</i> M.S., Forestry B.S., Environmental Sciences	15 years in biological evaluation, analysis and permitting for infrastructure projects and documentation	Biological site review and wildlife resources report, Water and biological resources

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CHAPTER 6 – REFERENCES CITED

- AKRF. 2019. Ravenswood Updated Acoustical Analysis and Recommendations for Proposed Battery Storage Facility, Long Island City, Queens, New Yor. Available at <https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B3BF48818-A8CB-45FF-93CD-F58A31C1F46D%7D> (accessed February 2022).
- Bureau of Labor Statistics (BLS). 2022a. Unemployment Rate in Logan County, KY [KYLOURN]. Federal Reserve Bank of St. Louis (FRED). Available at <https://fred.stlouisfed.org/series/KYLOURN> (accessed February 2022).
- _____. 2022b. Labor Force Data Series: Unemployment Rate. Kentucky Economy at a Glance. Available at https://www.bls.gov/regions/southeast/kentucky.htm#eag_ky.f.p (accessed February 2022).
- Corbisier, C. 2003. Living with Noise. *Public Roads* 67(1). Available at <https://www.fhwa.dot.gov/publications/publicroads/03jul/06.cfm> (accessed August 2021).
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetland and Deepwater Habitats of the United States*. Washington, D.C.: U.S. Fish and Wildlife Publication FWS/OBS-79/31.
- Environmental Protection Agency (EPA). 2021. Ecoregions of Kentucky. Available at https://gaftp.epa.gov/epadatacommons/ORD/Ecoregions/ky/ky_front.pdf (accessed August 2021).
- Federal Emergency Management Agency (FEMA). 2017. FEMA Flood Map Service Center: Search by Address. Available at <https://msc.fema.gov/portal> (accessed August 2021).
- Gregory, D., L.C. Thompson, A. Cavanaugh, B. Cavanaugh, S. Schoof, P. Hoffman, and R.D. Jones. 2022. Phase I Cultural Resource Survey (1,585 Acres) for the Russellville Solar Farm. Prepared by New South Associates for HDR, Inc., November 2022.
- Grossman, D. H., D. Faber-Langendoen, A. S. Weakley, M. Anderson, P. Bourgeron, R. Crawford, K. Goodin, S. Landaal, K. Metzler, K. D. Patterson, M. Pyne, M. Reid, and L. Sneddon. 1998. International classification of ecological communities: terrestrial vegetation of the United States. Volume I. The National Vegetation Classification System: development, status, and applications. The Nature Conservancy, Arlington, Virginia.
- HDR, Inc. (HDR). 2021. Phase I Environmental Site Assessment. Prepared by HDR, Inc., for Russellville Solar, LLC, May 2021.
- _____. 2022. Wildlife and Vegetation Assessment, Logan County Solar Energy Center, Logan County, Kentucky. Prepared by HDR, Inc., for Russellville Solar, LLC, February 2022.

- Kaufmann, J.E. 2007. Sinkhole fact sheet. U.S. Department of the Interior and U.S.G.S. Fact sheet 2007-3060.
- Kentucky Department of Agriculture. 2022. What is PACE? Available at <https://www.kyagr.com/marketing/PACE.html> (accessed February 2022).
- Kentucky Department of Fish and Wildlife Resources (KDFWR). 2021. Kentucky Bald Eagle Nest Monitoring Plan. Available at <https://fw.ky.gov/Wildlife/Documents/Eagles/KYBaldEagleMonitoringPlan2021.pdf> (accessed June 2021).
- Kentucky Energy and Environment Cabinet (KEEC). 2022. Baker Natural Area – Heritage Land. Available at <https://eec.ky.gov/Nature-Preserves/Locations/Pages/Baker-Natural-Area.aspx> (accessed February 2022).
- Kentucky Geological Survey (KGS). 2022a. Stratigraphic Column for this Quadrangle: GQ-714. Available at <https://kgs.uky.edu/kgsweb/download/24k/stratcol/gq714.pdf> (accessed February 2022).
- _____. 2022b. Sinkhole Data by County. Available at <https://kgs.uky.edu/kgsweb/download/karst/sinkpick.htm> (accessed February 2022).
- Kentucky Public Service Commission. 2022. Available at <https://psc.ky.gov/Home/EGTSB> (accessed February 2022).
- Kays, R. and D E. Wilson. 2002. *Mammals of North America*. Princeton University Press, Princeton, NJ.
- Kentucky State Data Center. 2016. Vintage 2016 Projections of Population and Households: State of Kentucky, Kentucky Counties, and Area Development Districts, 2015-2040. Available at <http://ksdc.louisville.edu/data-downloads/projections/> (accessed November 2021).
- Kentucky Transportation Cabinet (KYTC). 2020. Six Year Highway Plan – FY 2020 thru FY 2026. Available at <https://transportation.ky.gov/Program-Management/Highway%20Plan/2020HighwayPlanProjectListing.pdf> (February 2022).
- _____. 2021. Traffic Counts. Available at <https://transportation.ky.gov/Planning/Pages/Traffic-Counts.aspx> (accessed August 2021).
- _____. 2022. Highway District 3. Available at <https://transportation.ky.gov/DistrictThree/Pages/default.aspx> (February 2022).
- Logan County. 2022. Ordinance No. 19-920-06. An Ordinance Establishing Setback Requirements for Solar Farm Installations in Logan County, as amended and adopted on February 22, 2022.

- Logan Economic Alliance for Development (LEAD). 2021. Business Resources: Community. Available at <https://www.loganleads.com/business-resources/community-2/> (accessed August 2021).
- _____. 2022. Home. Available at <https://www.loganleads.com/> (accessed February 2022).
- Multi-Resolution Land Characteristics (MRLC). 2016. National Land Cover Database Evaluation, Visualization, and Analysis tool. Available at <https://www.mrlc.gov/viewer/> (accessed August 2021).
- Murray, M. 1974. *Hunting for Fossils: A Guide to Finding and Collecting Fossils in all 50 States*. Collier Books.
- National Geographic. 2002. *A Field Guide to the Birds of North America*. 4th ed. National Geographic Society Washington, D.C.
- National Institute for Occupational Safety and Health (NIOSH). 2014. Electric and Magnetic Fields (EMF). Available at <https://www.cdc.gov/niosh/topics/emf/default.html> (accessed August 2021).
- North American Bird Conservation Initiative (NABCI). 2020. Bird Conservation Region Map. Available at <https://nabci-us.org/resources/bird-conservation-regions-map/> (Accessed June 2021).
- North Carolina State University. 2017. Health and Safety Impacts of Solar PV. Available at https://nccleantech.ncsu.edu/wp-content/uploads/2018/10/Health-and-Safety-Impacts-of-Solar-Photovoltaics-2017_white-paper.pdf (Accessed June 2021).
- Office of Kentucky Nature Preserves. 2021. Kentucky Biological Assessment Tool: Project ID: 21-0128. (Accessed April 2021).
- Powell, R. Conant, R., and J. T. Collins. 2016. *Field Guide to Reptiles and Amphibians: of Eastern and Central North America*. 4th ed. Boston: Houghton Mifflin.
- Sauer, C.O. 1927. *Geography of the Pennyroyal: Kentucky Geological Survey*, ser. 6, v. 25, p. 303. Available at <https://archive.org/details/geographyofpenny00sauerich> (accessed February 2022).
- S. Schoof, P. Hoffman, R.D. Jones, and J.H. Tyson. 2022. *Historic Architecture Survey and Assessment of Effects for the Proposed Logan County Solar Project, Logan County, Kentucky*. Prepared by New South Associates, Inc. for HDR, September 2022.
- Silicon Ranch Corporation (SRC). 2021. Regenerative Energy. Available at <https://regenerativeenergy.org/> (accessed August 2021).
- Shaw, J., D. Estes, B. Rufhel, A.B. Morris, and T.R. Littlefield. 2021. *Tennessee-Kentucky Plant Atlas*. USF Water Institute, University of South Florida, University of Tennessee

Chattanooga, Austin Peay State University, University of Michigan, Furman University, and Kentucky State Nature Preserves Commission. Available at <https://tennesseekentucky.plantatlas.usf.edu> (accessed June 2021).

Tennessee Valley Authority (TVA). 1981. Class Review of Repetitive Actions in the 100-Year Floodplain. FR Vol. 46, No. 76—Tuesday, April 21, 1981. pp. 22845-22846.

_____. 2014. TVA Solar Photovoltaic Projects Final Programmatic Environmental Assessment. Available at https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/default-document-library/site-content/environment/environmental-stewardship/environmental-reviews/tva-solar-photovoltaic-projects/pv-final-pea-solar-pv-reduced-size.pdf?sfvrsn=5b15a107_2 (accessed February 2022).

_____. 2016. Bull Run Fossil Plant Landfill Final Environmental Impact Statement, Anderson County, Tennessee. Available at https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/default-document-library/site-content/environment/environmental-stewardship/environmental-reviews/disposal-of-coal-combustion-residuals-from-the-bull-run-fossil-plant/2016_11_21_brf-landfill-final_eis.pdf?sfvrsn=d33329a6_2 (accessed February 2022).

_____. 2017a. *Site Clearing and Grading Specifications*. Available at https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/energy/transmission/site-clearing-and-grading-specifications.pdf?sfvrsn=853fa634_2 (accessed February 2022).

_____. 2017b. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, Revision 3. Available at https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/energy/transmission/a-guide-for-environmental-protection-and-best-management-practices-for-tva-construction-and-maintenance-activities.pdf?sfvrsn=60c6b80d_2 (accessed February 2022).

_____. 2019. Integrated Resource Plan. Available at <https://www.tva.com/Environment/Environmental-Stewardship/Integrated-Resource-Plan> (accessed February 2022).

_____. 2020a. Implementation of the National Environmental Policy Act of 1969 (18 CFR Part 1318). Available at https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/environment/environmental-stewardship/nepa-environmental-reviews/tva_nepa_procedures_18_cfr_part_1318_effective_4-27-2020.pdf?sfvrsn=c34f6fe3_4 (accessed February 2022).

_____. 2020b. Substation Lighting Guidelines. Available at <https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default->

- [source/energy/transmission/substation-lighting-guidelines.pdf?sfvrsn=1cbe09ab_2](#) (accessed July 2021).
- _____. 2020c. Current TVA Transmission System Projects. Available at Accessed 7/29/2021 at <https://www.tva.com/energy/transmission/transmission-system-projects> (accessed July 2021).
- _____. 2021. TVA Regional Natural Heritage Database Results (Provided on March 2021).
- _____. 2022. Categorical Exclusion Checklist for Proposed TVA Actions: Geotechnical Investigation - Cave Springs, KY 161kV Switching Station - PN: 536152 - WO: 2S0E0. On file at TVA.
- U. S. Army Corps of Engineers (USACE). 1987. Corps of Engineers Wetlands Delineation Manual. Available at <https://usace.contentdm.oclc.org/digital/collection/p266001coll1/id/4530> (accessed August 2021).
- _____. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont (Version 2.0). Available at <https://usace.contentdm.oclc.org/utills/getfile/collection/p266001coll1/id/7607> (accessed March 2022).
- U.S. Census Bureau (USCB). 2021a. Explore Census Data. [Online Database]. Available at <https://data.census.gov/cedsci/> (accessed November 2021).
- _____. 2021b. Income and Poverty in the United States: 2020. Report Number P60-273. Available at <https://www.census.gov/library/publications/2021/demo/p60-273.html> (accessed November 2021).
- U.S. Department of Agriculture (USDA). 1995. Landscape Aesthetics: A Handbook for Scenery Management. Agriculture Handbook Number 701. US Forest Service, US Department of Agriculture. Available at https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5412126.pdf (accessed August 2021).
- _____. 2012. Changes to the Federal Noxious Weed List—New Species Added. Available at [changes-to-weedlist.pdf \(usda.gov\)](https://www.usda.gov/changes-to-weedlist.pdf) (accessed August 2021).
- _____. 2017. Census of Agriculture – County Data, Kentucky. USDA National Agricultural Statistics Service.
- _____. 2019. Web Soil Survey. Natural Resource Conservation Service, USDA. Available at <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx> (accessed August 2021).

- _____. 2021. Natural Resource Conservation Service Soil Series Descriptions. Available at <https://soilseries.sc.egov.usda.gov/osdname.aspx> (accessed August 2021).
- U.S. Department of Transportation (USDOT). 1993. Highway/Utility Guide. Federal Highway Administration. Available at <https://www.fhwa.dot.gov/utilities/010604.pdf> (accessed August 2021).
- _____. 2015. "Construction Noise Handbook." US Department of Transportation, Federal Highway Administration. Available at https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/ (accessed August 2021).
- U.S. Environmental Protection Agency (USEPA). 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with An Adequate Margin of Safety.
- _____. 2021. The 2017 National Emissions Inventory (NEI) Data. Available at <https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data> (accessed July 2021).
- _____. 2022a. Ecoregion Download Files by State – Region 4. Available at <https://www.epa.gov/eco-research/ecoregion-download-files-state-region-4#pane-15> (accessed February 2022).
- _____. 2022b. Overview of Greenhouse Gases. Available at <https://www.epa.gov/ghgemissions/overview-greenhouse-gases> (accessed February 2022).
- U.S. Fish and Wildlife Service (USFWS). 1997. Gray bat (*Myotis grisescens*) Fact Sheet. USFWS Ecological Services Field Offices-Midwest Region. September 19, 1997. Available at <https://www.fws.gov/midwest/endangered/mammals/pdf/gray-bat.pdf> (accessed June 2021).
- _____. 2006. Indiana Bat (*Myotis sodalis*) Fact Sheet. USFWS Ecological Services Field Offices-Midwest Region. Available at <https://www.fws.gov/midwest/endangered/mammals/inba/pdf/inbafactsht.pdf> (accessed June 2021).
- _____. 2015. Threatened Species Status for the Northern Long-eared Bat with 4(d) Rule. April 2015. Available at <https://www.gpo.gov/fdsys/pkg/FR-2015-04-02/pdf/2015-07069.pdf> (accessed June 2021).
- _____. 2021a. Information for Planning and Conservation (IPaC). Available at <http://ecos.fws.gov/ipac/> (accessed June 2021).

-
- _____. 2021b. Birds of Conservation Concern 2021. Migratory Birds Program, U.S. Fish and Wildlife Service. Available at <https://www.fws.gov/migratorybirds/pdf/management/birds-of-conservation-concern-2021.pdf> (accessed June 2021).
- U.S. Geological Survey (USGS). 1968. Geologic Map of the Russellville Quadrangle, Logan County, Kentucky.
- _____. 1988. Geologic Map of Kentucky: Sesquicentennial Edition of the Kentucky Geological Survey: U.S. Geological Survey and the Kentucky Geological Survey, scale 1:500,000.
- _____. 2014. Earthquake Hazards Program Unified Hazard Tool. Available at <https://earthquake.usgs.gov/hazards/interactive> (accessed February 2022).
- _____. 2022a. The National Map. Available at <https://apps.nationalmap.gov/downloader/#/> (accessed February 2022).
- _____. 2022b. Streamer. Available at <https://txpub.usgs.gov/DSS/streamer/web/> (accessed February 2022).
- U.S. Global Change Research Program (USGCRP). 2018. Fourth National Climate Assessment. Available at <https://www.globalchange.gov/nca4> (accessed February 2022).
- U.S. Water Resources Council. 1978. Guidelines for Implementing Executive Order 11988, Floodplain Management. Federal Register Vol. 43, No. 29, February 10, 1978. pp. 6030-6054.

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Appendix A – Geological Resources-Related Supporting Information

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June 11, 2021

Mr. Connor Echols
Manager, Project Development
Silicon Ranch Corporation
222 Second Avenue South, Suite 1900
Nashville, Tennessee 37201

RE: Phase I Environmental Site Assessment, dated June 11, 2021
Russellville Solar, Russellville, Logan County, Kentucky

Dear Mr. Echols,

HDR Engineering, Inc. (HDR) has conducted a Phase I Environmental Site Assessment (Phase I ESA) of the Russellville Solar (Project Area), located approximately 2.0 mile southwest of Russellville, in Logan County, Kentucky. This Phase I ESA has been prepared for Silicon Ranch Corporation (SRC) in support of financing and due diligence.

The Project Area consists of approximately 1,568.7 acres of agricultural and timber property and is comprised of nine contiguous, irregularly-shaped parcels identified on the Logan County GIS website as follows:

- Parcel ID #055-00-00-006-00; 431.8 acres
- Parcel ID #055-00-00-010-00; 111.6 acres
- Parcel ID #055-00-00-007-02; 91.4 acres
- Parcel ID #041-00-00-005-00; 189.3 acres
- Parcel ID #055-00-00-011-00; 84.5 acres
- Parcel ID #055-00-00-008-00; 114.1 acres
- Parcel ID #055-00-00-009-01; 72.7 acres
- Parcel ID #055-00-00-016-00; 468.4 acres
- Parcel ID #055-00-00-020-00; 4.9 acres

The Project Area is located east of Clarksville Road (County Route 79), east of Watermelon Road, and west of Orndoff Mill Road and along portions of J. Montgomery Road and A. P. Miller Road within a rural agricultural area of Logan County.

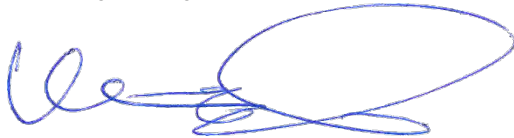
This Phase I ESA was completed to evaluate the potential presence of Recognized Environmental Conditions (RECs) that may adversely affect the Project Area and was conducted in accordance

with the scope and limitations of the ASTM International (ASTM) Practice E 1527-13. Based upon the Findings and Opinions presented in the report, HDR concludes that RECs have not been identified in association with the Russellville Solar property.

A small family cemetery was located on parcel 055-00-00-011-00. Cemeteries are protected from disturbance and desecration under Kentucky state law. Ground disturbance in and near the cemetery, to include a reasonable buffer around the site boundary, should be avoided. Access to the cemetery should be afforded to descendants of the interred. Family visits to the cemetery must be arranged with the landowner. Land managers should set aside a 150-foot buffer around the boundary of the cemetery to better ensure its protection.

HDR appreciates the opportunity to assist SRC on this project. Please do not hesitate to contact the undersigned at (704) 338-6787 or mark.filardi@hdrinc.com if you have questions regarding the aforementioned Phase I ESA.

Sincerely,
HDR Engineering, Inc.

A handwritten signature in blue ink, appearing to read 'Mark Filardi', with a large, stylized loop at the end.

Mark Filardi, PG
Senior Geologist, SAA GeoEnvironmental



Phase I Environmental Site Assessment



Silicon Ranch Corporation:
Russellville Solar

Russellville, Logan County, Kentucky

June 11, 2021





Report of Geotechnical Exploration
Russellville Solar Facility
333 Watermelon Road
Russellville, Kentucky
S&ME Project No. 1280-20-070

PREPARED FOR:

**Silicon Ranch Corp.
222 Second Avenue S, Suite 1900
Nashville, Tennessee 37201**

PREPARED BY:

**S&ME, Inc.
4350 River Green Parkway, Suite 200
Duluth, Georgia 30096**

December 4, 2020



December 4, 2020

Silicon Ranch Corp.
222 Second Avenue S, Suite 1900
Nashville, Tennessee 37201

Attention: Mr. Conor Goodson

Reference: **Report of Geotechnical Exploration**
Russellville Solar Facility
333 Watermelon Road; Russellville, Kentucky
S&ME Project No. 1280-20-070

Dear Mr. Goodson:

S&ME, Inc. (S&ME) is pleased to submit our *Report of Geotechnical Exploration* for the referenced project. Our services were performed in general accordance with our Proposal No. 12-2000385 dated November 13, 2020 and. We appreciate being selected to participate in this phase of the project. Please contact us with any questions about this report or if we may be of further service.

Sincerely,

S&ME, Inc.

A handwritten signature in blue ink that reads "Eric Conway".

Eric Conway, E.I.T.
Staff Professional
econway@smeinc.com

A circular professional engineer seal for the State of Kentucky. The seal contains the text "STATE OF KENTUCKY", "JEFFREY A DOUBRAVA", "28491", and "PROFESSIONAL ENGINEER". A handwritten signature in blue ink is written over the seal.

Jeffrey A. Doubrava, P.E.
Senior Engineer
KY PE Reg. No. 28491
jdoubrava@smeinc.com

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**Appendix B – Water Resources-Related Agency Coordination and
Supporting Information**

Wetland Delineation Report
Russellville Solar
Watermelon Road
Russellville, Logan County, Kentucky

July 31, 2019

Terracon Project No. N1197212



Prepared for:

Community Energy Solar, LLC
Chapel Hill, North Carolina

Prepared by:

Terracon Consultants, Inc.
Cincinnati, Ohio

terracon.com

Terracon

Environmental



Facilities



Geotechnical



Materials

Appendix 1 - REQUEST FOR CORPS JURISDICTIONAL DETERMINATION (JD)

To: District Name Here

- I am requesting a JD on property located at: Watermelon Road
(Street Address)
City/Township/Parish: Russellville County: Logan State: Kentucky
Acreage of Parcel/Review Area for JD: 1,600
Section: _____ Township: _____ Range: _____
Latitude (decimal degrees): 36.789914 Longitude (decimal degrees): 86.936531
(For linear projects, please include the center point of the proposed alignment.)
- Please attach a survey/plat map and vicinity map identifying location and review area for the JD.
- I currently own this property. I plan to purchase this property.
- I am an agent/consultant acting on behalf of the requestor.
- Other (please explain): _____.
- Reason for request: (check as many as applicable)
 - I intend to construct/develop a project or perform activities on this parcel which would be designed to avoid all aquatic resources.
 - I intend to construct/develop a project or perform activities on this parcel which would be designed to avoid all jurisdictional aquatic resources under Corps authority.
 - I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps, and the JD would be used to avoid and minimize impacts to jurisdictional aquatic resources and as an initial step in a future permitting process.
 - I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps; this request is accompanied by my permit application and the JD is to be used in the permitting process.
 - I intend to construct/develop a project or perform activities in a navigable water of the U.S. which is included on the district Section 10 list and/or is subject to the ebb and flow of the tide.
 - A Corps JD is required in order to obtain my local/state authorization.
 - I intend to contest jurisdiction over a particular aquatic resource and request the Corps confirm that jurisdiction does/does not exist over the aquatic resource on the parcel.
 - I believe that the site may be comprised entirely of dry land.
 - Other: _____
- Type of determination being requested:
 - I am requesting an approved JD.
 - I am requesting a preliminary JD.
 - I am requesting a "no permit required" letter as I believe my proposed activity is not regulated.
 - I am unclear as to which JD I would like to request and require additional information to inform my decision.

By signing below, you are indicating that you have the authority, or are acting as the duly authorized agent of a person or entity with such authority, to and do hereby grant Corps personnel right of entry to legally access the site if needed to perform the JD. Your signature shall be an affirmation that you possess the requisite property rights to request a JD on the subject property.

*Signature: _____ Date: _____

- Typed or printed name: _____
Company name: _____
Address: _____

Daytime phone no.: _____
Email address: _____

***Authorities:** Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Program of the U.S. Army Corps of Engineers; Final Rule for 33 CFR Parts 320-332.

Principal Purpose: The information that you provide will be used in evaluating your request to determine whether there are any aquatic resources within the project area subject to federal jurisdiction under the regulatory authorities referenced above.

Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public, and may be made available as part of a public notice as required by federal law. Your name and property location where federal jurisdiction is to be determined will be included in the approved jurisdictional determination (AJD), which will be made available to the public on the District's website and on the Headquarters USACE website.

Disclosure: Submission of requested information is voluntary; however, if information is not provided, the request for an AJD cannot be evaluated nor can an AJD be issued.

**TABLE OF AQUATIC RESOURCES IN REVIEW ARE WHICH “MAY BE” SUBJECT
TO REGULATORY JURISDICTION**

Site Number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated Amount of Aquatic Resource in Review Area (acreage and linear feet, if applicable)	Type of Aquatic Resource (i.e. wetland, stream, impoundment, etc.)	Geographic authority to which the aquatic resource “may be” subject (i.e., Section 404 or Section 10/404)
Wetland A	36.777328	-86.951289	0.95 ac	Wetland	Section 404
Wetland B	36.779092	-86.958715	1.11 ac	Wetland	Section 404
Wetland C	36.801531	-86.938631	0.88 ac	Wetland	Section 404
Wetland D	36.799868	-86.937797	0.09 ac	Wetland	Section 404
Wetland E	36.798357	-86.938473	0.14 ac	Wetland	Section 404
Wetland F	36.806036	-86.941152	1.84 ac	Wetland	Section 404
Wetland G	36.805283	-86.939728	0.18 ac	Wetland	Section 404
Wetland H	36.797875	-86.925033	0.08 ac	Wetland	Section 404
Wetland I	36.798016	-86.925033	0.03 ac	Wetland	Section 404
Wetland J	36.800322	-86.919266	3.27 ac	Wetland	Section 404
Wetland K	36.798524	-86.916544	1.22 ac	Wetland	Section 404
Wetland L	36.794575	-86.948812	0.74 ac	Wetland	Section 404
Wetland M	36.798215	-86.950261	0.05 ac	Wetland	Section 404

Stream 1	36.779994	-86.958985	207 lf	Stream	Section 404
Stream 2	36.7798061	-86.939915	4,599 lf	Stream	Section 404
Stream 3	36.797394	-86.939915	1,537 lf	Stream	Section 404
Stream 4	36.804994	-86.941152	186 lf	Stream	Section 404
Stream 5	36.807099	-86.940586	365 lf	Stream	Section 404
Stream 5a	36.807099	-86.940586	75 lf	Stream	Section 404
Stream 6	36.807292	-86.936789	84 lf	Stream	Section 404
Stream 7	36.806257	-86.937381	60 lf	Stream	Section 404
Stream 8	36.806298	-86.938409	16 lf	Stream	Section 404
Stream 9	36.806111	-86.938849	28 lf	Stream	Section 404
Stream 10	36.805768	-86.940182	171 lf	Stream	Section 404
Stream 11	36.792987	-86.921303	778 lf	Stream	Section 404
Stream 12	36.795202	-86.922031	1,466 lf	Stream	Section 404
Stream 13	36.797121	-86.922823	685 lf	Stream	Section 404
Stream 14	36.793824	-86.950261	325 lf	Stream	Section 404
Pond 1	36.783648	86.950109	0.92 ac	Pond	Section 404

Pond 2	36.781329	-86.953156	0.70 ac	Pond	Section 404
Pond 3	36.783153	-86.956136	0.42 ac	Pond	Section 404
Pond 4	36.791897	-86.948603	0.46 ac	Pond	Section 404
Pond 5	36.792664	-86.948603	0.70 ac	Pond	Section 404
Pond 6	36.801290	-86.939032	0.25 ac	Pond	Section 404
Pond 7	36.804156	-86.941529	0.81 ac	Pond	Section 404
Pond 8	36.805520	-86.939657	0.23 ac	Pond	Section 404
Pond 9	36.797875	-86.925033	0.70 ac	Pond	Section 404
Pond 10	36.792245	-86.927483	0.31 ac	Pond	Section 404
Pond 11	36.800322	-86.919266	0.26 ac	Pond	Section 404
Pond 12	36.798933	-86.917830	0.22 ac	Pond	Section 404
Pond 13	36.803331	-86.921264	0.29 ac	Pond	Section 404
Pond 14	36.808914	-86.943791	0.35 ac	Pond	Section 404
Pond 15	36.796148	-86.943791	0.74 ac	Pond	Section 404



DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
WEST REGULATORY FIELD OFFICE
2424 DANVILLE ROAD SW, SUITE-N
DECATUR, AL 35603

January 27, 2020

SUBJECT: LRN-2019-00805, Community Energy Solar, LLC.; Approved Jurisdictional Determination, Red River Watershed, Tennessee River Mile 241.6L Russellville, Logan County, Kentucky

Community Energy Solar, LLC.
Mr. Christopher Killenberg
151 East Rosemary Street, Suite 202
Chapel Hill, North Carolina 27514

Dear Mr. Killenberg:

This letter is in regard to your report entitled “Russellville Solar, Watermelon Road, Russellville, Logan County, Kentucky, July 31, 2019” (JD Report) which documented potential waters of the United States on a review area of approximately 1600 acres. This project has been assigned File No. LRN-2019-00805, please refer to this number in any future correspondence.

The U.S. Army Corps of Engineers (USACE) has regulatory responsibilities pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403). Under Section 10, the USACE regulates any work in, or affecting, navigable waters of the U.S. It appears the review area does not include navigable waters of the U.S. and would not be subject to the provisions of Section 10. Under Section 404, the USACE regulates the discharge of dredged and/or fill material into waters of the U.S., including wetlands.

Enclosed is an approved jurisdictional determination for aquatic resources identified as Stream 11, Stream 12, Stream 13, Wetland A and Wetland H, determined to be jurisdictional, and Streams 1-5, 10 and 14, Wetlands B-G and J-N, Ponds 1-15, that were determined not jurisdictional. The rationale for this determination is provided in the attached Approved Jurisdictional Determination forms. The approved jurisdictional determination expires five years from the date of this letter, unless new information warrants revision of the determination before the expiration date, or the District Engineer identifies specific geographic areas with rapidly changing environmental conditions that merit re-verification on a more frequent basis. This delineation/determination has been conducted to identify the limits of COE's Clean Water Act jurisdiction for the particular site identified in this request. This delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work. This approved jurisdictional determination is only valid for the review area as shown on the map labeled “LRN-2019-00508, Figure 1”

Site: Russeville Solar - Wetland A	Rater(s): C. Brendel	Date: 7/9/2019
---	-----------------------------	-----------------------

2	
max 6 pts.	subtotal

Metric 1. Wetland Area (size)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

- Select one size class and assign score.
- >50 acres (>20.2 ha) (6 pts)
 - 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
 - 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
 - 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
 - 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
 - 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
 - <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

ArcGIS was used to measure wetland. The wetland is 0.95 acre in size.

9	
max 14 pts.	subtotal

Metric 2. Upland Buffers and Surrounding Land Use

- 2a. Calculate average buffer width. Select only one and assign score. Do not double check.
- WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
 - MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
 - NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
 - VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)
- 2b. Intensity of surrounding land use. Select one or double check and average.
- VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
 - LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
 - MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
 - High. Urban, industrial, open pasture, row cropping, mining, construction (1)

10	
max 30 pts.	subtotal

Metric 3. Hydrology

- 3a. Sources of water. Score all that apply.
- High pH groundwater (5)
 - Other groundwater (3) [BR/CM (5)]
 - Precipitation (1) [unless BR/CM primary source (5)]
 - Seasonal/intermittent surface water (3)
 - Perennial surface water (lake or stream) (5)
- 3b. Connectivity. Score all that apply.
- 100-year floodplain (1)
 - Between stream/lake and other human use (1)
 - Part of wetland/upland (e.g., forest), complex (1)
 - Part of riparian or upland corridor (1)
- 3c. Maximum water depth. Select only one and assign score.
- >0.7 m (27.6 in.) (3)
 - 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
 - <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]
- 3d. Duration inundation/saturation. Score one or dbl. check & avg.
- Semi- to permanently inundated/saturated (4)
 - Regularly inundated/saturated (3) [BR/CM (4)]
 - Seasonally inundated (2) [BR/CM (4)]
 - Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]
- 3e. Modifications to natural hydrologic regime. Score one or double check and average.
- None or none apparent (12)
 - Recovered (7)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> ditch	<input type="checkbox"/> point source (nonstormwater)
<input type="checkbox"/> tile (including culvert)	<input type="checkbox"/> filling/grading
<input type="checkbox"/> dike	<input type="checkbox"/> road bed/RR track
<input type="checkbox"/> weir	<input type="checkbox"/> dredging
<input type="checkbox"/> stormwater input	<input type="checkbox"/> other _____

9	
max 20 pts.	subtotal

Metric 4. Habitat Alteration and Development

- 4a. Substrate disturbance. Score one or double check and average.
- None or none apparent (4)
 - Recovered (3)
 - Recovering (2)
 - Recent or no recovery (1)
- 4b. Habitat development. Select only one and assign score.
- Excellent (7)
 - Very good (6)
 - Good (5)
 - Moderately good (4)
 - Fair (3)
 - Poor to fair (2)
 - Poor (1)
- 4c. Habitat alteration. Score one or double check and average.
- None or none apparent (9)
 - Recovered (6)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> mowing	<input type="checkbox"/> shrub/sapling removal
<input type="checkbox"/> grazing	<input type="checkbox"/> herbaceous/aquatic bed removal
<input type="checkbox"/> clearcutting	<input type="checkbox"/> woody debris removal
<input type="checkbox"/> selective cutting	<input type="checkbox"/> sedimentation
<input type="checkbox"/> farming	<input type="checkbox"/> dredging
<input type="checkbox"/> toxic pollutants	<input type="checkbox"/> nutrient enrichment

30

Site:	Rater(s):	Date:
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30

subtotal previous page

0	subtotal
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max 10 pts.

Metric 5. Special Wetlands

raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

5	subtotal
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max 20 pts.

Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- Aquatic bed
- Emergent
- Shrub
- Forest
- Mudflats
- Open water <20 acres (8 ha)
- Moss/lichen. Other _____

Vegetation Community Cover Scale

- 0 = Absent or <0.1 ha (0.25 acre) contiguous acre
[For BR/CM <0.04 ha (0.1 acre)]
- 1 = Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
- 2 = Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
- 3 = Present and comprises a significant part or more of wetland's vegetation and is of high quality

6b. Horizontal (plan view) interspersion.
Select only one.

- High (5)
- Moderately high (4) [BR/CM (5)]
- Moderate (3)[BR/CM (5)]
- Moderately low (2) [BR/CM (3)]
- Low (1) [BR/CM (2)]
- None (0)

Narrative Description of Vegetation Quality

- low = Low species diversity &/or dominance of nonnative or disturbance tolerant native species
- mod = Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
- high = A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rare, threatened, or endangered species

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- Extensive >75% cover (-5)
- Moderate 25-75% cover (-3)
- Sparse 5-25% cover (-1)
- Nearly absent <5% cover (0)
- Absent (1)

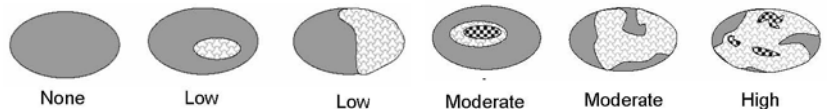
Mudflat and Open Water Class Quality

- 0 = Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
- 1 = Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
- 2 = Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <0.2 ha (0.5 to 5 acre)]
- 3 = High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

6d. Microtopography.
Score all present using 0 to 3 scale.

- Vegetated hummocks/tussocks
- Coarse woody debris >15 cm (6 in.)
- Standing dead >25 cm (10 in.) dbh
- Amphibian breeding pools

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

- 0 = Absent
- 1 = Present in very small amounts or if more common of marginal quality
- 2 = Present in moderate amounts, but not of highest quality or in small amounts of highest quality
- 3 = Present in moderate or greater amounts and of highest quality

35, Category 2

GRAND TOTAL
(max 100 pts)

- 0- 29 = Category 1, low wetland function, condition, quality**
- 30- 59 = Category 2, good/moderate wetland function, condition, quality**
- 60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: <http://www.epa.state.oh.us/dsw/401/401.html>

Site: Russeville Solar - Wetland B	Rater(s): C. Brendel	Date: 7/9/2019
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	2
max 6 pts.	subtotal

Metric 1. Wetland Area (size)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

- Select one size class and assign score.
- >50 acres (>20.2 ha) (6 pts)
 - 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
 - 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
 - 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
 - 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
 - 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
 - <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

ArcGIS was used to measure wetland. The wetland is 1.11 acre in size.

