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# SR BELL BUCKLE SOLAR

# DRAFT ENVIRONMENTAL ASSESSMENT

## Bedford County, Tennessee

**Prepared for:**
Tennessee Valley Authority
Knoxville, Tennessee

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## LIST OF ABBREVIATIONS

| Abbreviation | Term/Phrase/Name |
|---|---|
| AC | alternating current |
| ADDT | annual average daily traffic |
| AOI | area of interest |
| APE | Area of Potential Effects |
| AR | anti-reflective |
| ARAP | Aquatic Resource Alteration Permit |
| BGEPA | Bald and Golden Eagle Protection Act |
| BMP | Best Management Practice |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| CO | carbon monoxide |
| CWA | Clean Water Act |
| dBA | A-weighted decibel |
| DC | direct current |
| DFR | digital fault recorder |
| EA | Environmental Assessment |
| EMC | Electric Membership Corporation (Duck River) |
| EO | Executive Order |
| ESA | Environmental Site Assessment |
| E-TRIMS | Enhanced Tennessee Roadway Information Management System |
| FAA | Federal Aviation Administration |
| FEMA | Federal Emergency Management Agency |
| FIRM | Flood Insurance Rate Map |
| FPPA | Farmland Protection Policy Act |
| GHG | greenhouse gas |
| IPaC | Information for Planning and Conservation |
| IRP | Integrated Resource Plan |
| kV | kilovolt |
| LF | linear foot |
| MW | megawatt |
| MVA | mega volt amp |
| NAAQS | National Ambient Air Quality Standards |
| NEPA | National Environmental Policy Act |
| NHPA | National Historic Preservation Act |
| $NO_2$ | nitrogen dioxide |
| NPDES | National Pollutant Discharge Elimination System |
| NPS | National Park Service |
| NRCS | Natural Resources Conservation Service |
| NRHP | National Register of Historic Places |
| NWI | National Wetlands Inventory |
| NWP | Nationwide Permit |
| OSHA | Occupational Safety and Health Administration |
| PCN | Pre-Construction Notification |
| PEM | Palustrine Emergent (wetland type) |
| PFO | Palustrine Forested (wetland type) |
| PGA | peak ground acceleration |
| $PM_{10}$ | particulate matter having a diameter of less than or equal to 10 microns |

| | |
|---|---|
| $PM_{2.5}$ | particulate matter having a diameter of less than or equal to 2.5 microns |
| PMU | phasor measurement unit |
| PPA | power purchase agreement |
| PSS | Palustrine Scrub-Shrub (wetland type) |
| PUB | Palustrine Unconsolidated Bottom (wetland type) |
| PV | photovoltaic |
| SCADA | Supervisory Control and Data Acquisition |
| SHPO | State Historic Preservation Officer |
| $SO_2$ | sulfur dioxide |
| SPCC | Spill Prevention, Control, and Countermeasure |
| SRC | Silicon Ranch Corporation |
| SR Bell Buckle | SR Bell Buckle, LLC |
| SWPPP | Stormwater Pollution Prevention Plan |
| TDEC | Tennessee Department of Environment and Conservation |
| TDOA | Tennessee Division of Archaeology |
| TDOT | Tennessee Department of Transportation |
| TL | transmission line |
| TN | Tennessee |
| TN-QHP | Tennessee Qualified Hydrologic Professional |
| TT | transfer trip |
| TVA | Tennessee Valley Authority |
| UGB | Urban Growth Boundary |
| USACE | U.S. Army Corps of Engineers |
| USDA | U.S. Department of Agriculture |
| USEPA | U.S. Environmental Protection Agency |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| WWC | wet weather conveyance |

# CHAPTER 1

## 1.0 INTRODUCTION

The Tennessee Valley Authority (TVA) has entered into a Power Purchase Agreement (PPA) with SR Bell Buckle, LLC (SR Bell Buckle), a wholly-owned subsidiary of Silicon Ranch Corporation (SRC), in Bedford County, Tennessee. The long-term PPA would provide for TVA's purchase of electric power generated by the solar photovoltaic (PV) facility for 15 years.

In order to fulfill the PPA, SR Bell Buckle plans to develop a solar PV facility totaling approximately 367acres, north of Frank Martin Road in Bedford County, Tennessee (TN) (Parcel No. 050 008.00). While design of the facility is in the process of being finalized, the conceptual plan includes monofacial solar modules comprised of approximately 110,478 individual panels arranged over roughly 238 acres.

For the purpose of this Environmental Assessment (EA), the project site is defined as the 367-acre subject property. The proposed facility would occupy approximately 238 acres of the roughly 367-acre property to be owned by SRC and leased to SR Bell Buckle for the project. The proposed facility would have an alternating current (AC) generating capacity of 35 megawatts (MW) and would interconnect to the Duck River Electric Membership Corporation (Duck River) distribution network. The project would consist of multiple parallel rows of PV panels on single-axis tracking structures, direct current (DC) to AC inverters, and one transformer. It would connect to the existing Duck River Electric Membership Corporation's (EMC) KS Phillips, TN 161 kilovolt (kV) Substation, southwest of SR Bell Buckle's southern boundary. The panels would face 60 degrees east and track the sun throughout the day until they face 60 degrees west at sunset. The PV panel surface material would be a smooth glass with an anti-reflective (AR) coating.

Figure 1 identifies the location of the proposed solar facility.

### 1.1 PURPOSE AND NEED FOR ACTION

TVA is a corporate agency of the United States and the largest public power provider in the country. Through their partnership with 153 local power companies, TVA supplies energy across 80,000 square miles for 10 million people, 750,000 businesses, and 56 large industrial customers, including military installations and the U.S. Department of Energy facilities at Oak Ridge, Tennessee. Their service area includes parts of seven southeastern states called the Tennessee Valley. Since 1933, TVA's mission has been to serve the people of the region to make life better. TVA continues to execute on that mission today as it serves the Tennessee Valley through its commitment to leadership and innovation in energy, the environment and economic development. TVA has one of the largest, most diverse, and cleanest energy-generating systems in the nation characterized by low carbon, low rates, and high reliability – maintaining 99.999 percent reliability to customers since 2000.

TVA produces or obtains electricity from a diverse portfolio of energy sources, including solar, hydroelectric, wind, biomass, fossil fuel, and nuclear. The 2011 TVA Integrated Resource Plan (IRP) (IRP; TVA 2011) established the goal of increasing its renewable energy generating capacity by 1,500 to 2,500 MW by 2020. The IRP identified the various resources that TVA intends to use to meet the energy needs of the TVA region over the 20-year planning period while achieving TVA's objectives to deliver reliable, low-cost, and cleaner energy and to reduce environmental impacts. TVA's 2015 IRP (TVA 2015a) reinforced the continued expansion of

renewable energy generating capacity, including the addition of between 175 and 800 MW (AC) of solar capacity by 2023. In June 2019, TVA released the final 2019 IRP and the associated EIS (TVA 2019a). This updated IRP provides further direction on how TVA will deliver clean, reliable, and affordable energy in the Valley over the next 20 years, and the associated EIS describes the natural, cultural and socioeconomic impacts associated with the IRP. The 2019 IRP recommends solar expansion and anticipates growth in all scenarios analyzed, with most scenarios anticipating 5,000-8,000 MW and one anticipating up to 14,000 MW by 2038 (TVA 2019a).

In 2019, customer demand prompted TVA to release a Request for Proposal (RFP) for renewable energy resources (2019 Renewable RFP). The PPAs that resulted from this RFP (including the SR Bell Buckle PPA) will help TVA meet immediate needs for additional renewable generating capacity in response to customer demands and fulfill the renewable energy goals established in the 2019 IRP. The Proposed Action would provide cost-effective renewable energy consistent with the IRP and TVA goals.

## 1.2 BACKGROUND

Under the PPA, SR Bell Buckle would fund, build, own, and operate the solar energy facility.

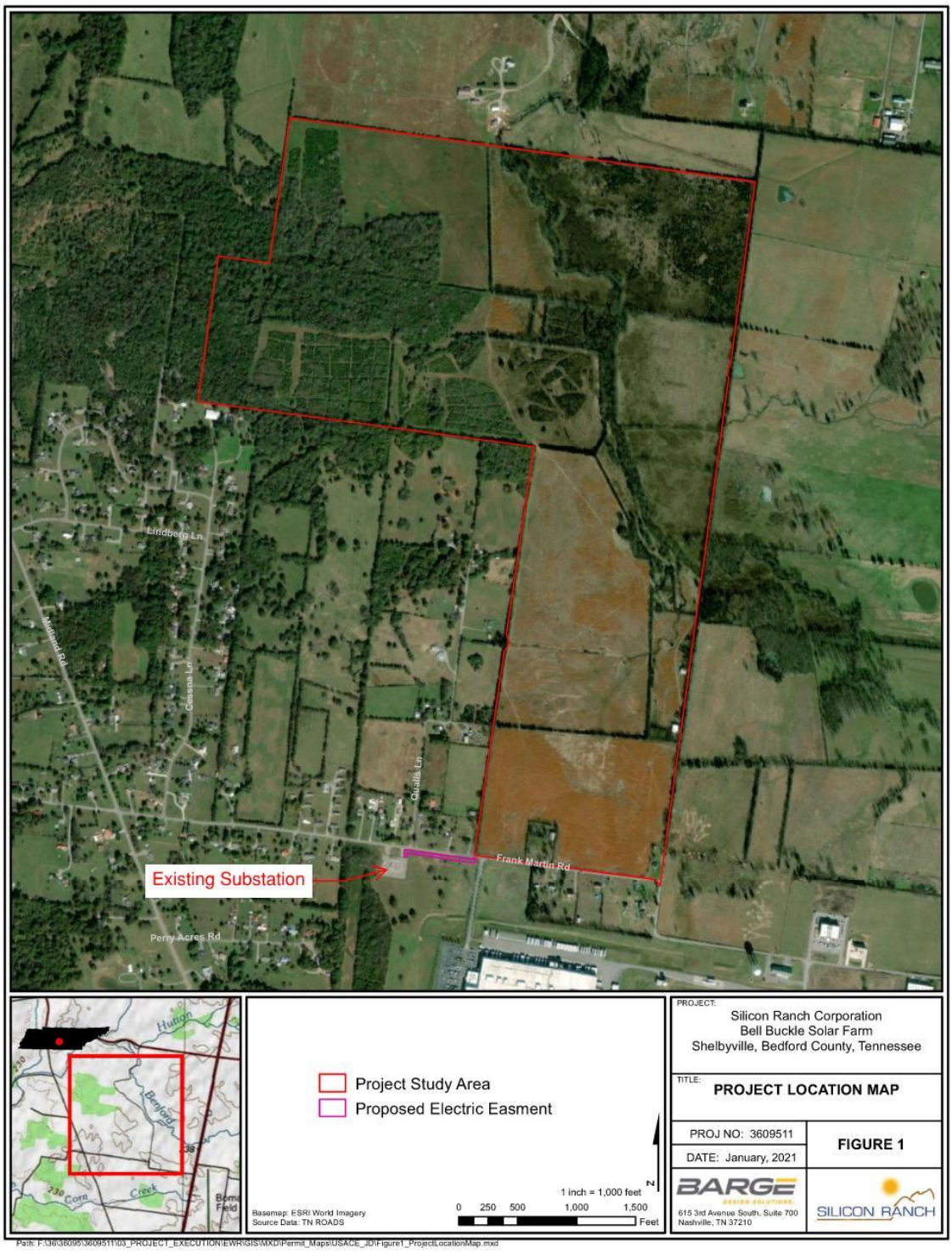


***Figure 1. Bell Buckle – Project Location***

## 1.3 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

The National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] §§ 4321-4347) requires Federal agencies to evaluate the potential environmental impacts of their proposed actions. This EA has been prepared consistent with the Council on Environmental Quality (CEQ) regulations for implementing NEPA at 40 Code of Federal Regulations (CFR) 1500-1508 issued in 1978 (43 FR 55990, Nov. 29, 1978), with minor revisions in 1979 and 1986, as well as TVA regulations at 18 CFR 1318 issued in 2020 (85 FR 17434, Mar. 27, 2020). Because TVA began this EA before CEQ issued revised NEPA regulations (85 FR 43304-43376, Jul. 16, 2020), TVA applied the previously promulgated 1978 CEQ regulations and TVA's 2020 NEPA regulations in the preparation of this EA (see 40 CFR 1506.13). TVA's Proposed Action, including connection to the existing substation southwest of the project site, would result in the construction and operation of the proposed solar facility by SR Bell Buckle. The environmental review has been carried out to evaluate potential impacts of TVA's Proposed Action (the purchase of power under the PPA) and potential impacts related to the construction and operation of the proposed project.

The following chapters describe the existing environment in the project site (Figure 1), analyze potential environmental impacts associated with the Proposed Action Alternative and the No Action Alternative, and identify and characterize cumulative impacts resulting from the proposed project in relation to other ongoing or reasonably foreseeable proposed activities within the surrounding area of the project site.

Potentially affected areas within and beyond the project site help define the area of impact. Chapter 3 discusses the extent of the area of impact with respect to certain environmental resources, e.g., impacts to archaeological resources are limited to areas of physical disturbance while impacts to historic architectural resources include structures within the proposed project's viewshed.

TVA's commitment to purchase renewable power is contingent upon the satisfactory completion of an appropriate environmental review and TVA's determination that the Proposed Action will be "environmentally acceptable." To be deemed "environmentally acceptable," TVA must determine the project would not result in significant impacts to the human environment and is consistent with applicable Federal, state, and local environmental laws and regulations. As part of this process, TVA must evaluate potential impacts resulting from the location, operation, and/or maintenance of the proposed project and determine if the project is consistent with the purposes, provisions, and requirements of applicable Federal, state, and local requirements.

Considering the proposed project and identification of applicable laws, regulations, executive orders (EO), and policies, the following resource areas have been included for discussion and analysis within this EA: land use; geology, soils, and prime farmland; water resources; floodplains; biological resources; visual resources; noise; air quality and greenhouse gases (GHGs); cultural resources; solid and hazardous wastes; public and occupational health and safety; transportation; and socioeconomics and environmental justice.

## 1.4 PUBLIC AND AGENCY INVOLVEMENT

Federal, state and local agencies, interested federally-recognized Native American Tribes, elected officials, and other stakeholders have been sent notification announcing the draft EA's availability for review and comment for a 30-day period. Specifically, the Federal Aviation Administration (FAA) and Bomar Field-Shelbyville Municipal Airport received a copy of the draft EA for review and comment. An electronic version of the draft EA has been posted on the TVA

website where comments can also be submitted electronically. Public notices have been published in local newspapers soliciting comments from other agencies, the general public, and any interested organizations. TVA will receive responses over a 30-day comment period. TVA will carefully review any comments received on the draft EA and address them, as appropriate, in the final EA.

In addition to the 30-day public comment review period, during the rezoning and planning process with the Bedford County Commission and Planning Commission, project neighbors would be notified of project hearings.

## 1.5 REQUIRED PERMITS AND LICENSES

Based on the scope of the proposed construction activities, as described in Chapter 2, the project would likely require a National Pollutant Discharge Elimination System (NPDES) construction general permit issued by the Tennessee Department of Environment and Conservation (TDEC). A general NPDES permit would require the development of a Stormwater Pollution Prevention Plan (SWPPP) and implementation of approved pollution prevention measures. In addition, the proposed stream crossing to accommodate the proposed interior access roads would require a general permit from TDEC (Section 401 of the Clean Water Act (CWA) Aquatic Alteration Resource Permit (ARAP)) and the U.S. Army Corps of Engineers (USACE) (Section 404 of the CWA, Nationwide Permit (NWP) Pre-Construction Notification (PCN)). Appropriate building and electrical permits would be obtained from the Bedford County Building Department and other local entities. If open burning is determined to be the best method for wood waste management, a burn permit would be obtained through the Tennessee Department of Agriculture, Division of Forestry. While SR Bell Buckle is currently exploring the location of the construction and permanent access roads, all potential areas have been included in the environmental review. As currently proposed, permanent access to the facility would be from the south, along Frank Martin Road.

# CHAPTER 2

## 2.0 DESCRIPTION OF THE ALTERNATIVES

As part of the environmental review, the EA analyzes and compares potential impacts related to each considered alternative.

This chapter focuses on the background and understanding of the evaluated alternatives by providing a description of each alternative, a comparison of these alternatives with respect to their potential environmental impacts, and identification of the Preferred Alternative.

This EA evaluates two alternatives: The No Action Alternative and the Proposed Action Alternative.