	14
max 14 pts.	subtotal

Metric 2. Upland Buffers and Surrounding Land Use

- 2a. Calculate average buffer width. Select only one and assign score. Do not double check.
- WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
 - MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
 - NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
 - VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)
- 2b. Intensity of surrounding land use. Select one or double check and average.
- VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
 - LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
 - MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
 - High. Urban, industrial, open pasture, row cropping, mining, construction (1)

	21
max 30 pts.	subtotal

Metric 3. Hydrology

- 3a. Sources of water. Score all that apply.
- High pH groundwater (5)
 - Other groundwater (3) [BR/CM (5)]
 - Precipitation (1) [unless BR/CM primary source (5)]
 - Seasonal/intermittent surface water (3)
 - Perennial surface water (lake or stream) (5)
- 3b. Connectivity. Score all that apply.
- 100-year floodplain (1)
 - Between stream/lake and other human use (1)
 - Part of wetland/upland (e.g., forest), complex (1)
 - Part of riparian or upland corridor (1)
- 3c. Maximum water depth. Select only one and assign score.
- >0.7 m (27.6 in.) (3)
 - 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
 - <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]
- 3d. Duration inundation/saturation. Score one or dbl. check & avg.
- Semi- to permanently inundated/saturated (4)
 - Regularly inundated/saturated (3) [BR/CM (4)]
 - Seasonally inundated (2) [BR/CM (4)]
 - Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]
- 3e. Modifications to natural hydrologic regime. Score one or double check and average.
- None or none apparent (12)
 - Recovered (7)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> ditch	<input type="checkbox"/> point source (nonstormwater)
<input type="checkbox"/> tile (including culvert)	<input type="checkbox"/> filling/grading
<input type="checkbox"/> dike	<input type="checkbox"/> road bed/RR track
<input type="checkbox"/> weir	<input type="checkbox"/> dredging
<input type="checkbox"/> stormwater input	<input type="checkbox"/> other _____

	13
max 20 pts.	subtotal

Metric 4. Habitat Alteration and Development

- 4a. Substrate disturbance. Score one or double check and average.
- None or none apparent (4)
 - Recovered (3)
 - Recovering (2)
 - Recent or no recovery (1)
- 4b. Habitat development. Select only one and assign score.
- Excellent (7)
 - Very good (6)
 - Good (5)
 - Moderately good (4)
 - Fair (3)
 - Poor to fair (2)
 - Poor (1)
- 4c. Habitat alteration. Score one or double check and average.
- None or none apparent (9)
 - Recovered (6)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> mowing	<input type="checkbox"/> shrub/sapling removal
<input type="checkbox"/> grazing	<input type="checkbox"/> herbaceous/aquatic bed removal
<input type="checkbox"/> clearcutting	<input type="checkbox"/> woody debris removal
<input type="checkbox"/> selective cutting	<input type="checkbox"/> sedimentation
<input type="checkbox"/> farming	<input type="checkbox"/> dredging
<input type="checkbox"/> toxic pollutants	<input type="checkbox"/> nutrient enrichment

50

Site:	Rater(s):	Date:
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50

subtotal previous page

max 10 pts.	5	subtotal
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Metric 5. Special Wetlands

raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

max 20 pts.	10	subtotal
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Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- Aquatic bed
- 2 Emergent
- 3 Shrub
- Forest
- Mudflats
- Open water <20 acres (8 ha)
- Moss/lichen. Other _____

Vegetation Community Cover Scale

- 0 = Absent or <0.1 ha (0.25 acre) contiguous acre
[For BR/CM <0.04 ha (0.1 acre)]
- 1 = Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
- 2 = Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
- 3 = Present and comprises a significant part or more of wetland's vegetation and is of high quality

6b. Horizontal (plan view) interspersion.
Select only one.

- High (5)
- Moderately high (4) [BR/CM (5)]
- Moderate (3)[BR/CM (5)]
- Moderately low (2) [BR/CM (3)]
- Low (1) [BR/CM (2)]
- None (0)

Narrative Description of Vegetation Quality

- low = Low species diversity &/or dominance of nonnative or disturbance tolerant native species
- mod = Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
- high = A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rare, threatened, or endangered species

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- Extensive >75% cover (-5)
- Moderate 25-75% cover (-3)
- Sparse 5-25% cover (-1)
- Nearly absent <5% cover (0)
- Absent (1)

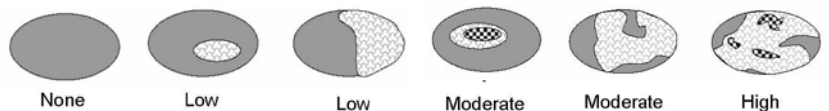
Mudflat and Open Water Class Quality

- 0 = Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
- 1 = Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
- 2 = Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <0.2 ha (0.5 to 5 acre)]
- 3 = High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

6d. Microtopography.
Score all present using 0 to 3 scale.

- Vegetated hummocks/tussocks
- Coarse woody debris >15 cm (6 in.)
- Standing dead >25 cm (10 in.) dbh
- Amphibian breeding pools

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

- 0 = Absent
- 1 = Present in very small amounts or if more common of marginal quality
- 2 = Present in moderate amounts, but not of highest quality or in small amounts of highest quality
- 3 = Present in moderate or greater amounts and of highest quality

65, Category 3

GRAND TOTAL
(max 100 pts)

- 0- 29 = Category 1, low wetland function, condition, quality**
- 30- 59 = Category 2, good/moderate wetland function, condition, quality**
- 60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: <http://www.epa.state.oh.us/dsw/401/401.html>

Site: Russeville Solar - Wetland C	Rater(s): C. Brendel	Date: 7/9/2019
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	1
max 6 pts.	subtotal

Metric 1. Wetland Area (size)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

- Select one size class and assign score.
- >50 acres (>20.2 ha) (6 pts)
 - 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
 - 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
 - 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
 - 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
 - 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
 - <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

ArcGIS was used to measure wetland. The wetland is 0.88 acre in size.

	14
max 14 pts.	subtotal

Metric 2. Upland Buffers and Surrounding Land Use

- 2a. Calculate average buffer width. Select only one and assign score. Do not double check.
- WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
 - MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
 - NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
 - VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)
- 2b. Intensity of surrounding land use. Select one or double check and average.
- VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
 - LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
 - MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
 - High. Urban, industrial, open pasture, row cropping, mining, construction (1)

	21
max 30 pts.	subtotal

Metric 3. Hydrology

- 3a. Sources of water. Score all that apply.
- High pH groundwater (5)
 - Other groundwater (3) [BR/CM (5)]
 - Precipitation (1) [unless BR/CM primary source (5)]
 - Seasonal/intermittent surface water (3)
 - Perennial surface water (lake or stream) (5)
- 3b. Connectivity. Score all that apply.
- 100-year floodplain (1)
 - Between stream/lake and other human use (1)
 - Part of wetland/upland (e.g., forest), complex (1)
 - Part of riparian or upland corridor (1)
- 3c. Maximum water depth. Select only one and assign score.
- >0.7 m (27.6 in.) (3)
 - 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
 - <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]
- 3d. Duration inundation/saturation. Score one or dbl. check & avg.
- Semi- to permanently inundated/saturated (4)
 - Regularly inundated/saturated (3) [BR/CM (4)]
 - Seasonally inundated (2) [BR/CM (4)]
 - Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]
- 3e. Modifications to natural hydrologic regime. Score one or double check and average.
- None or none apparent (12)
 - Recovered (7)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> ditch	<input type="checkbox"/> point source (nonstormwater)
<input type="checkbox"/> tile (including culvert)	<input type="checkbox"/> filling/grading
<input type="checkbox"/> dike	<input type="checkbox"/> road bed/RR track
<input type="checkbox"/> weir	<input type="checkbox"/> dredging
<input type="checkbox"/> stormwater input	<input type="checkbox"/> other _____

	13
max 20 pts.	subtotal

Metric 4. Habitat Alteration and Development

- 4a. Substrate disturbance. Score one or double check and average.
- None or none apparent (4)
 - Recovered (3)
 - Recovering (2)
 - Recent or no recovery (1)
- 4b. Habitat development. Select only one and assign score.
- Excellent (7)
 - Very good (6)
 - Good (5)
 - Moderately good (4)
 - Fair (3)
 - Poor to fair (2)
 - Poor (1)
- 4c. Habitat alteration. Score one or double check and average.
- None or none apparent (9)
 - Recovered (6)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> mowing	<input type="checkbox"/> shrub/sapling removal
<input type="checkbox"/> grazing	<input type="checkbox"/> herbaceous/aquatic bed removal
<input type="checkbox"/> clearcutting	<input type="checkbox"/> woody debris removal
<input type="checkbox"/> selective cutting	<input type="checkbox"/> sedimentation
<input type="checkbox"/> farming	<input type="checkbox"/> dredging
<input type="checkbox"/> toxic pollutants	<input type="checkbox"/> nutrient enrichment

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Site:	Rater(s):	Date:
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49
subtotal previous page

max 10 pts.	5	subtotal
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Metric 5. Special Wetlands

raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

max 20 pts.	8	subtotal
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Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- Aquatic bed
- Emergent
- 1 Shrub
- 3 Forest
- Mudflats
- Open water <20 acres (8 ha)
- Moss/lichen. Other _____

Vegetation Community Cover Scale

- 0 = Absent or <0.1 ha (0.25 acre) contiguous acre
[For BR/CM <0.04 ha (0.1 acre)]
- 1 = Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
- 2 = Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
- 3 = Present and comprises a significant part or more of wetland's vegetation and is of high quality

6b. Horizontal (plan view) interspersion.
Select only one.

- High (5)
- Moderately high (4) [BR/CM (5)]
- Moderate (3)[BR/CM (5)]
- Moderately low (2) [BR/CM (3)]
- Low (1) [BR/CM (2)]
- None (0)

Narrative Description of Vegetation Quality

- low = Low species diversity &/or dominance of nonnative or disturbance tolerant native species
- mod = Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
- high = A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rare, threatened, or endangered species

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- Extensive >75% cover (-5)
- Moderate 25-75% cover (-3)
- Sparse 5-25% cover (-1)
- Nearly absent <5% cover (0)
- Absent (1)

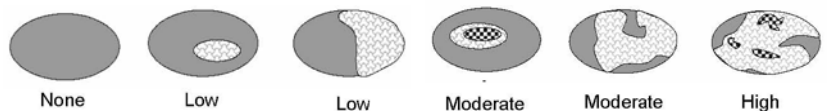
Mudflat and Open Water Class Quality

- 0 = Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
- 1 = Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
- 2 = Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <0.2 ha (0.5 to 5 acre)]
- 3 = High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

6d. Microtopography.
Score all present using 0 to 3 scale.

- Vegetated hummocks/tussocks
- Coarse woody debris >15 cm (6 in.)
- Standing dead >25 cm (10 in.) dbh
- Amphibian breeding pools

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

- 0 = Absent
- 1 = Present in very small amounts or if more common of marginal quality
- 2 = Present in moderate amounts, but not of highest quality or in small amounts of highest quality
- 3 = Present in moderate or greater amounts and of highest quality

62, Category 3

**GRAND TOTAL
(max 100 pts)**

- 0- 29 = Category 1, low wetland function, condition, quality**
- 30- 59 = Category 2, good/moderate wetland function, condition, quality**
- 60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: <http://www.epa.state.oh.us/dsw/401/401.html>

Site: Russeville Solar - Wetland D	Rater(s): C. Brendel	Date: 7/9/2019
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0	subtotal
max 6 pts.	

Metric 1. Wetland Area (size)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

- Select one size class and assign score.
- >50 acres (>20.2 ha) (6 pts)
 - 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
 - 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
 - 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
 - 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
 - 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
 - <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

ArcGIS was used to measure wetland. The wetland is 0.09 acre in size.

14	subtotal
max 14 pts.	

Metric 2. Upland Buffers and Surrounding Land Use

- 2a. Calculate average buffer width. Select only one and assign score. Do not double check.
- WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
 - MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
 - NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
 - VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)
- 2b. Intensity of surrounding land use. Select one or double check and average.
- VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
 - LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
 - MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
 - High. Urban, industrial, open pasture, row cropping, mining, construction (1)

14	subtotal
max 30 pts.	

Metric 3. Hydrology

- 3a. Sources of water. Score all that apply.
- High pH groundwater (5)
 - Other groundwater (3) [BR/CM (5)]
 - Precipitation (1) [unless BR/CM primary source (5)]
 - Seasonal/intermittent surface water (3)
 - Perennial surface water (lake or stream) (5)
- 3b. Connectivity. Score all that apply.
- 100-year floodplain (1)
 - Between stream/lake and other human use (1)
 - Part of wetland/upland (e.g., forest), complex (1)
 - Part of riparian or upland corridor (1)
- 3c. Maximum water depth. Select only one and assign score.
- >0.7 m (27.6 in.) (3)
 - 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
 - <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]
- 3d. Duration inundation/saturation. Score one or dbl. check & avg.
- Semi- to permanently inundated/saturated (4)
 - Regularly inundated/saturated (3) [BR/CM (4)]
 - Seasonally inundated (2) [BR/CM (4)]
 - Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]
- 3e. Modifications to natural hydrologic regime. Score one or double check and average.
- None or none apparent (12)
 - Recovered (7)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> ditch	<input type="checkbox"/> point source (nonstormwater)
<input type="checkbox"/> tile (including culvert)	<input type="checkbox"/> filling/grading
<input type="checkbox"/> dike	<input type="checkbox"/> road bed/RR track
<input type="checkbox"/> weir	<input type="checkbox"/> dredging
<input type="checkbox"/> stormwater input	<input type="checkbox"/> other _____

12	subtotal
max 20 pts.	

Metric 4. Habitat Alteration and Development

- 4a. Substrate disturbance. Score one or double check and average.
- None or none apparent (4)
 - Recovered (3)
 - Recovering (2)
 - Recent or no recovery (1)
- 4b. Habitat development. Select only one and assign score.
- Excellent (7)
 - Very good (6)
 - Good (5)
 - Moderately good (4)
 - Fair (3)
 - Poor to fair (2)
 - Poor (1)
- 4c. Habitat alteration. Score one or double check and average.
- None or none apparent (9)
 - Recovered (6)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> mowing	<input type="checkbox"/> shrub/sapling removal
<input type="checkbox"/> grazing	<input type="checkbox"/> herbaceous/aquatic bed removal
<input type="checkbox"/> clearcutting	<input type="checkbox"/> woody debris removal
<input type="checkbox"/> selective cutting	<input type="checkbox"/> sedimentation
<input type="checkbox"/> farming	<input type="checkbox"/> dredging
<input type="checkbox"/> toxic pollutants	<input type="checkbox"/> nutrient enrichment

40

Site:	Rater(s):	Date:
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40

subtotal previous page

max 10 pts.	5	subtotal
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Metric 5. Special Wetlands

raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

max 20 pts.	5	subtotal
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Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- Aquatic bed
- 1 Emergent
- 1 Shrub
- 1 Forest
- Mudflats
- Open water <20 acres (8 ha)
- Moss/lichen. Other _____

Vegetation Community Cover Scale

- 0 = Absent or <0.1 ha (0.25 acre) contiguous acre
[For BR/CM <0.04 ha (0.1 acre)]
- 1 = Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
- 2 = Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
- 3 = Present and comprises a significant part or more of wetland's vegetation and is of high quality

6b. Horizontal (plan view) interspersion.
Select only one.

- High (5)
- Moderately high (4) [BR/CM (5)]
- Moderate (3)[BR/CM (5)]
- Moderately low (2) [BR/CM (3)]
- Low (1) [BR/CM (2)]
- None (0)

Narrative Description of Vegetation Quality

- low = Low species diversity &/or dominance of nonnative or disturbance tolerant native species
- mod = Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
- high = A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rare, threatened, or endangered species

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- Extensive >75% cover (-5)
- Moderate 25-75% cover (-3)
- Sparse 5-25% cover (-1)
- Nearly absent <5% cover (0)
- Absent (1)

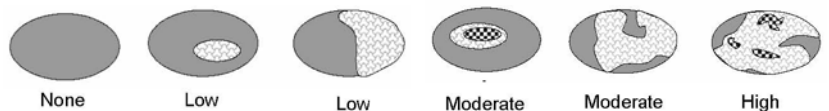
Mudflat and Open Water Class Quality

- 0 = Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
- 1 = Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
- 2 = Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <0.2 ha (0.5 to 5 acre)]
- 3 = High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

6d. Microtopography.
Score all present using 0 to 3 scale.

- Vegetated hummocks/tussocks
- Coarse woody debris >15 cm (6 in.)
- Standing dead >25 cm (10 in.) dbh
- Amphibian breeding pools

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

- 0 = Absent
- 1 = Present in very small amounts or if more common of marginal quality
- 2 = Present in moderate amounts, but not of highest quality or in small amounts of highest quality
- 3 = Present in moderate or greater amounts and of highest quality

50, Category 2

GRAND TOTAL
(max 100 pts)

- 0- 29 = Category 1, low wetland function, condition, quality**
- 30- 59 = Category 2, good/moderate wetland function, condition, quality**
- 60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: <http://www.epa.state.oh.us/dsw/401/401.html>

Site: Russeville Solar - Wetland E	Rater(s): C. Brendel	Date: 7/9/2019
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	1
max 6 pts.	subtotal

Metric 1. Wetland Area (size)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

- Select one size class and assign score.
- >50 acres (>20.2 ha) (6 pts)
 - 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
 - 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
 - 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
 - 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
 - 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
 - <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

ArcGIS was used to measure wetland. The wetland is 0.14 acre in size.

	14
max 14 pts.	subtotal

Metric 2. Upland Buffers and Surrounding Land Use

- 2a. Calculate average buffer width. Select only one and assign score. Do not double check.
- WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
 - MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
 - NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
 - VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)
- 2b. Intensity of surrounding land use. Select one or double check and average.
- VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
 - LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
 - MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
 - High. Urban, industrial, open pasture, row cropping, mining, construction (1)

	14
max 30 pts.	subtotal

Metric 3. Hydrology

- 3a. Sources of water. Score all that apply.
- High pH groundwater (5)
 - Other groundwater (3) [BR/CM (5)]
 - Precipitation (1) [unless BR/CM primary source (5)]
 - Seasonal/intermittent surface water (3)
 - Perennial surface water (lake or stream) (5)
- 3b. Connectivity. Score all that apply.
- 100-year floodplain (1)
 - Between stream/lake and other human use (1)
 - Part of wetland/upland (e.g., forest), complex (1)
 - Part of riparian or upland corridor (1)
- 3c. Maximum water depth. Select only one and assign score.
- >0.7 m (27.6 in.) (3)
 - 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
 - <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]
- 3d. Duration inundation/saturation. Score one or dbl. check & avg.
- Semi- to permanently inundated/saturated (4)
 - Regularly inundated/saturated (3) [BR/CM (4)]
 - Seasonally inundated (2) [BR/CM (4)]
 - Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]
- 3e. Modifications to natural hydrologic regime. Score one or double check and average.
- None or none apparent (12)
 - Recovered (7)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> ditch	<input type="checkbox"/> point source (nonstormwater)
<input type="checkbox"/> tile (including culvert)	<input type="checkbox"/> filling/grading
<input type="checkbox"/> dike	<input type="checkbox"/> road bed/RR track
<input type="checkbox"/> weir	<input type="checkbox"/> dredging
<input type="checkbox"/> stormwater input	<input type="checkbox"/> other _____

	12
max 20 pts.	subtotal

Metric 4. Habitat Alteration and Development

- 4a. Substrate disturbance. Score one or double check and average.
- None or none apparent (4)
 - Recovered (3)
 - Recovering (2)
 - Recent or no recovery (1)
- 4b. Habitat development. Select only one and assign score.
- Excellent (7)
 - Very good (6)
 - Good (5)
 - Moderately good (4)
 - Fair (3)
 - Poor to fair (2)
 - Poor (1)
- 4c. Habitat alteration. Score one or double check and average.
- None or none apparent (9)
 - Recovered (6)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> mowing	<input type="checkbox"/> shrub/sapling removal
<input type="checkbox"/> grazing	<input type="checkbox"/> herbaceous/aquatic bed removal
<input type="checkbox"/> clearcutting	<input type="checkbox"/> woody debris removal
<input type="checkbox"/> selective cutting	<input type="checkbox"/> sedimentation
<input type="checkbox"/> farming	<input type="checkbox"/> dredging
<input type="checkbox"/> toxic pollutants	<input type="checkbox"/> nutrient enrichment

41

Site:	Rater(s):	Date:
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41
subtotal previous page

max 10 pts.	5	subtotal
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Metric 5. Special Wetlands

raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

max 20 pts.	5	subtotal
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Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- Aquatic bed
- 1 Emergent
- 1 Shrub
- 1 Forest
- Mudflats
- Open water <20 acres (8 ha)
- Moss/lichen. Other _____

Vegetation Community Cover Scale

- 0 = Absent or <0.1 ha (0.25 acre) contiguous acre
[For BR/CM <0.04 ha (0.1 acre)]
- 1 = Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
- 2 = Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
- 3 = Present and comprises a significant part or more of wetland's vegetation and is of high quality

6b. Horizontal (plan view) interspersion.
Select only one.

- High (5)
- Moderately high (4) [BR/CM (5)]
- Moderate (3)[BR/CM (5)]
- Moderately low (2) [BR/CM (3)]
- Low (1) [BR/CM (2)]
- None (0)

Narrative Description of Vegetation Quality

- low = Low species diversity &/or dominance of nonnative or disturbance tolerant native species
- mod = Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
- high = A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rare, threatened, or endangered species

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- Extensive >75% cover (-5)
- Moderate 25-75% cover (-3)
- Sparse 5-25% cover (-1)
- Nearly absent <5% cover (0)
- Absent (1)

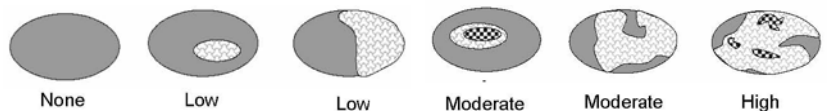
Mudflat and Open Water Class Quality

- 0 = Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
- 1 = Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
- 2 = Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <0.2 ha (0.5 to 5 acre)]
- 3 = High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

6d. Microtopography.
Score all present using 0 to 3 scale.

- Vegetated hummocks/tussocks
- Coarse woody debris >15 cm (6 in.)
- Standing dead >25 cm (10 in.) dbh
- Amphibian breeding pools

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

- 0 = Absent
- 1 = Present in very small amounts or if more common of marginal quality
- 2 = Present in moderate amounts, but not of highest quality or in small amounts of highest quality
- 3 = Present in moderate or greater amounts and of highest quality

51, Category 2

GRAND TOTAL
(max 100 pts)

- 0- 29 = Category 1, low wetland function, condition, quality**
- 30- 59 = Category 2, good/moderate wetland function, condition, quality**
- 60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: <http://www.epa.state.oh.us/dsw/401/401.html>

Site: Russeville Solar - Wetland F	Rater(s): C. Brendel	Date: 7/9/2019
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	2
max 6 pts.	subtotal

Metric 1. Wetland Area (size)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

- Select one size class and assign score.
- >50 acres (>20.2 ha) (6 pts)
 - 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
 - 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
 - 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
 - 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
 - 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
 - <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

ArcGIS was used to measure wetland. The wetland is 1.84 acre in size.

	12
max 14 pts.	subtotal

Metric 2. Upland Buffers and Surrounding Land Use

- 2a. Calculate average buffer width. Select only one and assign score. Do not double check.
- WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
 - MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
 - NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
 - VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)
- 2b. Intensity of surrounding land use. Select one or double check and average.
- VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
 - LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
 - MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
 - High. Urban, industrial, open pasture, row cropping, mining, construction (1)

	23
max 30 pts.	subtotal

Metric 3. Hydrology

- 3a. Sources of water. Score all that apply.
- High pH groundwater (5)
 - Other groundwater (3) [BR/CM (5)]
 - Precipitation (1) [unless BR/CM primary source (5)]
 - Seasonal/intermittent surface water (3)
 - Perennial surface water (lake or stream) (5)
- 3b. Connectivity. Score all that apply.
- 100-year floodplain (1)
 - Between stream/lake and other human use (1)
 - Part of wetland/upland (e.g., forest), complex (1)
 - Part of riparian or upland corridor (1)
- 3c. Maximum water depth. Select only one and assign score.
- >0.7 m (27.6 in.) (3)
 - 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
 - <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]
- 3d. Duration inundation/saturation. Score one or dbl. check & avg.
- Semi- to permanently inundated/saturated (4)
 - Regularly inundated/saturated (3) [BR/CM (4)]
 - Seasonally inundated (2) [BR/CM (4)]
 - Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]
- 3e. Modifications to natural hydrologic regime. Score one or double check and average.
- None or none apparent (12)
 - Recovered (7)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> ditch	<input type="checkbox"/> point source (nonstormwater)
<input type="checkbox"/> tile (including culvert)	<input type="checkbox"/> filling/grading
<input type="checkbox"/> dike	<input type="checkbox"/> road bed/RR track
<input type="checkbox"/> weir	<input type="checkbox"/> dredging
<input type="checkbox"/> stormwater input	<input type="checkbox"/> other _____

	13
max 20 pts.	subtotal

Metric 4. Habitat Alteration and Development

- 4a. Substrate disturbance. Score one or double check and average.
- None or none apparent (4)
 - Recovered (3)
 - Recovering (2)
 - Recent or no recovery (1)
- 4b. Habitat development. Select only one and assign score.
- Excellent (7)
 - Very good (6)
 - Good (5)
 - Moderately good (4)
 - Fair (3)
 - Poor to fair (2)
 - Poor (1)
- 4c. Habitat alteration. Score one or double check and average.
- None or none apparent (9)
 - Recovered (6)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> mowing	<input type="checkbox"/> shrub/sapling removal
<input type="checkbox"/> grazing	<input type="checkbox"/> herbaceous/aquatic bed removal
<input type="checkbox"/> clearcutting	<input type="checkbox"/> woody debris removal
<input type="checkbox"/> selective cutting	<input type="checkbox"/> sedimentation
<input type="checkbox"/> farming	<input type="checkbox"/> dredging
<input type="checkbox"/> toxic pollutants	<input type="checkbox"/> nutrient enrichment

50

Site:	Rater(s):	Date:
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50
subtotal previous page

max 10 pts.	5	subtotal
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Metric 5. Special Wetlands

raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

max 20 pts.	7	subtotal
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Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- Aquatic bed
- Emergent
- 1 Shrub
- 3 Forest
- Mudflats
- Open water <20 acres (8 ha)
- Moss/lichen. Other _____

Vegetation Community Cover Scale

- 0 = Absent or <0.1 ha (0.25 acre) contiguous acre
[For BR/CM <0.04 ha (0.1 acre)]
- 1 = Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
- 2 = Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
- 3 = Present and comprises a significant part or more of wetland's vegetation and is of high quality

6b. Horizontal (plan view) interspersion.
Select only one.

- High (5)
- Moderately high (4) [BR/CM (5)]
- Moderate (3)[BR/CM (5)]
- Moderately low (2) [BR/CM (3)]
- Low (1) [BR/CM (2)]
- None (0)

Narrative Description of Vegetation Quality

- low = Low species diversity &/or dominance of nonnative or disturbance tolerant native species
- mod = Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
- high = A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rare, threatened, or endangered species

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- Extensive >75% cover (-5)
- Moderate 25-75% cover (-3)
- Sparse 5-25% cover (-1)
- Nearly absent <5% cover (0)
- Absent (1)

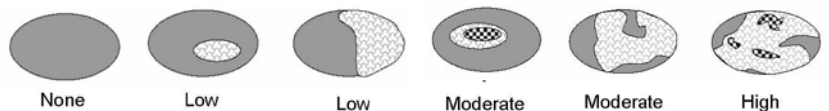
Mudflat and Open Water Class Quality

- 0 = Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
- 1 = Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
- 2 = Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <0.2 ha (0.5 to 5 acre)]
- 3 = High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

6d. Microtopography.
Score all present using 0 to 3 scale.

- Vegetated hummocks/tussocks
- Coarse woody debris >15 cm (6 in.)
- Standing dead >25 cm (10 in.) dbh
- Amphibian breeding pools

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

- 0 = Absent
- 1 = Present in very small amounts or if more common of marginal quality
- 2 = Present in moderate amounts, but not of highest quality or in small amounts of highest quality
- 3 = Present in moderate or greater amounts and of highest quality

62, Category 3

**GRAND TOTAL
(max 100 pts)**

- 0- 29 = Category 1, low wetland function, condition, quality**
- 30- 59 = Category 2, good/moderate wetland function, condition, quality**
- 60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: <http://www.epa.state.oh.us/dsw/401/401.html>

Site: Russeville Solar - Wetland G	Rater(s): C. Brendel	Date: 7/9/2019
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1	
max 6 pts.	subtotal

Metric 1. Wetland Area (size)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

- Select one size class and assign score.
- >50 acres (>20.2 ha) (6 pts)
 - 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
 - 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
 - 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
 - 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
 - 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
 - <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

ArcGIS was used to measure wetland. The wetland is 0.18 acre in size.

12	
max 14 pts.	subtotal

Metric 2. Upland Buffers and Surrounding Land Use

- 2a. Calculate average buffer width. Select only one and assign score. Do not double check.
- WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
 - MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
 - NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
 - VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)
- 2b. Intensity of surrounding land use. Select one or double check and average.
- VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
 - LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
 - MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
 - High. Urban, industrial, open pasture, row cropping, mining, construction (1)

15	
max 30 pts.	subtotal

Metric 3. Hydrology

- 3a. Sources of water. Score all that apply.
- High pH groundwater (5)
 - Other groundwater (3) [BR/CM (5)]
 - Precipitation (1) [unless BR/CM primary source (5)]
 - Seasonal/intermittent surface water (3)
 - Perennial surface water (lake or stream) (5)
- 3b. Connectivity. Score all that apply.
- 100-year floodplain (1)
 - Between stream/lake and other human use (1)
 - Part of wetland/upland (e.g., forest), complex (1)
 - Part of riparian or upland corridor (1)
- 3c. Maximum water depth. Select only one and assign score.
- >0.7 m (27.6 in.) (3)
 - 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
 - <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]
- 3d. Duration inundation/saturation. Score one or dbl. check & avg.
- Semi- to permanently inundated/saturated (4)
 - Regularly inundated/saturated (3) [BR/CM (4)]
 - Seasonally inundated (2) [BR/CM (4)]
 - Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]
- 3e. Modifications to natural hydrologic regime. Score one or double check and average.
- None or none apparent (12)
 - Recovered (7)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> ditch	<input type="checkbox"/> point source (nonstormwater)
<input type="checkbox"/> tile (including culvert)	<input type="checkbox"/> filling/grading
<input type="checkbox"/> dike	<input type="checkbox"/> road bed/RR track
<input type="checkbox"/> weir	<input type="checkbox"/> dredging
<input type="checkbox"/> stormwater input	<input type="checkbox"/> other _____

13	
max 20 pts.	subtotal

Metric 4. Habitat Alteration and Development

- 4a. Substrate disturbance. Score one or double check and average.
- None or none apparent (4)
 - Recovered (3)
 - Recovering (2)
 - Recent or no recovery (1)
- 4b. Habitat development. Select only one and assign score.
- Excellent (7)
 - Very good (6)
 - Good (5)
 - Moderately good (4)
 - Fair (3)
 - Poor to fair (2)
 - Poor (1)
- 4c. Habitat alteration. Score one or double check and average.
- None or none apparent (9)
 - Recovered (6)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> mowing	<input type="checkbox"/> shrub/sapling removal
<input type="checkbox"/> grazing	<input type="checkbox"/> herbaceous/aquatic bed removal
<input type="checkbox"/> clearcutting	<input type="checkbox"/> woody debris removal
<input type="checkbox"/> selective cutting	<input type="checkbox"/> sedimentation
<input type="checkbox"/> farming	<input type="checkbox"/> dredging
<input type="checkbox"/> toxic pollutants	<input type="checkbox"/> nutrient enrichment

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Site:	Rater(s):	Date:
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subtotal previous page

max 10 pts.	5	subtotal
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Metric 5. Special Wetlands

raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

max 20 pts.	9	subtotal
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Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- Aquatic bed
- 2 Emergent
- 3 Shrub
- Forest
- Mudflats
- Open water <20 acres (8 ha)
- Moss/lichen. Other _____

Vegetation Community Cover Scale

- 0 = Absent or <0.1 ha (0.25 acre) contiguous acre
[For BR/CM <0.04 ha (0.1 acre)]
- 1 = Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
- 2 = Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
- 3 = Present and comprises a significant part or more of wetland's vegetation and is of high quality

6b. Horizontal (plan view) interspersion.
Select only one.

- High (5)
- Moderately high (4) [BR/CM (5)]
- Moderate (3) [BR/CM (5)]
- Moderately low (2) [BR/CM (3)]
- Low (1) [BR/CM (2)]
- None (0)

Narrative Description of Vegetation Quality

- low = Low species diversity &/or dominance of nonnative or disturbance tolerant native species
- mod = Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
- high = A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rare, threatened, or endangered species

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- Extensive >75% cover (-5)
- Moderate 25-75% cover (-3)
- Sparse 5-25% cover (-1)
- Nearly absent <5% cover (0)
- Absent (1)

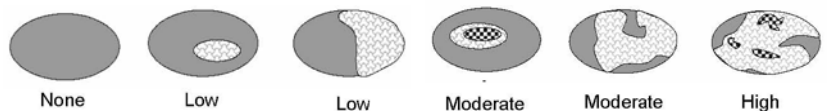
Mudflat and Open Water Class Quality

- 0 = Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
- 1 = Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
- 2 = Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <0.2 ha (0.5 to 5 acre)]
- 3 = High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

6d. Microtopography.
Score all present using 0 to 3 scale.

- Vegetated hummocks/tussocks
- Coarse woody debris >15 cm (6 in.)
- Standing dead >25 cm (10 in.) dbh
- Amphibian breeding pools

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

- 0 = Absent
- 1 = Present in very small amounts or if more common of marginal quality
- 2 = Present in moderate amounts, but not of highest quality or in small amounts of highest quality
- 3 = Present in moderate or greater amounts and of highest quality

55, Category 2

**GRAND TOTAL
(max 100 pts)**

- 0- 29 = Category 1, low wetland function, condition, quality**
- 30- 59 = Category 2, good/moderate wetland function, condition, quality**
- 60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: <http://www.epa.state.oh.us/dsw/401/401.html>

Site: Russeville Solar - Wetland H	Rater(s): C. Brendel	Date: 7/9/2019
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	0
max 6 pts.	subtotal

Metric 1. Wetland Area (size)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

- Select one size class and assign score.
- >50 acres (>20.2 ha) (6 pts)
 - 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
 - 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
 - 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
 - 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
 - 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
 - <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

ArcGIS was used to measure wetland. The wetland is 0.08 acre in size.

	6
max 14 pts.	subtotal

Metric 2. Upland Buffers and Surrounding Land Use

- 2a. Calculate average buffer width. Select only one and assign score. Do not double check.
- WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
 - MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
 - NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
 - VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)
- 2b. Intensity of surrounding land use. Select one or double check and average.
- VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
 - LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
 - MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
 - High. Urban, industrial, open pasture, row cropping, mining, construction (1)

	14
max 30 pts.	subtotal

Metric 3. Hydrology

- 3a. Sources of water. Score all that apply.
- High pH groundwater (5)
 - Other groundwater (3) [BR/CM (5)]
 - Precipitation (1) [unless BR/CM primary source (5)]
 - Seasonal/intermittent surface water (3)
 - Perennial surface water (lake or stream) (5)
- 3b. Connectivity. Score all that apply.
- 100-year floodplain (1)
 - Between stream/lake and other human use (1)
 - Part of wetland/upland (e.g., forest), complex (1)
 - Part of riparian or upland corridor (1)
- 3c. Maximum water depth. Select only one and assign score.
- >0.7 m (27.6 in.) (3)
 - 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
 - <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]
- 3d. Duration inundation/saturation. Score one or dbl. check & avg.
- Semi- to permanently inundated/saturated (4)
 - Regularly inundated/saturated (3) [BR/CM (4)]
 - Seasonally inundated (2) [BR/CM (4)]
 - Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]
- 3e. Modifications to natural hydrologic regime. Score one or double check and average.
- None or none apparent (12)
 - Recovered (7)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> ditch	<input type="checkbox"/> point source (nonstormwater)
<input type="checkbox"/> tile (including culvert)	<input type="checkbox"/> filling/grading
<input type="checkbox"/> dike	<input type="checkbox"/> road bed/RR track
<input type="checkbox"/> weir	<input type="checkbox"/> dredging
<input type="checkbox"/> stormwater input	<input type="checkbox"/> other _____

	8
max 20 pts.	subtotal

Metric 4. Habitat Alteration and Development

- 4a. Substrate disturbance. Score one or double check and average.
- None or none apparent (4)
 - Recovered (3)
 - Recovering (2)
 - Recent or no recovery (1)
- 4b. Habitat development. Select only one and assign score.
- Excellent (7)
 - Very good (6)
 - Good (5)
 - Moderately good (4)
 - Fair (3)
 - Poor to fair (2)
 - Poor (1)
- 4c. Habitat alteration. Score one or double check and average.
- None or none apparent (9)
 - Recovered (6)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> mowing	<input type="checkbox"/> shrub/sapling removal
<input type="checkbox"/> grazing	<input type="checkbox"/> herbaceous/aquatic bed removal
<input type="checkbox"/> clearcutting	<input type="checkbox"/> woody debris removal
<input type="checkbox"/> selective cutting	<input type="checkbox"/> sedimentation
<input type="checkbox"/> farming	<input type="checkbox"/> dredging
<input type="checkbox"/> toxic pollutants	<input type="checkbox"/> nutrient enrichment

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Site:	Rater(s):	Date:
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subtotal previous page

max 10 pts.	5	subtotal
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Metric 5. Special Wetlands

raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

max 20 pts.	6	subtotal
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Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- Aquatic bed
- Emergent
- Shrub
- Forest
- Mudflats
- Open water <20 acres (8 ha)
- Moss/lichen. Other _____

Vegetation Community Cover Scale

- 0 = Absent or <0.1 ha (0.25 acre) contiguous acre
[For BR/CM <0.04 ha (0.1 acre)]
- 1 = Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
- 2 = Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
- 3 = Present and comprises a significant part or more of wetland's vegetation and is of high quality

6b. Horizontal (plan view) interspersion.
Select only one.