### 2.1 NO ACTION ALTERNATIVE

The No Action Alternative provides for a baseline of conditions against which the impacts of the Proposed Action Alternative can be measured. Under this alternative, TVA would not purchase power through a 15-year PPA with SR Bell Buckle. The solar facility would not be constructed and operated by SR Bell Buckle. Within the project site, existing conditions, i.e., natural resources, visual resources, physical resources, and socioeconomics, would remain unchanged. The identified land would not be developed into a solar facility and TVA would rely on other energy sources to meet energy supply needs and increased renewable energies as described in the 2019 IRP.

### 2.2 PROPOSED ACTION ALTERNATIVE

The Proposed Action Alternative would provide for the installation and operation of a 35 MW AC solar facility in Bedford County, TN, and TVA's purchase of renewable energy from the facility under a 15-year PPA with SR Bell Buckle. The proposed project would be developed on a 367-acre tract between James Lawrence Road and Frank Martin Road in Bedford County, TN. While the design is in the process of being finalized, the conceptual plan includes monofacial solar modules (horizontal single axis) comprised of approximately 110,478 individual panels arranged over roughly 238 acres.

#### *2.2.1 Solar Facility*

The Proposed Action Alternative would result in the installation of approximately 110,478 individual solar panels arranged over roughly 238 acres of the 367-acre area. The solar arrays would likely be supported by steel piles which would either be driven or screwed into the ground to a depth of 6 to 10 feet. On-site sedimentation basins would be shallow and, to the extent feasible, utilize the existing terrain without requiring extensive excavation. The PV panels would be connected with underground wiring placed in trenches. The trenches would be approximately 3 to 4 feet deep and 1 to 4 feet wide. Figure 2 below provides the overall site layout for the Proposed Action Alternative.

The solar arrays utilized for the proposed facility would be composed of multiple monocrystalline PV modules or panels. 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). The proposed facility would convert sunlight into DC electrical energy within monocrystalline PV panels (Figure 3).

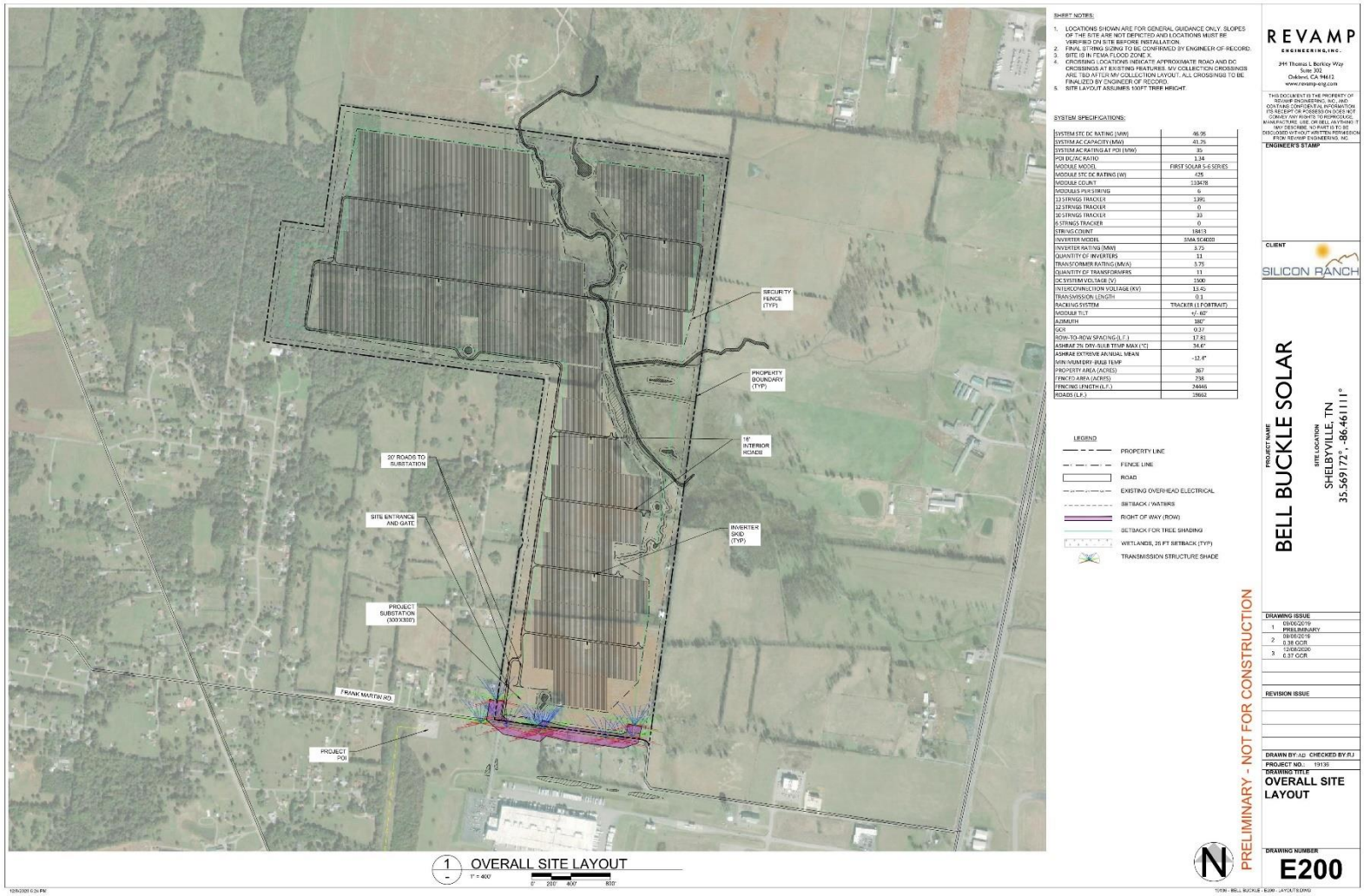


***Figure 2. Bell Buckle – Conceptual Layout***

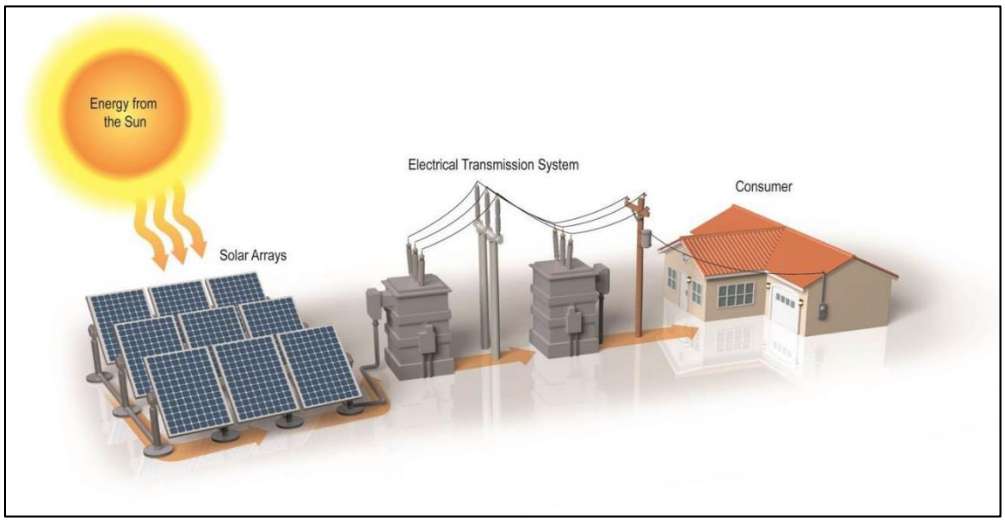


***Figure 3. General energy flow diagram of PV solar system (not to scale)***

The Bell Buckle solar facility would be composed of approximately 110,478 PV panels each capable of producing approximately 445 watts, mounted together in arrays (Figure 3). The arrays would connect to a total of eleven (11) 1,500V power inverters to convert the DC electricity generated by the solar panels into AC electricity, eleven (11) 4.00-mega volt amp (MVA) transformer for the project's electrical collection system, and a riser pole connecting to the Duck River EMC's KS Phillips, TN 161kV substation.

The PV panels would be mounted on motor-operated axis tracker structures, commonly referred to as single-axis trackers. The axis trackers would be designed to pivot the panels along their north-south axes to follow the path of the sun from the east to the west across the sky. The tracker assemblies would be constructed in parallel north-south rows using steel piles installed using either a vibratory pile driver or helical piles with a depth of 6 to 10 feet below grade (Figure 4).

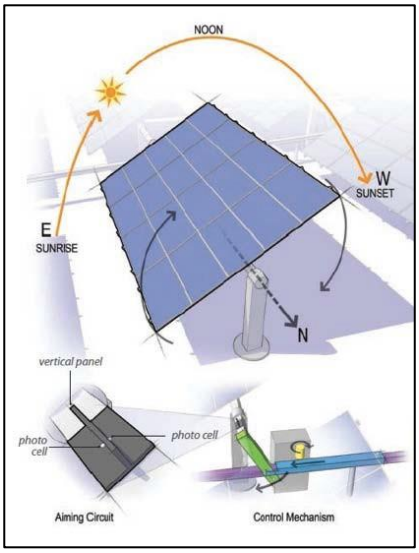


***Figure 4. Diagram of single-axis tracking system (not to scale)***

The PV modules would be electrically connected in series (called a "string") by wire harnesses that conduct DC electricity to combiner boxes. Each combiner box would collect power from strings of modules and feed a power conversion station via cables placed in excavated trenches. The excavated trenches would be approximately 3 to 4 feet deep and 1 to 4 feet wide. Each trench would be backfilled with project-site native soil and then appropriately compacted. Aboveground cables would be used to connect the modules to harnesses that lead wiring to combiner boxes.

The AC power from each individual inverter would be connected to the transformer. The underground voltage collection circuits would deliver AC electricity from the transformer to the project's riser pole connecting to the Duck River EMC overhead transmission line (TL).

The PV panels would be installed in parallel north-south rows and arranged to avoid wetlands on-site. Two streams on-site would be impacted by the proposed access roadway. The arrays would contain an inverter and approximately 1,600 trackers of panels. Buried electrical cables would connect the rows of PV panels to 1,500V power inverters, each connecting to a pad-mounted 4.00 MVA transformer on site. The buried cables would be linked together in series from each transformer to the point of interconnection. As described above, all trenches for buried cables on the site would be backfilled with native soil, and the ground surface would be returned to its original grade. The project would connect to a new riser pole and interconnect with the existing 13.45 kV distribution line already in place. The new riser pole would be constructed and maintained by Duck River EMC. The energy produced from the 35-MW AC site would be sold to TVA.

### *2.2.2 Electrical Interconnection*

As part of this project, Duck River EMC would install two (2), 26kV transmission lines from Duck River EMC's KS Phillips, TN 161kV Substation. Duck River would reconfigure the station, add a second 161/26kV transformer and two 26kV breakers to connect to the site. TVA would add the following facilities to the substation:

- Provide transfer trip (TT) and local relays to protect the TVA system from abnormal system conditions.
- Install two local relays to detect abnormal frequency and voltage along with 3V0 detection for 161kV ground faults.
- Provide an APP digital fault recorder (DFR) for phasor measurement unit (PMU) capability and event analysis purposes. TT and relay pickups to trigger recording.
- Install a Supervisory Control and Data Acquisition (SCADA) remote terminal unit (RTU).
- 161kV potentials to be utilized for voltage regulation.
- Duck River EMC would provide TVA remote access (SCADA control) to open breakers and local access to open isolation switching devices.

### *2.2.3 Construction*

Construction of the solar power facility generally requires site preparation (surveying and staking, removal of tall vegetation and small trees, light grading and clearing, installation of security fencing, installation of erosion control Best Management Practices (BMPs), and preparation of construction laydown areas) prior to solar array assembly and construction, which includes driving steel piles for the tracker support structures, installation of solar panels and electrical connections, and system testing and verification.

SR Bell Buckle is currently exploring the location of the construction and permanent access roads, keeping safety as the priority. These potential areas have been included in the environmental review. As currently proposed, permanent access to the facility would be from Frank Martin Road to the south. Benford Creek, discussed later in the document, would be disturbed to accommodate a proposed road crossing on site. It is anticipated that permitting activities related to Sections 401 and 404 of the CWA (33 U.S.C. § 1251 et seq.) would be required.

Appropriate BMPs would be implemented and maintained during construction and operation of the facility. SRC's standard practice, which would be employed by SR Bell Buckle, is to work with the existing landscape (e.g., slope, drainage, utilization of existing roads) where feasible to minimize or eliminate grading work to the greatest extent possible. Any required grading activities would be performed with portable earthmoving equipment and would result in a consistent slope

to the local land. Prior to grading, native topsoil would be removed from the area to be graded and stockpiled on site for redistribution over the disturbed area after the grading is completed. Silt fences, sedimentation basins, and other appropriate controls would be used, as needed, to minimize exposure of soil and to prevent eroded soil from leaving the work area. Disturbed areas would be seeded post-construction using a mixture of certified weed-free, low-growing native grass seed obtained from a reputable seed dealer and in compliance with the requirements established by the local office of the Natural Resources Conservation Service (NRCS). Erosion control measures would be inspected and maintained until vegetation in the disturbed areas has returned to the preconstruction conditions or the site is permanently stabilized. Water would be used for soil compaction and dust control during construction.

Grading would consist of the excavation and compaction of earth to meet the final design requirements. Limited to no grading is expected at the project location as the site is relatively flat and would not require any off-site or on-site hauling. Chipping and spread of minimal debris from tree clearing on the site would occur to minimize construction wastes. If burning occurs, only vegetation and untreated wood would be burned, and no burning of other construction debris is anticipated. If open burning is determined to be the best method for wood waste management, a burn permit would be obtained from the Tennessee Department of Agriculture, Division of Forestry and any additional permits needed to comply with local, state, and federal permitting requirements. In accordance with TDEC erosion and sediment control requirements, a minimum 30-foot buffer width surrounding all streams and wetlands would be established as an avoidance measure prior to any clearing, grubbing, or grading activities conducted by the construction contractor (TDEC 2012). Once sensitive areas are marked, construction areas would be cleared and mowed of vegetation and miscellaneous debris. Mowing would continue as needed to contain growth during construction.

To manage stormwater during construction, sediment traps and erosion control silt fences would be utilized. All wetlands and associated 30-foot buffers would be protected by erosion control silt fences, and sediment traps would be placed in strategic drainage areas to prevent sediment from entering on-site wetlands. Stream buffers would be protected by erosion control silt fences, and sediment traps would be placed in strategic drainage areas to prevent sediment from entering the streams. Note that stream impacts would occur from the proposed access roadway. Off-site sediment migration would be moderated by the placement of silt fences around the entire area to be cleared. These stormwater BMPs would prevent sediment from entering on-site streams and wetlands and prevent sediment migration off site.

A construction assembly area (laydown area) would be required for worker assembly, vehicle parking, and material storage during construction. This area would be on site for the duration of construction. A temporary construction trailer, used for material storage and office space, would be parked on site. Following completion of construction activities, all trailers, unused materials, and construction debris would be removed from the site. No operations and maintenance buildings or other permanent structures would be on site.

Construction would be sequenced to minimize the time that bare soil on the disturbed areas is exposed. As described above, silt fences would surround the perimeter of the development footprint to be cleared and graded. 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. Disturbed areas including but not limited to road shoulders, laydown areas, ditches, and other project-specific locations would be seeded post-construction. If conditions require, soil

would be stabilized by mulch or seed. Where required, hay mulch would be applied at 3 tons per acre and well distributed over the area. Erosion control measures would be inspected and maintained until vegetation in the disturbed areas has returned to the preconstruction conditions or the site is considered permanently stable. As part of NPDES permit authorization (see Section 1.4), a 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 design of the tracker support structures could vary depending on the final PV technology and vendor selected. Typical installations of this type are constructed using steel support piles. The driven steel pile foundation is typically galvanized and used where high load bearing capacities are required. The pile is driven with a hydraulic ram. Soil disturbance is restricted to the pile insertion location with temporary disturbance from the hydraulic ram machinery, which is about the size of a small tractor. Screw piles are another option for PV foundations which are driven into the ground with a truck-mounted auger. Screw piles create a similar soil disturbance footprint as driven piles.

Solar panels would be manufactured off site and shipped to the site ready for installation. If concrete pads are required for the drive motors, they would be precast and brought to the site via flatbed truck. Once the majority of components are placed on their respective foundations and structures, electricians and other workers would run electrical cabling throughout the solar field.

The proposed project would include new on-site power pole connections to the existing Duck River distribution line. The Duck River connection would exit the site via two (2) 26kV overhead lines and connect to an existing 13.45kV line or directly to the Duck River RMC's KS Phillips, TN 161kV Substation. After the equipment is electrically connected, electrical service would be tested, and motors and their controllers would be checked. As the solar arrays are installed, the balance of the facility would continue to be constructed and installed, and the instrumentation would be installed. Once all of the individual systems have been tested, integrated testing of the project would occur.