- High (5)
- Moderately high (4) [BR/CM (5)]
- Moderate (3)[BR/CM (5)]
- Moderately low (2) [BR/CM (3)]
- Low (1) [BR/CM (2)]
- None (0)

Narrative Description of Vegetation Quality

- low = Low species diversity &/or dominance of nonnative or disturbance tolerant native species
- mod = Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
- high = A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rare, threatened, or endangered species

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- Extensive >75% cover (-5)
- Moderate 25-75% cover (-3)
- Sparse 5-25% cover (-1)
- Nearly absent <5% cover (0)
- Absent (1)

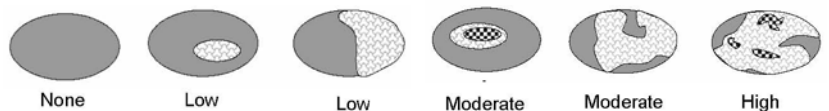
Mudflat and Open Water Class Quality

- 0 = Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
- 1 = Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
- 2 = Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <0.2 ha (0.5 to 5 acre)]
- 3 = High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

6d. Microtopography.
Score all present using 0 to 3 scale.

- Vegetated hummocks/tussocks
- Coarse woody debris >15 cm (6 in.)
- Standing dead >25 cm (10 in.) dbh
- Amphibian breeding pools

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

- 0 = Absent
- 1 = Present in very small amounts or if more common of marginal quality
- 2 = Present in moderate amounts, but not of highest quality or in small amounts of highest quality
- 3 = Present in moderate or greater amounts and of highest quality

39, Category 2

GRAND TOTAL
(max 100 pts)

- 0- 29 = Category 1, low wetland function, condition, quality**
- 30- 59 = Category 2, good/moderate wetland function, condition, quality**
- 60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: <http://www.epa.state.oh.us/dsw/401/401.html>

Site: Russeville Solar - Wetland J	Rater(s): C. Brendel	Date: 7/9/2019
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3	max 6 pts. subtotal
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Metric 1. Wetland Area (size)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

- Select one size class and assign score.
- >50 acres (>20.2 ha) (6 pts)
 - 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
 - 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
 - 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
 - 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
 - 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
 - <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

ArcGIS was used to measure wetland. The wetland is 3.27 acre in size.

9	max 14 pts. subtotal
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Metric 2. Upland Buffers and Surrounding Land Use

- 2a. Calculate average buffer width. Select only one and assign score. Do not double check.
- WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
 - MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
 - NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
 - VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)
- 2b. Intensity of surrounding land use. Select one or double check and average.
- VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
 - LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
 - MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
 - High. Urban, industrial, open pasture, row cropping, mining, construction (1)

18	max 30 pts. subtotal
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Metric 3. Hydrology

- 3a. Sources of water. Score all that apply.
- High pH groundwater (5)
 - Other groundwater (3) [BR/CM (5)]
 - Precipitation (1) [unless BR/CM primary source (5)]
 - Seasonal/intermittent surface water (3)
 - Perennial surface water (lake or stream) (5)
- 3b. Connectivity. Score all that apply.
- 100-year floodplain (1)
 - Between stream/lake and other human use (1)
 - Part of wetland/upland (e.g., forest), complex (1)
 - Part of riparian or upland corridor (1)
- 3c. Maximum water depth. Select only one and assign score.
- >0.7 m (27.6 in.) (3)
 - 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
 - <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]
- 3d. Duration inundation/saturation. Score one or dbl. check & avg.
- Semi- to permanently inundated/saturated (4)
 - Regularly inundated/saturated (3) [BR/CM (4)]
 - Seasonally inundated (2) [BR/CM (4)]
 - Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]
- 3e. Modifications to natural hydrologic regime. Score one or double check and average.
- None or none apparent (12)
 - Recovered (7)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> ditch	<input type="checkbox"/> point source (nonstormwater)
<input type="checkbox"/> tile (including culvert)	<input type="checkbox"/> filling/grading
<input type="checkbox"/> dike	<input type="checkbox"/> road bed/RR track
<input type="checkbox"/> weir	<input type="checkbox"/> dredging
<input type="checkbox"/> stormwater input	<input type="checkbox"/> other _____

13	max 20 pts. subtotal
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Metric 4. Habitat Alteration and Development

- 4a. Substrate disturbance. Score one or double check and average.
- None or none apparent (4)
 - Recovered (3)
 - Recovering (2)
 - Recent or no recovery (1)
- 4b. Habitat development. Select only one and assign score.
- Excellent (7)
 - Very good (6)
 - Good (5)
 - Moderately good (4)
 - Fair (3)
 - Poor to fair (2)
 - Poor (1)
- 4c. Habitat alteration. Score one or double check and average.
- None or none apparent (9)
 - Recovered (6)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> mowing	<input type="checkbox"/> shrub/sapling removal
<input type="checkbox"/> grazing	<input type="checkbox"/> herbaceous/aquatic bed removal
<input type="checkbox"/> clearcutting	<input type="checkbox"/> woody debris removal
<input type="checkbox"/> selective cutting	<input type="checkbox"/> sedimentation
<input type="checkbox"/> farming	<input type="checkbox"/> dredging
<input type="checkbox"/> toxic pollutants	<input type="checkbox"/> nutrient enrichment

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Site:	Rater(s):	Date:
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43
subtotal previous page

max 10 pts.	5	subtotal
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Metric 5. Special Wetlands

raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

max 20 pts.	11	subtotal
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Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- Aquatic bed
- 1 Emergent
- 2 Shrub
- 3 Forest
- Mudflats
- Open water <20 acres (8 ha)
- Moss/lichen. Other _____

Vegetation Community Cover Scale

- 0 = Absent or <0.1 ha (0.25 acre) contiguous acre
[For BR/CM <0.04 ha (0.1 acre)]
- 1 = Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
- 2 = Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
- 3 = Present and comprises a significant part or more of wetland's vegetation and is of high quality

6b. Horizontal (plan view) interspersion.
Select only one.

- High (5)
- Moderately high (4) [BR/CM (5)]
- Moderate (3)[BR/CM (5)]
- Moderately low (2) [BR/CM (3)]
- Low (1) [BR/CM (2)]
- None (0)

Narrative Description of Vegetation Quality

- low = Low species diversity &/or dominance of nonnative or disturbance tolerant native species
- mod = Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
- high = A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rare, threatened, or endangered species

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- Extensive >75% cover (-5)
- Moderate 25-75% cover (-3)
- Sparse 5-25% cover (-1)
- Nearly absent <5% cover (0)
- Absent (1)

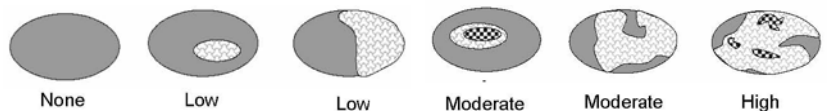
Mudflat and Open Water Class Quality

- 0 = Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
- 1 = Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
- 2 = Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <0.2 ha (0.5 to 5 acre)]
- 3 = High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

6d. Microtopography.
Score all present using 0 to 3 scale.

- Vegetated hummocks/tussocks
- Coarse woody debris >15 cm (6 in.)
- Standing dead >25 cm (10 in.) dbh
- Amphibian breeding pools

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

- 0 = Absent
- 1 = Present in very small amounts or if more common of marginal quality
- 2 = Present in moderate amounts, but not of highest quality or in small amounts of highest quality
- 3 = Present in moderate or greater amounts and of highest quality

59, Category 2

GRAND TOTAL
(max 100 pts)

- 0- 29 = Category 1, low wetland function, condition, quality**
- 30- 59 = Category 2, good/moderate wetland function, condition, quality**
- 60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: <http://www.epa.state.oh.us/dsw/401/401.html>

Site: Russeville Solar - Wetland K	Rater(s): C. Brendel	Date: 7/9/2019
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	1
max 6 pts.	subtotal

Metric 1. Wetland Area (size)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

- Select one size class and assign score.
- >50 acres (>20.2 ha) (6 pts)
 - 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
 - 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
 - 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
 - 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
 - 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
 - <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

ArcGIS was used to measure wetland. The wetland is 0.96 acre in size.

	14
max 14 pts.	subtotal

Metric 2. Upland Buffers and Surrounding Land Use

- 2a. Calculate average buffer width. Select only one and assign score. Do not double check.
- WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
 - MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
 - NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
 - VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)
- 2b. Intensity of surrounding land use. Select one or double check and average.
- VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
 - LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
 - MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
 - High. Urban, industrial, open pasture, row cropping, mining, construction (1)

	14
max 30 pts.	subtotal

Metric 3. Hydrology

- 3a. Sources of water. Score all that apply.
- High pH groundwater (5)
 - Other groundwater (3) [BR/CM (5)]
 - Precipitation (1) [unless BR/CM primary source (5)]
 - Seasonal/intermittent surface water (3)
 - Perennial surface water (lake or stream) (5)
- 3b. Connectivity. Score all that apply.
- 100-year floodplain (1)
 - Between stream/lake and other human use (1)
 - Part of wetland/upland (e.g., forest), complex (1)
 - Part of riparian or upland corridor (1)
- 3c. Maximum water depth. Select only one and assign score.
- >0.7 m (27.6 in.) (3)
 - 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
 - <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]
- 3d. Duration inundation/saturation. Score one or dbl. check & avg.
- Semi- to permanently inundated/saturated (4)
 - Regularly inundated/saturated (3) [BR/CM (4)]
 - Seasonally inundated (2) [BR/CM (4)]
 - Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]
- 3e. Modifications to natural hydrologic regime. Score one or double check and average.
- None or none apparent (12)
 - Recovered (7)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> ditch	<input type="checkbox"/> point source (nonstormwater)
<input type="checkbox"/> tile (including culvert)	<input type="checkbox"/> filling/grading
<input type="checkbox"/> dike	<input type="checkbox"/> road bed/RR track
<input type="checkbox"/> weir	<input type="checkbox"/> dredging
<input type="checkbox"/> stormwater input	<input type="checkbox"/> other _____

	13
max 20 pts.	subtotal

Metric 4. Habitat Alteration and Development

- 4a. Substrate disturbance. Score one or double check and average.
- None or none apparent (4)
 - Recovered (3)
 - Recovering (2)
 - Recent or no recovery (1)
- 4b. Habitat development. Select only one and assign score.
- Excellent (7)
 - Very good (6)
 - Good (5)
 - Moderately good (4)
 - Fair (3)
 - Poor to fair (2)
 - Poor (1)
- 4c. Habitat alteration. Score one or double check and average.
- None or none apparent (9)
 - Recovered (6)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> mowing	<input type="checkbox"/> shrub/sapling removal
<input type="checkbox"/> grazing	<input type="checkbox"/> herbaceous/aquatic bed removal
<input type="checkbox"/> clearcutting	<input type="checkbox"/> woody debris removal
<input type="checkbox"/> selective cutting	<input type="checkbox"/> sedimentation
<input type="checkbox"/> farming	<input type="checkbox"/> dredging
<input type="checkbox"/> toxic pollutants	<input type="checkbox"/> nutrient enrichment

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Site:	Rater(s):	Date:
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subtotal previous page

max 10 pts.	5	subtotal
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Metric 5. Special Wetlands

raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

max 20 pts.	6	subtotal
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Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- Aquatic bed
- 1 Emergent
- 1 Shrub
- 2 Forest
- Mudflats
- Open water <20 acres (8 ha)
- Moss/lichen. Other _____

Vegetation Community Cover Scale

- 0 = Absent or <0.1 ha (0.25 acre) contiguous acre
[For BR/CM <0.04 ha (0.1 acre)]
- 1 = Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
- 2 = Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
- 3 = Present and comprises a significant part or more of wetland's vegetation and is of high quality

6b. Horizontal (plan view) interspersion.
Select only one.

- High (5)
- Moderately high (4) [BR/CM (5)]
- Moderate (3)[BR/CM (5)]
- Moderately low (2) [BR/CM (3)]
- Low (1) [BR/CM (2)]
- None (0)

Narrative Description of Vegetation Quality

- low = Low species diversity &/or dominance of nonnative or disturbance tolerant native species
- mod = Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
- high = A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rare, threatened, or endangered species

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- Extensive >75% cover (-5)
- Moderate 25-75% cover (-3)
- Sparse 5-25% cover (-1)
- Nearly absent <5% cover (0)
- Absent (1)

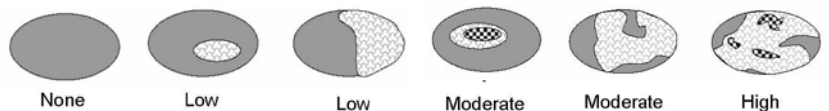
Mudflat and Open Water Class Quality

- 0 = Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
- 1 = Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
- 2 = Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <0.2 ha (0.5 to 5 acre)]
- 3 = High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

6d. Microtopography.
Score all present using 0 to 3 scale.

- Vegetated hummocks/tussocks
- Coarse woody debris >15 cm (6 in.)
- Standing dead >25 cm (10 in.) dbh
- Amphibian breeding pools

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

- 0 = Absent
- 1 = Present in very small amounts or if more common of marginal quality
- 2 = Present in moderate amounts, but not of highest quality or in small amounts of highest quality
- 3 = Present in moderate or greater amounts and of highest quality

53, Category 2

GRAND TOTAL
(max 100 pts)

- 0- 29 = Category 1, low wetland function, condition, quality**
- 30- 59 = Category 2, good/moderate wetland function, condition, quality**
- 60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: <http://www.epa.state.oh.us/dsw/401/401.html>

Site: Russeville Solar - Wetland L	Rater(s): C. Brendel	Date: 7/9/2019
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	2
max 6 pts.	subtotal

Metric 1. Wetland Area (size)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

- Select one size class and assign score.
- >50 acres (>20.2 ha) (6 pts)
 - 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
 - 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
 - 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
 - 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
 - 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
 - <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

ArcGIS was used to measure wetland. The wetland is 0.74 acre in size.

	14
max 14 pts.	subtotal

Metric 2. Upland Buffers and Surrounding Land Use

- 2a. Calculate average buffer width. Select only one and assign score. Do not double check.
- WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
 - MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
 - NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
 - VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)
- 2b. Intensity of surrounding land use. Select one or double check and average.
- VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
 - LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
 - MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
 - High. Urban, industrial, open pasture, row cropping, mining, construction (1)

	16
max 30 pts.	subtotal

Metric 3. Hydrology

- 3a. Sources of water. Score all that apply.
- High pH groundwater (5)
 - Other groundwater (3) [BR/CM (5)]
 - Precipitation (1) [unless BR/CM primary source (5)]
 - Seasonal/intermittent surface water (3)
 - Perennial surface water (lake or stream) (5)
- 3b. Connectivity. Score all that apply.
- 100-year floodplain (1)
 - Between stream/lake and other human use (1)
 - Part of wetland/upland (e.g., forest), complex (1)
 - Part of riparian or upland corridor (1)
- 3c. Maximum water depth. Select only one and assign score.
- >0.7 m (27.6 in.) (3)
 - 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
 - <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]
- 3d. Duration inundation/saturation. Score one or dbl. check & avg.
- Semi- to permanently inundated/saturated (4)
 - Regularly inundated/saturated (3) [BR/CM (4)]
 - Seasonally inundated (2) [BR/CM (4)]
 - Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]
- 3e. Modifications to natural hydrologic regime. Score one or double check and average.
- None or none apparent (12)
 - Recovered (7)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> ditch	<input type="checkbox"/> point source (nonstormwater)
<input type="checkbox"/> tile (including culvert)	<input type="checkbox"/> filling/grading
<input type="checkbox"/> dike	<input type="checkbox"/> road bed/RR track
<input type="checkbox"/> weir	<input type="checkbox"/> dredging
<input type="checkbox"/> stormwater input	<input type="checkbox"/> other _____

	13
max 20 pts.	subtotal

Metric 4. Habitat Alteration and Development

- 4a. Substrate disturbance. Score one or double check and average.
- None or none apparent (4)
 - Recovered (3)
 - Recovering (2)
 - Recent or no recovery (1)
- 4b. Habitat development. Select only one and assign score.
- Excellent (7)
 - Very good (6)
 - Good (5)
 - Moderately good (4)
 - Fair (3)
 - Poor to fair (2)
 - Poor (1)
- 4c. Habitat alteration. Score one or double check and average.
- None or none apparent (9)
 - Recovered (6)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> mowing	<input type="checkbox"/> shrub/sapling removal
<input type="checkbox"/> grazing	<input type="checkbox"/> herbaceous/aquatic bed removal
<input type="checkbox"/> clearcutting	<input type="checkbox"/> woody debris removal
<input type="checkbox"/> selective cutting	<input type="checkbox"/> sedimentation
<input type="checkbox"/> farming	<input type="checkbox"/> dredging
<input type="checkbox"/> toxic pollutants	<input type="checkbox"/> nutrient enrichment

45

Site:	Rater(s):	Date:
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45
subtotal previous page

	5	
max 10 pts.	subtotal	

Metric 5. Special Wetlands

raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

	10	
max 20 pts.	subtotal	

Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- Aquatic bed
- 2 Emergent
- 3 Shrub
- 2 Forest
- Mudflats
- Open water <20 acres (8 ha)
- Moss/lichen. Other _____

Vegetation Community Cover Scale

- 0 = Absent or <0.1 ha (0.25 acre) contiguous acre
[For BR/CM <0.04 ha (0.1 acre)]
- 1 = Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
- 2 = Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
- 3 = Present and comprises a significant part or more of wetland's vegetation and is of high quality

6b. Horizontal (plan view) interspersion.
Select only one.

- High (5)
- Moderately high (4) [BR/CM (5)]
- Moderate (3) [BR/CM (5)]
- Moderately low (2) [BR/CM (3)]
- Low (1) [BR/CM (2)]
- None (0)

Narrative Description of Vegetation Quality

- low = Low species diversity &/or dominance of nonnative or disturbance tolerant native species
- mod = Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
- high = A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rare, threatened, or endangered species

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- Extensive >75% cover (-5)
- Moderate 25-75% cover (-3)
- Sparse 5-25% cover (-1)
- Nearly absent <5% cover (0)
- Absent (1)

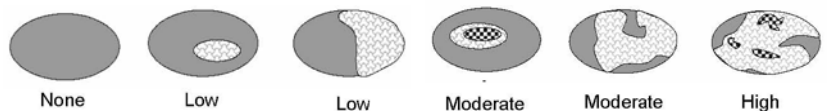
Mudflat and Open Water Class Quality

- 0 = Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
- 1 = Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
- 2 = Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <0.2 ha (0.5 to 5 acre)]
- 3 = High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

6d. Microtopography.
Score all present using 0 to 3 scale.

- Vegetated hummocks/tussocks
- Coarse woody debris >15 cm (6 in.)
- Standing dead >25 cm (10 in.) dbh
- Amphibian breeding pools

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

- 0 = Absent
- 1 = Present in very small amounts or if more common of marginal quality
- 2 = Present in moderate amounts, but not of highest quality or in small amounts of highest quality
- 3 = Present in moderate or greater amounts and of highest quality

60, Category 3

GRAND TOTAL
(max 100 pts)

- 0- 29 = Category 1, low wetland function, condition, quality**
- 30- 59 = Category 2, good/moderate wetland function, condition, quality**
- 60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: <http://www.epa.state.oh.us/dsw/401/401.html>

Site: Russeville Solar - Wetland M	Rater(s): C. Brendel	Date: 7/9/2019
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0	subtotal
max 6 pts.	

Metric 1. Wetland Area (size)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

- Select one size class and assign score.
- >50 acres (>20.2 ha) (6 pts)
 - 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
 - 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
 - 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
 - 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
 - 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
 - <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

ArcGIS was used to measure wetland. The wetland is 0.05 acre in size.

11	subtotal
max 14 pts.	

Metric 2. Upland Buffers and Surrounding Land Use

- 2a. Calculate average buffer width. Select only one and assign score. Do not double check.
- WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
 - MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
 - NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
 - VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)
- 2b. Intensity of surrounding land use. Select one or double check and average.
- VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
 - LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
 - MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
 - High. Urban, industrial, open pasture, row cropping, mining, construction (1)

14	subtotal
max 30 pts.	

Metric 3. Hydrology

- 3a. Sources of water. Score all that apply.
- High pH groundwater (5)
 - Other groundwater (3) [BR/CM (5)]
 - Precipitation (1) [unless BR/CM primary source (5)]
 - Seasonal/intermittent surface water (3)
 - Perennial surface water (lake or stream) (5)
- 3b. Connectivity. Score all that apply.
- 100-year floodplain (1)
 - Between stream/lake and other human use (1)
 - Part of wetland/upland (e.g., forest), complex (1)
 - Part of riparian or upland corridor (1)
- 3c. Maximum water depth. Select only one and assign score.
- >0.7 m (27.6 in.) (3)
 - 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
 - <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]
- 3d. Duration inundation/saturation. Score one or dbl. check & avg.
- Semi- to permanently inundated/saturated (4)
 - Regularly inundated/saturated (3) [BR/CM (4)]
 - Seasonally inundated (2) [BR/CM (4)]
 - Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]
- 3e. Modifications to natural hydrologic regime. Score one or double check and average.
- None or none apparent (12)
 - Recovered (7)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> ditch	<input type="checkbox"/> point source (nonstormwater)
<input type="checkbox"/> tile (including culvert)	<input type="checkbox"/> filling/grading
<input type="checkbox"/> dike	<input type="checkbox"/> road bed/RR track
<input type="checkbox"/> weir	<input type="checkbox"/> dredging
<input type="checkbox"/> stormwater input	<input type="checkbox"/> other _____

12	subtotal
max 20 pts.	

Metric 4. Habitat Alteration and Development

- 4a. Substrate disturbance. Score one or double check and average.
- None or none apparent (4)
 - Recovered (3)
 - Recovering (2)
 - Recent or no recovery (1)
- 4b. Habitat development. Select only one and assign score.
- Excellent (7)
 - Very good (6)
 - Good (5)
 - Moderately good (4)
 - Fair (3)
 - Poor to fair (2)
 - Poor (1)
- 4c. Habitat alteration. Score one or double check and average.
- None or none apparent (9)
 - Recovered (6)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> mowing	<input type="checkbox"/> shrub/sapling removal
<input type="checkbox"/> grazing	<input type="checkbox"/> herbaceous/aquatic bed removal
<input type="checkbox"/> clearcutting	<input type="checkbox"/> woody debris removal
<input type="checkbox"/> selective cutting	<input type="checkbox"/> sedimentation
<input type="checkbox"/> farming	<input type="checkbox"/> dredging
<input type="checkbox"/> toxic pollutants	<input type="checkbox"/> nutrient enrichment

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Site:	Rater(s):	Date:
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subtotal previous page

5	max 10 pts. subtotal
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Metric 5. Special Wetlands

raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

5	max 20 pts. subtotal
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Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- Aquatic bed
- 1 Emergent
- 1 Shrub
- 1 Forest
- Mudflats
- Open water <20 acres (8 ha)
- Moss/lichen. Other _____

Vegetation Community Cover Scale

- 0 = Absent or <0.1 ha (0.25 acre) contiguous acre
[For BR/CM <0.04 ha (0.1 acre)]
- 1 = Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
- 2 = Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
- 3 = Present and comprises a significant part or more of wetland's vegetation and is of high quality

6b. Horizontal (plan view) interspersion.
Select only one.

- High (5)
- Moderately high (4) [BR/CM (5)]
- Moderate (3)[BR/CM (5)]
- Moderately low (2) [BR/CM (3)]
- Low (1) [BR/CM (2)]
- None (0)

Narrative Description of Vegetation Quality

- low = Low species diversity &/or dominance of nonnative or disturbance tolerant native species
- mod = Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
- high = A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rare, threatened, or endangered species

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- Extensive >75% cover (-5)
- Moderate 25-75% cover (-3)
- Sparse 5-25% cover (-1)
- Nearly absent <5% cover (0)
- Absent (1)

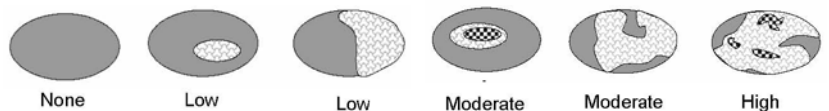
Mudflat and Open Water Class Quality

- 0 = Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
- 1 = Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
- 2 = Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <0.2 ha (0.5 to 5 acre)]
- 3 = High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

6d. Microtopography.
Score all present using 0 to 3 scale.

- Vegetated hummocks/tussocks
- Coarse woody debris >15 cm (6 in.)
- Standing dead >25 cm (10 in.) dbh
- Amphibian breeding pools

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

- 0 = Absent
- 1 = Present in very small amounts or if more common of marginal quality
- 2 = Present in moderate amounts, but not of highest quality or in small amounts of highest quality
- 3 = Present in moderate or greater amounts and of highest quality

47, Category 2

GRAND TOTAL
(max 100 pts)

- 0- 29 = Category 1, low wetland function, condition, quality**
- 30- 59 = Category 2, good/moderate wetland function, condition, quality**
- 60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: <http://www.epa.state.oh.us/dsw/401/401.html>

Site: Russeville Solar - Wetland N	Rater(s): C. Brendel	Date: 7/9/2019
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	1
max 6 pts.	subtotal

Metric 1. Wetland Area (size)

Notes: BR/CM = adjusted points for Blue Ridge and Cumberland Mountains. If an open water body (excluding aquatic beds and seasonal mudflats) is >20 acres (8 ha), then add only 0.5 acre (0.2 ha) of it to the wetland size for Metric 1.

- Select one size class and assign score.
- >50 acres (>20.2 ha) (6 pts)
 - 25 to <50 acres (10.1 to <20.2 ha) (5) [BR/CM (6)]
 - 10 to <25 acres (4 to <10.1 ha) (4) [BR/CM (6)]
 - 3 to <10 acres (1.2 to <4 ha) (3) [BR/CM (5)]
 - 0.3 to <3 acres (0.1 to <1.2 ha) (2) [BR/CM (3)]
 - 0.1 to <0.3 acre (0.04 to <0.1 ha) (1) [BR/CM (2)]
 - <0.1 acre (0.04 ha) (0)

Sources/assumptions for size estimate (list):

ArcGIS was used to measure wetland. The wetland is 0.30 acre in size.

	14
max 14 pts.	subtotal

Metric 2. Upland Buffers and Surrounding Land Use

- 2a. Calculate average buffer width. Select only one and assign score. Do not double check.
- WIDE. Buffers average 50 m (164 ft) or more around wetland perimeter (7)
 - MEDIUM. Buffers average 25 m to <50 m (82 to <164 ft) around wetland perimeter (4)
 - NARROW. Buffers average 10 m to <25 m (32 ft to <82 ft) around wetland perimeter (1)
 - VERY NARROW. Buffers average <10 m (<32 ft) around wetland perimeter (0)
- 2b. Intensity of surrounding land use. Select one or double check and average.
- VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
 - LOW. Old field (>10 years), shrubland, young 2nd growth forest (5)
 - MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field (3)
 - High. Urban, industrial, open pasture, row cropping, mining, construction (1)

	14
max 30 pts.	subtotal

Metric 3. Hydrology

- 3a. Sources of water. Score all that apply.
- High pH groundwater (5)
 - Other groundwater (3) [BR/CM (5)]
 - Precipitation (1) [unless BR/CM primary source (5)]
 - Seasonal/intermittent surface water (3)
 - Perennial surface water (lake or stream) (5)
- 3b. Connectivity. Score all that apply.
- 100-year floodplain (1)
 - Between stream/lake and other human use (1)
 - Part of wetland/upland (e.g., forest), complex (1)
 - Part of riparian or upland corridor (1)
- 3c. Maximum water depth. Select only one and assign score.
- >0.7 m (27.6 in.) (3)
 - 0.4 to 0.7 m (16 to 27.6 in.) (2) [BR/CM (3)]
 - <0.4 m (<16 in.) (1) [BR/CM 0.15 to 0.4 m (6 to <16 in.) (2)]
- 3d. Duration inundation/saturation. Score one or dbl. check & avg.
- Semi- to permanently inundated/saturated (4)
 - Regularly inundated/saturated (3) [BR/CM (4)]
 - Seasonally inundated (2) [BR/CM (4)]
 - Seasonally saturated in upper 30 cm (12 in.) (1) [BR/CM (2)]
- 3e. Modifications to natural hydrologic regime. Score one or double check and average.
- None or none apparent (12)
 - Recovered (7)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> ditch	<input type="checkbox"/> point source (nonstormwater)
<input type="checkbox"/> tile (including culvert)	<input type="checkbox"/> filling/grading
<input type="checkbox"/> dike	<input type="checkbox"/> road bed/RR track
<input type="checkbox"/> weir	<input type="checkbox"/> dredging
<input type="checkbox"/> stormwater input	<input type="checkbox"/> other _____

	13
max 20 pts.	subtotal

Metric 4. Habitat Alteration and Development

- 4a. Substrate disturbance. Score one or double check and average.
- None or none apparent (4)
 - Recovered (3)
 - Recovering (2)
 - Recent or no recovery (1)
- 4b. Habitat development. Select only one and assign score.
- Excellent (7)
 - Very good (6)
 - Good (5)
 - Moderately good (4)
 - Fair (3)
 - Poor to fair (2)
 - Poor (1)
- 4c. Habitat alteration. Score one or double check and average.
- None or none apparent (9)
 - Recovered (6)
 - Recovering (3)
 - Recent or no recovery (1)

Check all disturbances observed

<input type="checkbox"/> mowing	<input type="checkbox"/> shrub/sapling removal
<input type="checkbox"/> grazing	<input type="checkbox"/> herbaceous/aquatic bed removal
<input type="checkbox"/> clearcutting	<input type="checkbox"/> woody debris removal
<input type="checkbox"/> selective cutting	<input type="checkbox"/> sedimentation
<input type="checkbox"/> farming	<input type="checkbox"/> dredging
<input type="checkbox"/> toxic pollutants	<input type="checkbox"/> nutrient enrichment

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Site:	Rater(s):	Date:
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subtotal previous page

max 10 pts.	5	subtotal
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Metric 5. Special Wetlands

raw score*

*If the documented raw score for Metric 5 is 30 points or higher, the site is automatically considered a Category 3 wetland.

Select all that apply. Where multiple values apply in row, score row as single feature with highest point value. Provide documentation for each selection (photos, checklists, maps, resource specialist concurrence, data sources, references, etc).

- Bog, fen, wet prairie (10); acidophilic veg., mossy substrate >10 sq.m, sphagnum or other moss (5); muck, organic soil layer (3)
- Assoc. forest (wetl. &/or adj. upland) incl. >0.25 acre (0.1 ha); old growth (10); mature >18 in. (45 cm) dbh (5) [exclude pine plantation]
- Sensitive geologic feature such as spring/seep, sink, losing/underground stream, cave, waterfall, rock outcrop/cliff (5)
- Vernal pool (5); isolated, perched, or slope wetland (4); headwater wetland [1st order perennial or above] (3)
- Island wetland >0.1 acre (0.04 ha) in reservoir, river, or perennial water >6 ft (2 m) deep (5)
- Braided channel or floodplain/terrace depressions (floodplain pool, slough, oxbow, meander scar, etc.) (3)
- Gross morph. adapt. in >5 trees >10 in. (25 cm) dbh: buttress, multitrunk/stool, stilted, shallow roots/tip-up, or pneumatophores (3)
- Ecological community with global rank (NatureServe): G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier]
- Known occurrence state/federal threatened/endangered species (10); other rare species with global rank G1*(10), G2*(5), G3*(3) [*use higher rank where mixed rank or qualifier] [exclude records which are only "historic"]
- Superior/enhanced habitat/use: migratory songbird/waterfowl (5); in-reservoir buttonbush (4); other fish/wildlife management/designation (3)
- Cat. 1 (very low quality) : <1 acre (0.4 ha) AND EITHER >80% cover of invasives OR nonvegetated on mined/excavated land (-10)

max 20 pts.	6	subtotal
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Metric 6. Plant Communities, Interspersion, Microtopography

6a. Wetland vegetation communities.
Score all present using 0 to 3 scale.

- Aquatic bed
- 1 Emergent
- 1 Shrub
- 2 Forest
- Mudflats
- Open water <20 acres (8 ha)
- Moss/lichen. Other _____

Vegetation Community Cover Scale

- 0 = Absent or <0.1 ha (0.25 acre) contiguous acre
[For BR/CM <0.04 ha (0.1 acre)]
- 1 = Present and either comprises a small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
- 2 = Present and either comprises a significant part of wetland's vegetation and is of moderate quality, or comprises a small part and is of high quality
- 3 = Present and comprises a significant part or more of wetland's vegetation and is of high quality

6b. Horizontal (plan view) interspersion.
Select only one.

- High (5)
- Moderately high (4) [BR/CM (5)]
- Moderate (3)[BR/CM (5)]
- Moderately low (2) [BR/CM (3)]
- Low (1) [BR/CM (2)]
- None (0)

Narrative Description of Vegetation Quality

- low = Low species diversity &/or dominance of nonnative or disturbance tolerant native species
- mod = Native species are dominant component of the vegetation, although nonnative &/or disturbance tolerant native species can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare, threatened or endangered species
- high = A predominance of native species with nonnative sp &/or disturbance tolerant native sp absent or virtually absent, and high sp diversity and often but not always, the presence of rare, threatened, or endangered species

6c. Coverage of invasive plants.
Add or deduct points for coverage.

- Extensive >75% cover (-5)
- Moderate 25-75% cover (-3)
- Sparse 5-25% cover (-1)
- Nearly absent <5% cover (0)
- Absent (1)

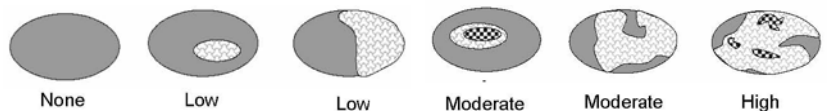
Mudflat and Open Water Class Quality

- 0 = Absent <0.1 ha (0.25 acres) [For BR/CM <0.04 ha (0.1 acre)]
- 1 = Low 0.1 to <1 ha (0.25 to 2.5 acres) [BR/CM 0.04 to <0.2 ha (0.1 to 0.5 acre)]
- 2 = Moderate 1 to <4 ha (2.5 to 9.9 acres) [BR/CM 0.2 to <0.2 ha (0.5 to 5 acre)]
- 3 = High 4 ha (9.9 acres) or more [BR/CM 2 ha (5 acres) or more]

6d. Microtopography.
Score all present using 0 to 3 scale.

- Vegetated hummocks/tussocks
- Coarse woody debris >15 cm (6 in.)
- Standing dead >25 cm (10 in.) dbh
- Amphibian breeding pools

Hypothetical Wetland for Estimating Degree of Interspersion



Microtopography Cover Scale

- 0 = Absent
- 1 = Present in very small amounts or if more common of marginal quality
- 2 = Present in moderate amounts, but not of highest quality or in small amounts of highest quality
- 3 = Present in moderate or greater amounts and of highest quality

53, Category 2

GRAND TOTAL
(max 100 pts)

- 0- 29 = Category 1, low wetland function, condition, quality**
- 30- 59 = Category 2, good/moderate wetland function, condition, quality**
- 60-100 = Category 3, superior wetland function, condition, quality**

**Based on ORAM Score Calibration Report for the scoring breakpoints between wetland categories: <http://www.epa.state.oh.us/dsw/401/401.html>

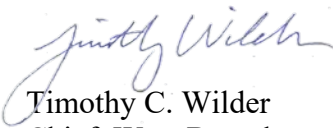
If you object to this decision, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeals Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this decision you must submit a completed RFA form to the Great Lakes and Ohio River Division, Division Office at the following address:

LRD Appeals Officer
U.S. Army Corps of Engineers
Great Lakes and Ohio River Division
550 Main Street, Room 10524
Cincinnati, OH 45202-3222
TEL (513) 684-2699; FAX (513) 684-2460

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the date listed on the RFA form. **It is not necessary to submit an RFA form to the Division Office if you do not object to the decision in this letter.**

We appreciate your awareness of the USACE regulatory program. If you have any questions, you may contact me or Gary Davis at (270) 702-1312 or by e-mail at gary.l.davis@usace.army.mil.

Sincerely,



Timothy C. Wilder
Chief, West Branch
Regulatory Division

Enclosures:

Notification of Administrative Appeal Options and Process and Request for Appeal Form
AJD Forms
LRN-2019-00805, Figures 1-3 (12 pages)

Electronic Copies Furnished:

Mr. Scott West, Terracon, Inc.

Memo

Date: Wednesday, November 03, 2021

Project: **Logan County Solar**

To: Russellville Solar, LLC

From: HDR

Subject: **Transmission Line- Jurisdictional Determination**

Russellville Solar LLC (Russellville Solar), a wholly owned subsidiary of Silicon Ranch Corporation (SRC), intends to develop a site in Logan County, Kentucky as a photovoltaic solar power generating facility known as Logan County Solar. The Logan County Solar Field Investigation Boundary encompasses nearly 1,022 contiguous acres in rural Logan County, Kentucky, located approximately two miles southwest of the city of Russellville (Appendix A, Figures 1-3). A jurisdictional determination (JD) verification (LRN-2019-00805) from the United States Army Corps was issued for the Field Investigation Boundary (Appendix B).

Since the issuance of the JD approval, a transmission line upgrade was added as an extension to the Study Area. The transmission line is referred to herein as the "Project." Since the location of the transmission line was not included in the boundaries of the 1,022-acre Field Investigation Boundary, the purpose of this memo is to update the JD information for Russellville Solar's internal records.

Project Location: East of Joe Montgomery Road in Logan County, Kentucky

Basin: Lower Cumberland [HUC: 05130205]

Nearest City: Russellville

County: Logan County

Center Decimal Degree Coordinates of TL: 36.806798/-86.917059

USGS Quadrangle Name: Russellville

Project Description and Recent Weather Conditions

The Transmission Line consists of agricultural fields and narrow strips of ruderal forested area. Dominant species within the agricultural fields is corn (*Zea mays*). Species within the ruderal forested areas included common hackberry (*Celtis Occidentalis*), black walnut (*Juglans nigra*), basswood (*Tilia americana*), blackgum (*Nyssa sylvatica*), black cherry (*Prunus serotina*), flowering dogwood (*Cornus florida*), and sassafras (*Sassafras albidum*) in the canopy and Chinese privet (*Ligustrum sinense*), coral berry bush (*Ardisia crenata*) in the midstory.

**Appendix C – Biological Resources-Related Correspondence and
Supporting Information**



Wildlife and Vegetation Assessment

Russellville Solar, LLC

Logan County, Kentucky
February 16, 2022



Carrie Allison
Wildlife Biologist (Consultation)
U.S. Fish & Wildlife Service
Frankfort Ecological Services Field Office
330 West Broadway, Rm 265
Frankfort, KY 40601

**Subject: Request for Study Plan Concurrence
Silicon Ranch Russellville Solar Farm
Logan County, Kentucky**

Dear Ms. Allison:

Jackson Group is requesting survey methodology concurrence relating to a threatened and endangered bat species presence/probable absence survey for a proposed project in Logan County, Kentucky.

Silicon Ranch Corporation has contracted Jackson Group to conduct a presence/probable absence survey at the proposed Russellville Solar Farm. The proposed project area of interest is approximately 1,569 acres and includes approximately 177 acres of forested habitat that provides potential suitable summer habitat for threatened and endangered bat species (see attached Aerial Map – Figure 1).

The following proposed survey methods are based on the technical criteria outlined in USFWS's *2020 Range-Wide Indiana Bat Summer Survey Guidelines*, dated March 2020. Based on the forested habitat within the project boundary (~177 acres), surveys will be conducted for a total of 18 net nights.

Mist-Net Survey

Jackson Group will survey a total of 18 net nights (2 sites, 3 nets/site for 3 calendar nights). The locations of the net sites will be determined by selecting the best possible net placement (e.g., streams, trails) that are typically the most effective places to survey. Specific sites for net placement will be determined by permitted bat biologists in the field and will follow USFWS (2020) guidelines for mist net surveys. Netting will begin at sunset and last for a minimum of five hours. If severe weather occurs for more than 30 minutes during the first 5 hours of the survey night that night will not count towards the required 3 nights at the site (see Severe Weather section below). Standard two-ply, 50 or 75 denier, nylon mist-nets with a mesh size of 38 millimeters (1.50 inches) will be used at all mist-net sites. Mist-nets will typically be placed in suitable bat habitat and positioned perpendicularly across flight corridors, filling the corridor from side to side and extending from ground-level up to overhanging canopy. Nets will be checked approximately every 10 minutes. Net set locations at the site will be distributed as evenly as possible throughout suitable habitat. Disturbance in the form of noise, light, and/or movement will be minimized at net locations. Additionally, surveyors will decontaminate and/or dispose of field gear according to the most current USFWS white-nose syndrome decontamination protocol. We will also follow the recent COVID-19 guidelines released in a memo by the USFWS in June 2020 suggesting we follow the guidance (<https://www.cdc.gov/coronavirus/2019-ncov/index.html>) of the Centers for Disease Control (CDC) and be in accordance with state, local, and other Federal requirements when handling wild bats. The mist-net location will be recorded using a handheld GPS unit in decimal degrees.

Radio Telemetry

Radio transmitters will be affixed to a maximum of two captured bats per site of the following species: Indiana bats (*Myotis sodalis*) and northern long-eared bats (*Myotis septentrionalis*). Preference will be given to reproductive females and juveniles, however, the first individual of the target species captured will be affixed with a radio transmitter (172 MHz range) regardless of sex if it meets the minimum weight requirements. Bats fitted with a transmitter will be tracked to their diurnal roost. No foraging tracking is proposed. Bats will be tracked during the day within a search radius of 2.5 miles from the point of capture to locate roost trees, up to a maximum of seven days. Daily telemetry searches will be conducted until the bat is located, or for a maximum of 8 hours per day. Telemetry crews, using a vehicle equipped with a five-element Yagi antenna (Wildlife Materials, Carbondale, Illinois), will attempt to track bats from parks, roads, and other public lands within this radius; however, crews will not enter any property without the express consent of the landowner. If access to roost trees is not possible (e.g., located on private property), roost locations will be estimated using triangulation. Where landowner permission is granted to access the roost tree, crews will gather the following information regarding roost trees: tree species, tree condition (living or dead), percent exfoliating bark, diameter at breast-height, estimated percent overstory within stand, and estimated percent understory/midstory within stand. If accessible, a photograph will be taken and the tree's location recorded using a handheld GPS.

A minimum of two emergence surveys will be conducted at each accessible roost tree identified during the tracking period to enumerate bats using the roost. Surveys will begin 30 minutes before dusk and continue until at least one hour after sunset or until the roost tree is not visible without additional illumination.

Severe Weather Definitions (related to mist-net surveys)

Severe weather is defined as including: temperatures below 10°C (50°F), precipitation (rain or heavy fog), and sustained winds exceeding 4-mph (9-mph). Light rain not lasting more than 30-minutes is not considered severe weather and surveyors may choose to continue netting during these conditions.

Closing

This presence/probable absence survey will strictly follow the technical criteria outlined in the 2020 Range-Wide Indiana Bat Summer Survey Guidelines, as well as any additional recommendations provided by your office. At this time, we respectfully request concurrence with our methodology and level of effort.

Please reply via email to sroberts@jacksongroupco.com with your concurrence, or with any additional requests or guidelines needed for concurrence. If you have any questions or require additional information, please contact me at (859) 623-0499.

Sincerely,



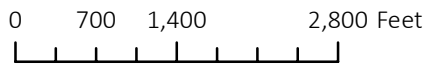
Shane Roberts
Vice President

Enclosures: Figure 1



Cave Spring

- Project Boundary
- Potential Survey Site Location



DESCRIPTION	Bat Survey - Logan County, KY
DATE	05/19/2021

GROUP



Bat Survey Report Russellville Solar Project

Russellville Solar LLC
Russellville Solar Project
Logan County, Kentucky

Prepared by:

Jackson Group

3925 Simpson Lane
Richmond, KY 40475
jacksongroupco.com

Prepared for:

Russellville Solar LLC

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400 West Summit Hill Drive, Knoxville, Tennessee 37902

April 12, 2022

Mr. Lee Andrews
U.S. Fish and Wildlife Service
Kentucky Ecological Services Field Office
J C Watts Federal Building
330 West Broadway, Room 265
Frankfort, Kentucky 40601-8670

Dear Mr. Andrews:

TENNESSEE VALLEY AUTHORITY (TVA) – LOGAN COUNTY SOLAR – REQUEST FOR CONCURRENCE

TVA entered into a Power Purchase Agreement (PPA) with Russellville Solar LLC (Russellville Solar), a wholly owned subsidiary of Silicon Ranch Corporation (SRC), on January 8, 2021, to purchase the electric power generated by a proposed solar photovoltaic (PV) facility in Logan County, Kentucky. The proposed solar facility, known as Logan County Solar, would be owned by SRC, operated by Russellville Solar, and would have an installed capacity of 173 megawatts. The solar facility would consist of arrays of either crystalline silicon or thin-film PV panels attached to ground-mounted single-axis trackers, central inverters, transformers, a substation and battery energy storage system, a switching station, an operations and maintenance building, access roads, and all associated cabling and safety equipment. The solar facility would connect to TVA's adjacent existing Springfield-Logan Aluminum 161-kiloVolt Transmission Line (TL). TVA would also install fiber-optic overhead ground wire along 2,500 feet of the existing TL mentioned above. The solar facility and associated Electrical Interconnection are herein referred to as the "Project Site". Under the terms of the PPA, TVA would purchase the electric output from the solar facility for an initial term of 20 years, subject to satisfactory completion of all applicable environmental reviews.

The proposed solar PV facility would occupy approximately 1,088 acres of a 1,569-acre Project Site. Approximately 89% (1,394) acres of the Project Site are agricultural fields, pastures, or otherwise cleared, open land, while approximately 11% (188 acres) of the Project Site are forested. Approximately 93 acres of forest is proposed for removal. No jurisdictional streams or wetlands would be impacted. More details about the scope and potential impacts of this project can be found in the draft Environmental Assessment available online <https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nepa-detail/logan-county-solar-project>. See attached SRC_Russellville Solar_Logan County Solar_Bio Report_20220216 for habitat assessment, figures, and wildlife survey results.

A review of the TVA Regional Natural Heritage database, Office of Kentucky Nature Preserves, and the U.S. Fish and Wildlife Service Information for Planning and Consultation (IPaC) website identified eight species listed as federally endangered, threatened, candidate for listing, or delisted and monitored under the Endangered Species Act that have the potential to occur within the Project Site in Logan County, Kentucky. These species include four mussels (snuffbox mussel, little-wing pearlymussel, smooth rabbitsfoot, slabside pearlymussel), one insect (monarch butterfly), and three mammals (gray bat, Indiana bat, and northern long-eared bat (NLEB)) that have the potential to occur within Logan County based on historic range, proximity to known occurrence records, biological characteristics, and/or physiographic characteristics. No federally designated critical habitats for these species are present within or adjacent to the Project Site, therefore no adverse modification of critical habitats would occur.

Field surveys were conducted by biologists from HDR in May 2021 and October 2021 to determine whether suitable habitat for federally listed species occurs within the Project Site. On site surveys identified 17 forested stands, 12 buildings, five sinkhole fissures/karst features, 12 wetlands, two intermittent streams, 15 ponds, and nine ephemeral streams. No construction, grading, or fill would occur in jurisdictional wetlands or within a 100-foot buffer around the five karst features. The proposed construction of one road crossing using culverts would impact approximately 16 linear feet of one non-jurisdictional intermittent stream and approximately 0.01 acre of one non-jurisdictional emergent linear wetland. Best management practices including a 50-foot buffer zone would be used surrounding intermittent streams and wetlands to reduce indirect impacts from construction activities.

The snuffbox mussel, little-wing pearlymussel, smooth rabbitsfoot, and slabside pearlymussel occupy specialized habitat within perennial streams. No perennial streams occur within the proposed Project Site. Additionally, the little-wing and slabside pearlymussel are historic records for Logan County and are not listed on the ECOS IPAC range shapefile. The snuffbox mussel, little-wing pearlymussel, smooth rabbitsfoot, and slabside pearlymussel would not be affected by the proposed actions.

Suitable roosting habitat for Indiana bat and NLEB exists within the 17 forested stands, five karst features, and 12 buildings in the Project Site. Of the 188 forested acres in the Project Site, approximately 93 acres of forest is proposed for removal. All 12 buildings have the potential to be demolished and removed from the Project Area. Tree removal is proposed to occur at any time after project construction initiation. Approximately 72 of the 93 acres proposed for tree removal offer moderate- and high-quality bat foraging and roosting habitat, consisting of large stands of mixed deciduous forests, trees with exfoliating bark, and/or good water sources. The remaining 21 acres of forested areas proposed for removal were identified as low-quality bat habitat. These consisted largely of small, young, mixed deciduous forests or hedgerows that lacked trees with exfoliating bark and/or good water sources. Foraging habitat for gray bat, Indiana bat, and NLEB exists over ponds, wetlands, and streams in the Project Site.

Mr. Lee Andrews
Page 3
April 12, 2022

The closest known gray bat roost is Potato Cave, approximately 6.2 miles away from the Project Site in Logan County. The closest known Indiana bat record is a summer record approximately 3.7 miles away. Both gray bat and Indiana bat records are historical. There are no known records of NLEB within Logan County. Karst features within the Project Site are small and all but one does not appear suitable for bat use. The one small pit that does have a suitable opening may be suitable for state-listed species but not for federally listed species due to its small size and shape. No known hibernacula for Indiana bat occur within ten miles of the Project Site. No known hibernacula or maternity roosts for NLEB occur within five miles of the Project Site.

Mist net surveys of the Project Site were conducted by Jackson Group biologists in May and June 2021 using the 2020 Range-Wide Indiana Bat Summer Survey Guidelines for determining presence/absence of Indiana bat and NLEB. Mist net surveys were conducted in the forested stands identified as moderate- or high-quality habitat over streams or forested corridors. No threatened or endangered bat species were captured over 18 net nights of survey effort. See attached SRC_Russellville Solar_Bat Survey Report_20210701.pdf for full mist net survey effort details, photos, and results.

No federally listed bats were captured during mist nets surveys of the Project Site. Up to 93 acres of suitable summer roosting habitat and foraging habitat for Indiana bat and NLEBs may be removed. Tree removal is proposed to occur at any time after project construction initiation. Construction Best management practices would be used around bodies of water, minimizing sedimentation and changes to hydrology. No construction would occur within 100-feet around the five karst features. Due to the lack of impacts to potential hibernacula, distance from known records, and no captures of federally listed bat species during presence/absence surveys, TVA has determined that proposed actions may affect but are not likely to adversely affect (NLAA) gray bat, Indiana bat, and northern long-eared bat.

While there are no Section 7 requirements for monarch butterfly as a candidate species, it is identified in IPaC as a species that could occur within the Project Site. Monarch butterflies were noted during field surveys completed by HDR biologists in May 2021. Approximately 87% of the Project Site consists of agricultural fields used for corn and wheat, <1% pasture and hayfield, and <1% residential lawns. Milkweed were not a dominant species observed or recorded within the Project Site. Due to the small amount of potentially suitable habitat that currently occurs on site, proposed actions would not jeopardize the continued existence of monarch butterfly.

Following construction, disturbed portions within the Project Site would be seeded with native grasses and/or noninvasive vegetation which may provide more flowering plants than previously occurred on-site. Proposed actions may ultimately benefit this species by providing suitable host plants and foraging habitat.

We respectfully request concurrence with our determination. Should you have any questions or

Mr. Lee Andrews
Page 4
April 12, 2022

wish to discuss the project in more detail, please contact Elizabeth Hamrick by email,
ecburton@tva.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "W. Douglas White", with a long horizontal flourish extending to the right.

W. Douglas White
Manager
Biological Compliance

EBH:ABM
Enclosures



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Kentucky Ecological Services Field Office
330 West Broadway, Suite 265
Frankfort, Kentucky 40601
(502) 695-0468

June 6, 2022

Liz Hamrick
TVA
400 West Summit Hill Drive
Knoxville, TN 37902

Subject: FWS 2022-0033571; Russellville Solar Project; Logan County, Kentucky

Dear Liz Hamrick:

The U.S. Fish and Wildlife Service's Kentucky Field Office (KFO) has reviewed the above-referenced project and request for concurrence received on April 13, 2022 and additional information received on May 16, 2022. The Tennessee Valley Authority (TVA) plans to purchase electric power generated by a proposed photovoltaic (PV) facility in Logan County, Kentucky. The KFO offers the following comments in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

Project Description

The proposed solar facility will have an installed capacity of 173 megawatts and will consist of arrays of either crystalline silicon or thin-film PV panels attached to ground-mounted single-axis trackers, central inverters, transformers, a substation and battery energy storage system, a switching station, an operations and maintenance building, access roads, and all associated cabling and safety equipment. The solar facility will connect to TVA's adjacent existing Springfield-Logan Aluminum 161-kiloVolt Transmission Line (TL) and include 2,500 feet of fiber-optic overhead ground wire along the existing TL. The solar facility will occupy approximately 1,088 acres of a 1,569-acre project area. The project area primarily consists of agricultural fields, pastures, or otherwise cleared, open land. Approximately 188 acres of the project area are forested. The project will require the removal of approximately 93 acres of forested habitat. No impacts to streams or wetlands are proposed.

Federally Listed Species

The TVA has determined that the proposed project will have "no effect" on the Snuffbox (*Epioblasma triquetra*), Little-wing Pearlymussel (*Pegias fabula*), Rabbitsfoot (*Quadrula cylindrica cylindrica*), and Slabside Pearlymussel (*Pleuroaia dolabelloides*) because the proposed action will not disturb suitable habitat for these species. There is no statutory requirement to request concurrence with a "no effect" determination; however, the KFO acknowledges this determination and has no additional comments or concerns regarding these species.

The TVA has also determined that the proposed action has the potential to affect the Indiana bat (*Myotis sodalis*), northern long-eared bat (*Myotis septentrionalis*) (NLEB), and gray bat (*Myotis grisescens*).

Federally Listed Bat Species: During habitat assessments conducted in May and October 2021, 17 forest stands, 12 abandoned buildings, 5 sinkhole/karst features, and one abandoned well were identified within the project area. There are no perennial streams within the project area; therefore, no impacts to gray bat foraging habitat are expected. The forested habitat within the project area is potential summer roosting habitat for the Indiana bat and NLEB. A presence/absence survey was conducted in June 2021 and no Indiana bats or NLEBs were captured. The KFO agreed that the survey results indicated probable summer absence of these species in a July 7, 2021 email. In addition, the 12 abandoned buildings are also considered potential summer roosting habitat for the Indiana bat and NLEB. Four of these structures will be removed; however, removal will occur from October 15 to March 31, when these species are not expected to be using these structures.

The abandoned well has the potential to be used by gray bats in the summer; however, there were no signs of bat usage or staining during the active season evaluation. A 100-foot buffer will be maintained around all sinkhole/karst features. Karst Features 1 and 2 do not have openings and are not likely to be used by Indiana bats, NLEBs, and/or gray bats for summer or winter roosting. Karst Feature 3 is potentially suitable as a summer/winter roost for gray bats and a winter roost for Indiana bats and NLEBs. Karst Feature 3 will not be impacted and the 18 acres of forested habitat surrounding the entrance will not be removed; therefore, if the above-referenced bat species are using Karst Feature 3, disturbance is considered unlikely. Karst Features 4 and 5 have openings, but the openings are completely blocked by an accumulation of trash and large debris; therefore, these features are unlikely to be used by the Indiana bat, NLEB, or gray bat.

Based on the results of the presence/absence survey, observations made during the habitat assessment, and proposed minimization and avoidance measures, the KFO concurs that the proposed action “may affect, but is not likely to adversely affect” the Indiana bat, NLEB, and gray bat.

Candidate Species

The monarch butterfly (*Danaus plexippus*) is a candidate species and not yet listed or proposed for listing. There are generally no section 7 requirements for candidate species, but we encourage all agencies and project proponents to take advantage of any opportunity they may have to conserve the species. For information on monarch conservation, please visit <https://www.fws.gov/savethemonarch>.

Summary

The KFO concurs with your determination that the proposed project “may affect, but is not likely to adversely affect” the Indiana bat, NLEB, and gray bat. In view of these findings, we believe that TVA has fulfilled the section 7 requirements of the Endangered Species Act for this project. TVA must reconsider section 7 obligations if (1) new information reveals that the proposed action may affect listed species in a manner or to an extent not previously considered, (2) the

proposed action is subsequently modified to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat is designated.

We appreciate the opportunity to review the proposed project. If you have any questions, please contact Carrie Allison of my staff at 502-695-0468, extension 46103.

Sincerely,

for Virgil Lee Andrews, Jr.
Field Supervisor

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**Appendix D – Cultural Resources-Related Correspondence and
Supporting Information**



400 West Summit Hill Drive, Knoxville, Tennessee 37902

April 16, 2021

Mr. Craig Potts
State Historic Preservation Officer
and Executive Director
Kentucky Heritage Council
410 High Street
Frankfort, Kentucky 40601

Dear Mr. Potts:

TENNESSEE VALLEY AUTHORITY (TVA), INITIATION OF CONSULTATION POWER PURCHASE AGREEMENT (PPA), RUSSELLVILLE, LOGAN COUNTY, KENTUCKY (36.765588, -86.975550) (TVA TRACKING NUMBER – CID 79976)

TVA proposes to enter into a 20-year PPA with Silicon Ranch (SR) Russellville LLC (SR Russellville), a subsidiary of Silicon Ranch Corporation (SRC) to purchase the electric power generated by a proposed solar photovoltaic (PV) facility in Logan County, Kentucky. The proposed solar facility would be owned by SRC and operated by SR Russellville and would have an installed capacity of 173 megawatts (MWs). The solar facility would connect to TVA's adjacent existing Springfield-Logan Aluminum 161-kiloVolt Transmission Line. The proposed solar facility would occupy portions of ten individual tracts of land in Logan County, approximately two miles southwest of Russellville, Kentucky, together totaling approximately 1,639 acres (Project Site). The Project Site is within a rural agricultural area. TVA considers the area of potential effects (APE) as the area of proposed ground-disturbance, where physical effects could occur including the silicon PV panels and associated infrastructure including several medium voltage transformers, one or two main power transformers, a substation and battery energy storage system, internal site access roads and all associated cabling and safety equipment. The APE also includes areas within a half-mile radius of the project within which the project would be visible, where visual effects on above-ground resources could occur. In order to obtain maximum flexibility in design to avoid both cultural and environmental resources the archaeological survey area consists of the entire 1,639 acres.

SRC contracted with New South Associates, Inc. to conduct a Phase I Cultural Resources survey. For your review, please find enclosed New South Associates' scope of work (SOW) for the Phase I Cultural Resources survey. Pursuant to 36 CFR § 800.4(b)(1), TVA finds that the SOW presented here represents a reasonable and good faith effort to carry out identification efforts.

By this letter, TVA is initiating consultation regarding the proposed undertaking. TVA is proposing to conduct Phase I Cultural Resources survey of the APE as described in the enclosed SOW.

Mr. Craig Potts
Page 2
April 16, 2021

Pursuant to 36 C.F.R. Part 800.3(f)(2), TVA is initiating consultation with federally recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for the National Register of Historic Places.

Please contact Michaelyn Harle by email, mharle@tva.gov, with your comments.

Sincerely,

A handwritten signature in black ink, appearing to read "Clinton E. Jones".

Clinton E. Jones
Manager
Cultural Compliance

MSH:ABM
Enclosures



ANDY BESHEAR
GOVERNOR

TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL
THE STATE HISTORIC PRESERVATION OFFICE

MICHAEL E. BERRY
SECRETARY

JACQUELINE COLEMAN
LT. GOVERNOR

410 HIGH STREET
FRANKFORT, KENTUCKY 40601
(502) 564-7005
www.heritage.ky.gov

CRAIG A. POTTS
EXECUTIVE DIRECTOR &
STATE HISTORIC
PRESERVATION OFFICER

May 14, 2021

Mr. Clinton Jones
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

**Re: TVA Power Purchase Agreement, Silicon Ranch, Russellville, Logan County, Kentucky
CID 79976**

Dear Mr. Jones:

Thank you for your email attached information concerning the above-mentioned project, received April 16, 2021. We understand that TVA proposes to enter into a power purchasing agreement with Silicon Ranch Corporation to purchase electricity from a proposed solar generating facility in Russellville, Logan County, Kentucky.

After review of the proposed scope of work, it appears to meet our specifications for conducting fieldwork in Kentucky. We understand from this scope that New South will adjust field methods as necessary to account for the field conditions encountered during survey, and that the proposed methods indicated on the aerial and topographic methods maps assume adequate surface visibility to conduct visual inspection for several of the parcels. We additionally note that New South will be assuming control of some previous survey work conducted by AECOM. This work resulted in the identification of archaeological resources, four of which are indicated as potentially eligible sites. We have not yet commented on AECOM's work, and so are limited in our ability to comment on the proposed treatment of sites identified by AECOM during New South's fieldwork. In general, any site identified only through surface reconnaissance should be subjected to systematic shovel testing to evaluate its subsurface integrity and potential to contain intact cultural features. If, however, some of the sites identified by AECOM were discovered and fully delineated through shovel testing and were recommended as not eligible for the NRHP, then additional work may not be necessary. If this kind of situation exists, please contact us for further consultation. We understand that New South plans to be able to produce a comprehensive report of their survey efforts as well as AECOM's results, as well as complete the registration of sites identified in both survey efforts with the Kentucky Office of State Archaeology.

Based on our review of the proposed APE and methodology for the Architectural (aboveground) survey, we are unclear whether the APE will be sufficient. Larger scale solar projects of this type are relatively new for us to review in Kentucky and, to date, our only APE recommendation has been to use viewshed modeling (with field verification, if necessary) as we have concerns about the visibility of solar installations based on topography (which is different in different parts of the state). Using viewshed modeling may also help limit the amount of survey necessary in some parts of the APE. It would be helpful for us to review a map showing both the direct project area as well as the proposed aboveground APE. Additionally, based on the map, it appears a cemetery may be located within the proposed APE for this project. If the cemetery has an aboveground expression (headstones, walls, etc.) we recommend that it is (at least) documented as an aboveground resource although cemeteries may be documented as both archaeological and aboveground resources.
(Continued on next page.)



An Equal Opportunity Employer

C. Jones
Tennessee Valley Authority
Silicon Ranch Russellville, Logan County, KY
May 14, 2021
Page 2 of 2

We look forward to continuing consultation with you.. Should you have any questions concerning archaeological resources, feel free to contact Chris Gunn of my staff at chris.gunn@ky.gov. Questions concerning above-ground resources can be directed to Jennifer Ryall at jennifer.ryall@ky.gov.

Sincerely,



Craig A. Potts,
Executive Director and
State Historic Preservation Officer

CP:cmg, jnr KHC# 61545, 61690



400 West Summit Hill Drive, Knoxville, Tennessee 37902

July 27, 2022

Mr. Craig Potts
State Historic Preservation Officer
and Executive Director
Kentucky Heritage Council
300 Washington Street
Frankfort, Kentucky 40601

Dear Mr. Potts:

RE: TENNESSEE VALLEY AUTHORITY (TVA), ARCHAEOLOGICAL SURVEY,
POWER PURCHASE AGREEMENT (PPA), RUSSELLVILLE, LOGAN COUNTY,
KENTUCKY (36.765588, -86.975550) (TVA TRACKING NUMBER – CID 79976) (KHC #
61545, 61690)

By this letter, TVA is replying to your May 12, 2022, emailed comments regarding New South Associates' (NSA) archaeological report. Please find attached the excel file outlining updates to the report in response to your comments. The updated report can be downloaded.

In addition, TVA would like to highlight three responses:

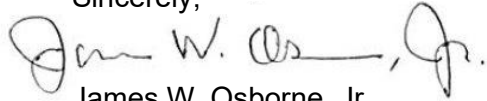
- In regards to the cemeteries, the buffer was expanded to 30 feet per your request. The updated site layout is attached showing the avoidance areas.
- NSA provided additional information regarding site 15LO288. With this additional information, TVA maintains that the site is not eligible for the National Register of Historic Places due to lack of integrity.
- Based on your concerns the entire boundary of site 15LO332 will be avoided. The avoidance of the site can be seen in the attached site layout.

With this additional information, TVA maintains that the proposed undertaking would have no adverse effect on archaeological properties. TVA will follow up in a separate letter regarding your comments to the architectural reports.

Mr. Craig Potts
Page 2
July 27, 2022

If you have any questions, please contact Michaelyn Harle by email, mharle@tva.gov.

Sincerely,

A handwritten signature in black ink that reads "James W. Osborne, Jr." with a stylized flourish at the end.

James W. Osborne, Jr.
Manager
Cultural Compliance

MSH:ERB
Enclosures



ANDY BESHEAR
GOVERNOR

TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL
THE STATE HISTORIC PRESERVATION OFFICE

MICHAEL E. BERRY
SECRETARY

JACQUELINE COLEMAN
LT. GOVERNOR

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CRAIG A. POTTS
EXECUTIVE DIRECTOR &
STATE HISTORIC
PRESERVATION OFFICER

August 26, 2022

Mr. James W. Osborne Jr.
Manager, Cultural Compliance
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902
Via email: jwosborn@tva.gov

Re: *Phase I Cultural Resource Survey, 1,585 Acres for the Russellville Solar Farm, Logan County, Kentucky* by Danny Gregory, Lori C. Thompson, Ashley Cavanaugh, Brian Cavanaugh, Sydney Schoof, Paul Hoffman, and Robbie D. Jones

Dear Mr. Osborne,

Thank you for your recent submission of the above referenced revised archaeological technical report pertaining to this undertaking. We understand that Silicon Ranch Corporation proposes to construct a solar farm in Logan County. We understand that the lead federal agency for the undertaking is the Tennessee Valley Authority. We understand that New South Associates, Inc. (NSA) conducted a Phase I archaeological survey of the 1,585-acre area of potential effects (APE). A total of 97 new archaeological sites and 66 isolated finds were identified as a result of this survey. We appreciate the revised report, which addresses many of the emailed comments provided by this office. Within those comments, provided to TVA on May 12, 2022, this office noted that “the above comments are not all inclusive, just the main points that should be addressed so that we can move forward with this review....”

Upon its review, we find that the report does not meet state documentation standards and guidelines. There are issues with the documentation of the APE, the methods, many of the sites, and field conditions which leave us unable to concur with the findings of the report. Please submit a revised archaeological report that addresses the following:

- In multiple maps showing the project area, such as Figures 1, 5, 6, etc., is the APE indicated on the map the APE for indirect effects? Please clarify the archaeological APE.



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Re: *Phase I Cultural Resource Survey, 1,585 Acres for the Russellville Solar Farm, Logan County, Kentucky* by Danny Gregory, Lori C. Thompson, Ashley Cavanaugh, Brian Cavanaugh, Sydney Schoof, Paul Hoffman, and Robbie D. Jones

- In many cases, it is unclear how site boundaries were determined. For example, sites 15Lo293 and 15Lo294 are 40 meters apart, but within Site 15Lo293, there are 40 meters separating the eastern surface finds from the western surface finds. At Site 15Lo295 there appears to be approximately 50 meters between the southern surface find and the central positive STP. Similar distances are seen within sites 15Lo333, 15Lo373, 15Lo375, 15Lo382, 15Lo388, and more. At Site 15Lo412 there are as many as 90 meters between identified artifacts, but all were grouped together as one site. Conversely, sites 15Lo400 and 15Lo401 appear to be approximately 20 meters apart, and both are documented as temporary campsites of undetermined precontact temporal affiliation, but they were considered separate. What separates sites 15Lo364 and 15Lo388? What separates sites 15Lo341, historic features from the twentieth century, and 15Lo381, a multicomponent eighteenth to twentieth century scatter located 40 meters away? Within the site description for 15Lo341, NSA states that “the historic material recovered at 15Lo381 could be associated with this well and the extant structure.” The extant structure is located to the southwest of Site 15Lo381, placing Site 15Lo381 between the structure and possibly associated features. As another specific example, it is unclear how the boundaries between Sites 15Lo397, 15Lo398, 15Lo399, 15Lo411, 15Lo288, and isolated finds RS 20 and RS 21 were determined. These sites are not temporally incompatible and were each identified in a cultivated field. Sites 15Lo398 and 15Lo399, in particular, are only 20 meters apart. What separates each of these sites? What does “the association of these sites is not clear due to cultivation in the area” mean for sites that are 20 or 40 meters apart? RS 20 is closer to the nearest positive shovel test within Site 15Lo397 than some of the artifacts identified within Site 15Lo397 are to each other. What makes one grouping a single site, but the other a separate site? Please note the list presented here is not exhaustive, and clarification is needed for several sites.
- At several sites, NSA completed general surface collection in selected 20-meter square areas. How were these areas selected?
- Throughout the report, please ensure that the site boundaries encompass all positive shovel tests and surface finds, or, in each case, clarify why they do not.
- On page 38, reference is made to the “four sites of unknown eligibility that do not extend into the current survey area” documented by AECOM. Which sites are these? Are areas that were surveyed as part of the old APE but fall outside of the current APE included in this report?
- In Figure 5, the five indicated archaeological sites are labeled as “potentially eligible,” but elsewhere in the report they are referred to as “unknown.” Please clarify the meaning of “unknown” and the difference between unknown and potentially eligible.
- In Figures 5 through 33, the breakdown between AECOM and NSA’s sites is confusing since NSA redefined and reevaluated all of the sites on the project. In the text, these figures are indicated to show the 97 archaeological sites and 66 isolated finds documented by NSA, so why are the sites separated by consultant in the figures? Are the boundaries in these figures the final boundaries as determined by NSA?
- Figure 34 shows the locations of various “HS” and “LO” points. However, neither the key nor the text of the report explain what these points are. Please clarify.