Within the 367-acre solar facility site, the 238-acre area containing the solar arrays and associated electrical infrastructure would be securely fenced with 7-foot-high chain-link fencing with three strands of barbed wire on the top throughout construction and the operation of the project. The proposed riser pole and electrical connection are located south of the site, along Frank Martin Road. The proposed TL would not be fenced. Construction activities would take approximately 10 months to complete using a crew of approximately 200 people at the peak of construction. Work would generally occur 6 days per week (Monday through Saturday) from 7 am to 5 pm. Additional hours could be necessary to make up schedule deficiencies or to complete critical construction activities.

### *2.2.4 Project Operations*

During operation of the solar facility, minor disturbance could occur to soils. Routine maintenance would include periodic motor replacement, inverter air filter replacement, fence repair, vegetation control, and periodic array inspection, repairs, and maintenance. The Proposed Action Alternative would implement an integrated vegetation management plan, including biological (i.e., managed sheep grazing), mechanical, and chemical controls as needed. Traditional trimming and mowing would be performed periodically (about 4 mowing events per year) to maintain the vegetation at a height ranging from 6 inches to 2 feet. Selective use of herbicides may also be employed around

structures to control weeds. Products would be used as needed to control noxious weeds per local, state, and federal regulations and would be applied by a professional contractor.

No major physical disturbance would occur as a result of facility operation. 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 1-degree angle every few minutes. This movement is barely perceptible. In the late afternoon, module rotation would start to backtrack west to east in a similar slow motion to minimize shading. At sunset the modules would track to a flat stow position. Otherwise, the PV modules would simply collect solar energy and transmit it to the Duck River EMC distribution system. With the exception of fence repair, vegetation control, and periodic array inspection, repairs, and maintenance, the facility would require relatively little human activity during operation. No water or sewer service, or permanent lighting would be required on site during operations.

The project site would not be staffed during operation; however, inspection and maintenance would be required biannually and in the case of equipment failures. At these times, up to four people would be on site for up to four days. Biannual inspections would involve drawing transformer oil samples and identifying any physical damage to panels, wiring, and interconnection equipment. Vegetation on the site would be maintained to control growth and prevent shading of the PV panels or interference with the tracking mechanisms. Traditional trimming and mowing would be performed on a quarterly basis, depending on growth rate, to maintain the vegetation. Selective use of spot herbicides may also be employed around structures to control any invasive weed outbreak. Precipitation in this region is adequate to remove dust and other debris from the PV panels while maintaining energy production; therefore, manual panel washing is not anticipated unless a specific issue is identified. The proposed project facility would be monitored remotely to identify any security or operational issues. If a problem is discovered during nonworking hours, a repair crew or law enforcement personnel would be contacted if an immediate response was warranted.

### *2.2.5 Decommissioning and Reclamation*

Following the expiration of the 15-year PPA with TVA, SR Bell Buckle would reassess the site operation and determine whether to cease operation or attempt to enter into a new PPA or other arrangement. If TVA or another entity is willing to enter into such an agreement, the facility would continue operating. If no commercial arrangement is possible, the facility would be decommissioned and dismantled and the site restored. In general, the majority of decommissioned equipment and materials would be recycled. Materials that cannot be recycled would be disposed of at approved facilities SR Bell Buckle would develop a decommissioning plan to document recycling and disposal of materials in accordance with applicable local, state, and federal laws and regulations.

## 2.3 COMPARISON OF ALTERNATIVES

This EA evaluates the potential environmental effects that could result from implementing the No Action Alternative or the Proposed Action Alternative at the proposed solar facility in Bedford County, TN. The analysis of impacts in this EA is based on current and potential future conditions on the property and within the surrounding region. The summary and comparison of impacts by alternative for each resource area evaluated is provided in Table 1.

## 2.4 MITIGATION MEASURES

SR Bell Buckle would implement the following minimization and mitigation measures in relation to resources potentially affected by the proposed project:

- Comply with the terms of the SWPPP prepared as part of the NPDES permitting process and implement other routine BMPs, such as placement of silt fences and sediment traps along buffer edges, and proper vehicle maintenance to reduce the potential for adverse impacts to groundwater.
- Design of the final layout would minimize direct impacts to aquatic features.
- Comply with the conditions of the TDEC Section 401 and USACE 404 of the CWA (33 U.S.C. § 1251 et seq.) permits, as applicable.
- Limit tree clearing to August 1 through March 31, when Federally listed bat species are not present on the landscape in Tennessee in accordance with commitments outlined in the Endangered Species Act Section 7(a)(2) consultation with USFWS {in progress}.
- Should traffic flow be a problem for local developments, SRC would consider staggered work shifts to space out the flow of traffic to and from the project site. Use of such mitigation measure would minimize potential adverse impacts to traffic and transportation to less than significant levels.
- Any road construction would be done in such a manner that upstream flood elevations would not be increased by more than 1.0 foot.

## 2.5 THE PREFERRED ALTERNATIVE

The Proposed Action Alternative has been identified as the Preferred Alternative. This alternative would generate renewable energy for TVA and its customers to help meet TVA's renewable energy goals. The Proposed Action Alternative would help TVA meet future energy demands on the TVA system and would meet TVA's purpose and need.

### *Table 1. Summary and Comparison of Alternatives by Resource Area*

| Resource Area | Impacts from No Action Alternative | Impacts from Proposed Action Alternative |
|---|---|---|
| Land Use and Zoning | No impacts anticipated | Minor direct and indirect adverse impacts are anticipated. A small portion of agricultural land would be lost due to project development. |
| Geology, Soils, and Prime Farmland | No impacts anticipated | Geology and Soils: Minor direct impacts to geology and soils, resulting from minor to minimal increases in erosion and sedimentation anticipated during construction and operation. While in operation, minor adverse impacts to soils would be offset by beneficial effects of vegetative management.<br>Farmland: Minor impacts to prime farmland are anticipated; no permanent or irreversible conversion of farmland would occur. |
| Water Resources | No impacts anticipated | Groundwater: No direct adverse impacts are anticipated; minor beneficial indirect impacts to groundwater due to reduction in fertilizer and pesticide agricultural use for the duration of the project.<br>Surface Water: Minor direct impacts to streams anticipated to accommodate the proposed access roads. Minor indirect impacts to water resources could occur from stormwater runoff during construction. No impacts to wetlands are anticipated.<br>Floodplains: No direct or indirect impacts are anticipated from the development of the solar facility. No significant impact on floodplains and their natural and beneficial values are anticipated. |
| Biological Resources | No impacts anticipated | Vegetation: Direct impact to vegetation by clearing up to approximately 122 acres of trees and other tall vegetation within the project area proposed for development.<br>Wildlife: Temporary displacement of wildlife and migratory birds during clearing and construction. Significant impacts to migratory bird populations are not anticipated. Minor impacts on common wildlife species due to the existence of project components and increased human presence.<br>Rare, Threatened and Endangered Species: Section 7 consultation under ESA is underway regarding potential effects to the federally listed Indiana bat and northern long-eared bat due to the loss of potential summer roosting habitat. With minimization measures impacts are not expected to be significant. |
| Visual Resources | No impacts anticipated | Temporary, minor direct impacts on visual resources are anticipated during the construction phase due to increased traffic. While the views from surrounding properties may be slightly affected, the overall appearance of the solar panels will blend in with the nearby airport and industrial and commercial developments. |
| Noise | No impacts anticipated | Minor temporary direct impacts would occur during construction activities. Minimal to negligible impacts during operations and maintenance. |
| Air Quality and Greenhouse Gas Emissions | No impacts anticipated | Air quality: Minor direct impacts to air quality would occur during construction activities from operation of equipment. No negative impacts to air quality are anticipated as a result of operation of the project.<br>Greenhouse gas emissions: Temporary impacts to GHG emissions expected during construction would be negligible. Offsetting beneficial effects would also occur due to the nearly emissions free power generated by the solar facility, offsetting power that would otherwise be generated by the combustion of fossil fuels. |
| Cultural Resources | No impacts anticipated | No direct or indirect impacts anticipated from development of the solar facility. |
| Solid and Hazardous Wastes | No impacts anticipated | Minor adverse impacts anticipated from development of the solar facility. Construction waste generated during construction activities would be directed to local landfills. Hazardous wastes would be handled, stored, and disposed of in accordance with the SWPPP and applicable state and federal laws and regulations. Impacts during system operation would be negligible through implementation of a recycling program. No adverse effects to waste management are anticipated with the use of BMPs. |
| Public and Occupational Health and Safety | No impacts anticipated | Minor temporary adverse impacts during construction. No adverse effects are anticipated with the use of BMPs. No public health or safety hazards are anticipated as a result of the operation. |

| | | |
|---|---|---|
| Transportation | No impacts anticipated | Minor temporary adverse impact during construction. No direct impacts to transportation are anticipated during operation. No indirect impacts to transportation are anticipated as a result of the operation. |
| Socioeconomics and Environmental Justice | No impacts anticipated | Socioeconomics: Minor beneficial direct, indirect, and cumulative impacts during construction and operation and maintenance activities by creation of local jobs and potential for expansion of future solar energy systems into the region.<br>Environmental Justice: No disproportionately adverse impacts are anticipated to minority or low-income populations. |

# CHAPTER 3

## 3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Chapter 3 discusses the existing environmental, social, and economic conditions of the proposed project site and surrounding areas with potential to be impacted by the proposed activities. In addition to the existing conditions, potential environmental effects associated with each considered alternative are identified and discussed throughout the chapter.

### 3.1 LAND USE

Considering the proposed actions, land use of the project site and surrounding properties have been included in the evaluation of potential impacts. This section provides a discussion of the existing land use within and surrounding the project site and potential impacts to land use associated with the No Action and Proposed Action Alternatives.

#### *3.1.1 Affected Environment*

The subject property lies between the towns of Deason and Shelbyville, in a predominantly rural, agricultural area of Bedford County, Tennessee. Deason is located approximately 1.6 mile to the northeast and the Shelbyville jurisdictional limits end adjacent to the site, south of Frank Martin Road. The area is largely rural and characterized by small neighborhoods and farmland. Bomar Field-Shelbyville Municipal Airport is 0.7 mile from the project site, across US-231. Additionally, Benford Creek passes through the northeastern portion of the property. The landscape is predominately pasture, with some forested areas.

The project site is primarily used for pastureland and hunting with portions of surrounding woodland. A house and three sheds are located on the southeastern portion of the site. Currently, the adjoining properties to the north, east, and west are residential and agricultural. There are several residential parcels immediately southwest of the site. There are approximately 145 residential structures within one half mile of the project site. The vast majority of these are single family structures of varying ages. There are eight (8) agricultural properties located within one half mile of the project site, several industrial offices, Carton Center medical facility, and a couple commercial structures. Immediately south of Frank Martin Road, on Airport Business Road, is an existing Walmart Distribution Center.

The site is currently zoned for agriculture; however, as part of the development process, the project site would be rezoned to industrial use. During the rezoning and planning process with the Bedford County Commission and Planning Commission, project neighbors would be notified of project hearings. Based on the Shelbyville future land use map, Shelbyville is planning light industrial development immediately south and south east of the project site.

There are no recreation or natural areas identified within a one-half mile of the project site.

#### *3.1.2 Environmental Consequences*

##### *3.1.2.1 No Action Alternative*

Under the No Action Alternative, the proposed solar facility would not be built, and the land uses of the site would not change. Existing land use would be expected to remain a mix of agricultural, forested, and residential for the foreseeable future.

#### *3.1.2.2 Proposed Action Alternative*

Under the Proposed Action Alternative, the proposed solar facility would result in the conversion of the site from agricultural uses to industrial. Given the rural nature of the project site and surrounding area, the Proposed Action Alternative would introduce a larger industrial footprint than the existing distribution center south of Frank Martin Road. The proposed scope requires the proposed zoning designation to receive a Special Exception from the board of Zoning Appeals.

Any portions of the project site outside of the 238-acre solar facility footprint and associated TL would remain undeveloped with no farming activities or other activities occurring other than general maintenance as required for operation of the facility. Installation of the solar facility would increase industrial development in this portion of Bedford County, TN. If the facility were to be decommissioned, the majority of land could be returned to agriculture or other use as allowed by local zoning regulations. Overall, impacts to land use resulting from the Proposed Action Alternative would be minimal.

Since the TVA substation modifications would occur within the footprint of the existing substation, no land-use related impacts would occur from the proposed modifications.

## 3.2 GEOLOGY, SOILS, AND PRIME FARMLAND

Considering the proposed actions, geology, soils, and prime farmland have been included in the evaluation of potential impacts. This section provides a discussion of the existing geology, soils, and prime farmland within the project site and potential impacts to geology, soils, and prime farmland associated with the No Action and Proposed Action Alternative.

### *3.2.1 Affected Environment*

#### *3.2.1.1 Geology*

The project site is located in Middle Tennessee which is divided into the Central Basin and the surrounding Highland Rim physiographic provinces. The project is located in Bedford County and is within the Central Basin. The site is mapped as being underlain by the Stones River Group, an Ordovician-aged limestone.

#### *3.2.1.2 Paleontology*

Ordovician sedimentary rocks cover a large portion of central Tennessee in the Central Basin. These rocks are primarily limestone deposited in the warm, shallow sea that covered the state during this time. Fossils of brachiopods, bryozoans, and crinoids are abundant in these rocks. Other Ordovician fossils in Tennessee include conodonts, trilobites, bivalves, sponges, and unusual echinoderms such as edrioasteroids. In the middle and later parts of the Ordovician, mountain building to the east (the Taconic Orogeny) caused the edge of the continent to warp downward into a deep-water basin. Sediments eroding off the rising mountains were carried westward into the sea, eventually filling the basin and pushing the shoreline toward the west. No significant fossil finds have been published or mapped near the project site. It is unlikely that any significant fossil remains are present within the project boundary as the area is not typically associated with paleontological finds (PaleoPortal, 2020).

#### *3.2.1.3 Geologic Hazards*

Potentially hazardous geological conditions can include the following: landslides, volcanoes, earthquakes/seismic activity, and subsidence/sinkholes. The project site does not have conditions for a majority of these types of hazards. The project site is located on relatively stable ground and 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. As the entire project site is underlain by limestone, karst features such as sinkholes and caves could potentially be present or form. Upon review of the topographic map for the area, no sinkholes or closed depressions are mapped nearby; however, this does not preclude their existence.

Seismic activity at the project 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 United States Geological Survey (USGS) Earthquake Hazards Program publishes a seismic hazard map (Figure 5) that display the PGA with 10 percent (1 in 500-year event) probability of exceedance in 50 years. The potential ground motion for the proposed project site is 0.12g, for a PGA with a 10 percent probability of exceedance within 50 years (USGS 2018).