Re: *Phase I Cultural Resource Survey, 1,585 Acres for the Russellville Solar Farm, Logan County, Kentucky* by Danny Gregory, Lori C. Thompson, Ashley Cavanaugh, Brian Cavanaugh, Sydney Schoof, Paul Hoffman, and Robbie D. Jones

- Cavanaugh and Cavanaugh 2022 should be included in the section describing previously conducted cultural resource investigations near the project area.
- Please include a short discussion of the site types used throughout the report, and how they are determined. Since NSA is using site types not commonly used in Kentucky, this would aid understanding of all of the findings.
- Please include a photograph of the historic artifacts from Site 15Lo288 to aid in understanding of the site.
- In the description of Site 15Lo288, Site 15Lo411 is listed as a precontact site found near Site 15Lo288. However, in the description of Site 15Lo411 later in the report, it is classified as a multi-component site. Please clarify.
- In Figures 39 and 40, please illustrate the shovel test locations in Site 15Lo289.
- On page 119, NSA states that “Investigations at 15LO292 produced three flake fragments and one flake of an unidentified chert. The lithic assemblage consists of debitage composed of St. Genevieve chert.” Please clarify if the artifacts were St. Genevieve chert or unidentified chert.
- How many shovel tests were excavated at Site 15Lo293? The text states that judgmental shovel testing was conducted. Figure 45 depicts one shovel test.
- Within the description of Site 15Lo297, NSA states that Stratum II is intact, that artifacts were recovered from Stratum II, and that all cultural material was recovered from disturbed surface or plow-zone contexts. This is confusing. Please clarify.
- Was a mean artifact date determined for Site 15Lo297? How many of the historic artifacts were diagnostic? Can the two-century date range be pared down at all?
- The recommendation provided for Site 15Lo297 appears to be based entirely on conditions found outside of the project area. Therefore, more information is needed about the survey work done in that area. Were the soils similar in the project area and in the area to the north? Were the features found to the north identified in a shovel test, and if so, how deeply buried were they? If all materials from the portion of Site 15Lo297 within the APE were recovered from disturbed contexts and none of the shovel tests displayed integrity, what research potential would this portion of the site have?
- Within the text, NSA states that historic artifacts were recovered from 10 shovel tests at Site 15Lo297. Figure 51 only depicts 9 shovel tests with historic material.
- For Site 15Lo332, were any maps dating to before 1950 consulted? If a location for a structure could be determined through archival research, more intense testing could be conducted in that area. We would recommend that it is prudent to delay a recommendation that the historic portion of the site has no research potential.
- There is a duplicate paragraph on pages 153 and 156. Please delete one. There is a duplicate paragraph on pages 157 and 160. Please delete one.
- At several of the sites, historic artifacts were identified at a predominately prehistoric site, or vice versa. For many of these sites, the reasoning for inclusion or exclusion of these artifacts as a component of each site is unclear. For example, within the description of Site 15Lo410, NSA states that the 10 historic artifacts are not considered a historic component. At Site 15Lo299, a wire nail and a spark plug are considered a historic component. Please clarify the reason for this at each site.

Re: *Phase I Cultural Resource Survey, 1,585 Acres for the Russellville Solar Farm, Logan County, Kentucky* by Danny Gregory, Lori C. Thompson, Ashley Cavanaugh, Brian Cavanaugh, Sydney Schoof, Paul Hoffman, and Robbie D. Jones

- Please make a recommendation for Site 15Lo333. Within the report, NSA makes the case against the site's eligibility for listing under Criteria A, B, C, or D. They then state that the eligibility of the site cannot be determined. Although, according to the report, the current project as planned will not disturb any cultural deposits, there still must be recommendations for sites within the APE. Please note that it is acceptable to recommend a determination for only the portion of the site that falls within the APE.
- At multiple sites, such as 15Lo289, 15Lo290, 15Lo292, and more, only one shovel test was excavated. In the report, NSA say that stratigraphy is consistent across each of these sites. It's unclear how that could be ascertained from one shovel test per site.
- In the description of Site 15Lo343, describing plowing as "destruction" seems overstated. Was the area destroyed or disturbed?
- On page 221, one of the site numbers in this sentence needs to be changed: "Sites 15LO360 and 15LO360 are Precontact lithic scatters located 40 meters northwest and 80 meters west, respectively, of 15LO352."
- Please include a photograph of the tools from Site 15Lo357 to aid in understanding of the site.
- The shovel tests described in the text for Site 15Lo360 are not found in Figure 112.
- The shovel tests excavated by NSA described in the text for Site 15Lo363 are not in Figure 117.
- The shovel tests excavated by NSA described in the text for Site 15Lo367 are not in Figures 123 and 126.
- How was it determined that the plowzone of Site 15Lo372 was disturbed by logging?
- Where were the historic artifacts identified within Site 15Lo381? They are not indicated in the associated figures.
- Only seven of the nine shovel tests NSA excavated at Site 15Lo386 are depicted in Figure 160.
- Was the entirety of Site 15Lo388 a harvested corn field? In the 2020 aerial there appears to be a lawn area towards the eastern end of the site; was it harvested corn at the time of survey?
- Figures 169 and 171 are the same photograph.
- Was Site 15Lo395 identified in a farm road or a drainage? The aerial and photograph appear to depict one of these, but it is not mentioned in the text.
- It may be helpful to future researchers to include the sinkhole on Figure 198.
- Please clarify why Anderson Cemetery is considered a component of Site 15Lo411.
- Was a pedestrian survey conducted around Anderson Cemetery or were the borders determined only by the markers and the current treeline?
- In Figure 206, why are the boundaries for Site 15Lo414 and Cemetery 5 different?
- In the conclusion, NSA states that limestone outcrops were identified near Sites 15Lo332 and 15Lo410. These are not included in the relevant site descriptions earlier in the report. Where were they located relative to each site?
- Based on the site description in the report, Site 15Lo296 should be included in the second paragraph under "Archaic Sites Identified Near Sinkholes and Sinking Streams" on page 462.
- Are all the sites listed under "Archaic Sites Located on Upland Ridges" definitively Archaic? Most were described as "unidentified prehistoric" elsewhere in the report.

Re: *Phase I Cultural Resource Survey, 1,585 Acres for the Russellville Solar Farm, Logan County, Kentucky* by Danny Gregory, Lori C. Thompson, Ashley Cavanaugh, Brian Cavanaugh, Sydney Schoof, Paul Hoffman, and Robbie D. Jones

Finally, in the future, please consider removing the qualification of “better-preserved examples of this component type with larger, more diverse assemblages exist” as an argument against a given site’s eligibility. Taken to its logical conclusion, this would disqualify the vast majority of sites.

We will provide comments upon receipt of the revised technical report. A pdf version of the report should be submitted to our office via email at khc.section106@ky.gov. Please feel free to contact Nicole Konkol at nicole.konkol@ky.gov with any questions or concerns.

Sincerely,



Craig A. Potts,
Executive Director and
State Historic Preservation Officer

CP/peh

KHC # 65784

cc: Michaelyn S Harle, TVA, mharle@tva.gov
Emily Beliles, TVA, ebeliles@tva.gov
Amy Boardman McCampbell, TVA, aboardma@tva.gov



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September 22, 2022

Mr. Craig Potts
State Historic Preservation Officer
and Executive Director
Kentucky Heritage Council
300 Washington Street
Frankfort, Kentucky 40601

Dear Mr. Potts:

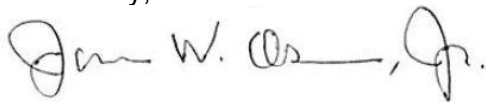
RE: TENNESSEE VALLEY AUTHORITY (TVA), ARCHAEOLOGICAL SURVEY, POWER PURCHASE AGREEMENT (PPA), RUSSELLVILLE, LOGAN COUNTY, KENTUCKY (36.765588, -86.975550) (TVA TRACKING NUMBER – CID 79976) (KHC # 61545, 61690)

By this letter, TVA is replying to your August 29, 2022, letter providing additional comments to New South Associates' (NSA) archaeological report. Please find attached the excel file outlining updates to the report in response to your comments. The updated report can be downloaded at [nsa-main - Synology NAS \(quickconnect.to\)](#)

With this additional information, TVA maintains that the proposed undertaking would have no adverse effect on archaeological properties. TVA will follow up in a separate letter regarding your comments to the architectural reports.

If you have any questions, please contact Michaelyn Harle by email, mharle@tva.gov.

Sincerely,



James W. Osborne, Jr.
Manager
Cultural Compliance

MSH:ERB
Enclosures

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400 West Summit Hill Drive, Knoxville, Tennessee 37902

October 4, 2022

Mr. Craig Potts
State Historic Preservation Officer
and Executive Director
Kentucky Heritage Council
300 Washington Street
Frankfort, Kentucky 40601

Dear Mr. Potts:

REPLY: TENNESSEE VALLEY AUTHORITY (TVA), POWER PURCHASE AGREEMENT (PPA), RUSSELLVILLE, LOGAN COUNTY, KENTUCKY-- ARCHITECTURAL SURVEY (36.765588, -86.975550) (TVA TRACKING NUMBER – CID 79976)

In our letter dated April 4, 2022, TVA consulted with your office regarding TVA's proposal to enter into a 20-year PPA with Silicon Ranch Russellville LLC (SR Russellville), a subsidiary of Silicon Ranch Corporation (SRC), to purchase the electric power generated by a proposed solar photovoltaic (PV) facility in Logan County, Kentucky. By this letter, TVA is replying to your May 5, 2022, email regarding New South Associates' (NSA) architectural report. Please find attached the excel file outlining updates to the report in response to your comments. The updated report can be downloaded.

In addition, TVA would like to highlight responses concerning the Watson House and the Brown House:

- LO-93/Watson House:
 - At the request of TVA, NSA conducted additional analysis of LO-93/the Watson House. Based on this additional information NSA recommends LO-93 eligible for listing on the National Register of Historic Places (NRHP) under Criterion A for significance under transportation.
 - The property is located approximately 0.43 miles south from the project area and is partially obscured by vegetation. In addition, per a local ordinance, the applicant is required to plant a vegetative buffer around the perimeter of the site where natural vegetation is inadequate to shield views from the project area. Thus, visual effects would be further diminished by the installation of the visual buffer of evergreen trees around the project. With both the existing and planned vegetation buffer, TVA finds that although the property is eligible, the proposed undertaking would not have an adverse effect.
- LO-245/Brown House:
 - In response to your comments, NSA also conducted additional analysis regarding the Brown House. Based on additional analysis, NSA recommends the Brown House (LO 245) eligible for listing in the NRHP for historic architectural significance under Criterion C with a period of significance of 1815

to 1938. NSA recommends the Brown House's associated outbuildings and the Alexander and Anderson Cemetery not contributing to the Brown House's eligibility.

- As currently designed, solar panels would be present to the north, west, east, and south of the house outside a 250-foot buffer surrounding the property (see attached current proposed design titled *Russellville 60_ Civil Site Plan*). The solar panels would be 8 feet in height when they are fully upright in early morning and late afternoon and five feet high at midday when they are lying flat, or horizontal (Figure 1). A landscape buffer of staggered row of 8-foot-tall evergreens would surround the yard further obscuring the view from the panels. The current landowner, Karl Dawson, will retain the land and he has agreed to maintain the house in its current status as a rental residential property that would be occupied. Thus, the proposed undertaking would not affect the location, design, materials, and workmanship conveyance of the property's significance under Criterion C.
- As NSA points out in their report, the surrounding rural setting of the Brown House would be affected by the solar facility. However, as stated in the report, the house was historically associated with outbuildings that have been demolished over time diminishing its integrity of setting. To further aid in the assessment of visual effects, TVA had HDR, Inc, SRC's environmental consultant, produce visual renderings of line-of-sight views from the house with the proposed solar array and visual vegetation buffer (Figures 2-5). With the vegetation buffer, the renderings demonstrate that the proposed solar arrays would only be minimally visible from the Brown House. The arrays would be more visually intrusive in the morning and late afternoon, when the panels would be facing east or west, respectively, at their maximum tilt, with the upper edge of the panels about 8 feet from the ground (depicted in the renderings). This effect would be least visible at mid-day when the panel profile would be flat and about 5 feet tall. The anti-reflective PV panel surfaces would minimize glare and reflection. Lighting associated with the undertaking would be downward-facing and/or low glare to minimize effects. Regarding atmospheric effects, the only auditory changes expected would be temporary and associated with the construction of the facility. The majority of the construction activities would not mark a significant difference in the noise levels. The activity most likely to have a change in noise levels (approximately 90 to 95 decibels) would be pile driving during construction of the solar arrays. While noise related to pile driving may be perceptible, the noise would not be at sustained levels, would be temporary, and would not alter characteristics that qualify the Brown House for the NRHP. As the proposed undertaking was designed to avoid physical alterations and minimize viewshed effects to the property, TVA finds that while there would be a minimal visual effect to the property the effect would not be adverse.
- Alexander and Anderson Cemetery
 - NSA recommends the Alexander and Anderson Cemetery as not eligible under Criteria A, B, and C, nor does NSA recommend the cemetery a contributing resource to the Brown House, which is eligible under Criterion C. The cemetery

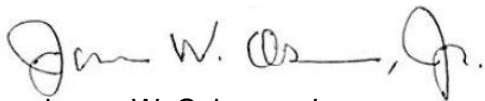
Mr. Craig Potts
Page 3
October 4, 2022

- was also evaluated under Criterion D as part of the archaeological survey and NSA recommends it ineligible under this criterion as well. Although the cemetery is recommended ineligible, it would be avoided by a 250-foot buffer during construction, maintenance, and operation of the site to avoid any physical effects and to remain consistent with Kentucky Burial Protection Laws (KRS 525.105, 110, 115, 120; KRS 72.020; 901 KAR 5:090). The cemetery would remain accessible to the public via a 5-foot pedestrian walkway for ingress/egress from the public road.

Pursuant to 36 CFR Part 800.5(c) we are notifying you of TVA's finding of no adverse effect; providing the documentation specified in § 800.11(e); and inviting you to review the finding. Also, we are seeking your agreement with TVA's eligibility determinations and finding that the undertaking as currently planned would have no adverse effects on historic properties.

Please contact Michaelyn Harle or Hallie Hearnese by email, mharle@tva.gov and hahearnese@tva.gov with your comments.

Sincerely,



James W. Osborne, Jr.
Manager
Cultural Compliance

MSH:ERB
Enclosures



Figure 1: Example of a single-axis, tracking photovoltaic system with panels near maximum tilt as viewed from the east or west.



LOGAN COUNTY SOLAR
KOP-10a Unbuffered view looking Northeast from Southwest of Brown House

Date issued: September 28, 2022
Horiz. Field of View: 29mm / 63.6°



Figure 2: Unbuffered view depicting the proposed solar array looking northeast of Brown House (panels at maximum height).



LOGAN COUNTY SOLAR
KOP-10a Buffered view looking Northeast from Southwest of Brown House

Date issued: September 28, 2022
Horiz. Field of View: 29mm / 63.6°



Figure 3: View depicting the proposed solar array looking northeast of Brown House with proposed vegetation buffer (panels at maximum height).



LOGAN COUNTY SOLAR
KOP-10b Unbuffered view looking North from North side of Brown House

Date issued: September 28, 2022
Horiz. Field of View: 29mm / 63.6°



Figure 4: Unbuffered view looking north from the north side of the Brown house depicting the proposed solar arrays (panels at maximum height).



LOGAN COUNTY SOLAR
KOP-10b Buffered view looking North from North side of Brown House

Date issued: September 28, 2022
Horiz. Field of View: 29mm / 63.6°



Figure 5: View depicting the proposed solar array looking north from north site of the Brown House with proposed vegetation buffer (panels at maximum height).



ANDY BESHEAR
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THE STATE HISTORIC PRESERVATION OFFICE

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CRAIG A. POTTS
EXECUTIVE DIRECTOR &
STATE HISTORIC
PRESERVATION OFFICER

10/31/2022

Hallie Hearnes
Architectural Historian
Tennessee Valley Authority
400 W. Summit Hill Drive
Knoxville, TN 37902

RE: TVA, CID 79976, Revised Cultural Historic for the Proposed SRC Russellville Solar Facilities and Power Purchase Agreement, Russellville, Logan County, Kentucky

Dear Ms. Hearnes:

Thank you for your submittal of a revised Cultural Historic and DOE for the above-referenced undertaking. We understand that Russellville Solar is proposing to install a solar project near Russellville in Logan County, Kentucky. This facility would connect to TVA's existing Springfield-Logan Aluminum 161-kV Transmission Line, and TVA will purchase electric power generated at the facility. To facilitate this connection, a new substation would be built on site. 1,569 acres of land will be leased as part of this project, with the facility occupying roughly 1,110 acres of it. The associated solar panels would have a maximum height of eight feet, and associated infrastructure would include cabling, safety equipment, transformers, internal roads, and other generating components. A planted landscape buffer of evergreen trees will line the perimeter of the site.

The above-ground APE for this undertaking was defined as a half mile radius around the project lease area. KHC site check data identified three previously recorded historic resources within the project APE, and site reconnaissance identified a total of 28 resources. Our office concurs with the following eligibility recommendations:

- LO-304-306, 323-326, and LO-315, all farmsteads, are Ineligible for the NRHP.
- LO-307-311, LO-313, LO-314, and LO-319-322, all residential structures, are Ineligible for the NRHP.
- LO-316, a single track of the Memphis Line of the R.J Corman Railroad, LO-317, Ed's Barbeque, and LO-318, a portion of US-79, are Ineligible for the NRHP.

RE: TVA, CID 79976, Revised Cultural Historic for the Proposed SRC Russellville Solar Facilities and Power Purchase Agreement, Russellville, Logan County, Kentucky

- LO-312, the Cave Spring Cemetery, LO-385, the Miller Cemetery and Ogden Gravesite, and LO-386, the Whitaker Cemetery, are Ineligible for the NRHP.
- LO-95, the c. 1848 Harmony Hall Farm, was previously recommended Eligible for the NRHP, but due to the age of the original survey, no clear area of significance was provided. The current report recommends the Harmony Hall Farm as Eligible for the NRHP under Criteria A, B, and C. Our office concurs with these recommendations, the proposed NRHP boundary, period of significance, and contributing/non-contributing auxiliary resources.
- LO 245, the Brown Farm and Cemetery, is a c. 1800-1825 log dwelling, outbuildings, and cemetery. This resource was previously recorded in KY SHPO database as a Kentucky Landmark, but no formal significance recommendation was made at that time. The current survey recommends the Brown Farm as Eligible for the NRHP under Criterion C, and our office concurs with this recommendation. Our office also concurs with the proposed NRHP boundary, period of significance, and contributing/non-contributing auxiliary resources.
- LO-96, the Watson House, is a c. 1820s antebellum farm and inn associated with the first major road network in this part of the State, US-79. This resource was previously surveyed for the NRHP, but no formal determination was made. The current report has evaluated the resource under all criteria and recommends the site as Eligible for the NRHP under Criterion A for its association with transportation history. Our office concurs with this recommendation, as well as the proposed period of significance, NRHP boundary, and contributing/non-contributing auxiliary structures.

We understand that revisions have been requested to the archaeological report. Once the eligibility of archaeological resources has been reviewed by our office, we will be able to fully comment on the eligibility and effects on above and below-ground resources associated with this undertaking. Potential effects to above-ground NRHP-Eligible resources LO-95, LO-96, and LO-245 will be discussed at that time. Our office also requests the previously requested above-ground survey forms for the resources identified within the Cultural Historic be provided with that documentation.

Thank you for making the requested revisions. Should you have any questions, please contact Gabrielle Fernandez of my staff at Gabrielle.Fernandez@ky.gov.

Sincerely,



Craig Potts
Executive Director and
State Historic Preservation Officer

CP: gf, KHC# 220014



ANDY BESHEAR
GOVERNOR

TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL
THE STATE HISTORIC PRESERVATION OFFICE

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CRAIG A. POTTS
EXECUTIVE DIRECTOR &
STATE HISTORIC
PRESERVATION OFFICER

December 20, 2022

Michaelyn Harle
Supervisor, Cultural Projects
Cultural Compliance
Tennessee Valley Authority
400 W. Summit Hill Drive
Knoxville, TN 37902
Via email: mharle@tva.gov

RE: TVA, CID 79976, Proposed SRC Russellville Solar Facilities and Power Purchase Agreement, Russellville, Logan County, Kentucky

Phase I Cultural Resource Survey, 1,585 Acres for the Russellville Solar Farm, Logan County, Kentucky by Danny Gregory, Lori C. Thompson, Ashley Cavanaugh, Brian Cavanaugh, Sydney Schoof, Paul Hoffman, and Robbie D. Jones
November 21, 2022

Dear Ms. Harle,

Thank you for your submittal of a revised Phase I and DOE for the above-referenced undertaking. We understand that Russellville Solar, LLC is proposing to install a solar facility near Russellville in Logan County, Kentucky. This facility would connect to TVA's existing Springfield-Logan Aluminum 161-kV Transmission Line, and TVA will purchase electric power generated at the facility for a term of 20 years. To facilitate this connection, a new substation would be built on site. 1,569 acres of land will be leased as part of this project, with the facility occupying roughly 1,110 acres of it. The associated solar panels would have a max height of eight feet, and associated infrastructure would include cabling, safety equipment, transformers, internal roads, and other generating components. A planted landscape buffer of evergreen trees would line the perimeter of the site.

We understand that New South Associates, Inc. (NSA) conducted a Phase I archaeological survey over 1,585 acres of land, and that methods included pedestrian survey and shovel test excavation. A

RE: TVA, CID 79976, Proposed SRC Russellville Solar Facilities and Power Purchase Agreement, Russellville, Logan County, Kentucky

total of 97 archaeological sites and 68 isolated finds were documented during this investigation. We accept the archaeology report without revision.

Of the archaeological sites documented, NSA recommended that 89 of them are not eligible for the National Register of Historic Places (NRHP). We concur that Sites 15Lo288-296, 15Lo298, 15Lo299, 15Lo333-356, 15Lo359-15Lo366, 15Lo368-15Lo404, 15Lo406-15Lo409, 15Lo411, and 15Lo413-15Lo416 are not eligible for listing on the NRHP.

Three of the sites (15Lo411 [Anderson Cemetery], 15Lo413 [Ogden Cemetery], and 15Lo414 [Miller Cemetery]) recommended as not eligible for the NRHP are recommended for avoidance due to the high potential of human remains. We understand that the project plans will incorporate a 250-foot (76 meter) buffer around each of these sites, and that the sites and buffers will be avoided during all construction, maintenance, and operation of the site.

Eight sites (15Lo297, 15Lo332, 15Lo357, 15Lo358, 15Lo367, 15Lo405, 15Lo410, and 15Lo412) are recommended as having an unknown NRHP eligibility. NSA recommended that these sites should be avoided by any ground-disturbing activities or, if avoidance is not possible, that additional investigations be conducted prior to project activities. We concur with these recommendations. We understand that these eight sites, as well as a 20-meter buffer around each, will be excluded from all ground-disturbing activities. We understand that Russellville Solar, LLC and TVA have drafted a letter agreement that specifies that no disturbance of these eight sites or any area within their buffers will occur during the entire 20-year term of their agreement.

Our office previously reviewed the above-ground Cultural Historic in October of 2022 and concurred with all above-ground eligibility recommendations. Having now received the below-ground report, our office is able to comment on the effects of this undertaking.

Three NRHP-Eligible resources were identified as part of the above-ground report: LO-95, LO-96, and LO-256. LO-95, the Harmony Hall Farm, is located roughly 0.40 miles from the proposed undertaking and is not expected to have a line of sight. LO-96, the Watson House, is located 0.43 miles from the proposed project area and though it will have a slight line of sight to the undertaking, the visual intrusion will be minimal, and the resource will retain its transportation significance.

LO-234, the Brown House, is an early 19th century log resource that is Eligible for the NRHP under Criterion C and will be located within the project area. As designed, the solar panels would be present around all cardinal directions of the house, outside of a 250-foot buffer surrounding the property. The Anderson Cemetery, located within the site boundaries, is recommended Non-Contributing to the site, and will be avoided during construction, protected from ground disturbance by the above-mentioned 250-foot buffer.

Separating the property from the eight-foot-tall solar panels would be a staggered row of eight-foot-tall evergreens surrounding the yard. The current landowner will retain the property and continue to

RE: TVA, CID 79976, Proposed SRC Russellville Solar Facilities and Power Purchase Agreement, Russellville, Logan County, Kentucky

maintain the residence in its current form. As discussed, the surrounding rural setting of the Brown House would be affected by the solar facility; however, the historic outbuildings have been demolished over time which was diminished its integrity of setting. Plans indicate that the panels would be more visual intrusive in the morning and late afternoon when the panels are at their maximum height. However, anti-reflective panel surfaces would minimize glare and reflection, and lighting associated with the undertaking would be downward facing and/or low glare.

As such, while there will be visual effects introduced as part of this undertaking, our office does not believe the project will introduce any effects that would adversely impact the characteristics that qualify these resources for inclusion on the NRHP. Therefore, our office concurs with the finding of **No Adverse Effect**, assuming that Sites 15Lo297, 15Lo332, 15Lo357, 15Lo358, 15Lo367, 15Lo405, 15Lo410, 15Lo411, 15Lo412, 15Lo413, and 15Lo414, along with their appropriate buffers described above, are avoided by all ground-disturbing activities. This concurrence is also conditional upon review and acceptance of the revised above-ground survey forms previously requested by our office within two months of the date of this letter.

We look forward to receipt of the above-ground survey forms. In the unlikely event that human remains are found during construction for this project, work should cease immediately, and the county coroner and the Kentucky Heritage Council should be contacted. Should you have any questions, please contact Gabrielle Fernandez or Patti Hutchins of my staff at Gabrielle.Fernandez@ky.gov or Patricia.Hutchins@ky.gov.

Sincerely,



Craig Potts
Executive Director and
State Historic Preservation Officer

KHC# 200471, prev. 65069, 65144, 65784, 66165, 220014, 220464

CP: gf, peh

cc: James W. Osborne, TVA, jwosborn@tva.gov
Emily Beliles, TVA, ebeliles@tva.gov
Amy Boardman McCampbell, TVA, aboardma@tva.gov
Philip Mink, OSA, pbmink2@uky.edu

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ANDY BESHEAR
GOVERNOR

TOURISM, ARTS AND HERITAGE CABINET
KENTUCKY HERITAGE COUNCIL
THE STATE HISTORIC PRESERVATION OFFICE

MICHAEL E. BERRY
SECRETARY

JACQUELINE COLEMAN
LT. GOVERNOR

410 HIGH STREET
FRANKFORT, KENTUCKY 40601
(502) 564-7005
www.heritage.ky.gov

CRAIG A. POTTS
EXECUTIVE DIRECTOR &
STATE HISTORIC
PRESERVATION OFFICER

01/03/2023

Hallie Hearnese
Architectural Historian
Tennessee Valley Authority
400 W. Summit Hill Drive
Knoxville, TN 37902

RE: TVA, CID 79976, Revised Survey Forms for the Proposed SRC Russellville Solar Facilities and Power Purchase Agreement, Russellville, Logan County, Kentucky

Dear Ms. Hearnese:

Thank you for your submittal of 28 revised survey forms for the above-referenced undertaking. Receipt of these forms fulfills our office's previous request in earlier correspondence.

Thank you for making the requested revisions. Should you have any questions, please contact Gabrielle Fernandez of my staff at Gabrielle.Fernandez@ky.gov.

Sincerely,

Craig Potts
Executive Director and
State Historic Preservation Officer

CP: gf, KHC# 220628 prev. 220014

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400 West Summit Hill Drive, Knoxville, Tennessee 37902

April 19, 2021

Mr. Paul Barton
Tribal Historic Preservation Officer
Eastern Shawnee Tribe of Oklahoma

[REDACTED]

Ms. Tonya Tipton
Tribal Historic Preservation Officer
Shawnee Tribe

[REDACTED]

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

[REDACTED]

Ms. Elizabeth Toombs
Tribal Historic Preservation Officer
Cherokee Nation

[REDACTED]

Dr. Andrea Hunter
Director and Tribal Historic Preservation
Officer
Osage Nation Historic Preservation Office

[REDACTED]

Ms. Whitney Warrior
Director of Historic Preservation
United Keetoowah Band of Cherokee
Indians in Oklahoma

[REDACTED]

Mr. Logan Pappenfort
Director of Cultural Preservation
Peoria Tribe of Indians of Oklahoma

[REDACTED]

Mr. Stephen Yerka
Historic Preservation Specialist
Tribal Historic Preservation Office
Eastern Band of Cherokee Indians

[REDACTED]

Dear Sir or Madam:

TENNESSEE VALLEY AUTHORITY (TVA), INITIATION OF CONSULTATION, POWER PURCHASE AGREEMENT (PPA), RUSSELLVILLE, LOGAN COUNTY, KENTUCKY (36.765588, -86.975550) (TVA TRACKING NUMBER – CID 79976)

TVA proposes to enter into a 20-year PPA with Silicon Ranch (SR) Russellville LLC (SR Russellville), a subsidiary of Silicon Ranch Corporation (SRC) to purchase the electric power generated by a proposed solar photovoltaic (PV) facility in Logan County, Kentucky. The proposed solar facility would be owned by SRC and operated by SR Russellville and would have an installed capacity of 173 megawatts (MWs). The solar facility would connect to TVA's adjacent existing Springfield-Logan Aluminum 161-kiloVolt Transmission Line. The proposed solar facility would occupy portions of ten individual tracts of land in Logan County, approximately two miles southwest of Russellville, Kentucky, together totaling approximately 1,639 acres (Project Site). The Project Site is within a rural agricultural area. TVA considers

Sir/Madam
Page 2
April 19, 2021

the area of potential effects (APE) as the area of proposed ground-disturbance, where physical effects could occur including the silicon PV panels and associated infrastructure including several medium voltage transformers, one or two main power transformers, a substation and battery energy storage system, internal site access roads and all associated cabling and safety equipment. The APE also includes areas within a half-mile radius of the project within which the project would be visible, where visual effects on above-ground resources could occur. In order to obtain maximum flexibility in design to avoid both cultural and environmental resources the archaeological survey area consists of the entire 1,639 acres.

SRC contracted with New South Associates, Inc. to conduct a Phase I Cultural Resources survey. For your review, please find enclosed New South Associates' scope of work (SOW) for the Phase I Cultural Resources survey. Pursuant to 36 CFR § 800.4(b)(1), TVA finds that the SOW presented here represents a reasonable and good faith effort to carry out identification efforts.

By this letter, TVA is initiating consultation regarding the proposed undertaking. TVA is proposing to conduct Phase I Cultural Resources survey of the APE as described in the enclosed SOW.

TVA is consulting with Absentee Shawnee Tribe of Indians of Oklahoma, Cherokee Nation, Eastern Band of Cherokee Indians, Eastern Shawnee Tribe of Oklahoma, Osage Nation, Peoria Tribe of Oklahoma, Shawnee Tribe, and United Keetoowah Band of Cherokee Indians in Oklahoma.

Please respond by May 19, 2021 if possible regarding any comments on the proposed undertaking or the proposed Phase I survey. If you have any questions, please contact me by phone, (865) 253-1265 or by e-mail, mmshuler@tva.gov.

Sincerely,



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

Sir/Madam
Page 3
April 19, 2021

MSH:ABM

Enclosures

cc (Enclosures):

Ms. Sheila Bird
Cultural Preservation Consultant
Shawnee Tribe

[REDACTED]

Ms. Erica Gorsuch
Assistant THPO/Section 106 Coordinator
United Keetoowah Band of Cherokee Indians in Oklahoma

[REDACTED]

Ms. Courtney Neff
Section 106 Assistant
Osage Nation Historic Preservation Office

[REDACTED]

Mr. Russell Townsend
Tribal Historic Preservation Officer
Eastern Band of Cherokee Indians

[REDACTED]

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G W Y J D B F
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Office of the Chief

Chuck Hoskin Jr.
Principal Chief

Bryan Warner
Deputy Principal Chief

May 19, 2021

Marianne Shuler
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, TN 37902

Re: CID 79976, Proposed Power Purchase Agreement with Silicon Ranch Russellville

Ms. Marianne Shuler:

The Cherokee Nation (Nation) is in receipt of your correspondence about **CID 79976**, and appreciates the opportunity to provide comment upon this project. Please allow this letter to serve as the Nation's interest in acting as a consulting party to this proposed project.

The Nation maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project, cross referenced the project's legal description against our information, and found instances where this project intersects or adjoins such resources.

Thus, the Nation recommends that a cultural resources survey is conducted for this project, and requests a copy of the related report. The Nation requires that cultural resources survey personnel and reports meet the Secretary of Interior's standards and guidelines.

However, the Nation requests that the Tennessee Valley Authority (TVA) halt all project activities immediately and re-contact our Offices for further consultation if items of cultural significance are discovered during the course of this survey.

Additionally, the Nation requests that TVA conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the Nation's databases or records.

CID 79976
May 19, 2021
Page 2 of 2

If you require additional information or have any questions, please contact me at your convenience.
Thank you for your time and attention to this matter.

Wado,



Elizabeth Toombs, Tribal Historic Preservation Officer
Cherokee Nation Tribal Historic Preservation Office

[REDACTED]
[REDACTED]

HISTORIC ARCHITECTURE
SURVEY AND ASSESSMENT
OF EFFECTS REPORT FOR
THE PROPOSED LOGAN
COUNTY SOLAR PROJECT

LOGAN COUNTY, KENTUCKY



HISTORIC ARCHITECTURE SURVEY AND ASSESSMENT OF EFFECTS FOR THE PROPOSED LOGAN COUNTY SOLAR PROJECT

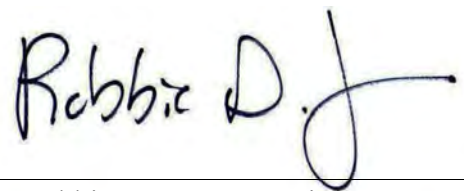
Logan County, Kentucky

Report submitted to:

HDR • 440 South Church Street • Suite 1000 • Charlotte, North Carolina 28202-2075

Report prepared by:

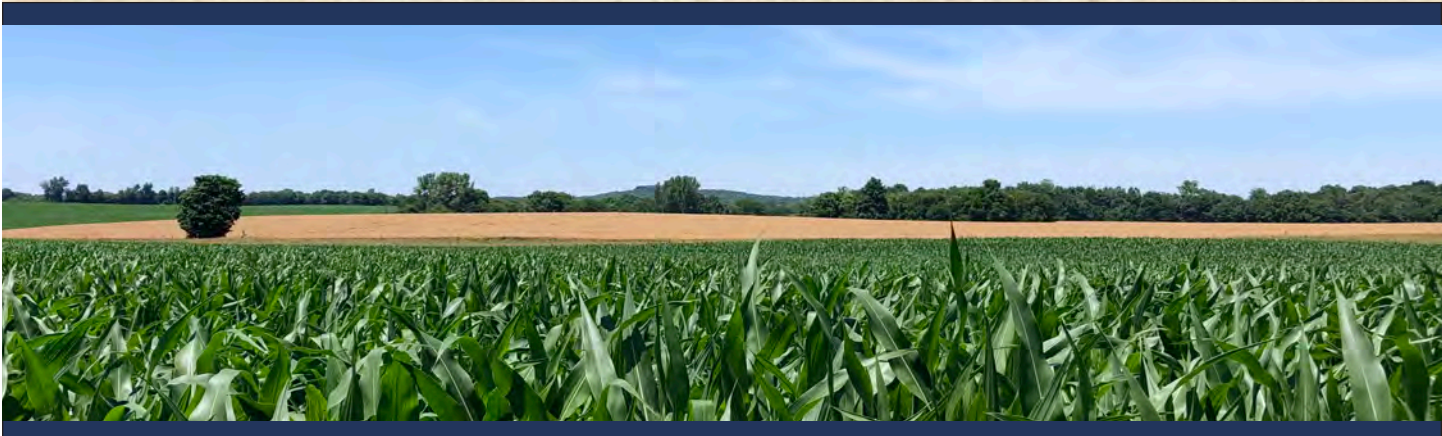
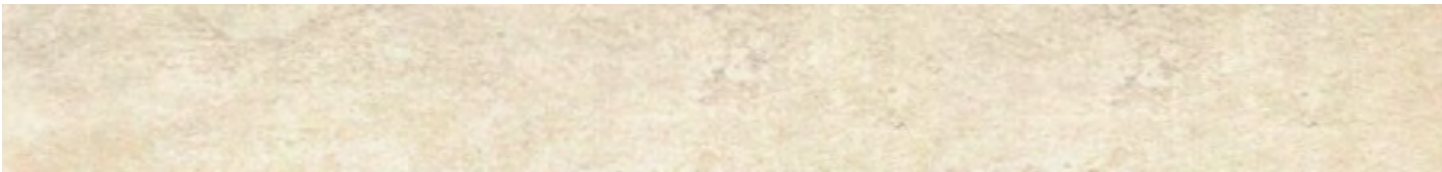
New South Associates, Inc. • 1629 Fatherland Street • Nashville, Tennessee 37206



Robbie D. Jones – Project Manager

Sydney Schoof – Architectural Historian and Co-Author
Paul Hoffman – Architectural Historian and Co-Author
Robbie D. Jones – Senior Architectural Historian and Co-Author
Jackie H. Tyson – Senior Architectural Historian and Co-Author

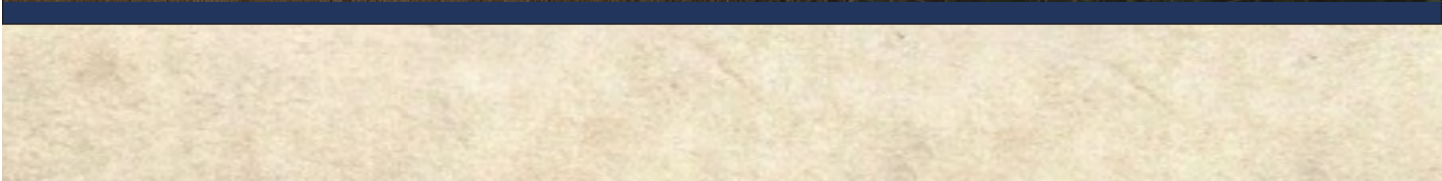
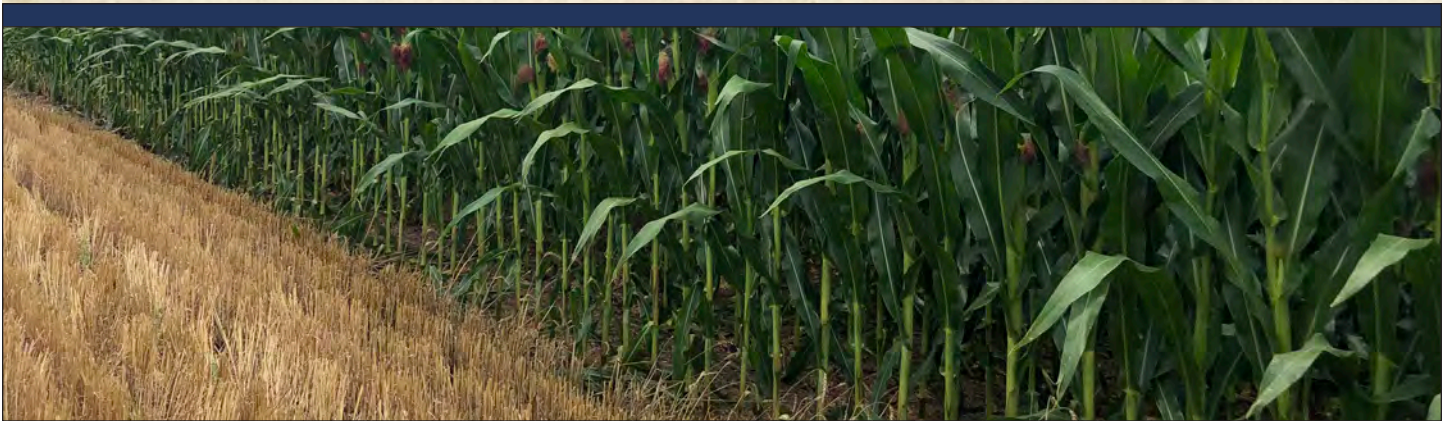
September 30, 2022 • **Final Report**
New South Associates Technical Report 4214



PHASE I CULTURAL RESOURCE SURVEY
1,585 ACRES FOR THE RUSSELLVILLE SOLAR FARM

LOGAN COUNTY, KENTUCKY

NEW SOUTH ASSOCIATES, INC.



Phase I Cultural Resource Survey (1,585 Acres) for the Russellville Solar Farm

Logan County, Kentucky

Subconsultant Agreement 10297497

Report submitted to:

HDR Engineering • 750 Old Hickory Boulevard, Building 1, Suite 200 • Nashville, Tennessee 37027

Report prepared by:

New South Associates, Inc. • 6150 East Ponce de Leon Avenue • Stone Mountain, Georgia 30083



Danny Gregory, MA, RPA – Principal Investigator

Lori C. Thompson, MA, RPA – Archaeologist and Author

Ashley Cavanaugh – Archaeologist and Co-Author

Brian Cavanaugh – Archaeologist and Co-Author

Sydney Schoof – Architectural Historian and Co-Author

Paul Hoffman – Architectural Historian and Co-Author

Robbie D. Jones – Senior Architectural Historian and Co-Author

November 21, 2022 • **Final Report**
New South Associates Technical Report 4248

Appendix E – Public Notice and Draft EA Public Comments

INVITATION FOR PUBLIC COMMENT

Logan County Solar Project

The Tennessee Valley Authority (TVA) is asking the public to provide input on a draft Environmental Assessment (EA) for the Logan County Solar Project in Logan County, Kentucky. Details of the review are available in a draft Environmental Assessment at www.tva.com/nepa.

TVA has entered into a power purchase agreement (PPA) with Russellville Solar LLC, a wholly owned subsidiary of Silicon Ranch Corporation, to purchase the power generated by the proposed Logan County Solar Project in Logan County, Kentucky. The project is anticipated to generate up to 173 megawatts (MW) alternating current (AC) in capacity. The proposed solar facility would be constructed and operated by Russellville Solar LLC.

The draft EA includes two alternatives: a No Action Alternative and an Action Alternative. Under the No Action Alternative, TVA would not purchase the power generated by the project under the 20-year PPA with Russellville Solar LLC, and TVA would not be involved with the project. Under the Proposed Action Alternative, Russellville Solar LLC would construct and operate a 173-MW AC single-axis tracking photovoltaic (PV) solar power facility with a 30-MW Battery Energy Storage System (BESS). The proposed project would be developed on 1,088 acres of a 1,569-acre project site located approximately 2 miles southwest of the city of Russellville in Logan County, Kentucky. TVA's connection to the new solar facility would occur at the existing Springfield-Logan Aluminum 161-kV TL via a proposed substation and switching station in the northeastern portion of the solar facility site. The entire 173-MW output from the solar facility would be sold to TVA under the terms of the PPA.

The complete draft Environmental Assessment is available at www.tva.com/nepa.

Submitting Comments

TVA invites you to comment on the draft EA. Comments must be received or postmarked no later than **May 3, 2022**. Electronic comment submittals are preferred. Any comments received, including names and addresses, will become part of the administrative record and will be available for public inspection.

Written comments should be sent to:

Tennessee Valley Authority
ATTN: Elizabeth Smith, NEPA Specialist
400 W. Summit Hill Drive, WT-11D, Knoxville, TN 37902

Email comments here: nepa@tva.gov

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Comment No.	EA Section No.	Topic	Public / Agency Comment	TVA Response	Commenter(s)
1	2.5	Air Quality	Suggestions to comply with NAAQs: Utilize alternatively fueled equipment. Utilize other emission controls that are applicable to your equipment. Reduce idling time on equipment.	Mitigation measures to minimize air quality impacts are listed in Section 2.5 of this EA and the use of alternatively fueled equipment is not proposed at this time. Overall, the construction and operations of the project would have minor to negligible effects to regional air quality, as discussed in Section 3.7 of this EA.	KY Dept of Env Protection
2	2.3	Alternatives	Why was this site selected?	The site selection criteria are described in Section 2.3 of this EA. The selected site meets these criteria as well as providing adequate contiguous acreage and having willing landowners.	Brooke Barnes Caleb Speck Kari & Janet Hall Duncan Gillum Allie Robertson Evelt Young Vick Family Trust Stephanie Oliver
3	1.1	Alternatives	Why not use other sources of energy?	As described in Section 1.1 of this EA, TVA is committed to increasing its use of clean, non-carbon emitting generation, while maintaining a reliable, low-cost, power system. To achieve this, and in response to customer demand, TVA has established goals for additional renewable generating capacity, including solar energy. The Proposed action would help TVA achieve these goals in a cost-effective manner.	Harry Eich Kari & Janet Hall Bridget Coots
4	3.4.2.2.2	Biological Resources	How will forests be protected?	Tree removal has been minimized to the extent possible in plan designs. Approximately 188 acres (11 percent) of the Project site is forested. While the project has been designed to minimize tree removal, 93 acres of forest would be cleared. The remaining 95 acres of forest on the site would be protected. The 93 acres of forest to be cleared represents a very small proportion (0.2 percent) of the forested area of Logan County.	Vick Family Trust
5	N/A	Construction	No comments	N/A	Department of Housing Buildings and Construction
6	3.7.2.2.3	Climate Change	How will this project affect climate change?	See Section 3.7 of this EA for a detailed description of the anticipated greenhouse gas emissions from the project and its effect on climate change. Overall, the Project would have a small beneficial effect on climate change, primarily by increasing TVA's use of non-carbon emitting electricity generation and reducing the need for new a small reduction in fossil-fueled generation.	Brooke Barnes
7	3.8	Cultural Resources	To receive a review from the KY Heritage Council/State Historical Preservation Office (SHPO) you must follow the instructions located on their website at http://www.heritage.ky.gov/siteprotect/ . There you will find the required documents for the Section 106 Review and Compliance for 36 CFR Part 800. This Section 106 submission process to SHPO will assist applicants and agencies in providing the appropriate level of information to receive comments from SHPO.	TVA has consulted with KHC throughout the environmental review and obtained concurrence, as shown in the Final EA.	KY Heritage Council/State Historical Preservation Office (SHPO)
8	3.8.2.2, 3.8.2.3	Cultural Resources	Will surrounding cemeteries or access to cemeteries be affected?	No. The nearby Anderson Cemetery, Ogden Gravesite, and Miller Cemetery would not be directly affected and will remain accessible to the public.	Larry Vick Vick Family Trust

Comment No.	EA Section No.	Topic	Public / Agency Comment	TVA Response	Commenter(s)
9	3.8	Cultural Resources	Will important archeological sites or artifacts be impacted? How will they be protected?	See Section 3.8 of this EAEA. The Project has been designed to avoid impacts to important archaeological and historic sites determined to be important by being listed on the National Register of Historic Places (NRHP), eligible for listing on the NRHP, or of undetermined eligibility. In addition, tree buffers will be maintained near the Harmony Hall Farm and the Brown Farm to shield them from views of the solar facilities. TVA has consulted with the Kentucky Historical Commission and Indian tribes and the Historical Commission has concurred with TVA's determination that the Project will not adversely affect historic properties.	Vick Family Trust
10	2.2.5	Decommissioning	What is the process for decommissioning?	This is described in Section 2.2.5 of this EAEA. In brief, once the decision is made to cease operating the solar facility, Russellville Solar would remove the above-ground facility components as well as below-ground components to a depth of at least three feet. Removed materials would be recycled to the extent possible and remaining materials disposed of at approved facilities in accordance with local, state, and federal laws and regulations. The former solar farm site would be suitable for other uses, including row-crop farming.	Caleb Speck
11	2.2.5	Decommissioning	How will the site be restored to be used for farmland after decommissioning?	Following decommissioning and if requested by the landowner, holes would be filled with local soil types, and roads and large excavated rocks would be removed. Overall, the Project site would be returned to a tillable state.	Caleb Speck Susan Walker Bridget Coots
12	2.2.5	Decommissioning	What happens if the solar panels wear out?	The performance of the solar panels will be monitored during the operation of the facility and failed panels will be replaced as necessary. The failed panels will be recycled to the extent feasible or otherwise disposed of at an approved facility in accordance with local, state, and federal laws and regulations. Once the decision is made to stop operating the facility, the solar panels would be removed and recycled or otherwise disposed of as part of the overall decommissioning process.	Caleb Speck
13	3.3	Floodplains	The project cannot be properly evaluated without a specific location of construction. Portions of the project may be are in the regulated floodplain. If the work involves underground utilities only with no ground surface elevation changes, and no construction of aboveground structures in the regulated floodplain, or installation of utility poles, this project may be covered under the Floodplain General permit if any construction for stream crossings within the regulated floodplain are conducted by directional boring. If open trenching for stream crossings within the floodplain are required, the project would require a Stream construction permit from the Division of Water. If a USACE 404 permit is required, a water quality certification would also be required. The stream construction application serves as the WQC application also, but there are additional federal application requirements.	Comment noted. The project is not anticipated to effect jurisdictional water resources or regulated floodplains and would install utilities using boring methods, as discussed in Section 3.3. of this EA. However, if necessary, the project would obtain the appropriate Clean Water Act 404 permit(s) and water quality certification(s), as presented in Section 1.4 of this EA.	Division of Water (Floodplain Management Section)
14		Project Funding	How will everything be funded?	The construction and operation of the solar facility would be funded by Russellville Solar LLP, a subsidiary of Silicon Ranch Corporation, and its investors. TVA would purchase the power generated by the facility under the terms its Power Purchase Agreement with Russellville Solar LLP.	General

Comment No.	EA Section No.	Topic	Public / Agency Comment	TVA Response	Commenter(s)
15	1.3	General	Concern that response period and public meetings were not available or made known to public in the area.	<p>Russellville Solar hosted two community meetings, on July 29 and December 14, 2021, at the Logan County Cooperative Extension Office in Russellville to describe the Project. The July meeting was advertised in the News Democrat-Leader, a local newspaper published in Russellville, and letters were mailed to adjacent landowners to notify them of the upcoming meeting. The December meeting was advertised via invitations to surrounding landowners. See Section 1.3 of the EA for additional details on these meetings.</p> <p>TVA issued the draft of this EA for a 30-day public and agency review and comment period. TVA notified the public of the availability of the draft EA via an advertisement in the News Democrat-Leader and posted the draft EA on its website. TVA also notified appropriate local, state, and federal agencies and federally recognized tribes of the availability of the draft EA.</p>	Vick Family Trust
16		General	General support of the project	Comment noted.	Cassie Sobey Jeff Smith Catherine J Martin Rhonda Bratcher Lee Coursey Pat Stewart Holly Hardenberg Jon Smith Joyce Cox
17		General	How will the promises made in this EIS be kept if conditions/ownership changes?	The mitigation measures and project design parameters described in Chapter 2 of this EA would be binding on the project owner (Russellville Solar LLC) and, should project ownership change, any future owner. Any changes to the mitigation measures and design parameters would require approval by TVA.	Caleb Speck
18	2.2.2, 3.4.2.2.4	General	What will happen to homes and other structures on the property?	Several isolated single-family homes and agricultural buildings are scattered across the Project site. While four on-site buildings (located in the NE quadrant) will be demolished, eight buildings will be avoided by the Project. One of the buildings that would remain is a Kentucky Landmark, and some other buildings are anticipated to remain to support the sheep grazing operation established as part of the Project, as described in Section 2.2.3.	Vick Family Trust
19	1.4	Transportation	For any new access to the adjacent state highway (KY 1041/Watermelon Road), please contact KYTC District 3 Permits.	Comment noted. Russellville Solar LLC will comply with all applicable KYTC requirements.	Kentucky Transportation Cabinet
20	1.4	Groundwater	The proposed work is located in an area with a high potential for karst development where groundwater is susceptible to direct contamination from surface activities. It is our recommendation that proposed work be made aware of the requirements of 401 KAR 5:037 and the need to develop a Groundwater Protection Plan (GPP) for the protection of groundwater resources within that area.	Comment noted. If a Groundwater Protection Plan (GPP) is determined to be necessary for the proposed project under 401 KAR 5:037, then the Project will comply with all requirements in the GPP and any additional requirements determined to be necessary by the KDEP Division of Water.	Division of Water (Groundwater Division)

Comment No.	EA Section No.	Topic	Public / Agency Comment	TVA Response	Commenter(s)
21	3.3.2.2.1	Groundwater	How will groundwater be protected and/or impacted?	Groundwater is addressed in Section 3.3.2 of this EA. Measures to protect groundwater include the preparation and implementation of a stormwater prevention protection plan and the use of best management practices as described in Section 3.3.2.2.1. The construction and operation of the solar facility is not expected to adversely affect groundwater. If a Groundwater Protection Plan (GPP) is determined to be necessary for the proposed project under 401 KAR 5:037, then the Project will comply with all requirements in the GPP and any additional requirements determined to be necessary by the KDEP Division of Water.	Kari & Janet Hall
22		Groundwater	How will groundwater be monitored during and after construction?	Neither Russellville Solar nor TVA propose to monitor groundwater. If a Groundwater Protection Plan (GPP) is determined to be necessary for the proposed project under 401 KAR 5:037, then the Project will comply with all requirements in the GPP and any additional requirements determined to be necessary by the KDEP Division of Water.	Kari & Janet Hall
23		Hunting	How will hunting opportunities be impacted and will they be mitigated?	Once construction of the facility begins, the Project Site is expected to be closed to hunting, and this closure will remain in effect throughout the operation of the facility. No mitigation for the loss of hunting opportunities is planned.	Anthony Shoemake Caleb Speck Vick Family Trust
24		Infrastructure	This project supports BRADD's infrastructure goal.	Comment noted.	Barren River Area Development District (BRADD)
25		Transportation	How will people access land that was previously accessed by way of this property (access easement)?	Existing access points through the Project Site would remain for use by area landowners. AP Miller Road would remain open to the public and would not be gated. The small gravel road accessing the Vick Family Trust and other properties would likewise not be closed by the project.	Vick Family Trust
26	3.6.2	Noise	How will you manage noise from construction and operation?	Noise generated during the construction and operation of the solar facility is described in Section 3.6.2 of this EA. The highest noise levels would be from site clearing and grading, which would primarily occur for a relatively short period of time near the start of construction activities, and from the use of pile drivers to install the solar panel support structures. Pile driving would occur throughout much of the 14- to 18-month construction period. Noise would be managed, in part, by limiting construction to daylight hours, avoiding weekend construction work, and maintaining existing wooded areas, which will buffer noise, around the perimeter of the site.	Larry Vick
27	3.4.2.2.2	Operation/Maintenance	How will the sheep on-site impact the surrounding landscape/wildlife?	Wildlife use of the project site during operation of the solar facility is described in Section 3.4.2.2.2 of this EA. The sheep flock will be regularly rotated in order to maintain a diverse mix of native and non-invasive grasses at a height that does not interfere with the solar panels. This will maintain habitat for a variety of pollinator species, small mammals, ground-dwelling birds, and other wildlife. Impacts to the surrounding area from the sheep flock are expected to be minimal, although the security fencing around the solar facility will affect the movement of deer and other large animals.	Caleb Speck Vick Family Trust
28	2.2.3	Operation/Maintenance	How will solar panels withstand weather events?	The various components of the solar facility are designed to withstand severe weather events such as ice storms, hail storms, and tornadoes with minimal damage. The facility will be monitored both remotely and by regular on-site inspections, and additional on-site inspections will be conducted following extreme weather events.	Vick Family Trust

Comment No.	EA Section No.	Topic	Public / Agency Comment	TVA Response	Commenter(s)
29	2.2.3	Operation/Maintenance	How will solar panels be maintained?	Maintenance of the solar facility is described in Section 2.2.3 of this EA. The primary maintenance activities will include replacement of lubricants and other fluids as needed, repair or replacement of failed facility components, and management of vegetation. Vegetation management will mostly rely on rotational grazing by a flock of sheep, along with occasional mowing or application of herbicides as needed. A permanent building will be constructed along Joe Montgomery Road in the eastern portion of the site to support operations and maintenance activities. Most facility maintenance activities other than vegetation management are likely to be carried out by employees or contractors based outside the local project area. The sheep flock is likely to be attended by locally based shepherds.	Vick Family Trust
30	3.2.2.2.4	Prime Farmland	Why are you taking away prime farmland? What justifies this?	Most of the tracts of land in south-central Kentucky and nearby portions of Tennessee that meet the solar facility site selection criteria described in Section 2.3 of this EA contain large proportions of prime farmland. Therefore, avoidance of prime farmland is not feasible for a solar facility in this part, or some other parts, of TVA's service territory. While the construction and operation of the solar facility would result in the elimination of row cropping on the site, agricultural production would continue during operation through use of the site for grazing sheep. Any changes to soil productivity would be minimal and the site could be returned to row cropping following decommissioning of the facility.	Robert Menees Stacy menees Rhonda Werner Paula Gillum Kristin Dickinson All Vick Harry Eich Stephanie Oliver Lauren Barnes Elmer S & Elaine Jenkins Elaine Dixon Emily Wetton Larry Vick Brooke Barnes Caleb Speck Kari & Janet Hall Duncan Gillum Allie Robertson Samantha Sisk Susan Walker Evet Young Bridget Coots Vick Family Trust
31	3.2.2.2.4	Prime Farmland	How will the solar panels effect the efficiency of the farmland over time?	Because the construction and operation of the solar facility would have little effect on the productivity of soils on the site and most of the site would be utilized for grazing sheep, impacts to prime farmland would be minimal. Following decommissioning of the solar facilities, the site could be utilized for a variety of types of agricultural production, including row cropping.	Larry Vick Caleb Speck Kari & Janet Hall Susan Walker
32		Property Rights	Are the landowners choosing this or is TVA taking the land by force?	The landowners have entered into voluntary agreements with Russellville Solar LLC for the use of their land. TVA has not been involved in this aspect of the project development, and there has been no use of eminent domain for acquiring the site.	Jon Smith
33	3.11.2	Public Health & Safety	Are solar farms safe?	Yes. See Section 3.11.2 of this EA. The facility site will be surrounded by security fencing to manage unauthorized public entry and all applicable electrical, workplace safety, and environmental codes and standards will be followed during construction and operation.	General

Comment No.	EA Section No.	Topic	Public / Agency Comment	TVA Response	Commenter(s)
34	3.11.2	Public Health & Safety	How will construction workers be protected?	Under the Proposed Action Alternative, workers on the Project site would have an increased safety risk during construction of the proposed solar facility. However, because construction work has known hazards, Russellville Solar establish and maintain health and safety plans in compliance with OSHA regulations that all construction workers, as well as operations and maintenance workers will be required to follow. Health and safety plans emphasize BMPs for site safety management to minimize potential risks to workers. Examples of BMPs include employee safety orientations; establishment of work procedures and programs for site activities; use of equipment guards, emergency shutdown procedures, lockout procedures, site housekeeping, and personal protective equipment; regular safety inspections; and plans and procedures to identify and resolve hazards.	General
35	3.11.2	Public Health & Safety	What is the effect of the electromagnetic radiation from these solar panels? One commenter also stated a general concern with health issues related to solar facilities.	During operation, solar PV systems, like many other electrical systems, generate electromagnetic fields (EMF). However, according to a study published by North Carolina State University (2017), solar PV technologies and solar inverters do not pose significant human health risks. EMF produced by electricity has enough energy to produce heat but not enough to remove electrons from a molecule or damage DNA. Distance from the EMF source, such as provided by the setback of solar panels and other equipment from the site perimeter and the security fencing, renders the exposure to EMF insignificant and, therefore, not harmful to human health. The strength of the EMF present at the perimeter of a solar facility within a building is substantially lower than the typical exposures to EMF from household sources such as refrigerators and microwave ovens (NIOSH 2014).	John S. Ferris, Caleb Speck, Vick Family Trust
36	3.11.2	Public Health & Safety	How will you watch out for trespassers?	The solar facility site will be enclosed by six-foot-tall chain-link security fencing topped with three strands of barbed wire. Site access will be limited to TVA and Russellville Solar staff and contractors and guests escorted by staff and contractors. Facility operations will be monitored remotely and by periodic site visits by staff and/or contractors conducting inspection and maintenance activities, including managing the sheep grazing the site. If a problem is discovered during nonworking hours, a local repair crew or law enforcement personnel would be contacted if an immediate response were warranted.	Anthony Shoemake
37		Public Health & Safety / Waste	If asbestos, lead paint and/or other contaminants are encountered during this project contact the Division of Waste Management for proper disposal and closure.	The project would develop and implement a variety of plans and programs to ensure safe handling, storage, use, and decommissioning of hazardous materials (e.g., Hazardous Material Business Plan), as noted in Section 3.10 of the EA.	Division of Waste Management
38	1.3	Purpose	Why is it necessary/important to ask the public opinion?	Public involvement promotes transparency and facilitates better decision-making. Council on Environmental Quality and TVA regulations on implementing NEPA state that the agency must involve, to the extent practicable, the public, State, Tribal, and local governments, other relevant agencies, and applicants in preparing EAs.	General

Comment No.	EA Section No.	Topic	Public / Agency Comment	TVA Response	Commenter(s)
39	3.13	Socioeconomics	How will you mitigate the loss in jobs from the decrease in farming?	The removal of 973 acres of prime farmland from row cropping represents just 0.4 percent of farmland in the county. Therefore, the acreage the project will remove from row cropping is insignificant in terms of the remaining available prime agricultural land. The project will maintain a sheep herd on site, which would be shepherded by local or regional contract or direct personnel and sold as seedstock or market lambs and would offset loss of row-cropping economic opportunities by adding some local agricultural jobs. Construction activities would also likely provide jobs to the local workforce. See Section 3.13 of this EA.	Samantha Grise Lauren Barnes Elmer S & Elaine Jenkins Brooke Barnes Caleb Speck Evelt Young
40	3.13.2	Socioeconomics	How are the people profiting financially from this project?	The local and regional economic impacts from the construction and operation of the solar facility are described in Section 3.13.2 of this EA. Short-term beneficial economic impacts will result from the employment of construction workers and the purchase of facility components and construction materials and services. Beneficial economic impacts during the operation of the solar facility will result from the employment of maintenance workers and the increased local tax base. TVA is a not-for-profit government-owned utility that would purchase the power produced by the solar facility and thus will not receive profit from the solar facility business.	Samantha Grise Lauren Barnes Elmer S & Elaine Jenkins Brooke Barnes Evelt Young Vick Family Trust
41	3.2.2.2.4	Socioeconomics	Will the decrease in farmland lead to food shortages?	The removal of 973 acres of prime farmland from row cropping is not anticipated to lead to food shortages as this represents just 0.4 percent of farmland in the county. Therefore, the acreage the project will remove from row cropping is insignificant in terms of the remaining available prime agricultural land and regional food production. Following decommissioning of the solar facilities, the site could be utilized for a variety of types of agricultural production, including row cropping.	Duncan Gillum
42	3.13.2	Socioeconomics	Will locals be employed?	Russellville Solar, LLC will prioritize the hiring of qualified local construction and maintenance workers.	Samantha Grise Lauren Barnes Caleb Speck Evelt Young Bridget Coots
43		Utilities	Will Logan County have access to the energy produced by this solar farm?	The energy delivered to the electric grid from this solar facility will be a TVA designated network resource and therefore only serve TVA Native Load (which consists of residential, commercial, and industrial end-users within TVA's 7-State service territory).	Larry Vick Kari & Janet Hall Allie Robertson Evelt Young Vick Family Trust
44	3.13.2	Socioeconomics	How will land value of surrounding properties be affected? Can we expect a decrease in values?	The Project has been designed to minimize impacts to adjacent and nearby properties and is not expected to decrease the value of these properties according to a study done for the project. Measures to minimize effects on property values include setbacks from the project site perimeter and the maintenance and/or establishment of tree buffers as required by Logan County. Section 3.13.2 of the EA has been revised to provide more information on this topic.	John S. Ferris, Vick Family Trust

Comment No.	EA Section No.	Topic	Public / Agency Comment	TVA Response	Commenter(s)
45		Socioeconomics	Aren't solar panels expensive?	As part of its long-range energy resource planning, TVA periodically evaluates various types of electrical generation. The results of its most recent comprehensive evaluation are described in its 2019 Integrated Resource Plan. The cost of solar generation, including the cost of solar panels, has declined greatly in recent years and TVA offers programs, such as Green Invest, to grow solar in the Valley at the lowest cost possible via a competitive procurement approach that also leverages economies of scale, such as this Russellville Solar Project. The Green Invest program framework also ensures that Green Invest customers cover any increased cost of renewable energy and ensures there is no cost shifting to non-participants.	Harry Eich
46		Socioeconomics	Will there be tax credits for surrounding landowners?	Federal investment tax credits are currently available to the owners of commercial solar facilities. No such tax credits are available to surrounding landowners.	Kari & Janet Hall Vick Family Trust
47	1.4	Stormwater/Erosion	If the construction area disturbed is equal to or greater than 1 acre, the applicant will need to apply for a Kentucky Pollutant Discharge Elimination System (KPDES) stormwater discharge permit.	Comment noted. Russellville Solar LLC will comply with all applicable permitting requirements.	DoW - Surface Water Permits Branch - Permit Support Section
48	3.2.2	Stormwater/Erosion	How will runoff be managed?	Prior to starting construction, Russellville Solar LLC will develop a stormwater pollution protection plan (See Section 1.4) and then implement the plan during all phases of construction and operation. Specific runoff and erosion control measures include installation of silt fences, rapid revegetation of disturbed areas and maintenance of undisturbed buffers along streams and wetlands.	Caleb Speck
49	3.2.2	Stormwater/Erosion	How will erosion be controlled?	Erosion will be controlled during the construction and operation of the solar facility in accordance with the stormwater pollution prevention plan. Erosion control measures are listed in Section 2.5 of this EA and include the use of silt fences, maintenance of buffer areas along streams, and the planting and maintaining vegetation on the facility site.	Vick Family Trust Caleb Speck
50	3.13.2	Socioeconomics	How will taxes for the surrounding community be impacted?	The local tax base would increase from construction of the solar facility and would be most beneficial to Logan County and the vicinity.	Kari & Janet Hall General
51	3.12.2	Transportation	How will this project impact traffic? One commented specifically stated a concern for increased traffic on US 79.	The potential impacts to traffic are described in Section 3.13.2 of this EA. Due to the proximity of the Project site to the city of Russellville, possible minor to moderate traffic impacts along Watermelon Road, US 79, and US 431 could occur during construction, as a portion of the construction workers would likely commute to the Project site from and through Russellville. Effects could be moderate on portions of US 79, given that the road is currently experiencing high volumes in comparison with its capacity and is pending a widening project, as discussed in the introduction to Chapter 3. Traffic flow around the Project site would be heaviest at the beginning of the work day, at lunch, and at the end of the work day.	John S. Ferris, Caleb Speck
52	3.12.2	Transportation	How will traffic impacts be mitigated?	Use of mitigation measures, such as posting a flag person during heavy commute periods to manage traffic flow, prioritizing access for local residents, and implementing staggered work shifts during daylight hours, would minimize potential adverse impacts to traffic and transportation to minor or negligible levels.	Caleb Speck

Comment No.	EA Section No.	Topic	Public / Agency Comment	TVA Response	Commenter(s)
53	2.2.1	Understanding	How does solar energy work?	<p>Photovoltaic (PV) power generation is the direct conversion of light into electricity at the atomic level. PV 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.</p> <p>Single PV devices, or cells, are connected together in chains to form modules. These modules are mounted together and connected electrically in series to form arrays. The modules, estimated to be approximately 6.6 feet by 4 feet, would be located in individual blocks consisting of the PV arrays and an inverter station on a concrete pad or steel piles, to convert the DC electricity generated by the modules into AC electricity. The modules would be attached to single-axis trackers that follow the path of the sun from the east to the west across the sky.</p>	
54	1.1	Utilities	Will more coal plants be shut down due to this addition of solar panels?	TVA's energy planning is described in Section 1.1 of this EA. The proposed solar facility will partially fulfill TVA's goals for increased renewable energy generating capacity and will not, by itself, result in the retirement of any of TVA's currently operating coal plants.	Harry Eich
55	2.2.4	Utilities	Is solar energy reliable?	While solar generation is an intermittent form of generation, it is generally predictable based on both long-term climate trends and shorter-term weather forecasts. The availability of electricity generated by the proposed solar facility would be enhanced by its possible pairing with the onsite battery energy storage system, which would enable power generated during daylight times of lower power demand to be stored and utilized during times of higher demand, including when the sun is not shining.	Duncan Gillum
56	3.5.2	Visual Impacts	How will solar panels impact the view (aesthetics)?	If left unbuffered, the manufactured, structured appearance of the built facility would be most apparent from vantage points surrounding the Project site along Watermelon Road, A.P Miller Road, Marian Acres Road, Green Downs Road, and RJ Corman Railroad (see Photos 3-7 and 3-8 in this EA). However, in following county requirements for solar facilities, tree buffers will be maintained or, where currently absent, planted around the perimeter of the site to shield views of the facility (see Photos 3-9 and 3-10). A screen will be added to the security fence for additional visual buffering. These visual buffering measures will comply with Logan County requirements. The Project will also adhere to county-required setbacks of facility components of 100 feet from adjacent property boundary lines and public road and railroad ROWs and 250 feet from residences, schools, churches, hospitals, nursing facilities, and cemeteries. These measures will reduce views of the Project site from adjacent and nearby areas. See Section 3.5.2 of this EA for a more detailed description of the visual impacts of the solar facility and measures to minimize these visual impacts.	Larry Vick Brooke Barnes Allie Robertson Bridget Coots
57		Waste	UST Branch records indicate no underground storage tank site issues identified within the project impact area. If any UST's are encountered during the project construction they should be reported to KDWM. Any UST issues or questions should be directed to the UST Branch.	This corroborates with findings from the project's Phase I environmental site assessment, which will be updated through the course of project development and construction.	Division of Waste Management - UST Branch

Comment No.	EA Section No.	Topic	Public / Agency Comment	TVA Response	Commenter(s)
58		Waste	Superfund Branch records indicate no superfund site issues identified within the project impact area. Any superfund issues or questions should be directed to the Superfund Branch.	This corroborates with findings from the project's Phase I environmental site assessment, which will be updated through the course of project development and construction.	Division of Waste Management - Superfund Branch
59		Waste	Solid Waste Branch records indicate no active or historic landfill sites within the project impact area. Any solid waste issues or questions should be directed to the Solid Waste Branch.	This corroborates with findings from the project's Phase I environmental site assessment, which will be updated through the course of project development and construction.	Division of Waste Management - Solid Waste Branch
60		Waste	Hazardous Waste Branch records indicate no hazardous waste issues identified within the project impact area. Any hazardous waste issues or questions should be directed to the Hazardous Waste Branch.	This corroborates with findings from the project's Phase I environmental site assessment, which will be updated through the course of project development and construction.	Division of Waste Management - Hazardous Waste Branch
61		Waste	<p>RLA Branch records indicate the following RLA tracked open dumps within the project impact area: MASTER AI ID: 116641 MASTER AI NAME: Patsy Brown Property Dump USER GROUP DESCRIPTION: RCLA Dump ID ALTERNATE AI ID: LONGITUDE: -86.93333 LATITUDE: 36.7888333 Any questions or issues should be directed to the RLA Branch.</p> <p>The information provided is based on those facilities or sites that KDWM currently has in its database. If you would like additional information on any of these facilities or sites, you may contact the file room custodian at (502) 782-6357. Please keep in mind additional locations of releases, potential contamination or waste facilities may be present but unknown to the agency. Therefore, it is recommended that appropriate precautions be taken during construction activities. Please report any evidence of illegal waste disposal facilities and releases of hazardous substances, pollutants, contaminants or petroleum to the 24-hour Environmental Response Team at 1-800-928-2380.</p>	The project's Phase I environmental site assessment identified the Patty Brown Dump as having been excavated and filled with dirt and states that following coordination with the KEEC and follow-up site visit, the incident was determined to be closed.	Division of Waste Management - RLA Branch
62		Waste	According to Division of Solid Waste Management records, no underground storage tank site issues, superfund site issues, active or historic landfills, or hazardous waste issues have been identified within the project impact area. One open dump, the Patsy Brown Property Dump, Master AI ID 116641, occurs in the project impact area.	This corroborates with findings from the project's Phase I environmental site assessment, which will be updated through the course of project development and construction.	Division of Waste Management
63	2.2.5; 3.10.2	Waste	How will the solar panels be disposed of?	The majority of decommissioned equipment and materials would be recycled. Materials that cannot be recycled would be disposed of at an approved facility in accordance with federal, state, and local laws and regulations. Other wastes, including batteries, will be disposed of off-site and/or recycled in accordance with manufacturer recommendations and appropriate federal, state, and local laws and regulations and industry BMPs.	General