*3.2.1.4 Soils*

The project site contains eight (8) known soil types. The predominant soil on the project site is Talbott silt loam, comprising of approximately 27.5percent of the on-site soil. The remaining main soil types include Talbott-Rock outcrop complex (TrC), Godwin silt loam (Go), and Eagleville silty clay loam (Ea). Figure 6 below shows the approximate distribution area of each soil type while Table 2 provides a list of soils identified within the project site area of interest (AOI), defined as the 367-acre project site

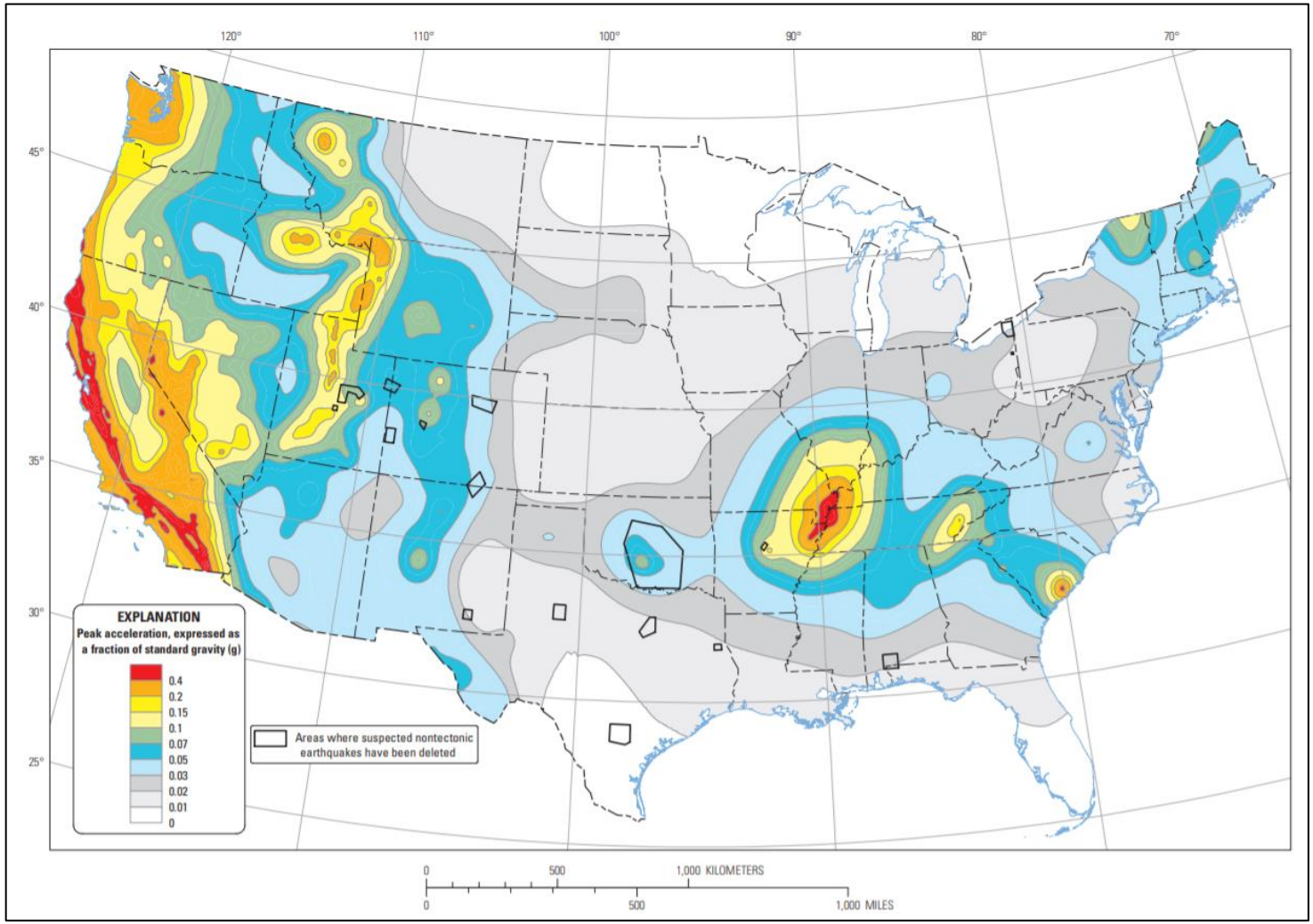


***Figure 5. Ten-percent Probability of Exceedance in 50 Years Map of Peak Ground Acceleration***

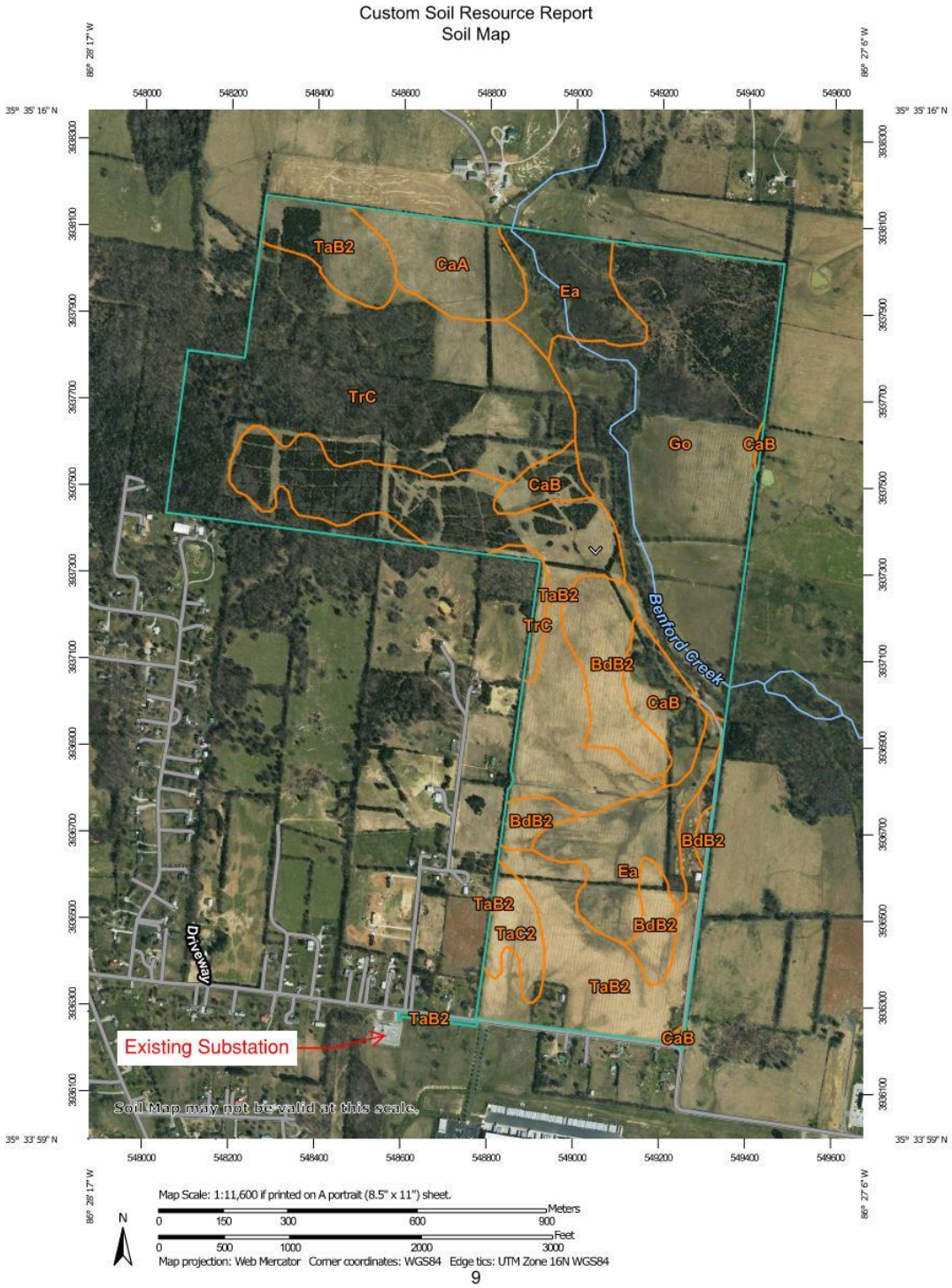


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***Figure 6. Site Soil Map***

***Table 2. Site Soils***

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| BdB2 | Bradyville silt loam, 2 to 5 percent slopes | 23.6 | 6.4% |
| CaA | Capshaw silt loam, 0 to 2 percent slopes | 15.8 | 4.3% |
| CaB | Capshaw silt loam, 2 to 5 percent slopes | 14.6 | 4.0% |
| Ea | Eagleville silty clay loam, frequently flooded | 34.9 | 9.5% |
| Go | Godwin silt loam, frequently flooded | 86.1 | 23.4% |
| TaB2 | Talbott silt loam, 2 to 5 percent slopes, eroded | 96.7 | 26.3% |
| TaC2 | Talbott silt loam, 5 to 12 percent slopes, eroded | 6.6 | 1.8% |
| TrC | Talbott-Rock outcrop complex, 2 to 15 percent slopes | 88.9 | 24.2% |
| **Totals for Area of Interest** | | **367.2** | **100.0%** |

***Source:*** https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

Below is a brief description of some of the more prominent soils identified on the project site:

Bradyvile silt loam (BdB2) is well drained, 2 to 5 percent slopes, with a low runoff class, and more than 80 inches depth to the water table. Capshaw silt loam (CaA) has 0 to 2 percent slopes, is moderately well drained, and is about 24 to 40 inches depth to the water table. Capshaw silt loam (CaB), is 2 to 5 percent slopes, moderately well drained, and is about 24 to 40 inches depth to the water table. Eagleville silty clay loam (Ea) is frequently flooded, about 0 to 2 percent slopes, and about 12 to 24 inches depth to the water table. Goodwin silt loam (Go) is frequently flooded, 0 to 2 percent slopes, and is about 12 to 24 inches depth to water table. Talbott silt loam (TaB2) is 2 to 5 percent slopes, eroded, more than 80 inches depth to water table, and well drained. Talbott silt loam (TaC2) is 5 to 12 percent slopes, eroded, well drained, and more than 80 inches depth of water table. Talbott-Rock outcrop complex (TrC) is 2 to 15 percent slopes, well drained, and more than 80 inches depth to water table. TrC does not experience frequent flooding (USDA NRCS 2020s).

Of the eight (8) soils identified on the project site, only two (2) soil units are considered hydric for Bedford County, TN. The Eagleville silty clay loam, frequently flooded, and Godwin silt loam, frequently flooded (Go) are rated as hydric for the project site, which accounts for 29.9-percent of the entire project study area. The dominant soil unit, Talbott silt loam (TaB2), accounts for 27.5-percent of the project study area and is considered as non-hydric for the county.

*3.2.1.5 Prime Farmland*

Prime farmland, as defined by the U.S. Department of Agriculture (USDA), “is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water). The soils are of the highest quality and can economically produce sustained high yields of crops when treated and managed according to acceptable farming methods.”

The Farmland Protection Policy Act ([FPPA]; 7 U.S.C. 4201 et seq.) requires Federal agencies to minimize the impact Federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. Prime farmland is land that is the most suitable for economically producing sustained high yields of food, feed, fiber, forage, and oilseed crops.

Of the seventeen soils identified, two of the eight soil types are indicated as prime farmland, making up approximately 30.3 acres of the project site (about 8.7% of the on-site soils). These soils include: CaA and CaB.

### *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 would be expected to remain a mix of farmland and forested areas. If current land use remains unchanged, impacts to soils from continued agricultural use could result from a depletion of nutrients, causing minor changes to the site.

#### *3.2.2.2 Proposed Action Alternative*

The following sections describe the anticipated impacts on geology, soils, and prime farmland should the Proposed Action Alternative be approved and implemented.

*Geology and Paleontology*

Under the Proposed Action Alternative, minor impacts to geology could occur.

The solar arrays would be supported by steel piles which would either be mechanically driven into the ground to a depth of 7 to 9 feet. Trenching to approximately three feet would also be required for underground wiring connections between solar panels. On-site sedimentation basins would be shallow and, to the extent feasible, utilize the existing terrain without requiring extensive excavation. The PV panels would be connected with underground wiring placed in excavated trenches and backfilled with project-site native soil. Due to the small sizes of the subsurface disturbances, only minor direct impacts to potential subsurface geological resources would be anticipated.

As excavation would be limited, only minor direct impacts to geological resources would be anticipated. 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.

Ground disturbance would occur at specific locations within the proposed TL to install poles and connect to the Duck River substation, off-site. Poles would be installed at a depth of 10-15 feet. Due to limited areas of disturbance and the shallow nature of the proposed subsurface disturbances, only minor impacts to geological resources are anticipated. Note, since the TVA substation modifications would occur within the footprint of the existing substation, no geology related impacts would occur from the proposed modifications.

*Geologic Hazards*

Hazards resulting from geological conditions would be minor because the project site is in a relatively stable geologic setting. There is a moderate potential for small to moderate intensity seismic activity. The facility would be designed to comply with applicable seismic standards

prescribed in state and local building codes. A seismic event could cause minor impacts to the project site and equipment on the site. The project could be subject to potential adverse effects from ground failure associated with liquefaction during a strong seismic event. Structural damage to PV panels, PV panel support structures, and other associated equipment could occur. Since the site would not be staffed during operation, potential damage to on-site structures would pose very limited risk to humans. Geologic hazard impacts on the site would be unlikely to impact off-site resources.

The proposed poles associated with the proposed Duck River TL would be designed to comply with applicable standards. Potential impacts from seismic activity would be minimal and unlikely to cause adverse impacts to the proposed poles. Since the TVA substation modifications would occur within the footprint of the existing substation, no new impacts related to geology and paleontology are anticipated.

*Soils*

As part of the site preparation and development process, portions of the site could be temporarily affected during mowing/vegetative maintenance and construction activities. Soils located in areas where only vegetation clearing is proposed would remain in place unless a circuit trench or foundation would be constructed.

It is unlikely that off-site soil resources would be necessary for construction. However, if borrow materials, such as sand and gravel, or other aggregate are necessary during site preparation, resources may be obtained from nearby previously permitted off-site sources.

Minor disturbance to soils would occur during operation of the Proposed Action Alternative. The creation of new impervious surface, in the form of panel footings and the foundations for the inverter stations and substation, would result in a minor increase in stormwater runoff and potentially increase soil erosion. Use of BMPs such as soil erosion and sediment control measures would minimize the potential for increased soil erosion and runoff. Due to the project disturbance area being greater than 1 acre, a NPDES Permit for discharges of stormwater associated with construction activities would be required. Application for the permit would require submission of a SWPPP describing the management practices that would be utilized during construction to prevent erosion and runoff and those to reduce pollutants in stormwater discharges from the project site. Following construction, implementation of soil stabilization and vegetation management measures would reduce the potential for erosion impacts during site operations.

During operation of the solar facility, minor disturbance could occur to soils. Routine maintenance would include periodic motor replacement, inverter air filter replacement, fence repair, vegetation control, and periodic array inspection, repairs, and maintenance. The Proposed Action Alternative would implement an integrated vegetation management plan including biological (i.e., managed sheep grazing), mechanical and chemical controls as needed. Mechanized landscaping may include use of lawnmowers, weed eaters, etc. Traditional trimming and mowing would be performed periodically to maintain the vegetation at a height ranging from 6 inches to 2 feet. Selective use of herbicides may also be employed around structures to control weeds. Products would be applied by a professional contractor and used to control noxious weeds per local, state and federal regulations. Weather events, e.g., predicted rainfall or high winds, would be taken into account prior to application of herbicides in efforts to reduce potential runoff or drift. These

maintenance activities would not result in any adverse impacts to soils on the project site during operations.

Since the TVA substation modifications would occur within the footprint of the existing substation, it is unlikely that soil-related impacts would occur from the proposed modifications.

*Prime Farmland*

A land evaluation and site assessment system is used by the USDA NRCS to establish a farmland conversion impact rating score (7 CFR § 658.4(c)(4)(ii)). When considering the impact rating score, project stakeholders must consider alternative sites if the potential adverse impacts on the farmland exceed the recommended allowable level (USDA 2014).

The construction and operation of the Proposed Action Alternative would result in temporary adverse impact to prime farmland. Approximately 8.7 percent, 30.3 acres, of the project site soil is considered prime farmland. The entirety of the solar array, which would cover approximately 238 acres, would be installed in areas identified as prime farmland. Ground disturbances from the proposed TL would be temporary during construction and no loss of prime farmland are anticipated from the TL. Further, since the TVA substation modifications would occur within the footprint of the existing substation, no impacts to prime farmland are anticipated from the proposed modifications.

Any area within the project site not developed for the solar facility would remain undeveloped with no agricultural or other activities, aside from general maintenance of vegetation. Adhering to BMPs during construction and operation of the solar facility, including installing erosion control devices (ECDs) during stockpiling events, would preserve topsoil and limit erosion, resulting in negligible impacts to prime farmland.

Solar projects do not result in the permanent or irreversible conversion of farmland. While agricultural production would cease on the project site, long-term impacts to prime farmlands and soil productivity on the site would be insignificant, and the site could be readily returned to agricultural production once the solar farm is dismantled. Based on the limited site disturbance, there would be minimal direct and indirect effects on prime farmland under the Proposed Action Alternative.

## 3.3 WATER RESOURCES

This section provides an overview of existing water resources within the project site, and the potential impacts on these water resources that would be associated with the No Action Alternative and Proposed Action Alternatives. Water resources discussed in this section include groundwater and surface water (wetlands and floodplains).

### *3.3.1 Affected Environment*

#### *3.3.1.1 Groundwater*

The Ordovician aquifer is the principal aquifer that underlines the project site. This aquifer underlies large parts of central Kentucky and central Tennessee in the Interior Low Plateaus Province (USGS 1995). There are no sole source aquifers designated by the U.S. Environmental Protection Agency (USEPA) in Bedford County, based on available information (USEPA 2020e).

*3.3.1.2 Surface Water*

Surface waters are defined as water features that are on the Earth's surface typically consisting of streams, lakes, ponds, and wetlands. Surface water features are further segregated into perennial, intermittent, and ephemeral. Tennessee also designates certain surface water features as wet weather conveyances (WWC). Perennial waters are permanent surface water features that have water present throughout the year. Intermittent classification is generally restricted to streams that have a well-defined channel but only contain water part of the year, typically during winter and spring seasons when the stream bed is below the water table. Ephemeral streams or WWCs are features that only flow in direct response to precipitation events and typically exist as topographic swales and dry drainages with poor bed/bank development. Wetlands are those inundated by surface water or groundwater such that vegetation has adapted to saturated soil conditions (i.e. swamps, marshes, bogs).

This project site is located in Bedford County and drains to waterways within the (8-digit HUC 06040002) Upper Duck River watershed and more specifically to the Fall Creek lower watershed (12-digit HUC 060400020306). Benford Creek passes through the northeastern corner of the project site.

Surface water features on the project site were identified by a Tennessee Qualified Hydrologic Professional (TN-QHP) during a site visit. Prior to conducting the field survey, aerial photographs, USGS topographic maps, National Wetlands Inventory (NWI) maps, and soil survey maps were consulted to identify current and historic drainage patterns of the subject property and connectivity of potential wetlands to any other jurisdictional wetlands or waters of the U.S. A field investigation was conducted to evaluate areas of potential jurisdiction using procedures established for "routine delineations" as found in the U.S. Army Corps of Engineers (USACE) 1987 Wetland Delineation Manual and with additional information as provided in the USACE Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0) (USACE 2010).


***Figure 6a. Environmental Features***

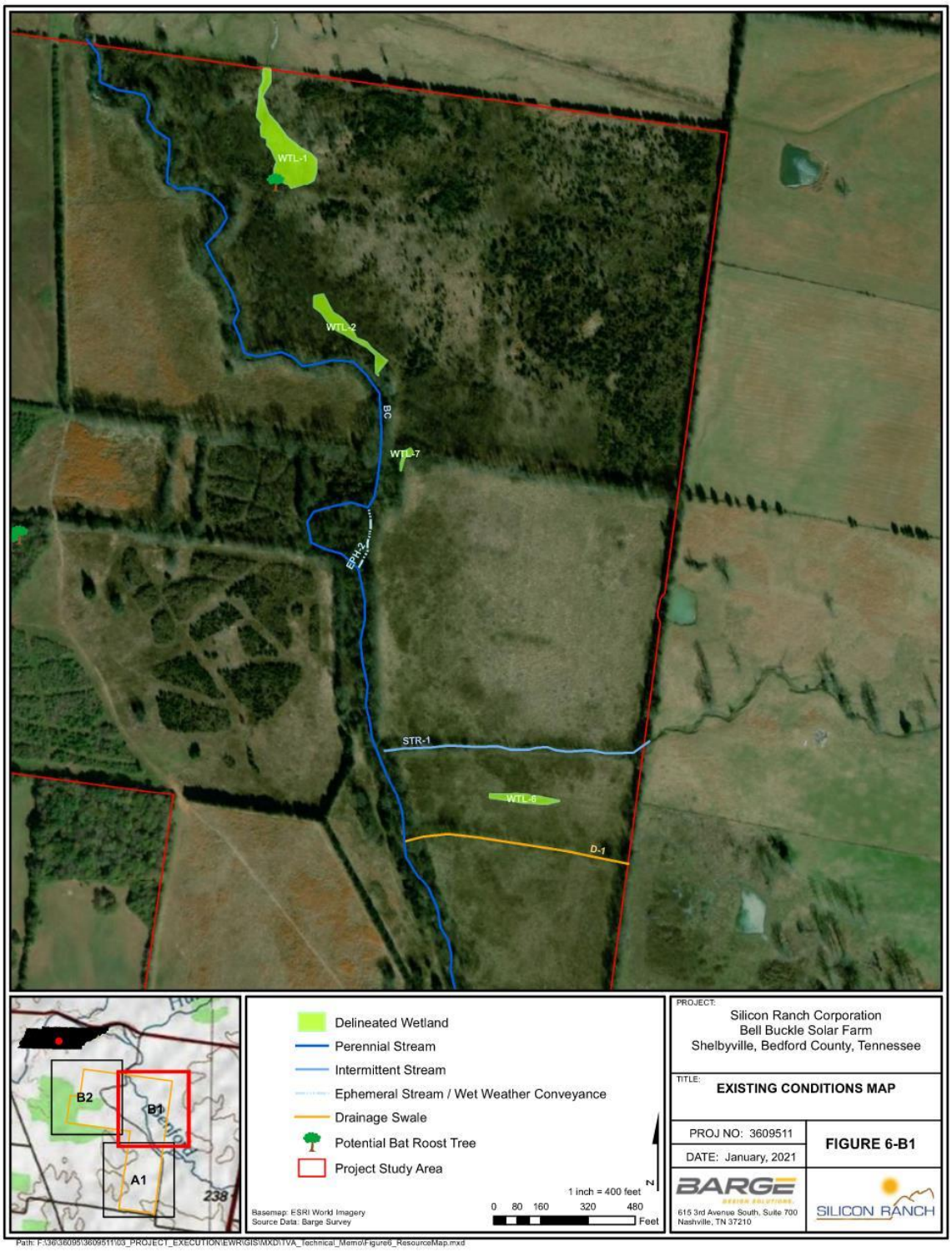


***Figure 7b. Environmental Features***

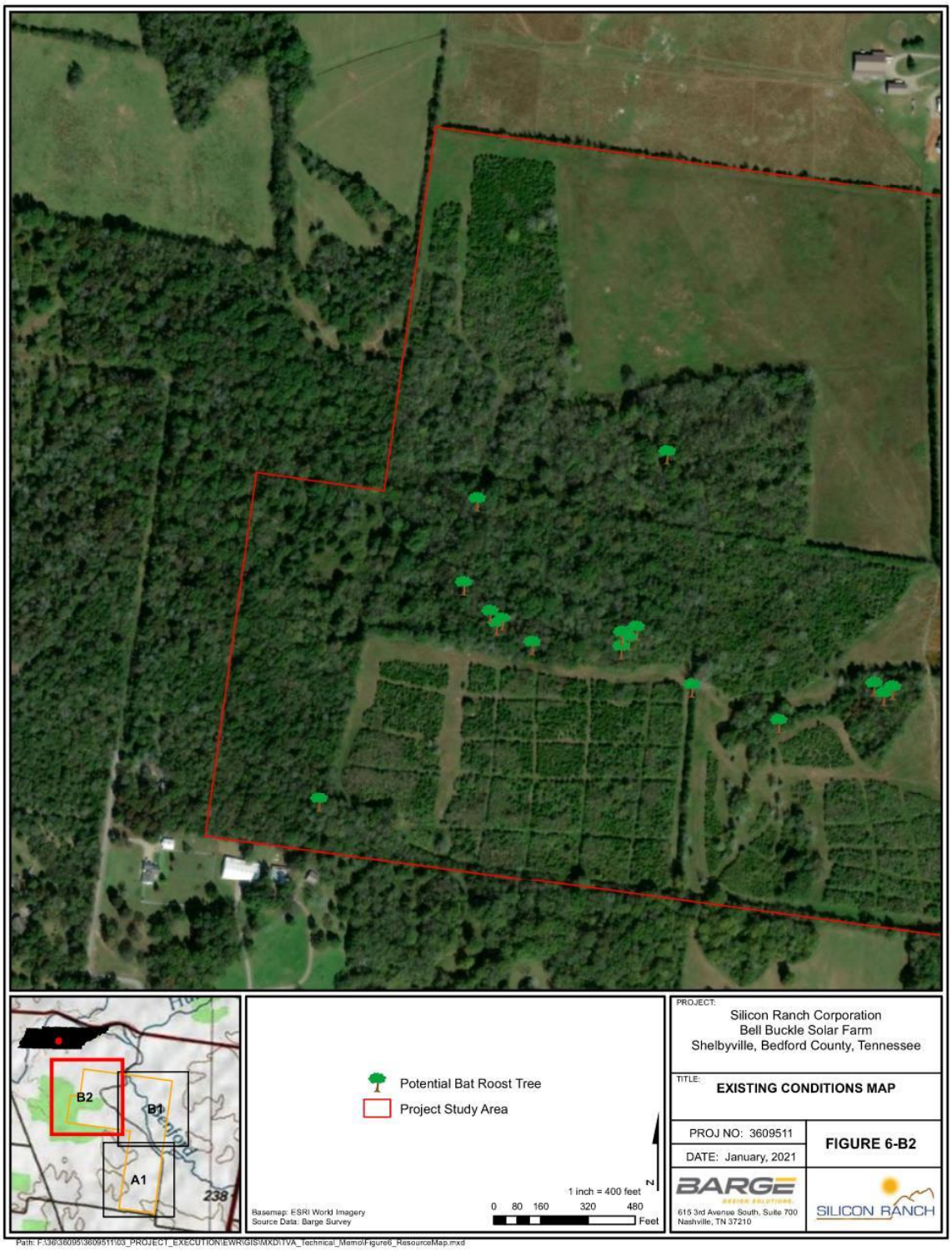


***Figure 8c. Environmental Features***

Figures 7a-7c summarize environmental features located within the project site. Eight (8) wetland and pond features were observed within the project study area. Two (2) of these features were observed as wholly or partially man-made ponds, or a Palustrine Unconsolidated Bottom (PUB) feature. The remaining wetlands systems were observed as either Palustrine Emergent (PEM), Palustrine Scrub-Shrub (PSS), or Palustrine Forested (PFO) wetland features. Each wetland feature was verified with the positive identification of suitable hydrology, hydrophytic vegetation, and hydric soils.

The two (2) man-made pond features within the project study area were WTL-4 and P-1. WTL-4 was observed to have established wetland fringe with vegetation along the margins of the open water. P-1 did not have established wetland fringe and appeared to be more consistently used by cattle. Both features appeared to be isolated with no obvious sign of connection to nearby jurisdictional waters.

The remaining six (6) wetland features were determined as natural, PEM, PSS and PFO ecological communities. WTL-1 was primarily PSS, and WTLs 2 and 7 was primarily PFO. WTLs 3, 5, and 6 were all PEM wetland complexes. Table 3 details the wetland features delineated within the project site.

***Table 3: Wetland Features Delineated during Bell Buckle Field Survey***

| Waterbody I.D. | Description | Location Within Project Boundaries | Estimated Amount of Aquatic Resource in Project Site |
|---|---|---|---|
| WTL-1 | PSS | 35.584362, -86.45851 | 0.63 acres |
| WTL-2 | PFO | 35.582983, -86.458354 | 0.21 acres |
| WTL-3 | PEM | 35.573474, -86.457475 | 0.04 acres |
| WTL-4 | PEM/PUB | 35.574855, -86.456221 | 0.04 acres |
| WTL-5 | PEM | 35.576453, -86.455939 | 0.09 acres |
| WTL-6 | PEM | 35.578426, -86.456012 | 0.10 acres |
| WTL-7 | PFO | 35.581623, -86.457464 | 0.02 acres |
| P-1 | PUB | 35.569478, -86.460013 | 0.09 |

In addition to the wetlands identified, two (2) ephemeral streams (wet weather conveyance, WWC) were delineated in the project study area. The WWCs were determined based on secondary indicators while conducting the Hydrologic Determination. WWC-1 is a small tributary to Benford Creek and was observed connecting an identified wetland to Benford Creek. This conveyance flows through an active cattle pasture; obvious impacts to the bed and bank of this stream were observed throughout. Substrate in the conveyance was observed to be moderately sorted by primarily hard packed soils with gravel and cobble distributed throughout. The second ephemeral channel was identified upon site review with USACE. This channel conveys excess surface water from Benford Creek and could potentially be the formation of an oxbow in the meandering of perennial water.

Further, Benford Creek and an unnamed Tributary (UNT) to Benford Creek were inspected within the project boundary. Benford Creek is a perennial stream with a channel bottom of sand, gravel,

and cobble. The UNT to Benford Creek was inspected as an intermittent stream with a channel bottom consisting of silt, sand, and gravel. Table 4 describes the streams delineated on-site.

***Table 4: Stream Features Delineated during Bell Buckle Field Survey***

| Waterbody I.D. | Description | Location Within Project Boundaries | Estimated Amount of Aquatic Resource in Project Site |
|---|---|---|---|
| EPH-1 | Ephemeral Stream / Wet Weather Conveyance | Start: 35.57454, -86.455971<br>End: 35.575857, -86.456032 | 540 LF |
| EPH-2 | Ephemeral Stream / Wet Weather Conveyance | Start: 35.580571, -86.457972<br>End: 35.581123, -86.457870 | 216 LF |
| D-1 | Drainage Swale / Wet Weather Conveyance | Start: 35.577823, -86.454883<br>End: 35.578017, -86.457442 | 772 LF |
| Benford Creek | Perennial Stream | Start: 35.575575, -86.455107<br>End: 35.585483, -86.46111 | 5,073 LF |
| UNT to Benford Creek | Intermittent Stream | Start: 35.578859, -86.457679<br>End: 35.578968, -86.454645 | 922 LF |

*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 1-percent chance of flooding in any given year is normally called the 100-year floodplain. The area subject to a 0.2-percent chance of flooding in any given year is normally called the 500-year floodplain. It is necessary to evaluate development in the 100-year floodplain to ensure that the project is consistent with the requirements of EO 11988, Floodplain Management.

Figure 8 shows the Bedford County, Tennessee, Flood Insurance Rate Map (FIRM) Panel Number 47003C0200E, effective 8/2/2007, and the proposed project site (FEMA 2020). There are no identified floodplains within the proposed project site. Benford Creek is a perennial stream flowing through the parcel. It has a floodplain; however, it is unmapped.

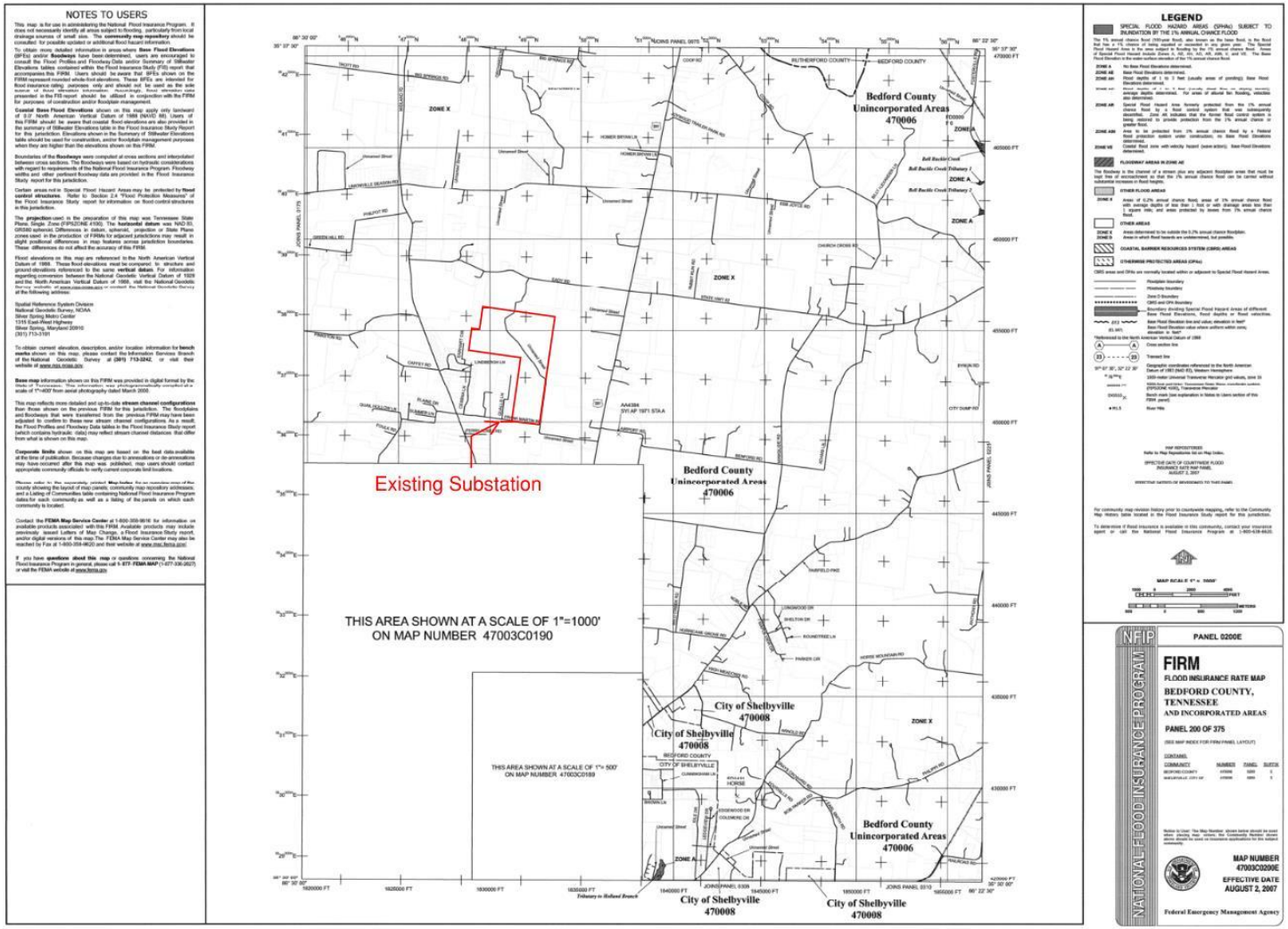


***Figure 8. Site Boundary and FEMA Floodplain***

### *3.3.2 Environmental Consequences*

#### *3.3.2.1 No Action Alternative*

Under the No Action Alternative, the proposed solar facility would not be constructed and no project-related impacts to water resources would occur.