Comment No.	EA Section No.	Topic	Public / Agency Comment	TVA Response	Commenter(s)
64		Waste	Are solar panels sustainable? During production? During retirement?	As discussed in Section 5.2 of the 2019 IRP EIS, thin-film solar PV panels have a life cycle GHG emission rate of 22 tons CO ₂ -eq/GWh which is much lower and more sustainable than coal plants which have life cycle GHG emission rates greater than 1,000 tons CO ₂ -eq/GWh. The majority of decommissioned equipment and materials would be recycled. Materials that cannot be recycled would be disposed of at an approved facility in accordance with federal, state, and local laws and regulations.	Harry Eich
65	2.2.5; 3.10.2	Waste	Are solar panels recyclable?	At present, parts of the solar panels can be recycled, including the aluminum frame, copper wire, junction boxes and, depending on area market conditions, the glass that comprises most of the weight of the panel. There are currently efforts to increase the recycling of other parts of solar panels, including the solar cells. When the solar facility is decommissioned, the recycling of the solar panels and other facility components will be prioritized over other means of disposal.	Harry Eich
66		Water Quality	Best management practices should be utilized to reduce runoff from project activities into nearby waters.	The project would develop a stormwater pollution prevention plan and adhere to it. This permit is noted in Section 1.4 of this EA.	Division of Water (Water Quality Branch)
67		Water Quality	This proposed project is not within a designated Source Water Protection Area.	Comment noted.	Division of Water (Watershed Management Branch)
68		Water Quality	If the activity requires a federal permit due to activities in or near Waters of the U.S., a Clean Water Act Section 401 Water Quality Certification from the DOW may be required for this project.	The project would necessary Clean Water Act 404 or 401 permits and adhere to the permit conditions. These permits are noted in Section 1.4 of this EA.	Division of Water (Water Quality Certification Section)
69	3.3.2.2.2	Water Resources	How will streams, wetlands, and waters be protected/impacted?	While the solar facility was designed to avoid streams and wetlands, complete avoidance was not feasible. Thus, the project will affect a 16-foot section of an intermittent stream and an 0.01-acre area of a wetland by the installation of culverts for road crossings. Impacts to streams and wetlands, as well as measures to protect them, including 50-foot avoidance buffers around onsite streams and wetlands, are described in more detail in Section 3.3.2.2 of this EAEA.	Vick Family Trust

Comment No.	EA Section No.	Topic	Public / Agency Comment	TVA Response	Commenter(s)
70	3.4.2.2.3	Wildlife	Will this project impact wildlife?	The construction and operation of the solar facility would impact the wildlife on the Project site through the removal of about 93 acres of forest and conversion of most of the developed portion of the site from cropland and forest to a mix of grasses and herbaceous plants, including those that tend to attract pollinators . The forest that would be removed generally occurs in small patches within the agricultural landscape and in linear patches along field borders or streams and consists of mixed deciduous forests. Although these areas may be in small patches or linear, they represent areas of refuge or corridors for movement for forest-dependent wildlife. The removal of forested habitat from the Project site would have direct and indirect adverse effects on the wildlife species that utilize this habitat from their displacement or, particularly for less mobile species, elimination. The security fencing around blocks of solar panels (see Figure 2-2 of this EA) would inhibit the movement of large animals within the Project site. Overall, the proposed action would have minor adverse impacts on populations of common wildlife species. These impacts would be partially offset by minor beneficial effects from the Project sheep grazing operation. Vegetation management of the Project site, intended to provide fodder for the sheep, would help maximize animal diversity on the Project site by creating pollinator habitat and providing habitat for small mammals and ground-dwelling birds.	Vick Family Trust
71	3.4.2.2.3	Wildlife	Are solar farms hazardous to wildlife?	See the preceding comment and Section 3.4.2.2 of this EAEA for descriptions of the likely effects of the construction and operation of the solar farm on wildlife. Aside from these mostly habitat-related effects, the solar farm would not present any particular hazards to wildlife.	Vick Family Trust
72	3.1.2	Zoning	Will the site be rezoned?	No. Logan County does not have zoning restrictions or a land use plan that applies to the unincorporated portions of the county, including the solar facility site.	Vick Family Trust

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#1]
Date: Tuesday, April 5, 2022 12:46:10 PM

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Name	Cassie Sobey
City	RUSSELLVILLE
State	KY
Organization	Russellville Logan County Airport
Email	[REDACTED]
Phone Number	[REDACTED]
Please provide your comments by uploading a file or by entering them below. *	We are very much in favor of this project and are willing to assist with whatever we can, to see this project go ahead. Kind regards Cassie Sobey Airport Manager Russellville Logan County Airport

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#2]
Date: Thursday, April 7, 2022 9:56:39 AM

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Name	Robert Menees
City	Russellville
State	Ky
Email	[REDACTED]
Phone Number	[REDACTED]

Please provide your comments by uploading a file or by entering them below. *

We are not in support of this project. We do not want the land taken out of farm production

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#3]
Date: Thursday, April 7, 2022 9:58:39 AM

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Name	Stacy menees
City	Russellville
State	Ky
Email	[REDACTED]
Phone Number	[REDACTED]
Please provide your comments by uploading a file or by entering them below. *	We are against this proposed project. Do not want land taken from farming

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#4]
Date: Thursday, April 7, 2022 10:45:24 AM

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Name	Rhonda Werner
City	Elkton
State	KY
Organization	N/a
Email	[REDACTED]
Phone Number	[REDACTED]

Please provide your comments by uploading a file or by entering them below. *

I live in the next town over and work in the agricultural industry and DO NOT want to see anymore farm land taken for such solar farms. Find rocky, hard to farm land if you want to expand your solar farms, stop taking away valuable farm land that we cannot get more if. Who needs electricity when we have no food. NO TO THE SOLAR FARM IN LOGAN CO.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#5]
Date: Thursday, April 7, 2022 10:56:50 AM

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Name	Paula Gillum
City	Guthrie
State	KY
Email	[REDACTED]
Phone Number	[REDACTED]

Please provide your comments by uploading a file or by entering them below. *

I don't understand why you want to take away good production land to build solar farms. Electricity is great, but what good is it if we can't eat. You are literally taking food out of our mouths in order to produce electricity. There is land better suited for your project. Choose a rocky hillside, the top of a mountain, the top of a building, anywhere that is not land producing crops that contribute to our literal survival.

You all keep on taking from the farmers with no regard to their livelihood, or the lives of others. I think this project is a terrible idea in this area; and shame on you for thinking that using farmland for solar panels is a good idea.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#6]
Date: Thursday, April 7, 2022 2:34:09 PM

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Name	Jeff
City	Smith
State	Ky
Email	[REDACTED]
Phone Number	[REDACTED]

Please provide your comments by uploading a file or by entering them below. *

I am very much in favor of TVA participating in every possible way in the Logan County Solar Project. I'm thrilled to see our local TVA taking a leadership position in seeking a remedy for this climate emergency.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#7]
Date: Thursday, April 7, 2022 3:25:18 PM

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Name Kristin Dickinson

City Guthrie

State KY

Phone Number



Please provide your comments by uploading a file or by entering them below. *

I cannot imagine that 1000 acres of what is surely prime farm land is best used for the production of solar energy. Isn't there less desirable ground that could be made useful for this purpose? We need to eat, therefore farmers need to farm.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#8]
Date: Thursday, April 7, 2022 4:45:25 PM

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Please provide your comments by Negative
uploading a file or by entering them
below. *

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#9]
Date: Thursday, April 7, 2022 8:36:10 PM

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Name	anthony shoemake
City	RUSSELLVILLE
State	KY
Email	[REDACTED]
Phone Number	[REDACTED]

Please provide your comments by uploading a file or by entering them below. *

Hi I'm one of the people who will be directly affected by this project. I grew up on the Joe Montgomery Farm and have been connected to it all my life. The farm was/is controlled by the Statton/Montgomery Trust. Me and my friends have hunted this farm all our lives, and my nephew still lives on it. At the current time I have a 10 year lease on the Hunting rights to this farm. In the past I have provided security for this farm. Getting up all times of the night and driving out there to take care of trespassing issues, up to and including calling law enforcement. People trespass on this farm every year and every farm bordering it has hunters on them. If this and those other farms isn't watched over they WILL be flooded with trespassers. What I have been told is the farms will be fenced in and off limits to everyone. The county road that runs 2/3 of the way through the farm will have be gated and sealed off. The farmers have a made a road to move their heavy equipment from one side of Russellville to the other while staying out of town and off the main roads. This will be sealed off. I have been told that the front half of the Montgomery farm won't be used because it stays too wet. Why couldn't we continue to hunt this? As far as the Montgomery farm goes you will only have access to 1 light tower and about 500yds off power lines, The other towers you see are on farms NOT leased for this. And they DO NOT want this! If you go thru with this and need someone to patrol these areas me and my nephew would be interested in this. I know all the surrounding farms and have contact every year through trespassing issues dealt with. I have lived in this area my entire life and know most of the surrounding people. Thanks for your time

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#10]
Date: Thursday, April 7, 2022 10:19:39 PM

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Name Catherine J Martin

City Morgantown

State KY

Email 

Please provide your comments by uploading a file or by entering them below. *

I think it's well beyond time that solar becomes a viable option in our area.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#11]
Date: Thursday, April 7, 2022 11:14:48 PM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the “Report Phishing” button located on the Outlook Toolbar at the top of your screen.

Name	Rhonda Bratcher
City	Russellville
State	Kentucky
Email	[REDACTED]

Please provide your comments by uploading a file or by entering them below. *	Why ask the public when the pandemic already proved most don't understand science? They will just argue against it with Tucker Carlton talking points. I saw someone write about the beauty of the old farms today. All I see are falling down old homes and barns and people being paid to sit on their land. Build the solar farm.
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From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#12]
Date: Friday, April 8, 2022 7:34:49 AM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the “Report Phishing” button located on the Outlook Toolbar at the top of your screen.

Name	Lee Coursey
City	Russellville
State	Ky
Organization	Russellville Dental Lab
Email	[REDACTED]
Phone Number	[REDACTED]
Please provide your comments by uploading a file or by entering them below. *	I believe the TVA should purchase the solar power. It does not matter how “clean” the energy being produced currently is because renewable energy is more important. I would literally pay more for electricity for it to be clean.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#13]
Date: Friday, April 8, 2022 8:15:16 AM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the “Report Phishing” button located on the Outlook Toolbar at the top of your screen.

Name	Stephanie Oliver
City	Auburn
State	KY
Email	[REDACTED]
Please provide your comments by uploading a file or by entering them below. *	As a woman in Agriculture, I am highly against this proposed "solar farm" in Logan County, KY. The agricultural land needs to be used to create food for our country instead of importing it. Can these solar panels not be added to high rise buildings, roofs, anything except in a field where our food is grown and harvested for us to consume?

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#14]
Date: Friday, April 8, 2022 11:07:13 AM

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Name	Holly Hardenberg
City	Bowling Green
State	KY
Organization	TMW Contracting LLC
Email	[REDACTED]
Phone Number	[REDACTED]
Please provide your comments by uploading a file or by entering them below. *	I am a fan of renewable energy and would like to see this project come to fruition. I hope you get it done.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#15]
Date: Friday, April 8, 2022 12:31:42 PM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Name	Samantha Grise
City	Russellville
State	Kentucky
Email	[REDACTED]
Phone Number	[REDACTED]

Please provide your comments by uploading a file or by entering them below. *

This project is only fiscally sound for the owners of the proposed site. To put 1,000 acres of solar panels that have no monetary value to this county as a whole is unjust. Please consider land in Warren County where the power is to be utilized. Unless you plan to employ many Logan Countians for the life of this project, the area may as well be a sink hole for the county.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#16]
Date: Friday, April 8, 2022 1:15:07 PM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Name	Minerva A. Westray
City	Bowling Green
State	Kentucky
Organization	Vick Family Trust
Email	[REDACTED]
Phone Number	[REDACTED]
Please provide your comments by uploading a file or by entering them below. *	Unloaded file from Vick Family Trust entered below. We sincerely request the Tennessee Valley Authority to issue a No Action Alternative as related to the Environmental Assessment proposed for this dangerous and risky project. Thank you for your time and attention.

Upload File #1



[tva_public_comments.pdf](#)

3.57 MB · PDF

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#17]
Date: Friday, April 8, 2022 7:52:10 PM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Name	Pat Stewart
City	Bowling Green
State	Ky
Email	[REDACTED]
Phone Number	[REDACTED]
Please provide your comments by uploading a file or by entering them below. *	This will be a great addition to the community. Would love to see more Solar generation projects in our area!!

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#18]
Date: Friday, April 8, 2022 9:57:51 PM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Name	Harry Eich
City	Bowling Green
State	KY
Email	[REDACTED]
Phone Number	[REDACTED]

Please provide your comments by uploading a file or by entering them below. *

Solar is not as "green" as people have been told and not nearly as efficient. The main problem with solar arrays is the chemicals needed to process silicate into the silicon used in the panels. To make pure enough silicon requires processing it with hydrochloric acid, sulfuric acid, nitric acid, hydrogen fluoride, trichloroethane, and acetone. In addition, they also need gallium, arsenide, copper-indium-gallium-diselenide, and cadmium-telluride, which also are highly toxic. Silicone dust is a hazard to the workers, and the panels cannot be recycled. If you look beyond the myth of zero emissions you will see these things are just as hazardous as coal and not nearly as cheap or efficient! The embedded environmental costs of making and replacing solar panels is just not talked about. "Going Green" may sound like the Utopian ideal with catchy buzzwords, but when you look at the hidden and embedded costs realistically and with an open mind, "Going Green" is more destructive to the Earth's environment than meets the eye. TVA may want to look good and help "save the earth from climate change", but they will help kill it if they don't take a good hard look at this albatross before they commit. This is prime farmland you propose to turn into a wasteland of solar panels and would be put to better use by planting food people can eat. Currently, the geniuses in DC that are behind this push to save the environment with dumb projects like this are going to make food and energy so expensive, people will not be able to afford them. Don't help these dim bulbs. Crank up the coal generators again. We have more than enough coal to last and it is cheaper and more efficient anyway.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#19]
Date: Saturday, April 9, 2022 10:55:20 AM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the “Report Phishing” button located on the Outlook Toolbar at the top of your screen.

Name	All Vick
City	Russellville
State	Kentucky
Phone Number	[REDACTED]

Please provide your comments by uploading a file or by entering them below. *	I am against the solar project in Logan County Kentucky. I live on the J. Montgomery Road . Please find the following in response to a request from the Tennessee Valley Authority requesting public input concerning the proposed construction of a solar facility in Logan County, Kentucky. My main concerns is taking thousands of acres of prime crop farmland out of production now and potentially forever. To take thousands of prime farmlands used for food and energy sources out of production now and potentially forever seems very wrong . No action alternative.
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From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#20]
Date: Saturday, April 9, 2022 2:10:52 PM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.


Name	Lauren Barnes
City	Adairville
State	Kentucky
Email	[REDACTED]
Phone Number	[REDACTED]

Please provide your comments by uploading a file or by entering them below. *

I would like to ask the TVA to seek the NO ACTION ALTERNATIVE concerning the Logan County Solar Project. I am very upset to see good farm land go to waste on a project that has nothing to do with our community or county. I am 21 years old and I am worried about the future this Solar Project will have on our community. This project is taking away jobs, farmer's source of income and the future of the Olmstead community.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#21]
Date: Sunday, April 10, 2022 11:50:07 PM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the “Report Phishing” button located on the Outlook Toolbar at the top of your screen.

Name	Elmer S & Elaine Jenkins
City	Allensville
State	Kentucky
Email	
Please provide your comments by uploading a file or by entering them below. *	No Action Alternative This project will take approximately 1600 acres of prime farmland out of agriculture production over a 40 year period affecting the entire county. It will directly impact our farmers, crop services, farm implement sales/service and grain companies which in turn will impact other businesses in the county costing our community numerous jobs.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#22]
Date: Monday, April 11, 2022 9:28:31 AM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Name	Elaine Dixon
City	Adairville
State	KY
Email	[REDACTED]
Phone Number	[REDACTED]
Please provide your comments by uploading a file or by entering them below. *	No action alternative. Not in favor of using prime farmland in Logan County for this project.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#23]
Date: Wednesday, April 13, 2022 2:54:58 PM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Name	Emily wetton
City	Adairville
State	KY
Email	[REDACTED]
Phone Number	[REDACTED]
Please provide your comments by uploading a file or by entering them below. *	I do not want solar panels in our area. This would take up and waste good prime farm land, which our farmers depend on.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#24]
Date: Saturday, April 16, 2022 11:01:13 AM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the “Report Phishing” button located on the Outlook Toolbar at the top of your screen.

Name	Larry Vick
City	Russellville
State	Kentucky
Phone Number	[REDACTED]

Please provide your comments by uploading a file or by entering them below. *

I live on [REDACTED]. Solar panels will be a eyesore to the neighbors on Watermelon Road .

Solar panels will degrade farmland where projects are placed over time.

Our farmland is one of our greatest resources, and so in effect if you allow these solar panels to go into our area, after their lifespan of 20 years, they're filled with hazardous chemicals. With this being said , it' will be pretty tough from a monetary standpoint to redevelop that land into anything else but a solar grave yard.

There are cemeteries close to the properties were they plan to place solar panels. I'm against them putting solar panels close to the cemetery's. The solar farm does not benefit Logan County with any type of energy. It's more for Warren county. So why not put the solar panels in Warren county.

My house it in feet of this project and I do not want them next to my house. My way of life will chat. Hazard chemicals, noise, eye sore, my health. I am AGAINST the Russellville Solar Project.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#25]
Date: Monday, April 18, 2022 9:47:11 PM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the “Report Phishing” button located on the Outlook Toolbar at the top of your screen.

Please provide your comments by uploading a file or by entering them below. *

As a farmer and resident of Logan County, I am currently against the project that has been proposed.

My first concern is the loss of prime farm land that will be taken out of production. During this time of increased inflation, families are feeling the rising cost of food at the store. I don't think it is wise to continue building houses, factories, and solar farms on prime farm land. It think those all would be better suited on land that is otherwise unproductive for feeding our nation.

My next concern is the potential adverse effects the solar farm will have on the land and environment. Obviously the panels themselves ruin the view in my opinion, but they also have negative effects on the local environment and wildlife. I can only imagine the construction process itself will damage the land so that it possibly won't ever be able to return to its previous productivity (compaction, soil horizon mixing, rerouting of natural flows of water and/or wetland, etc).

Another concern is the longevity of the project and those who seek to build it. It is my fear that the initial companies (LLC) that have been set up to construct the site will cease to exist or transfer ownership to other companies as time moves forward. I'm concerned that contracts will be nullified and not upheld, and I'm afraid the landowner/community will be left with a defunct solar farm that is cost prohibitive to clean up. I believe TVA should require bonding before purchasing the electricity to cover the cost of decommissioning and restoration of the site should it become unusable at any time.

Another concern is property tax. I believe the site will be rezoned and taxes will be astronomical.

All in all, I think this is a bad move for Logan County and TVA. I think these solar farms are very short sighted and will prove to be wrong in the long run. I'm afraid TVA will not be concerned with what the citizens think, and will continue forward with the project anyway. After all, it's not in your back yard, right?

Thanks for the opportunity to submit comments on this project.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#32]
Date: Monday, April 25, 2022 9:27:47 PM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Name	Brooke Barnes
City	Adairville
State	KY
Email	[REDACTED]
Phone Number	[REDACTED]

Please provide your comments by uploading a file or by entering them below. *

I would like to request the TVA to issue a NO ACTION ALTERNATIVE regarding the Russellville Solar LLC project in Logan County. I do not feel this is something that will be beneficial to the residents of Logan County. Taking land out of agriculture not only hurts the farmer, but many other people who live and work in Logan County. Solar farms have not proven to be very beneficial in creating more environmental friendly forms of energy. They are an eye sore and will not be helping with any power source in Logan County. My grandparents live right in the middle of this project and I hate to think about the impact this project will have on the lives and their health. Russellville Solar LLC has not been very neighborly nor have they taken into account how the community feels about this project. Please issue a NO ACTION ALTERNATIVE and don't let large companies such as Shell Oil collect carbon credits for farmland in Logan County. Solar farms need to be placed on land that is not farmable such as deserts, wetlands and industrial areas. NO ACTION ALTERNATIVE is the right choice!

Thank you for your time and consideration.

From: [Wufoo](#)
To: [nepa](#)
Subject: NEPA Comments - Logan County Solar Project [#33]
Date: Monday, April 25, 2022 11:45:38 PM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the “Report Phishing” button located on the Outlook Toolbar at the top of your screen.

Name	Caleb Speck
City	Auburn
State	KY
Email	[REDACTED]

Please provide your comments by uploading a file or by entering them below. *

April 25, 2022

To Whom it May Concern,

Please consider the below questions concerning the proposed Solar Farm referred as, Logan County Solar.

The greatest concern with said project is the removal of highly productive farmland from it’s current, natural, state of crop production for the provision of food, fuel and fiber. Not to mention the local employment and source and livelihood for many Logan County residents who rely on the farmland for employment. Can the production of solar energy be generated from differing land types and landscapes? Does a solar farm have the need for a specific soil or land type? To my understanding, it does not, therefore resulting in a significant waste of vitally productive ground that is an essential food supply source. This is particularly important considering the current Ukraine crisis and already expected wheat shortage. Can you please explain, in detail, the reasoning for the selection of prime south Logan farmland for the Logan County Solar project and why other land types are not considered?

Additional concerns lie in the unknown and possibly harmful health implications to the neighboring residents due to the emissions of electromagnetic radiation from the panels. With many nearby homes can you explain, in detail, the possible health ramifications of radioactive material exposure?

Additional concerns exist with traffic safety for motorists. The rural county road, Watermelon Road already experiences a high volume of daily traffic due to the number of residents living in the area and farm transportation. A large agricultural business, the Hopkinsville Granary, also generates a large volume grain trucks, large equipment and even heavy rail traffic which can block the road for long periods of time. How will this narrow side road handle the increased traffic of 400 plus works and the additional large services trucks and vehicles for the construction of such a large solar project? This is a safety concern for those who have to travel Watermelon Road and Highway 79 daily as they commute to work and take their children to school. Has the KY Transportation Cabinet and

Logan County Road Department made preparations for the significant increase of traffic?

Land Management concerns, with such a long period project, how will the prim farmland be preserved? All area farmers constantly fight erosion. How will the project respond to gully's, sinkholes, and the washing away of land created by weather? I am concerned the land will not be maintained properly to manage erosion. After the long contract, how much work will it take for the land to be returned to productive farmland or will it ever be able to be? Concerned that the land will not be returned to it's productive state after said project.

What happens if the solar panels become obsolete before the contract ends? Will TVA no longer purchase its power? What will happen then? Will the panels just sit unused until the end of the contract?

Wildlife Management concerns– will hunting be allowed? There are a number of predators in the area that will prey on sheep, how will this be addressed? Are the sheep of any benefit to TVA?

Concerns lie with the temporary jobs this project will supply while it will completely terminate many once permanent jobs. Will the company hire local Logan County residents or will they be brought in from other locates, states and countries? Concerned for the loss of jobs for the farmers, farm hands, seed and fertilize suppliers, crop insurers, state and federal government agencies to work to preserve the land.

Please take these concerns under consideration for the Logan County Solar project. Please address how these vital issues plan to be handled to ensure the safety of nearby residents and the preservation of natural resources.

Respectfully submitted,

Caleb Speck

Questions about solar energy for Logan Co.

Questions submitted by Kari and Janet Hall

1. Why can't the solar energy that is converted be sent to help those in Logan County?
Why is it distributed to other surrounding counties instead of remaining in Logan County?
2. Do the solar panels being used by the companies present any type of soil contamination that would require clean up or prevent future row cropping mechanisms for future farming purposes.
3. Why can't land that is currently not being farmed or used for pasture be utilized instead of using good farmland for crops?
4. From an energy conservation perspective, it makes more sense to use land not used for the purpose of row cropping. Why is this alternative not considered?
5. Could farmers be subject to the same tax credits that the corporations receive if they are using their farmland for the good of alternative energy? Why is this not considered?
6. Why are tax free municipal bonds being sold when it would be more prudent for Logan Co. to tax the bonds in order to build revenue?

From: [Duncan Gillum](#)
To: [Smith, Elizabeth](#)
Subject: Logan county solar project
Date: Thursday, April 7, 2022 11:13:39 AM

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Sent from my iPhone

To whom it may concern if Tva or whoever is involved with this project the issues that concern me most are
1 using good farm land that produces food for a world of people you go to the store now and carry out 100\$ in a bag doing away with acre after acre for this project that project will someday create food shortages
2 there are thousands upon thousands of acres in the western United States that not good for anything would be great for a mega solar project
Now with issues of power I do understand the power supply is stretched and this is because the world we live in today take for instance if everybody goes all at once buys electric cars what's going to happen when they plug them all in at one time solar alone will not be near enough power . This conversation can go on and on but we need to be smart about this and plan for a future of a safe food source clean energy and a clean environment for the generations to come

Thank you for your time

From: [Allie Robertson](#)
To: [nepa](#)
Subject: Logan County Solar Panels
Date: Thursday, April 7, 2022 1:08:01 PM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the “Report Phishing” button located on the Outlook Toolbar at the top of your screen.

To whom it may concern,

This is to voice my opinion about the Solar project in Olmstead, Ky. I am completely opposed to the project for taking totally good crop land for panels that do not supply Logan County. I feel since they will supply electricity to Bowling Green they should be stationed there. Most land around Bowling Green is too rocky for crop land anyway and would be a better site for solar panels. The project adjoins my property and I enjoy the morning sun rises. Fences, Solar panels and trees blocking my view is not what I will enjoy in my old age!

Thank you for your consideration on this matter! Sincerely, Allie

Robertson

[Sent from Yahoo Mail on Android](#)

From: Samantha Sisk
To: [Smith, Elizabeth](#)
Subject: Logan County Solar Farm
Date: Thursday, April 7, 2022 11:28:08 AM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Hi,

I just want to state that it would be in the best interest of the county, state and country to choose land that is not best suited for the growing of crops for this project. We need every inch of available farmland to produce crops. Please choose a different parcel of land.

Thank you,
Samantha Boley

Sent from my iPhone

From: [Jon Smith](#)
To: [nepa](#)
Subject: Russellville ky solar farm
Date: Thursday, April 7, 2022 9:33:00 AM

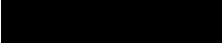
This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

I APPROVE of the project and the interest of TVA wanting to utilize this resource. I live in the olmstead ky area and am very excited for this.

As a farmer and business owner it's up to the land owners to decide what they want to do with their property and if this is deemed by them to be a good use for their property then let it be done and move forward.

--

Jon Keith Smith
J.K. Sky Farm LLC, Owner/Chief Pilot



From: [REDACTED]
To: [nepa](#)
Subject: Solar Farm
Date: Thursday, April 7, 2022 3:33:42 PM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

After living in Logan County for almost 66 years I feel qualified to say that our beautiful farmland is our greatest resource and gift. I am a farmer here and vehemently oppose placing solar panels on any local land. I appreciate the affordable, reliable power that has been provided to us through TVA, but our rich Pembroke soil must not be covered for this endeavor. Allow actual farming to continue here. That will benefit our region for generations to come.

Sent from my iPhone

From: [evett_young](#)
To: [nepa](#)
Subject: my opinion on the proposal to build a solar farm on more than 1,000 acres of farmland in Logan County.
Date: Thursday, April 7, 2022 10:04:15 AM

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Hi! My name is Evett Young. I am a 4th generation farmer In Logan county and wanted to share my thoughts and opinions on the solar farm. In South Logan we have some of the best farm land in Kentucky and I hate to see that being sold for a solar farm. Especially when the solar farm will have no benefit whatsoever to the citizens of Logan County. I am completely against over 1,000 acres of our precious farm land being used for a solar farm. Farm land is something that's becoming scarce and we need to keep ahold of all we can. If this solar farm will be beneficial to the people of Bowling green, why not build in Bowling green? There is plenty of land for sale in Warren County for the solar farm to be built on. Like I said before I am completely against over 1,000 acres of our precious farm land being sold to become a solar farm. Thank you for taking the time to listen to my thoughts and opinion on the solar farm being built in Logan County.

From: nepa
To: [Smith, Elizabeth](#)
Subject: Fwd: Feedback on Proposed Solar Farm in Logan County Kentucky
Date: Friday, April 8, 2022 6:42:28 PM

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From: BRIDGET COOTS [REDACTED]
Sent: Friday, April 8, 2022 4:37:20 PM
To: nepa <nepa@tva.gov>
Subject: Feedback on Proposed Solar Farm in Logan County Kentucky

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

To Whom It May Concern:

My name is Bridget Blick Coots and I am speaking for myself, my husband John and both our boys John Wilson Coots and Winston Coots.

I grew up in Logan County on a farm nearby this proposed site. My grown boys own this farm now and make their living on farms in Logan County. The proposed site is some of the best farm ground around anywhere, I know for a fact this is high yielding grain farmland. I don't think the people that are in charge of making these decisions realize how much farm land is being taken out of agriculture use every year.

Farmers are fighting a battle they can't win. No farmer can afford to buy farm ground that is being sold for development, whether it be for housing or industrial, With every passing generation the family farm is being sold off to the highest bidder. The important people in the world need to start thinking long and hard before you cut the throats of the people that provide food for not only our nation but others. There is no quick replacement for losing millions maybe billions of bushels of grain each year to developments and that was before we had to worry about solar farms.

There is not a person I know in Logan County that wants this to happen except for the people leasing the ground. The company they are leasing to has been in business 7 years or so, there is a very low probability that this company will be around in 20 years much less 40, then what happens to this destroyed farmland.

It's easy to say that it can be put back in production, it will in all actuality be a huge if not impossible undertaking to do so.

I'm 51, but my children are only in their 20's, and what about their grandchildren? What are we doing to their rural home life that we have always been so proud of and

taken care of? What will be left for the future generations if we are not good stewards with the land. There are many many ways to get power environmentally friendly, there is only so much land that is capable of being productive farm land.

I strongly feel that the Solar Farm in Logan County will have devastating effects on people and the environment for years to come. Logan County is a beautiful place to live and visit, are we really willing to open it up for this kind of development? I assure you more will follow, if you open the door for this you will systematically be destroying one of the prettiest and productive counties in the state of Kentucky. Are the rewards worth the risk? I don't think so.

Any jobs created to amount to anything will only be during construction. Once construction is complete there will be very few jobs and I hazard to guess they will not go to someone that is from Logan County originally.

My boys are 4th generation farmers and it is an uphill battle all the way these days under the best of circumstances.

I plead with the people in control to seek another site for this Solar Plant. I never dreamed a day would come that I would even worry about the people that own this ground doing something like this to this beautiful farmland, but alas money is a powerful motivator, even if you aren't hurting for it.

This situation needs serious contemplation that takes in way more than dollar signs. There are some things in life that shouldn't be tampered with, I feel that destroying farmland unnecessarily falls in that category.

Respectfully

Bridget Blick Coots, John Coots, John Wilson Coots and Winston Coots

From: [Joyce Cox](#)
To: [nepa](#)
Subject: Solar farm
Date: Friday, April 8, 2022 2:23:28 PM

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I encourage TVA to enter the solar power purchase with Logan Co LLC.
Clean energy and jobs are a win win!
Sent from my iPhone

From: [Smith, Elizabeth](#)
To: [RichardsonSeacat, Harriet](#)
Subject: Fwd: Logan County Solar Project Public Comment
Date: Friday, April 8, 2022 2:10:33 PM
Attachments: [TVA Public Comments.pdf](#)

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From: kevinwestray@twc.com [REDACTED]
Sent: Friday, April 8, 2022 12:48:41 PM
To: Smith, Elizabeth [REDACTED] [REDACTED]
[REDACTED]
Subject: Logan County Solar Project Public Comment

This is an EXTERNAL EMAIL from outside TVA. THINK BEFORE you CLICK links or OPEN attachments. If suspicious, please click the "Report Phishing" button located on the Outlook Toolbar at the top of your screen.

Good morning. We hope you are well. Please find attached a written letter from the Vick Family Trust voicing concerns and comments of the proposed Logan County Solar Project-Russellville Solar Environmental Assessment and Appendices proposal. We strongly request the Tennessee Valley Authority to issue a No Action Alternative for this very dangerous and risky project. We truly thank you for the opportunity to voice our concerns and comments concerning this proposed project.

Kevin and Minerva Westray

April 06, 2022

Elizabeth Smith

Tennessee Valley Authority

400 Summit Hill Drive

Knoxville, Tennessee 37902

Regard: Logan County Solar Project-Russellville Solar Environment Assessment and Appendices

Please find the following in response to a request from the Tennessee Valley Authority requesting public input concerning the proposed construction of a solar facility in Logan County, Kentucky. The following concerns and comments are from the Vick Family Trust. The Vick Family Trust owns and operates a 120 acre tract directly adjacent to and completely bound on the western and southern sides of the property by the proposed solar development. The Vick Family Trust includes nine Logan County residence families directly affected by this proposed facility. The Vick Family Trust will strongly employ the Tennessee Valley Authority to issue a No Action Alternative to all sections of this project and to the project in whole as outlined in Chapter 2.1 of the Environmental Assessment. Below we will begin to describe our comments and concerns of this proposed project.

We will begin by saying that several of our concerns are unique to the effects on the current and successful farm cropping operations of the Vick Family Trust property and move into our concerns and comments for this farming community Logan County, Kentucky, and indeed the United States of America requesting a No Action Alternative to this proposed project.

In Chapter 1.3 of the Environmental Assessment, Russellville Solar asserts that it held two public meetings concerning this project. We do not believe that this is the case, and if indeed public meetings were held, why were not the minutes, comments, and concerns of these public meetings placed in the submitted Environmental Assessment report. Russellville Solar did hold two promotional informational meetings by invitation. The first by a Russellville Solar represented that shortly afterwards left Russellville Solar with the second meeting conducted by a different new representative of Russellville Solar. The Logan County Fiscal Court County Judge Executive also acknowledged that at this point in the process that had not been any public meeting in Logan County on this project.

Only recently has the Kentucky Public Service Commission opened a formal public comment and question format concerning this proposed project. As outlined by the Order Issued by the Kentucky State Board on Electric Generation and Transmission siting in Case Number 2021-00235 Dated March 17, 2022, we are currently in the First Request for Information to Russellville Solar, LLC, phase of this comment period. The first public hearing on this proposed project is scheduled for June 30, 2022, before the Kentucky Public Service Commission in Frankfort, Kentucky. As to date, Russellville Solar has not responded to any question from the Vick Family Trust concerning this proposed project as per a written and filed letter to the Kentucky Public Service Commission dated March 19, 2022. In addition,

with several Logan County Fiscal Court members announcing that this project is a 100 percent go with no oversight or public comment period, the Vick Family Trust truly thanks the Kentucky Public Service Commission and the Tennessee Valley Authority for this voice of our comments and concerns in this very destructive project to the health and economy of Logan County, Kentucky. With the Logan County Fiscal Court now authorizing private out of court meetings with Russellville Solar and the continued closed door executive sessions occurring, the tax paying citizens of Logan County truly appreciated this public comment and concern format to allow the long-standing prime cropland farming community in Logan County to have a voice in this very risky project. With this lack of community balance to this proposed project, we would request the Tennessee Valley Authority to issue a No Action Alternative to this proposed project.

As per Chapter 2.4 of the Environmental Assessment addressing Analysis of Impact based on the potential future conditions of the properties and the surrounding project area, the Vick Family Trust would like to address the current and future access easement to the crop farming operations of the Trust. The only access to the crop farming operations of the Vick Family Trust is along the one-way county roadway of A.P. Miller Road and onto the current access roadway easement. Another crop farming property is also in use of this same access roadway to successfully farm their property. The current access easement goes completely across the proposed solar development area landlocking the Vick Family Trust from access by farming equipment to our property. Indeed, the other property owner becomes landlocked by this proposed project also. The Vick Family Trust has requested that Russellville Solar provide a specific and detailed plan on how it proposes to allow at least a fifty-foot full time access easement to the Vick Family Trust property to insure our continued successful crop farming operation. Russellville Solar has not responded to our request concerning this access easement. The Vick Family Trust property is bound completely on the western and southern side by this proposed development and is directly impacted by this solar operation. Because of this potential ability to landlock current farming operation cropland, the Vick Family Trust would request the Tennessee Valley Authority issue a No Action Alternative to this proposed project. Landlocking or even temporarily denying access to this successful crop farming operation would put an end to the revenue generated from this farming operation directly and greatly affecting the economic conditions of the members of the Vick Family Trust.