#### *3.3.2.2 Proposed Action Alternative*

Under the Proposed Action Alternative, minor impacts from construction would be expected on streams and floodplains. No impacts to wetlands are anticipated as a result of the Proposed Action Alternative.

*Groundwater*

Direct adverse impacts to the supply and availability of groundwater are not anticipated with implementation of the Proposed Action Alternative. During construction, hazardous materials would be on-site that could potentially contaminate groundwater resources, including petroleum products for fuel and lubrication of construction equipment, hydraulic fluids, and a variety of other chemicals commonly used for general construction permits. A Spill Prevention, Control, and Countermeasure (SPCC) Plan would minimize the potential for leaks or spills that may occur. Pollution to groundwater from sedimentation could occur during construction activities resulting from erosion. Appropriate BMPs would be followed, and all proposed project activities would be conducted in a manner to ensure waste materials are contained and the introduction of pollution materials to the receiving waters would be minimized. A general construction stormwater permit would be needed as more than one (1) acre would be disturbed. This permit also requires the development and implementation of a SWPPP.

An average 30-foot buffer is proposed around the wetlands and streams on-site to comply with the TDEC General Construction Stormwater permit (TDEC 2020). The SWPPP would identify specific BMPs to address construction-related activities that would be adopted to minimize stormwater impacts. Additionally, BMPs, as described in the Tennessee Erosion and Sediment Control Handbook (TDEC 2012), would be used to avoid contamination of surface water in the project site.

Additionally, impervious buildings and infrastructure prevent rain from percolating through the soil and result in additional runoff of water and pollutants into storm drains, ditches, and streams. Clearing of vegetation and ground cover, and the addition of impervious surfaces, could alter the current stormwater flowers. The Proposed Action Alternative could increase the impervious cover on the project site, thus altering and possibly increasing the concentrated stormwater flow off the project site. This flow would be properly treated by implementing proper BMPs or diverting stormwater discharge to ensure proper drainage. The proposed substation modifications would be within the existing substation footprint, so no impacts to groundwater are anticipated from the modifications.

If the facility were to be decommissioned or closed, a Decommissioning and Closure Plan would be developed. The Decommissioning and Closure Plan would detail procedures to control erosion and sedimentation to maintain compliance with NPDES requirements and permits. Water usage for potential decommissioning and closure is not likely to exceed that used for operation and maintenance. Therefore, impacts to groundwater resulting from a decommissioning and closure of the facility are not anticipated.

Overall, impacts to local aquifers and groundwater are not anticipated due to the limited volume of groundwater required for initial construction, operation, and maintenance, or decommissioning and closure. Implementation of BMPs and a Decommissioning and Closure Plan would reduce the potential for hazardous materials to reach groundwater resources throughout construction and operations of the facility.

Additionally, minor, indirect beneficial impacts to groundwater could occur from the discontinued use of broad applications of herbicides, pesticides, and fertilizers, due to change in land use from agriculture to solar.

*Surface Waters*

During construction, portable toilets would be provided for the construction workforce as needed. These toilets would be pumped out regularly, and the sewage would be transported by tanker truck to a publicly owned wastewater treatment works that accepts pump out. Equipment washing and dust control discharges would be handled in accordance with BMPs described in the SWPPP for water-only cleaning. Proper implementation of these and other controls would result in only minor and temporary impacts to surface waters.

Maintenance activities associated with solar panels would possibly include, but would not be limited to, periodic inspections, repairs, herbicide/pesticide use, lawn maintenance, and panel cleanings. Cleaning operations should utilize pure water, but if an additive is required to help facilitate the cleaning process, then the waste product would need to be evaluated to ensure proper disposal of the waste stream according to federal, state and local regulations. Herbicide/pesticides would not be applied within 50 feet of water bodies and all Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 U.S.C. §136 et seq.) requirements would be followed.

Should the removal of the PV panels be required due to damage or decommissioning activities, decommissioned equipment and materials, including PV panels, racks, and transformers, would be recycled. Waste would be disposed of properly in accordance with applicable local, state, and federal laws and regulations. With proper implementation of controls, the Proposed Action Alternative would be expected to have the potential for only temporary minor impacts and would not be expected to have long-term direct or indirect impacts to wetlands or water resources.

TVA is subject to Executive Order (EO) 11990, Protection of Wetlands, which mandates federal agencies avoid new construction in wetlands wherever practicable and otherwise minimize wetland destruction or degradation. Furthermore, CWA sections 404 and 401 require state and federal oversight for regulated impacts to jurisdictional wetland features. This oversight similarly requires no practicable alternative to impacting wetlands, and unavoidable impacts are subject to compensatory mitigation requirements to replace lost wetland functions and values. In addition, a ‘no net loss of wetlands’ policy was first adopted as a national goal under President George H. W. Bush’s administration in 1988. This policy is aimed at balancing wetland losses due to development with wetlands preservation and restoration efforts. This policy was further refined and endorsed by subsequent administrations, eventually resulting in the 2008 Final Compensatory Mitigation Rule regulations promulgated jointly by the USEPA and the USACE. In alignment with the goals of EO 11990 and the ‘no net loss of wetlands’ policy, and in compliance with CWA 404/401, all wetlands on site would be avoided by the proposed solar facility. Likewise, the 30’ buffer and erosion control plan would protect wetland features on site from indirect impacts, such as siltation, during site development.

Based on the preliminary site layout, a road crossing would impact Benford Creek and the identified ephemeral channel to provide access to the NE portion of the property. This impact would be subject to the terms and condition of a general Aquatic Resource Alteration Permit (ARAP) from TDEC pursuant to Section 401 of the CWA, and a USACE Nationwide Permit pursuant to Section 404 of the CWA (33 U.S.C. § 1251 et seq.). A Hydrologic Determination from TDEC and Jurisdictional Determination from the USACE was previously issued. Based on the Proposed Action Alternative, individual permitting efforts would not be needed. With implementation of appropriate BMPs, impacts to surface waters and aquatic life would be insignificant during construction and no long-term adverse impacts are anticipated.

Construction and maintenance of the TL would not result in impact to jurisdictional wetlands or streams. Since the TVA substation modifications would occur within the footprint of the previously developed substation, no impacts to water resources would occur as a result of the modifications.

*Floodplains*

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 activities in the 100-year floodplain unless there is no practicable alternative.

As shown in Figure 2 and metioned in Section 3.3, the solar facility and construction activities under the Proposed Action Alternative would avoid Benford Creek and a buffer on either side of Benford Creek. One roadway crossing is proposed. Consistent with EO 11988, roads are considered repetetive actions in the 100-year floodplain that should result in minor impacts. To minimize adverse impacts, any road construction would be done in such a manner that upstream flood elevations would not be increased by more than 1.0 foot. The buffer width for water quality protection would satisfy the buffer width requirement for Benford Creek in Bedford County floodplain regulations for unmapped streams, which would be consistent with EO 11988.

The Proposed Action would also involve construction of a TL and modifications to the existing Duck River EMC substation outside 100-year floodplains. Therefore, the proposed TL and substation modifications would be consistent with the EO 11988.

## 3.4 BIOLOGICAL RESOURCES

This section provides an overview of existing biological resources within the Bell Buckle site and potential impacts to biological resources that would be associated with the Proposed Action Alternative and No Action Alternative.

### *3.4.1 Affected Environment*

The existing biological resources reviewed include vegetation, wildlife, and rare, threatened, or endangered species.

A desktop survey was performed prior to field investigations of the proposed project site. Wildlife, vegetation, and threatened and endangered (T&E) species were researched during the desktop survey and verified through field investigations in July 2020 and January 2021. Results of desktop

survey, field investigations, and list updates are described in this section. Photos taken during the field investigation are included in Appendix B.

Biological resources are regulated by a number of federal and state laws. The laws and rules relevant to the Proposed Action undertaken by SR Bell Buckle include:

- The ESA (16 U.S.C. §§ 1531-1544);
- The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. §§ 703-712) (for actions of nonfederal entities);
- The Executive Order 13186 (January 10, 2001) Responsibilities of Federal Agencies to Protect Migratory Birds;
- Rules of the Tennessee Wildlife Resources Agency, Chapter 1660-01-32 (based on authority provided in Tennessee Code Annotated §§ 70-1-206, 70-8-104, 70-8-106 and 70-8-107).

No Bald or Golden Eagle nests were identified on-site nor are records of these species known from Bedford County. Therefore, the Bald and Golden Eagle Protection Act (BGEPA) is not included in the relevant laws and rules to the Proposed Action Alternative.

*3.4.1.1 Vegetation*

The project site is mostly utilized as pastureland for cattle and hunting as observed with multiple baiting feeders and blinds. The low herbaceous growth of the pastures and between the wooded portions of the project study area include foxtail grass (*Setaria pumila*), orchard grass (*Dactylus glomerata*), perennial ryegrass (*Lolium perenne*), common vetch (*Vicia sativa*), bush clover (*Lespedeza cuneate*), common milk weed (*Asclepias syriaca*), little bluestem (*Schizachyrium scoparium*), and passion vine (*Passiflora incarnata*). In some of the wetter portions of the pastureland within the project study area, fox sedge (*Carex vulpinoidea*), spikerush (*Eleocharis palustris*), giant ironweed (*Vernonia gigantea*) and path rush (*Juncus tenuis*) were observed.

Native fragmented woodland was also observed along Benford Creek and much of the northern portion of the project study area. This forest community ranges between early successional forest to secondary growth mixed hardwood forest. Dominant vegetation in the woodland portion of the project area include red cedar (*Juniperus virginiana*), green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), bur oak (*Quercus macrocarpa*), shagbark hickory (*Carya ovata*), red oak (*Quercus rubra*), and black cherry (*Prunus serotina*) in the tree stratum; honeysuckle (*Lonicera morrowii*), privet (*Ligustrum sinense*) and blackberry (*Rubus argutus*) in the shrub stratum; and Virginia creeper (*Parthenocissus quinquefolia*), woodoats (*Chasmanthium latifolium*), Japanese silt grass (*Microstegium vimineum*), and wingstem (*Verbesina alternifolia*) in the herbaceous stratum.

In the northeastern corner of the project study area, pockets of exposed limestone bedrock were observed amongst the red cedar dominated groves. These pocket vegetative communities were observed with late populations of glade stonecrop (*Sedum pulchellum*) and flowering plains coreopsis (*Coreopsis tinctoria*). The exposed limestone pockets were small and disturbed, and no species of conservation were found.

### *3.4.1.2 Wildlife*

Native wildlife was observed throughout the project study area. Identified wildlife were observed utilizing the fragmented forested portions of the site, the open pastureland, and the surrounding residential and industrial environments. Table 5 below details some of the observed wildlife during the field investigations. This list is a preliminary species presence list for the project study area.

***Table 5. Observed Wildlife within Project Site***

| Common Name | Scientific Name |
|---|---|
| **Birds** | |
| American robin | *Turdus migratorius* |
| Blue jay | *Cyanocitta cristata* |
| Carolina wren | *Thryothorus ludovicianus* |
| Cooper's hawk | *Accipiter cooperii* |
| Eastern towhee | *Pipilo erythrophthalmus* |
| European starling | *Sturnus vulgaris* |
| Field sparrow | *Spizella pusilla* |
| Great blue heron | *Ardea herodias* |
| House finch | *Haemorhous mexicanus* |
| Indigo bunting | *Passerina cyanea* |
| Killdeer | *Charadrius vociferus* |
| Northern cardinal | *Cardinalis cardinalis* |
| Northern mockingbird | *Mimus polyglottos* |
| Red tailed hawk | *Buteo jamaicensis* |
| Red-winged black-bird | *Agelaius phoeniceus* |
| Tufted titmouse | *Baeolophus bicolor* |
| Wood thrush | *Hylocichla mustelina* |
| Yellow warbler | *Setophaga petechia* |

| Common Name | Scientific Name |
|---|---|
| **Mammals** | |
| Eastern chipmunk | *Tamias striatus* |
| Eastern gray squirrel | *Sciurus carolinensis* |
| White-tailed deer | *Odocoileus virginianus* |
| Raccoon | *Procyonidae lotor* |
| Nine Banded Armadillo | *Dasypus novemcinctus* |
| Coyote | *Canis latrans* |
| **Reptiles** | |
| Common Garter snake | *Thamnophis sirtalis* |
| Ground skink | *Scincella lateralis* |
| **Amphibians** | |
| Green frog | *Lithobates clamitans* |
| American toad | *Anaxyrus americanus* |
| Gray treefrog | *Hyla versicolor* |
| **Fish** | |
| Minnow spp. | -- |
| **Invertebrates** | |
| Viceroy | *Limenitis archippus* |
| Monarch | *Danaus plexippus* |

*Migratory Birds*

The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) Trust Resource website was evaluated for migratory bird species that may be present within the project site and is included in Appendix B.

The USFWS IPaC report identified one species of migratory bird of conservation concern that has the potential to occur in the vicinity of the project site: the red-headed woodpecker (*Melanerpes erythrocephalus*). This is a Bird of Conservation Concern (BCC) which is a species that is not already federally listed and represents USFWS's highest conservation priorities. The IPaC report indicates the red-headed woodpecker breeds May 10-September 10 with highest probability of occurrence in the project site from late April to early May, and late October (USFWS 2020b). However, this species is known to occur year-round in the region. The red-headed woodpecker is typically found in scattered, open woodlots in agricultural areas, dead timber in swamps, or pine savannahs. Though this species was not identified on site, the agricultural areas through much of the project site may provide resources for this bird (Cornell University 2020).

Given the details of the crossing proposed within the project site, no impact to aquatic species or their habitat is expected. Flow and bedform is not expected to be altered.

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

TVA provided a heritage database query for the project site. The search criteria included aquatics (within a 10-mile radius of the project site, county, and HUC), botany (within a five (5) mile radius of the project site and the county), natural areas (within a five (5) mile radius of the project site) and terrestrial zoology (within a three (3) mile radius project site and county). No state or federally listed species were observed during the July 2020 site inspection. Table 6 details the potentially present federal and state protected species for the area from the heritage database query, USFWS IPaC database, and TDEC Rare Species Data Viewer.

***Table 6. Protected Species Potentially within the Project Site***

| Scientific | Common Name | Federal Status | TN State Rank | TN Status | Potential Habitat (Y/N) |
|---|---|---|---|---|---|
| **Mammal** | | | | | |
| *Myotis grisescens* | Gray Bat | Endangered | S2 | E | Y-(Foraging) |
| *Myotis septrionalis* | Northern Long-eared Bat | Threatened | S1S2 | T | Y (Roost) |
| *Myotis sodalis* | Indiana Bat | Endangered | S1 | E | Y (Roost) |
| **Amphibian** | | | | | |
| *Cryptobranchus alleganiensis* | Hellbender | Partial Status | S3 | E | N |
| **Fish** | | | | | |
| *Etheostoma aquali* | Coppercheeck Darter | N/A | S2S3 | T | N |
| *Etheostoma cinereum* | Ashy Darter | N/A | S2S3 | E | N |
| *Etheostoma denoncourti* | Golden Darter | N/A | S2 | D | N |
| *Etheostoma luteovinctum* | Redband Darter | N/A | S4 | D | N |
| *Etheostoma striatulum* | Striated Darter | N/A | S1 | T | N |
| *Hemitremia flammea* | Flame Chub | N/A | S3 | D | N |
| *Noturus fasciatus* | Saddled Madtom | N/A | S2 | T | N |
| *Percina phoxocephala* | Slenderhead Darter | N/A | S3 | D | N |
| **Insect** | | | | | |
| *Gomphus sandrius* | Tennessee Clubtail dragonfly | N/A | S1 | Rare | N |
| *Danaus plexippus* | Monarch Butterfly | Candidate Species | N/A | N/A | Y |
| **Mollusk** | | | | | |
| *Ephioblasma florentina walkeri* | Tan Riffleshell | Endangered | S1 | E | N |
| *Ephioblasma turgidula* | Turgid Blossom Pearlymussel | Endangered | SX | E | N |

| | | | | | |
|---|---|---|---|---|---|
| *Lemiox rumosus* | Birdwing Pearlymussel | Endangered | S1 | E | N |
| *Pleuronaia dolabelloides* | Slabside Pearlymussel | Endangered | S2 | E | N |
| *Ptychobranchus subtentum* | Fluted Kidneyshell | Endangered | S2 | E | N |
| *Quadrula cylindrica cylindrica* | Smooth Rabbitsfoot | Threatened | S3 | T | N |
| **Plant** | | | | | |
| *Amsonia tabernaemontana var. gattingeri* | Limestone Blue Star | N/A | S3 | S | Y |
| *Arnoglossum plantagineum* | Fen Indian-plantain | N/A | S2 | T | Y |
| *Astragalus tennesseensis* | Tennessee Milk-vetch | N/A | S3 | S | Y |
| *Dalea foliosa* | Leafy Prairie-clover | Endangered | S2S3 | E | Y |
| *Paysonia densipila* | Duck River Bladderpod | N/A | S3 | S | Y |
| *Phemeranthus calcaricus* | Limestone Flame-flower | N/A | S3 | S | Y |

State Rank Abbreviations:

S1: Extremely rare and critically imperiled in the state with five or fewer occurrences, or very few remaining individuals, or because of some special condition where the species is particularly vulnerable to extinction

S2: Very rare and imperiled within the state, six to twenty occurrences, or few remaining individuals, or because of some factor(s) making it vulnerable to extinction

S3: Rare and uncommon in the state, from 21-100 occurrences

S4: Widespread, abundant, and apparently secure within the state, but with cause for long-term concern

SX: Believed to be extirpated from the state

State Status Abbreviations:

D: Deemed in need of management

E: Endangered

T: Threatened

S: Special Concern

Data Sources:

* TVA Heritage Database Query

*TDEC Rare Species Data Viewer

* USFWS IPaC

The USFWS IPaC Trust Resource website was evaluated for potential species that may be present within the project site. An official list of threatened and endangered species that may potentially be affected by activities performed at this location can be found in Appendix B.

Three species of federally listed mammals potentially occur on the project site: the gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), and the northern long-eared bat (*Myotis septentrionalis*). Records of all three species are known from Bedford County. The closest known

gray bat and northern long-eared bat records are from a cave approximately 8.5 mi away. The closest known Indiana bat record is a historical record from a cave approximately 16.4 miles away.

Winter habitats (hibernacula) used by these species include caves, mines, and cave-like structures (NatureServe 2020; USFWS 2015, 2020c, 2020d). Indiana bats and northern long-eared bats also utilize areas near caves in the fall and spring (for swarming and staging) prior to migration back to their summer habitat (roosting habitat) (NatureServe 2020). Gray bats roost in caves year-round and migrate between summer and winter roosts during spring and fall (Brady et al. 1982, Tuttle 1976a). Bats disperse over bodies of water at dusk where they forage for insects emerging from the surface of the water (Tuttle 1976b).

During the summer, Indiana bats roost under the exfoliating bark of dead and living trees in mature forests with an open understory often near sources of water. Indiana bats are known to change roost trees frequently throughout the season, yet still maintain site fidelity, returning to the same summer roosting areas in subsequent years. This species forages over forest canopies, along forest perimeters, tree lines, and occasionally over bodies of water (Kurta et al. 2002; USFWS 2020).

In the summer, northern long-eared bats roost individually or in colonies beneath exfoliating bark or in crevices of both live and dead trees. While roost selection is similar to Indiana bats, northern long-eared bats are more opportunistic in roost site selection. This species has also been documented roosting in abandoned buildings and under bridges. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (USFWS 2020c).

The survey for potential suitable roosting habitat was performed concurrently with the surface water delineation, in July 2020 and re-visited in January 2021. The Range-wide Indiana Bat Survey Guideline Phase I SOP was implemented to conduct the potential habitat survey (USFWS 2020e). No suitable caves or potential hibernacula sites for all federally listed bat species were observed in the project area. Potential roosting habitat was identified as trees larger than three (3) inches in diameter at breast height and that contained loose or shaggy bark or crevices suitable for use. There is potential suitable bat roosting habitat for the Indiana bat (*Myotis sodalis*) and the northern long-eared bat (*Myotis septentrionalis*) located within the project site, which can be found on Figures 7a-7c. A total of 27 potential bat roost trees were observed and documented within the fragmented wooded portions of the project site. A Bat habitat map is provided in Appendix E. There is approximately 164 acres of woodland on-site. Of this, approximately 51.84 acres was qualified as “good” quality habitat, 17.81 acres was qualified as “marginal” quality habitat, and 94.2 acres was identified as “poor” quality habitat. Habitat quality was based on roosting suitability of trees, density of forest midstory, and proximity to water sources.

No suitable roosting habitat for the gray bat (*Myotis grisescens*) was noted during the field inspection. Potential foraging habitat for the gray bat (Myotis grisescens) is located on the property in streams and wetlands.

Regarding threatened and endangered plants potentially present within the project site, pockets of exposed limestone bedrock were observed in the northeastern corner of the project study area. These regions of exposed limestone and short herbaceous growth amongst the cedar groves were analyzed for potential as a natural glade vegetative community. Due to the ongoing disturbance from the current landowner, the formation of a natural glade or barren was not

observed. Late season glade stonecrop was observed in these pocket formations; however none of the listed glade dependent plant species were observed.

The leafy prairie-clover (*Dalea foliosa*) is also listed as endangered with potential to occur within the project site. The leafy prairie-clover occurs in prairie remnants along the Des Plains River in Illinois, in thin soils over limestone substrate. In Alabama and Tennessee, it lives in prairie-like areas on the edges of cedar glades. It favors sites with a wet spring and fall and dry summer. It is especially vulnerable to commercial and residential development and road construction. This species was not identified on site within the potential habitat. Additionally, no critical habitat has been designated for this species (USFWS 2020a).

The remaining state listed species only one had potential habitat on site, but was not identified, the Duck River bladderpod (*Lesquerella densipila*). This species prefers cedar glades with this soil over limestone, open alluvial sites, stream bottoms and fallow fields. As stated, many of these habitat types were available on site, but the specimen was not identified during the field survey. However, this is typically not present until winter months. A survey may be necessary during bloom of this species to determine presence/absence. The remainder of the state listed species require habitat that was not identified on site during the field survey.

The hellbender (*Cyrptobranchus alleganiensis*) is generally found in shallow, fast-flowing, rocky streams. They are found in areas with large, intermittent, irregularly shaped rocks within swith water. They tend to stay away from slow moving water and muddy banks with slab rock bottoms. The streams identified on site were slow flowing, pooled, and rock slab bottom in areas that were not covered by soft sediment. This species was not identified on site and the required habitat was not present.

The Tennessee clubtail dragonfly (*Gomphus sandrius)* is listed as rare in the state of Tennessee. This species prefers wide shallow swift flowing rivers. As stated above the river on within the site is not shallow and is primarily a pooled complex of river. This species was not identified on-site and the required habitat was not present.

The monarch butterfly (*Danaus plexippus)* was recently listed as a Candidate species under ESA and was identified on-site during field surveys. They live in a variety of habitats throughout North America and various locations across the globe. In North America, the eastern population (east of the Rocky Mountains) migrate north to the United States and Canada in March. The fall migration back to overwintering sites in Mexico from August to November. They require milkweed for breeding and use a variety of flowering plants throughout migration and breeding (USFWS 2020f). The monarch butterfly was identified flying over the site and milkweed was limited in the northwestern corner of the property along the margins of the hayfield. No caterpillars were noted on these specimens.

The USFWS IPaC report identified four threatened and endangered clams that have the potential to occur in the vicinity of the project site: the fluted kidneyshell (*Ptychobranchus subtentum*), Rabbitsfoot (*Quadrula cylindrica cylindrica*), slabside pearlymussel (*Pleuronaia dolabelloides*), and turgid blossom (pearlymussel) (*Epioblasma turgidula*). These aquatic species require flowing perennial stream habitat and, per TDEC's database, are noted as affiliated with the nearby Duck River. The Duck River is not anticipated for impact by the proposed project; Therefore, no formal presence/absence survey of these listed species was performed for the aforementioned freshwater mussel species.

The Ashy Darter, Golden Darter, Flame Chub, Saddled Madtom, and Slender Darter are noted as affiliated with the Duck River, outside of the project site. The Coppercheek Darter is primarily found in deep riffles, runs and flowing pools within the Buffalo River watershed. The Redband Darter is typically found in Limestone streams, Nashville Basin, and portions of Highland Rim. The Striated Darter is typically found in Bedrock pools of headwaters and creeks with large slabrock cover within the upper Duck River watershed. After review of the Benford Creek within the project site, the stream lacks suitable habitat for these darter species. Benford Creek was observed with shallow slow-moving waters of a silt, sand, gravel, and small cobble substrate. This particular portion of Benford Creek lacks deep pools and slabrock preferred by the listed darter species within the watershed. The presence of the listed species was not inspected within Benford Creek. Suitable stream habitat was not observed for the remaining listed species that require an aquatic environment.

### *3.4.2 Environmental Consequences*

#### *3.4.2.1 No Action Alternative*

Under the No Action Alternative, the proposed solar facility would not be constructed and no project-related impacts to Federal or state threatened and endangered species or wildlife would occur. Additionally, no vegetation would be disturbed or removed under the No Action Alternative.

#### *3.4.2.2 Proposed Action Alternative*

*Vegetation*

Under the proposed action, approximately 122-acres of the wooded area would potentially require tree removal for the development of the site. A map depicting the proposed tree clearing is provided in Appendix E. Following construction of the solar facility, the remaining project area would be maintained to prevent vegetation from growing above panel height.

Taking into consideration the large amount of similar vegetation types in the area both regionally and locally, clearing the existing vegetation, removal of cropland, and light grading would be considered minimal and insignificant impacts. The surrounding area consists of similar vegetation communities, and the effects of the conversion of agricultural and open land would be relatively small. Direct impacts to forested land would be minimal as most of the trees species on the project site are located adjacent to the site locally and regionally. Following construction, the solar facility will be maintained to prevent vegetation from growing above the panel height, converting the vegetation from maintained agricultural practices. No adverse impact to unique vegetation communities is anticipated. Effects would be further reduced as revegetation of the site would be accomplished using native and/or noninvasive species. Disturbed areas would be seeded post-construction using a mixture of certified weed-free, low-growing native grass seed obtained from a reputable seed dealer and in compliance with the requirements established by the local office of the NRCS. Flowering seed mix will be placed in designated disturbed areas, which may provide more flowering plants than previously occurred on-site. The Proposed Action Alternative would not significantly contribute to the spread of exotic or invasive species.

BMPs and appropriate erosion controls would be used as needed to minimize exposure of soil and erosion of soil from the project site. Silt fences, sedimentation basins, and other appropriate controls would be used, as needed, to minimize exposure of soil and to prevent eroded soil from leaving the work area. Disturbed areas would be seeded post-construction using a mixture of certified weed-free, low-growing native grass seed obtained from a reputable seed dealer and in compliance with the requirements established by the local office of the NRCS. Flowering seed

mix will be placed in designated disturbed areas, which may provide more flowering plants than previously occurred on-site. Erosion control measures would be inspected and maintained until vegetation in the disturbed areas has become well-established and stabilized.

As the TVA substation upgrades would occur within the footprint of the existing substation, no impact to vegetation is anticipated.

*Wildlife*

Wildlife present at the time of construction would be impacted, particularly during use of heavy machinery for vegetation clearing and driving piles. This would result in the displacement of any wildlife (primarily common, habituated species) currently using the area. Direct effects to some individuals may occur if those individuals are immobile during the time of habitat removal. This would be more likely to occur if activities took place during breeding/nesting seasons or winter hibernation periods when animals are immobile in shallow borrows. Habitat removal likely would disperse mobile wildlife into surrounding areas in an attempt to find new food sources, shelter sources and to reestablish territories. Those animals able to use early successional habitats could return to the site upon completion of the project. Approximately 129 acres of habitat is not proposed for development and would be available for wildlife use. Due to the amount of similarly suitable habitat in areas immediately adjacent to the project site, populations of common wildlife species likely would not be impacted by the proposed actions.

One migratory bird of conservation concern identified by the USFWS may be impacted by the proposed action, red-headed woodpecker. While this species was not observed on site during field reviews, suitable habitat for the species was observed. A different migratory bird of conservation concern was identified during field surveys, wood thrush. Vegetation removal is proposed when both of these species could be on site at the end of their breeding seasons when second broods may be reared. Direct effects could occur to these nestlings in proposed areas of tree removal. Mobile individuals are expected to flush if disturbed. Due to the timing of the proposed vegetation removal (late summer- March) and the relative abundance of similarly suitable habitat nearby, it is not expected that populations of these migratory bird species would impacted.

Overall, direct impacts to wildlife would be minor and insignificant. These impacts would be temporary during construction, and wildlife populations may be able to disperse to undeveloped habitat within the project site. Upon completion of the project the site will be revegetated using a mixture of certified weed-free, low-growing native grass seed obtained from a reputable seed dealer and in compliance with the requirements established by the local office of the NRCS. Flowering seed mix will also be placed in designated disturbed areas, which may provide more flowering plants than previously occurred on-site. Wildlife able to use this type of habitat are expected to return to the site upon completion of proposed actions.

As the TVA substation upgrades would occur within the footprint of the existing substation, no impact to wildlife is anticipated.

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

Under the Proposed Action Alternative, three (4) federally listed or protected mammals or invertebrate species and one state-listed plant have the potential to occur in the action area (gray bat, Indiana bat, northern long-eared bat, and Duck River Bladderpod). The federal candidate

species, the monarch butterfly, was observed on the project site during the field investigation. Federally listed plants and aquatic species would not be impacted by the proposed actions.

As noted, there were eight (8) fish, four (4) mussels, and 1 (amphibian) identified by data queries of the project area and surrounding HUC. The ashy darter, golden darter, flame chum, and slender darter are affiliated with the Duck River and would not be found in the project area. Suitable habitat for other identified darter species (Coopercheed darter, redband darter, and striated darter) was not observed in Bedford Creek or other bodies of water on site. Similarly, no suitable habitat exists on the project site for species of mussels or hellbenders identified in the database searches. The fluted kidneyshell, Rabbitsfoot, slabside pearlymussel, and turgid blossom (pearlymussel), ashy darter, golden darter, flame chum, slender darter, Coopercheed darter, redband darter, striated darter, and hellbender would not be impacted by proposed actions.

As discussed, late season stonecrop was observed in pocked formations. However, none of the listed glade dependent plant species were observed. Impacts to limestone blue star, fen Indian plantain, Tennessee milk vetch, leafy prairie clover, and limestone flame flower would not occur with the development of the project.

Habitat for the Duck River Bladderpod was observed amongst the pasturelands of the project site. These areas were heavily impacted by cattle and hay harvesting. During the July 2020 site inspection, no specimens of Duck River Bladderpod were observed. A presence/absence survey during the flowering season (between March through May) might be required to determine the potential impacts with the species with the construction of the proposed solar facility. After the installation of the solar facility, it could be possible for the Duck River Bladderpod to remain present since solar facilities maintain a low vegetation growth stage under the panels. The proposed project would have no effect on federally listed and no significant impacts on state listed plant species."

Monarch butterflies were recently listed under the Endangered Species Act as a candidate species. While there are there are no Section 7 requirements for this species as a candidate species, one individual of this species was observed during field review, flying over an open field portion of the site. Little milkweed was observed in the northwestern corner hayfield along margins, but no eggs or caterpillars were observed. Due to the small amount of suitable habitat that currently occurs on site proposed action would not impact populations of monarch butterfly. Following completion of the project, agricultural crops would be replaced with early successional habitat which may provide more flower plants than previously occurred on site. While no significant impacts are anticipated, proposed actions may ultimately benefit this species by providing suitable foraging habitat.

The Tennessee clubtail dragonfly is listed as rare in the State of Tennessee. No specimen were observed on site, either as aquatic larvae or as adult specimen. This stream that flows through this site is deep and slow moving which does not provide the suitable shallow, wide and swift flowing habitat required by this species. Minor crossing are proposed for this site which will minimize the potential for impact to this species if present. A full macroinvertebrate study would be required to determine the presence/absence of this species.

Field review of the project site determined that a total of 69.65 acres of suitable summer roosting habitat (identified as good or marginal) for Indiana bat and northern long-eared bat exists on site. Of the 121 total acres of forest proposed for clearing, approximately 31.0 acres identified as good

quality habitat and 16.5 acres of marginal quality habitat would be cleared. Another 73.5 acres of poor quality habitat is proposed for clearing (Figure provided in Appendix E). No suitable winter roosting habitat for these species or gray bat occurs in the action area. Wetlands, streams and forested areas offer suitable foraging habitat for bat species. No impacts to wetlands are proposed. One road crossing over water is proposed to access the northeastern portion of the site. This could impact Benford Creek and the adjacent ephemeral channel. Best management practices would be used around all streams and wetlands to minimize potential impacts to bat foraging habitat. Tree removal is proposed between August 1 and March 31 of any given year. Tree removal at this time of year would avoid direct impacts to non-volant pups roosting in trees. Any disturbed volant individuals are expected to flush. Section 7 consultation under the Endangered Species Act is underway regarding potential impacts to federally listed bats.