Remaining on the Analysis of Impact based on the potential future conditions of the properties and the surrounding area, the Vick Family Trust would like to express our concerns and comments of taking thousands of acres of prime crop farmland out of production now and potentially forever. An easy argument could be made that current crop grain farming operations are as important to the fuel and energy needs of our nation as the proposed solar panels not even mentioning the life sustaining food grown on this prime farmland every year. Grains produced on this prime farmland in America are used daily in fuel production fueling our cars and equipment energy needs. More and more the life sustaining food produced on this prime rich farmland in Logan County and America is feeding the nation and world. There are many alternative locations throughout Logan County to facilitate constructing this proposed solar farm. To take thousands of prime farmlands used for food and energy sources out of production now and potentially forever seems very wrong for Logan County and the future needs of the United States of America. The economic loss to Logan County by taking this prime cropland out of production is huge. The loss of payroll to work the land, the purchase of equipment to farm the land, the purchase of fertilizer to enrich the land, the purchase of fuels to run the equipment, the trucks to take the grain to

market, the storage facilities to process the grain, and the loss of tax base to Logan County from the Industrial Revenue Tax Exempt Bonds to name a few creates a major economic loss to Logan County from the direct construction of this project on prime farmland. With many other viable locations for this solar farm construction in Logan County, this proposed project simply creates too much of an economic loss to Logan County and a loss to our nation to allow this construction on prime farmland in Logan County, Kentucky. We would again ask for an issue of No Action Alternative.

Concerning Chapter 1 of the Environmental Assessment involving need for action, no power generated from this proposed solar project would affect Logan County in any way. The farmland put out of production would generate power to be used in other counties and other states. On several public occasions Russellville Solar has announced the power generated from this proposed project would be used to help publicly traded companies of General Motors and Facebook with no power being given to Logan County. General Motors is in Warren County, Kentucky, north of Bowling Green and Facebook is located in Sumner County, Tennessee. Given this fact, we see no need for action of this project in Logan County to take prime farmland out of production when there are thousands of viable solar farm sites near these out of county and out of state publicly traded companies. We feel the Tennessee Valley Authority should request sites much closer to the user point of the generated energy to create a need for action.

Along the entire western boundary of the Vick Family Trust property there is an existing berm and wooded tree line protecting our property and insuring a successful cropping operation. As the Environmental Assessment notes from the map on page 55, Figure 3-6, there are numerous identified Wet Land Areas, Ponds, and Streams directly along this western property line boundary of the Vick Family Trust on the proposed solar farm property. The Vick Family Trust has requested from Russellville Solar a specific and detail plan on how Russellville Solar will both protect this existing and critical berm and tree line area during and after construction; and how will Russellville Solar contain, monitor, and control the surface and ground water runoff both during and after construction of this proposed solar farm facility. Russellville Solar has not provided either a specific or detail plan concerning these issues in a Best Management Practices Plan outlining the steps to address these issues.

While reviewing Table 2-1 of the Environmental Assessment, it can clearly be seen that all criteria for these categories of Land Use, Geology, Soil, and Prime Farmland, Water Resources, Biological Resources, Visual Resources, Noise, Air Quality and GHS Emissions, Culture Resources, Utilities, Waste Management, Public and Occupational Health and Safety, Transportation, Socioeconomics, and Environmental Justice all fall into the category of Impacts from No Action Alternative. We would hereby request the Tennessee Valley Authority issue a No Action Alternative for the entire project based on these criteria.

The Environmental Assessment list in Table 1-1, the Permits and Approvals List needed on this project; however, the permits themselves or the approval of these requested permits do not appear in this Environmental Assessment. There is no mention in this Environment Assessment of how this construction on solar farm operation will affect the numerous homes and people living in those homes for the next 20 years from all the dangers surrounding a solar farm operation. There is no mention in this Environmental Assessment of how severely adjacent property land values will decrease from this proposed project and what compensation will be given to the adjacent property owners from this loss due to this direct solar farm facility. There is no mention in the Environment Assessment of the

dangerous elements and chemicals located in these solar panels and their direct impact on the people and wildlife living very close to this proposed solar farm facility. There is simply no mention of the dangers this facility poses to the prime farmland in Logan County from this proposed solar farm operation in the Environmental Assessment.

Regarding page 149 of the Environmental Assessment, there is contained a report prepared for Community Energy Solar, LLC, three years ago on July 21, 2019. The request for the Logan County Solar Project is from Russellville Solar, LLC. This report should be removed from the Environmental Assessment on this proposed project. These numerous shell changes, name changes, personnel changes, and address changes all show that Russellville Solar, LLC, does not have the ability or understanding to construct a successful project on this sensitive and very delicate prime Pembroke crop farmland in Logan County. In addition, the Environmental Assessment does not address the protection and access to the existing and functioning modern cemetery in the middle of this proposed solar farm development. These factors show a issue of No Action Alternative are required for this proposed dangerous project.

Everyone in Logan County knows this proposed solar farm site is one of the richest archaeological areas in Logan County. Some land has been taken out of the proposed site area due to archaeological evidence and some adjacent land has been rejected due to archaeological concerns and evidence. On page 202 of the Environmental Assessment the Cherokee Nation addresses this issue noting "Tennessee Valley Authority halt all project activities immediately", if further archaeological cultural artifacts are uncovered during this proposed construction. The archaeological risk coupled with the existing functioning cemetery in the middle of this proposed site should give pause to the construction of this project. Simply this is the wrong site in Logan County for this proposed project. The inhabited residence occupied home on the Vick Family Trust property is not even listed in Table 3-16 of the Environmental Assessment. These issues show a No Action Alternative is in order.

The Environmental Assessment completely ignores the health, safety, and management of the huge sheep flock required for maintenance of this proposed solar site. The direct affect to the protection and management of the huge wildlife population is not properly addressed in this Environmental Assessment. The protection of this proposed massive solar farm facility from numerous wildlife hunting activities in this area is not addressed in the Environmental Assessment. The general maintenance and liability resulting from wind, storm, or any damages from these solar panel to adjacent landowners is not addressed in the Environmental Assessment. The absence of these general issues clearly show that Russellville Solar is not aware or capable of properly constructing and maintaining for 20 years or more this proposed \$ 200 million dollar solar operation on the most valuable prime farmland in the United States of America and on one of the most sensitive environments in this country. If there has ever been a site for a issue of No Action Alternative, this is the property and the submission of this Environmental Assessment bears this out.

We truly appreciate the services of the Tennessee Valley Authority to our community and this country. We thank you for the ability to publicly voice our concerns and comments on this proposed project. Given these conditions, we employ the Tennessee Valley Authority to issue a No Action Alternative to this entire project and protect the value to our nation created by this sensitive and rich crop prime farmland in Logan County, Kentucky.

Respectfully Submitted,

Minerva A. Westray-Trustee

Minerva A. Westray-Trustee

Vick Family Trust

NEPA Comments – Logan County Solar Project

TVA welcomes your comments on this environmental review.

Comments should be clear, concise, and relevant to the analysis of the proposed action. Comments that are solution-oriented and provide specific examples will be more effective than those that simply oppose the proposed action. TVA may respond collectively to numerous comments that repeat the same basic message. For additional guidance on submitting meaningful comments, please see [A Citizen’s Guide to NEPA](#). Please fill in the form below to provide your comments to TVA.

Note: Any comments received, including names and addresses, will become part of the administrative record and will be available for public inspection.

Name

John S. Ferris

City

Russellville

State

Ky

Organization

Email

Phone Number

###

Please provide your comments by uploading a file or by entering them below. *

I am writing regarding the proposed solar panel site near Russellville, Ky. As we are the nearest property owners to the site, we are concerned about our property values, and the health issues that may be realized. Also the increased traffic on the already over used highway 79 is a real concern. We have many other reasons for not wanting this project to materialize. Therefore, we oppose the development of the solar farm at this site near Russellville, Ky.

Minimum of 1 words. *Currently Used: 79 words.*

I would like to ask the TVA to issue a **No Plan Alternative** regarding the Logan County Solar Project titled Russellville Solar LLC, a subsidiary of Silicon Ranch Corporation. Building a solar farm in Logan County will be detrimental to our county. This is a rich farming community with prime farm land that feeds and employs many people. I own land on Watermelon Road and my ancestors owned some of the land that is proposed to be used in this project. I have been told stories my entire life of how hard my ancestors worked to have and keep the land in order to pass it down to other generations for the purpose of farming. Placing 1600 acres of prime tillable farm land in solar panels does not make good use of the fertile soil. The negative effects of this project on Logan County are numerous. This is a very troublesome proposal affecting prime agriculture land in Logan County. Agriculture is how we feed the world. We have many other options for electricity but very few for producing food without the land. Silicon Ranch/Russellville Solar LLC have not been transparent nor have they tried to take into consideration the concerns of the neighbors to this project.

In the Environment Assessment, it is listed in section 2.2 that there are only 4 landowners who will be taking part in this project. Therefore, there are only 4 landowners who will be reaping any benefit from this project, but 1000's of people who live on 79 South, Watermelon Road, J Montgomery Road and AP Miller Roads will be negatively affected by the traffic, noise, pollution, visual changes, and loss of jobs in the area. By taking land out of agriculture production, one is taking jobs away from the farmer, farm suppliers, farm workers, parts suppliers, tire repair businesses, insurance, etc. Some of the landowners who are putting their land into this project do not live in the county and will not be adversely affected by the project like the people who live and work in Logan County on a daily basis. While Russellville Solar LLC claims they will hire 450 local workers to construct the solar farm, these will be temporary jobs and will not be sustainable jobs for anyone in Logan County. In 2017, the net cash farm income in Logan County was 38,387,000.00 and Logan County was the 3rd top producer of grain in the state of KY. The payroll for hired farm workers in 2017 was 11,243,000.00. As you can see, farming is a large part of our county and a very critical need.

In article 1.3, Russellville Solar LLC claims to have had 2 public meetings. The first meeting was listed in small print in the classified section of the newspaper who only a small amount of people in our county take. There were no minutes nor comments listed from these meetings which is procedure for a public meeting. The 2nd meeting much like the 1st was by invitation only to a small amount of people and did not represent the entire Logan County community. Who exactly did receive invitations to this meeting? None of the meetings were listed on the local radio station and again, no minutes nor records were kept. The audience at both "public" meetings were very much against the project and expressed their opinions to the members of Silicon Ranch. The maps and pictures shown at the meetings were difficult to see and the presentation was not informational nor informative. The representatives from Silicon Ranch could not answer simple questions and did not seem to care about the concerns of the people present at the meetings.

In section 2.2.2, the project site will be accessible only to TVA, Russellville Solar LLC and their agents and contractors. Does this mean the actual landowner will not be allowed on their property for the next 40 years of the project? This would be very troublesome to the landowners. I would not want property that I owned to be leased by companies who will not even allow me to walk or ride over my property.

Section 2.2.5-Decommissioning process would be coordinated with Logan County-we have been told numerous times that Logan County would have no responsibility for the solar farm but yet Russellville

Solar LLC is reporting they would have to seek Logan County's help with the decommissioning process. Also, it is reported that the panels and other supplies used would be recycled. How and where would this recycling occur? To date, there are no recycling centers for solar components. The soil is also to be returned to a tillable state. With erosion and run off from the solar panels, the numerous holes that will be placed in the ground, it will be nearly impossible to return the soil to a tillable state. Solar farms have not been in place long enough to know the decommissioning process nor if the land would be suitable after the project is termed.

Section 3.2.1.5- This section repeatedly calls the land prime farmland-why would anyone take prime farmland to build solar panels? We need the land to feed our children for many years to come. Russellville Solar LLC reports that 98.6% of the land they will be using for this project is prime farmland. Why not use recovered strip mine land in Muhlenberg County where there are TVA power lines? Ironically, coal resources from these areas of Muhlenberg County were used to power the TVA steam power plant near Drakesboro, KY. It would seem that since TVA used the coal from a lot of these fields, it would be common sense and good stewardship of the land to use these fields for renewable solar energy rather than prime farm land. While we understand development cost would be higher to use this land, it makes much more sense to use non-productive land for long term renewable energy production.

Section 3.4.2.2-This section reports that 93 acres of forested land will be cleared to put up solar panels. Clearing the forested area will greatly affect wildlife and soil erosion. Again, this makes no common sense to clear existing woodland for solar energy production. This shows lack of knowledge of the land and its many uses.

Section 3.6.2.2-Noise concerns during the construction process and the 40 year project. The pile drivers will be extremely loud and bothersome to neighbors. How many hours a day will this take place? The noise levels during construction and during the lifetime of this project will be difficult on the neighbors. Living in the country has always provided solitude, quietness, and peace-now, the neighbors will hear loud and obtrusive noises every time they go outside.

Section 3.9.1.4-The water companies in the area, South Logan Water Association and Logan Todd Water Commission have not been contacted about these projects. Once again, Russellville Solar LLC has not done their due diligence in reporting to businesses and customers in the area of the projected project.

Section 3.10.2.2-Where will all the waste during construction and during the 40 year process be taken? Landfills are full and how are we helping the environment by continuing to haul waste and other contaminants? Solar farms are being sold as "green energy" but in reality, solar farms are causing as much contaminant to the earth as any other source of energy.

Throughout the environment survey, cemeteries and historical structures are discussed. Solar farms near these sites would be detrimental and could cause damage over time. Would anyone be able to visit the cemeteries since they would be in the middle of a solar farm? Would the solar farm damage the sites? Will the harmful chemicals from solar panels affect the environment? Once again, solar farms have not been in existence long enough to be able to provide any reliable data.

Section 3.13.2.2- Construction is to take 14-18 weeks, use 450 workers and they will work 5-7 days per week. These are small country roads that will be unable to handle that much traffic. Children live in these areas and play outside-will they be safe? The people who live and work on these roads will be

greatly affected in their daily travel. Will Silicon Ranch/Russellville Solar be responsible for coordinating traffic concerns and issues?

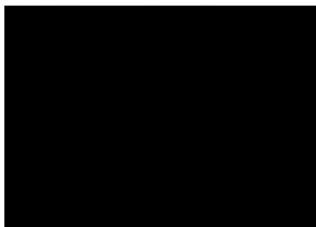
On page 202, the Cherokee Nation requested that TVA halt all project activities immediately and not move forward with this project. No other correspondence is noted. To move forward with this project would be a violation against the Cherokee Nation request.

This project has changed names numerous times and had several different people in charge. It has been confusing, non-transparent and is not something Logan County needs to be a part of. Russellville Solar LLC did not even file an application with the state of KY until 3/1/22 when the PSC became involved. The company has been sent many questions and concerns which have not been answered to date. Russellville Solar LLC is not showing signs of being a good neighbor and has had very poor communication with the citizens of Logan County. Silicon Ranch has not been in business long enough to have any reliable data. The company reports that the power generated will go to GM in Bowling Green and Facebook-two businesses that are not even in Logan County. Therefore, how is this project beneficial to the residents of Logan County? Logan County is known for its rich farm land and being some of the nation's top producers of grain. We need to keep our land in order to feed the United States for years to come. My ancestors worked hard to have the land to pass down for generations and I would hate to see their hard work destroyed for solar farms. While there may be a place for solar, it's not in Logan County on prime farm land. Therefore, we implore TVA to stop this project and choose the **NO ACTION ALTERNATIVE**.

Thank you for allowing the public a time to comment on this project.

Dawson Barnes Family Farms LLC

Gwen Dawson Barnes





ANDY BESHEAR
GOVERNOR

REBECCA W. GOODMAN
SECRETARY

**ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION**

ANTHONY R. HATTON
COMMISSIONER

300 SOWER BOULEVARD
FRANKFORT, KENTUCKY 40601
TELEPHONE: 502-564-2150
TELEFAX: 502-564-4245

April 22, 2022

TVA
400 W Summit Hill Dr.
Knoxville, TN 37902

RE: Logan County Solar Project---(NEPA 2022-12)

Dear Sir or Madam,

The Energy and Environment Cabinet serves as the state clearinghouse for review of environmental documents generated pursuant to the National Environmental Policy Act (NEPA). Within the Cabinet, the Commissioner's Office in the Department for Environmental Protection coordinates the review for Kentucky state agencies. We received your letter requesting an environmental review for this project. We have reviewed the document and provided comments below.

Division of Enforcement and Compliance Assistance

The Division of Enforcement does not have any comment about this Environmental Assessment.

The proposed site is southwest of Russellville, KY, between U.S. Hwy. 79 and U.S. Hwy. 431. An aerial view of the site shows the project site as undeveloped farm land. The site is east of the headwaters of the Red River.

Division of Water

Water Quality Branch

Comment: No comments.

Questions should be directed to Andrea Fredenburg, (502) 782-6950,
Andrea.Fredenburg@ky.gov.

Field Operations Branch

Comment: 1) Project is >1acre disturbance therefore developers would need to submit an application for a KPDES General Stormwater Construction Activities permit and receive approval from DOW before implementing construction.
2) Construction plans would need to include development of a SWPPP (Stormwater Pollution Prevention Plan) applicable to the site and install/maintain proper Best Management Practices (BMPs) within the project area and throughout the duration of project to ensure protection of surface waters.
3) For the stream area disturbing/crossing: Floodplain construction approval will need to be determined through DOW's Water Resources Branch.
4) For the stream area, wetland disturbing/crossing: Developers to obtain a 404/401 Water Quality Certification approval through the USACE & DOW.
Questions should be directed to Constance Coy, (502) 782-6587, Constance.Coy@ky.gov.

Watershed Management Branch

Water Supply Section:

Comment: No comments.

Questions should be directed to

Chip Zimmer at (502) 782-7141, Edward.Zimmer@ky.gov.

Ben Currens at (502) 782-5227, Ben.Currens@ky.gov.

Groundwater Section:

Comment: The proposed work is endorsed by the Groundwater Section of the Watershed Management Branch. However, the proposed work is located in an area with a high potential for karst development where groundwater is susceptible to direct contamination from surface activities. It is our recommendation that proposed work be made aware of the requirements of 401 KAR 5:037 and the need to develop a Groundwater Protection Plan (GPP) for the protection of groundwater resources within that area.

Questions should be directed to Kurtis Spears at (502) 782-7119, Kurtis.Spears@ky.gov or Adam Nolte at (502) 782-1312, Adam.Nolte@ky.gov.

Water Resources Branch

Floodplain Management Section:

Comment: The project appears to be outside the regulated floodplain. If work is completed in the regulated floodplain, a Stream construction permit from the Division of Water (<https://eec.ky.gov/Environmental-Protection/Water/FloodDrought/Pages/UnderstandYourFloodHazards.aspx>) and from the local floodplain coordinator would be required.

If a USACE 404 permit is required, a 401 water quality certification would also be required.

Questions should be directed to Shawn Hokanson at (502) 782-6977, Shawn.Hokanson@ky.gov.

Water Quality Certification Section:

Comment: If the activity requires a federal permit due to activities in or near Waters of the U.S., a Clean Water Act Section 401 Water Quality Certification from the DOW may be required for this project.

Questions should be directed to the Water Quality Certification Section, (502) 564-3410, 401WQC@ky.gov.

Surface Water Permits Branch

Permit Support Section:

Comment: If the construction area disturbed is equal to or greater than 1 acre, the applicant will need to apply for a Kentucky Pollutant Discharge Elimination System (KPDES) stormwater discharge permit.

Questions should be directed to the Permit Support Section, (502) 564-3410, SWPBsupport@ky.gov.

Division of Waste Management

UST Branch records indicate no underground storage tank site issues identified within the project impact area. If any UST's are encountered during the project construction they should be reported to KDWM. Any UST issues or questions should be directed to the UST Branch.

Superfund Branch records indicate no superfund site issues identified within the project impact area. Any superfund issues or questions should be directed to the Superfund Branch.

Solid Waste Branch records indicate no active or historic landfill sites within the project impact area. Any solid waste issues or questions should be directed to the Solid Waste Branch.

Hazardous Waste Branch records indicate no hazardous waste issues identified within the project impact area. Any hazardous waste issues or questions should be directed to the Hazardous Waste Branch.

RLA Branch records indicate the following RLA tracked open dumps within the project impact area:

MASTER AI ID: 116641

MASTER AI NAME: Patsy Brown Property Dump

USER GROUP DESCRIPTION: RCLA Dump ID

ALTERNATE AI ID:

LONGITUDE: -86.93333

LATITUDE: 36.7888333

Any questions or issues should be directed to the RLA Branch.

All solid waste generated by this project must be disposed of at a permitted facility.

If asbestos, lead paint and/or other contaminants are encountered during this project contact the Division of Waste Management for proper disposal and closure.

The information provided is based on those facilities or sites that KDWM currently has in its database. If you would like additional information on any of these facilities or sites, you may contact the file room custodian at (502) 782-6357. Please keep in mind additional locations of releases, potential contamination or waste facilities may be present but unknown to the agency. Therefore, it is recommended that appropriate precautions be taken during construction activities. Please report any evidence of illegal waste disposal facilities and releases of hazardous substances, pollutants, contaminants or petroleum to the 24-hour Environmental Response Team at 1-800-928-2380.

Division for Air Quality

401 KAR 63:010, Fugitive Emissions, states that no person shall cause, suffer, or allow any material to be handled, processed, transported, or stored without taking reasonable precaution to prevent particulate matter from becoming airborne. Additional requirements include the covering of open bodied trucks, operating outside the work area transporting materials likely to become airborne, and that no one shall allow earth or other material being transported by truck or earth-moving equipment to be deposited onto a paved street or roadway. Please note the Fugitive Emissions Fact Sheet located at <https://eec.ky.gov/Environmental-Protection/Air/Documents/Fugitive%20Dust%20Fact%20Sheet.pdf>

401 KAR 63:005 states that open burning shall be prohibited except as specifically provided. Open Burning is defined as the burning of any matter in such a manner that the products of combustion resulting from the burning are emitted directly into the outdoor atmosphere without passing through a stack or chimney. However, open burning may be utilized for the expressed purposes listed on the Open Burning Brochure located at <https://eec.ky.gov/Environmental-Protection/Air/Pages/Open-Burning.aspx>

The Division would like to offer the following suggestions on how this project can help us stay in compliance with the National Ambient Air Quality Standards (NAAQS). These air quality control strategies are beneficial to the health of citizens of Kentucky.

- Utilize alternatively fueled equipment.
- Utilize other emission controls that are applicable to your equipment.
- Reduce idling time on equipment.

The Division also suggests an investigation into compliance with applicable local government regulations.

Kentucky Nature Preserves

Your project might have the potential of impacting federally or state listed species and natural communities. Go to the Kentucky Biological Assessment Tool (kynaturepreserves.org) to obtain a Standard Occurrence Report for information regarding listed species known within your project area. The report will also provide information on public and private conservation lands, areas of biodiversity significance, and other natural resources in your project area for which the Office of Kentucky Nature Preserves maintains data.

This review is based upon the information that was provided by the applicant. An endorsement of this project does not satisfy, or imply, the acceptance or issuance of any permits, certifications or approvals that may be required from this agency under Kentucky Revised Statutes or Kentucky Administrative Regulations. Such endorsement means this agency has found no major concerns from the review of the proposed project as presented other than those stated as conditions or comments. If you should have any questions, please contact me at (502) 782-0863 or e-mail Louanna.Aldridge@ky.gov.

Sincerely,



Louanna Aldridge
Staff Assistant
Office of the Commissioner
Department for Environmental Protection
Energy and Environment Cabinet

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Andy Beshear
Governor

OFFICE OF THE GOVERNOR
DEPARTMENT FOR LOCAL GOVERNMENT
100 AIRPORT ROAD, THIRD FLOOR
FRANKFORT, KENTUCKY 40601
PHONE (502) 573-2382
FAX (502) 227-8691
www.kydlgweb.ky.gov

Dennis Keene
Commissioner

May 5, 2022

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

RE: Logan County Solar Project Draft EA
SAI# KY202204040292

Dear Mrs. Smith:

The Kentucky State e-Clearinghouse is the official designated Single Point of Contact (SPOC) for the Commonwealth pursuant to Presidential Executive Order 12372, and supported by Kentucky Statutes KRS 45.031. The primary function of the SPOC is to streamline the review aforementioned process for the applicant and the funding agency. This process helps in vocalizing the statutory and regulatory requirements. Information in the form of comments, if any, will be attached to this correspondence.

This proposal has been reviewed by the appropriate state agencies in the e-Clearinghouse for conflicts with state or local plans, goals and objectives. After receiving this letter, you should make it available to the funding agency and continue with the funding agencies application process. This e-Clearinghouse SPOC letter signifies only that the project has followed the state reviewing requirements, and is neither a commitment of funds from this agency or any other state or federal agency. Please remember if any federal reviews are required the applicant must follow through with those federal agencies.

The results of this review are valid for one year from the date of this letter. If the project is not submitted to the funding agency or not approved within one year after the completion of this review, the applicant can request an extension by email to Lee.Nalley@ky.gov. If the project changes in any way after the review, the applicant must reapply through the e-Clearinghouse for a new review. There are no exceptions.

If you have any questions regarding this letter or the review process please contact the e-Clearinghouse office at 502-892-3462.

Sincerely,

A handwritten signature in blue ink that reads "Lee Nalley".

Lee Nalley, SPOC
Kentucky State Clearinghouse

Attachment



Barren River Area Development District

Emily Hathcock

No duplications or conflicts. Supports BRADD's Infrastructure Goal 1: Provide adequate infrastructure to accommodate and facilitate development within the BRADD.

Department for Environmental Protection

Louanna Aldridge

Leslie Poff - Endorse with Comments 401 KAR 63:010, Fugitive Emissions, states that no person shall cause, suffer, or allow any material to be handled, processed, transported, or stored without taking reasonable precaution to prevent particulate matter from becoming airborne. Additional requirements include the covering of open bodied trucks, operating outside the work area transporting materials likely to become airborne, and that no one shall allow earth or other material being transported by truck or earth-moving equipment to be deposited onto a paved street or roadway. Please note the Fugitive Emissions Fact Sheet located at <https://eec.ky.gov/Environmental-Protection/Air/Documents/Fugitive%20Dust%20Fact%20Sheet.pdf>

401 KAR 63:005 states that open burning shall be prohibited except as specifically provided. Open Burning is defined as the burning of any matter in such a manner that the products of combustion resulting from the burning are emitted directly into the outdoor atmosphere without passing through a stack or chimney. However, open burning may be utilized for the expressed purposes listed on the Open Burning Brochure located at <https://eec.ky.gov/Environmental-Protection/Air/Pages/Open-Burning.aspx>

The Division would like to offer the following suggestions on how this project can help us stay in compliance with the National Ambient Air Quality Standards (NAAQS). These air quality control strategies are beneficial to the health of citizens of Kentucky.

- ? Utilize alternatively fueled equipment.
- ? Utilize other emission controls that are applicable to your equipment.
- ? Reduce idling time on equipment.

The Division also suggests an investigation into compliance with applicable local government regulations.

Mark Cleland - Endorse with Comments The Division of Enforcement does not have any comments. John Carlton - Endorse with Comments SAI# KY202204040292– Logan County; Logan County; Logan County Solar Project Draft EA

The proposed project is subject to Division of Water (DOW) jurisdiction because the following are or appear to be involved: storm water discharge. The applicant must cite the State Application Identifier (SAI # KY202204040292) when submitting information to the DOW.

PROJECT DESCRIPTION

Division of Water

Water Quality Branch

Comment: Best management practices should be utilized to reduce runoff from project activities into nearby waters.

Questions should be directed to Andrea Fredenburg, (502) 782-6950, Andrea.Fredenburg@ky.gov.

Field Operations Branch

Comment: Endorse.

Questions should be directed to Daniel Fraley, (606) 782-8794, Daniel.Fraley@ky.gov.

Watershed Management Branch

Water Supply Section:

Comment: This proposed project is not within a designated Source Water Protection Area.

Questions should be directed to

Chip Zimmer at (502) 782-7141, Edward.Zimmer@ky.gov.

Groundwater Section:

Comment: The proposed work is endorsed by the Groundwater Section of the Watershed Management Branch. However, the proposed work is located in an area with a high potential for karst development where groundwater is susceptible to direct contamination from surface activities. It is our recommendation that proposed work be made aware of the requirements of 401 KAR 5:037 and the need to develop a Groundwater Protection Plan (GPP) for the protection of groundwater resources within that area.

Questions should be directed to

Kurtis Spears at (502) 782-7119, Kurtis.Spears@ky.gov or Adam Nolte at (502) 782-1312, Adam.Nolte@ky.gov.

Water Resources Branch

Floodplain Management Section:

Comment: The project cannot be properly evaluated without a specific location of construction. Portions of the project may be are in the regulated floodplain. If the work involves underground utilities only with no ground surface elevation changes, and no construction of aboveground structures in the regulated floodplain, or installation of utility poles, this project may be covered under the Floodplain General permit if any construction for stream crossings within the regulated floodplain are conducted by directional boring. The Floodplain General permit can be downloaded from <https://eec.ky.gov/Environmental-Protection/Water/FloodDrought/Documents/Floodplain%20General%20Permit.pdf>. If open trenching for stream crossings within the floodplain are required, the project would require a Stream construction permit from the Division of Water (<https://eec.ky.gov/Environmental-Protection/Water/FloodDrought/Pages/UnderstandYourFloodHazards.aspx>), if a USACE 404 permit is required, a water quality certification would also be required). The stream construction application serves as the WQC application also, but there are additional federal application requirements.

Questions should be directed to Shawn Hokanson at (502) 782-6977, Shawn.Hokanson@ky.gov.

Water Quality Certification Section:

Comment: If the activity requires a federal permit due to activities in or near Waters of the U.S., a Clean Water Act Section 401 Water Quality Certification from the DOW may be required for this project.

Questions should be directed to the Water Quality Certification Section, (502) 564-3410, 401WQC@ky.gov.

Surface Water Permits Branch

Permit Support Section:

Comment: If the construction area disturbed is equal to or greater than 1 acre, the applicant will need to apply for a Kentucky Pollutant Discharge Elimination System (KPDES) stormwater discharge permit.

Questions should be directed to the Permit Support Section, (502) 564-3410, SWPBsupport@ky.gov.

The Kentucky Division of Water supports the goals of EPA's Sustainable Infrastructure Initiative. This Initiative seeks to promote sustainable practices that will help to reduce the potential gap between funding needs and spending at the local and national level. The Sustainable Infrastructure Initiative will guide our efforts in changing how Kentucky views, values, manages, and invests in its water infrastructure. This website, www.epa.gov/waterinfrastructure/, contains information that will help you ensure your facility and operations are consistent with and can benefit from the aims of the Sustainable Infrastructure Initiative.

John Poore - Endorse with Comments Based on the information provided by the applicant for this project:

UST Branch records indicate no underground storage tank site issues identified within the project impact area. If any UST's are encountered during the project construction they should be reported to KDWM. Any UST issues or questions should be directed to the UST Branch.

Superfund Branch records indicate no superfund site issues identified within the project impact area. Any superfund issues or questions should be directed to the Superfund Branch.

Solid Waste Branch records indicate no active or historic landfill sites within the project impact area. Any solid waste issues or questions should be directed to the Solid Waste Branch.

Hazardous Waste Branch records indicate no hazardous waste issues identified within the project impact area. Any hazardous waste issues or questions should be directed to the Hazardous Waste Branch.

RLA Branch records indicate the following RLA tracked open dumps within the project impact area:

MASTER AI ID: 116641

MASTER AI NAME: Patsy Brown Property Dump

USER GROUP DESCRIPTION: RCLA Dump ID

ALTERNATE AI ID:

LONGITUDE: -86.93333

LATITUDE: 36.7888333

Any questions or issues should be directed to the RLA Branch.

All solid waste generated by this project must be disposed of at a permitted facility.

If asbestos, lead paint and/or other contaminants are encountered during this project contact the Division of Waste Management for proper disposal and closure.

The information provided is based on those facilities or sites that KDWM currently has in its database. If you would like additional information on any of these facilities or sites, you may contact the file room custodian at (502) 782-6357. Please keep in mind additional locations of releases, potential contamination or waste facilities may be present but unknown to the agency. Therefore, it is recommended that appropriate precautions be taken during construction activities. Please report any evidence of illegal waste disposal facilities and releases of hazardous substances, pollutants, contaminants or petroleum to the 24-hour Environmental Response Team at 1-800-928-2380.

Department of Housing Buildings and Construction

Don Newberry

The Department of Housing Buildings and Construction, Division of Building Code Enforcement, has no comments concerning this proposed project.

Division of Water

Andrea Fredenburg

Best management practices should be utilized to reduce runoff from project activities into nearby waters.

DOW

Daniel Fraley

Endorse

Kentucky Department of Fish & Wildlife Resources

Doug Dawson

Based on the information provided, the Kentucky Department of Fish & Wildlife Resources has no comments concerning the proposed project. Please contact Doug Dawson at 502-892-4472 or doug.dawson@ky.gov if you have further questions or require additional information.

Kentucky Division of Water

Shawn Hokanson

The project cannot be properly evaluated without a specific location of construction. Portions of the project may be in the regulated floodplain. If the work involves underground utilities only with no ground surface elevation changes, and no construction of aboveground structures in the regulated floodplain, or installation of utility poles, this project may be covered under the Floodplain General permit if any construction for stream crossings within the regulated floodplain are conducted by directional boring. The Floodplain General permit can be downloaded from <https://eec.ky.gov/Environmental-Protection/Water/FloodDrought/Documents/Floodplain%20General%20Permit.pdf>. If open trenching for stream crossings within the floodplain are required, the project would require a Stream construction permit from the Division of Water (<https://eec.ky.gov/Environmental-Protection/Water/FloodDrought/Pages/UnderstandYourFloodHazards.aspx>), if a USACE 404 permit is required, a water quality certification would also be required). The stream construction application serves as the WQC application also, but there are additional federal application requirements.

Kentucky Transportation Cabinet

Joseph Plunk

For any new access to the adjacent state highway (KY 1041/Watermelon Road), please contact KYTC District 3 Permits, 270-746-7898.

KY Division of Water

Chip Zimmer

This proposed project is not within a designated Source Water Protection Area. Questions should be directed to Ben Currens at 502-782-5227 or Benjamin.Currens@ky.gov.

KY Heritage Council

Yvonne Sherrick

To receive a review from the KY Heritage Council/State Historical Preservation Office (SHPO) you must follow the instructions located on their website at <http://www.heritage.ky.gov/siteprotect/>. There you will find the required documents for the Section 106 Review and Compliance for 36 CFR Part 800. This Section 106 submission process to SHPO will assist applicants and agencies in providing the appropriate level of information to receive comments from SHPO. If you have any questions please contact Yvonne Sherrick, Administrative Specialist III, (502) 564-7005, Ext. 113, yvonne.sherrick@ky.gov.

Please note: If your project is funded through Transportation Alternative (TAP), Transportation Enhancements (TE), Congestion, Mitigation, Air Quality (CMAQ), or Safe Routes to School (SRTS) you will need to send this information to Michael Jones, Historic Preservation Program Administrator with the Kentucky Transportation Cabinet via email MichaelR.Jones2@ky.gov or hard copy to Michael Jones, Office of Local Programs, KY Transportation Cabinet, 200 Mero Street Frankfort, KY 40622. Do not send materials directly to SHPO if your project involves funding from these four sources as it will cause delays in the review process. Michael Jones will consult directly with the SHPO on projects with these funding sources to complete the Section 106 review.

KY. Division of Water

Kurtis Spears

The proposed work is endorsed by the Groundwater Section of the Watershed Management Branch. However, the proposed work is located in an area with a high potential for karst development where groundwater is susceptible to direct contamination from surface activities. It is our recommendation that proposed work be made aware of the requirements of 401 KAR 5:037 and the need to develop a Groundwater Protection Plan (GPP) for the protection of groundwater resources within that area. Questions should be directed to Adam Nolte (502-782-1312) or Kurtis Spears (502-782-7119).