As the TVA substation upgrades would occur within the footprint of the existing substation, no impact to threatened and endangered species is anticipated.

## 3.5 VISUAL RESOURCES

This section provides an overview of existing visual resources within and surrounding the Bell Buckle project site and potential impacts to visual resources that would be associated with the Proposed Action Alternative and No Action Alternative.

Visual resources are the characteristics of a place, both natural and manmade, that give a particular landscape its character and aesthetic quality. An observer's experience within or near a specific location can be determined by the visual resources at and surrounding that location. A viewshed is defined as the environment that is visible from a certain vantage point.

### *3.5.1 Affected Environment*

The project site, located in rural Bedford County, is primarily farmland with gently rolling terrain. The site is surrounded by agricultural fields and residential property. While there are some wooded areas within the project site, the land has been actively farmed. Benford Creek runs through the northeastern portion of the site. The Walmart Distribution Center is south of the site, in addition to several healthcare facilities. A distillery is located east of the site along US-231. The Bomar Field-Shelbyville Municipal Airport is 0.7-mile east of the site, east of US-231. The proposed TL falls south of the site, along Frank Martin Road between the Walmart Distribution Center and the existing substation.

Due to its proximity to the Bomar Field-Shelbyville Municipal Airport, a glint and glare analysis was prepared for the Proposed Action Alternative.

### *3.5.2 Environmental Consequences*

#### *3.5.2.1 No Action Alternative*

Under the No Action Alternative, the proposed solar facility would not be built and there would be no project-related changes to the visual character of the area. Existing views would be expected to remain unchanged.

#### *3.5.2.2 Proposed Action Alternative*

Construction of the solar facility would temporarily alter the visual character of the project site. During construction, heavy machinery would be present, changing the visual characteristics from vantage points surrounding the project site. In areas where grading would be necessary, minor changes to the contour, color, and texture of the ground surface would be visible. Erosion Control

Devices (ECDs) such as silt fences would likely be visible from the properties adjacent to the project site. Visual impacts from construction would be minimal at night since most construction is anticipated to occur during the day. Erosion control silt fences and sediment traps would be removed once construction is complete.

Due to the project's proximity to the Bomar Field-Shelbyville Municipal Airport, a glint and glare analysis was performed in accordance with FAA standards. The intent of the analysis was to identify the glare that could exist and determine if the glare would adversely impact the surrounding properties, vehicles traveling along nearby roadways, or pilots approaching the Bomar Field-Shelbyville Municipal Airport. The glint and glare analysis is enclosed within Appendix C.

The Proposed Action Alternative would result in the installation of approximately 110,478 individual solar panels arranged over roughly 238 acres of the 367-acre site. At full extension, these panels are roughly 6 to 8 feet in height, depending on grade, and would have a setback of approximately 150 feet from the property boundary. Vehicles traveling along adjacent roadways including Frank Martin Road, Cessna Lane, Midland Road, Eady Road, Airport Rad, and Route 231 would not experience adverse effects, such as glare, with no impact to driver's visibility. While views from surrounding properties may be slightly affected, the overall appearance of the solar panels would blend in with the immediate surrounding environment created by the nearby industrial and commercial facilities.

The glint and glare analysis considered specifics to the PV panels, including single-axis tracking, surface material, and maximum tracking angle. The panels would face 60 degrees east and track the sun throughout the day until they face 60 degrees west at sunset. At sunset the modules would track to a flat stow position. The PV panel surface material would be a smooth glass with an AR coating. Upon review of the expected total footprint of the proposed solar facility, no glare occurrences for the 179 residential and commercial structures within a 0.5 mile radius of the project site is anticipated as a result of the proposed project. Further, no glare occurrences along Runway 18 or Runway 36 approach paths at the Bomar Field-Shelbyville Municipal Airport were identified (Capitol Airspace Group 2020).

Visual impacts associated with the proposed TL would result in minor direct impacts to the visual landscape surrounding the project site. The TL would be visible from Frank Martin Rd, the residential homes north of Frank Martin Rd, and the adjacent Walmart Distribution Center.

Since the TVA substation upgrades would be constructed within the footprint of the existing substation, no impacts would occur from the modifications.

While minor visual impacts are anticipated from the development of the proposed solar facility, the project is located in an area of Bedford County that has been identified for industrial growth and would be rezoned to accommodate the proposed development.

## 3.6 NOISE

This section provides an overview of existing noise within and surrounding the Bell Buckle project site and potential impacts to noise that would be associated with the Proposed Action Alternative and No Action Alternative.

The magnitude and frequency of environmental noise may vary considerably over the course of the day, throughout the week, and across seasons, in part due to changing weather conditions and the effects of seasonal vegetation cover.

Noise is generally described as unwanted sound, which can be based either on objective effects (hearing loss, damage to structures, etc.) or subjective judgments (such as community annoyance). Sound is typically measured by the decibel (dB), which is used to express the ratio of one value of a physical property to another on a logarithmic scale. A day-night average sound level of 55 dBA is commonly used as a threshold level for noise which could result in adverse impacts, and prolonged exposure to levels above 65 dBA is considered unsuitable for residential areas (USEPA 1974).

### *3.6.1 Affected Environment*

The proposed project would be developed on a 367-acre tract located north of Frank Martin Road in Bedford County, Tennessee. Surrounding major sources of noise come from the operation of the airport, nearby industrial and commercial facilities, and the surrounding roadways.

Few sensitive noise receptors, residences, occur within 200 feet of the project site. These residences are located along the south west boundary of the site and are between 200-400 feet of the project site boundary. These include residences south of Frank Martin Road, residences between the project site and Midland Road, and several residences along Eady Road. The nearest occupied houses are approximately 200 feet from the proposed facility's southwestern boundary. These residences are more than 750 feet from the proposed inverters associated with the proposed site layout. Throughout the rezoning and planning process with the Bedford County Commission and Planning Commission, project neighbors would be notified of project hearings and provided an opportunity to provide comments related to the scope.

The proposed TL is located south of the project site, along Frank Martin Road. The easement is comprised of maintained/mowed grass, adjacent to the existing Walmart Distribution Center.

Noise regulations were reviewed for Bedford County; no numerical limits were identified for the project.

### *3.6.2 Environment Consequences*

#### *3.6.2.1 No Action Alternative*

Under the No Action Alternative, no noise impacts would occur from the construction or operation of the proposed solar facility, and the project would not result in related changes to noise levels in the area. No noise would be generated by the operation of the proposed solar facility.

#### *3.6.2.2 Proposed Action Alternative*

The Proposed Action Alternative would result in short-term noise production related to construction activities. Construction equipment typically results in a maximum noise level within the range of 80-90 dBA, dropping to 71-81 dBA at 300 feet, and 50-60 dBA at 1,000 feet. Elevated noise levels caused by construction equipment could be experienced by nearby residents, but construction noise would be of short duration, and likely not exceed the 71-81 dBA noise level at nearby houses for prolonged periods. The construction work associated with pile driving will be the loudest and occur intermittently during daylight hours. Other construction-related noise would remain under 65 dBA for nearby residences. Work would generally occur six (6) days per week (Monday through Saturday) from 7 am to 5 pm.

Elevated noise levels from construction equipment could be perceptible above background noise but would be of short duration during normal daylight hours and would likely not exceed the 71-81 dBA noise level for prolonged periods. Maintenance activities, primarily mowing, would result in noise periodically; however, this noise would be similar to existing noises near the project site. The proposed inverters would produce minimal noise near the substation on-site. Specifically, there are two residences within 500-feet west of the substation. Noise generated from the substation is anticipated to be minimal, resulting in insignificant noise to nearby residences. Provided that the adjacent residences are more than 750 feet from the proposed inverters, direct noise impacts from the inverters to residences would be insignificant.

Noise impacts associated with construction of the TL would be temporary, occurring during construction only when the poles and overhead line are constructed. Elevated noise levels would be temporary and would only occur during daytime hours. Maintenance activities, including vegetation management, would result in noise periodically; however, this noise would be comparable to existing noises near the project site. No noise related impacts are anticipated from the proposed TVA substation upgrades.

Overall noise impacts resulting from the Proposed Action Alternative would be insignificant.

## 3.7 AIR QUALITY AND GREENHOUSE GAS EMISSIONS

This section describes the existing air quality and GHG emissions in the project site and region and the potential impacts on air quality and GHG emissions that would be associated with the No Action and Proposed Action Alternatives.

### *3.7.1 Affected Environment*

The Clean Air Act (42 U.S.C. §7401 et seq.) mandates the protection and enhancement of our nation's air quality resources. National Ambient Air Quality Standards (NAAQS) for the following criteria pollutants have been set to protect the public health and welfare:

- Sulfur dioxide ($SO_2$),
- Ozone,
- Nitrogen dioxide ($NO_2$),
- Particulate matter whose particles are less than or equal to 10 micrometers ($PM_{10}$),
- Particulate matter whose particles are less than or equal to 2.5 micrometers ($PM_{2.5}$),
- Carbon monoxide (CO), and
- Lead.

The system-wide emissions from TVA's electrical generating facilities are described in TVA's 2019 Integrated Resource Plan Environmental Impact Statement (TVA 2019). TVA has reduced its emissions of criteria pollutants and GHG through the installation of emission controls at fossil fueled plants, idling and retirement of coal-fired generating units, increased use of low-emission generating facilities, and increased energy efficiency and demand reduction efforts.

#### *3.7.1.1 Air Quality*

The primary NAAQS were promulgated to protect the public health, and the secondary NAAQS were promulgated to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. Areas in violation of the NAAQS are designated as nonattainment areas. New sources to be located in or near these areas may be

subject to more stringent air permitting requirements. A listing of the NAAQS is presented in Table 7 (USEPA 2020b). National standards other than annual standards are not to be exceeded more than once per year (except where noted). Based on available ambient air quality data, Bedford County is currently in attainment for all criteria pollutants (USEPA 2020d).

***Table 7. NAAQS Table***

| Pollutant | | Primary/ Secondary | Averaging Time | Level | Form |
|---|---|---|---|---|---|
| Carbon Monoxide (CO) | | primary | 8 hours<br>1 hour | 9 ppm<br>35 ppm | Not to be exceeded more than once per year |
| Lead (Pb) | | primary and secondary | Rolling 3 month average | 0.15 µg/m3 (1) | Not to be exceeded |
| Nitrogen Dioxide (NO2) | | primary | 1 hour | 100 ppb | 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| | | primary and secondary | 1 year | 53 ppb (2) | Annual Mean |
| Ozone (O3) | | primary and secondary | 8 hours | 0.070 ppm (3) | Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years |
| Particle Pollution (PM) | PM2.5 | primary | 1 year | 12.0 µg/m3 | annual mean, averaged over 3 years |
| | | secondary | 1 year | 15.0 µg/m3 | annual mean, averaged over 3 years |
| | | primary and secondary | 24 hours | 35 µg/m3 | 98th percentile, averaged over 3 years |
| | PM10 | primary and secondary | 24 hours | 150 µg/m3 | Not to be exceeded more than once per year on average over 3 years |
| Sulfur Dioxide (SO2) | | primary | 1 hour | 75 ppb (4) | 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| | | secondary | 3 hours | 0.5 ppm | Not to be exceeded more than once per year |

**Source: USEPA 2020**

**Abbreviations:** ppb = parts per billion, ppm = parts per million, µg/m3 = micograms per cubic meter

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m3 as a calendar quarter average) also remain in effect.

(2) The level of the annual NO2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous SO2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2)any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO2 standards or is not meeting the requirements of a SIP call under the previous SO2 standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

Areas in compliance with the NAAQS are designated “attainment areas”. Areas not in compliance with the NAAQS are designated as “nonattainment areas”. Nonattainment areas are usually defined by county. Areas that cannot be classified based on available information for a specific pollutant are designated as “unclassifiable” and are treated as attainment areas unless proven otherwise. If an area that was formerly designated as a nonattainment for a particular pollutant later qualifies as attainment, it is then categorized as “maintenance” for that pollutant for the next 20 years (as long as the area continues to meet the NAAQS for that pollutant) before qualifying to be designated to attainment. Based on available ambient air quality data, Bedford County is currently in attainment for all criteria pollutants (USEPA 2020d).

The project site is in rural Bedford County and has a combination of agricultural, residential, industrial, and commercial development surrounding the site. Denser development is located south in downtown Shelbyville. Bedford County has no air quality monitoring sites listed in USEPA’s national database for NAAQS-regulated pollutants. Bedford County is in attainment for

all criteria pollutants and meets federal and state air quality standards (USEPA 2020d). Based on Air Quality Statistics (as of May 5, 2020), Bedford County air quality data was not available.

#### *3.7.1.2 Regional Climate*

Weather conditions determine the potential for the atmosphere to disperse emissions of air pollutants. Middle TN's climate is characterized by warm, humid summers with average high temperatures up to 90 degrees Fahrenheit (°F) and cool winters with average low temperatures around 30°F.

In Shelbyville, the summers are hot and muggy. The winters are cold and wet, and it is particularly cloudy year-round. Over the course of the year, the temperature typically varies from 30°F to 89°F and is rarely above 95°F (Weatherspark 2020).

#### *3.7.1.3 Greenhouse Gas Emissions*

GHGs are chemical compounds in the Earth's atmosphere that trap and convert sunlight into infrared heat. Gases exhibiting greenhouse properties come from both natural and man-made sources. Carbon dioxide, methane, and nitrous oxide are among the most common GHGs emitted from natural processes and human activities.

The primary GHG emitted by human activities in the U.S. is carbon dioxide, representing more than 80 percent of total GHG emissions. This occurs when carbon dioxide enters the atmosphere through the burning of fossil fuels (coal, natural gas, and oil), solid waste, trees, and wood products and chemical reactions. Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle (USEPA 2020c).

The largest source of carbon dioxide and of overall GHG emissions is fossil fuel combustion. Agricultural activities, including various management practices (i.e., irrigation, tillage, fertilizer application) can lead to the production and emissions of nitrous oxide (EPA 2020c).

### *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 to air quality or climate change would occur as the proposed solar facility would not be constructed. No air pollutants or GHG emissions would be generated by equipment or vehicles from construction or operation of the solar facility. Existing land use would remain a mix of forested, residential, and agricultural, with little effect on climate and air quality.

#### *3.7.2.2 Proposed Action Alternative*

Under the Proposed Action Alternative, minor impacts to air quality would occur during the construction of the facility. Only minimal air impacts would be expected, as construction might result in localized dust and fumes from equipment. The construction would likely involve the use of diesel-powered machinery and thereby create small amounts of air borne dust and debris. Emissions associated with diesel fuels by internal combustion engines would generate local emissions, including carbon monoxide, nitric oxide, and sulfur dioxide during construction (an increase of GHG during construction). The impacts on air quality would be expected to be minimal and short-lived.

Approximately 238-acres of the project site would be subject to ground disturbing activities, which includes vegetation clearing. Properly implemented control and suppression measures, as well

as BMPs and standard erosion control measures, such as reseeding, would minimize potential for wind erosion. Tree and other tall vegetation removed during construction to accommodate the panel layout and TL would represent a minor loss of sequestered carbon, as well as potential future carbon sequestration. Minor adverse impacts to air quality and GHGs is anticipated from construction of the proposed solar facility and TVA substation upgrades.

The operation of the solar facility would result in minimal impacts due to maintenance activities such as facility inspections and periodic mowing; however, a minor reduction in GHG emissions is expected as the carbon dioxide-free power generated by the solar facility would displace power which would otherwise be generated in part by fossil fuels. This would result in minor beneficial impacts to air quality (TVA 2019).

No direct or indirect impacts to regional climate would be associated with the construction of the Proposed Action Alternative. 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 Proposed Action Alternative would change the surface characteristics somewhat, but it would have little effect on soil permeability and hydrologic characteristics of the developed area. Vegetation would still 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 which happens with urban development. Therefore, average temperatures of the developed area are not expected to change significantly due to the Proposed Action Alternative.

## 3.8 CULTURAL RESOURCES

This section describes an overview of the existing cultural resources within the project site and potential impacts on these cultural resources that would be associated with the Proposed Action Alternative and No Action Alternative.

Cultural resources are prehistoric and historic archaeological sites, districts, buildings, structures, and objects, as well as locations of historic events of importance. Cultural resources that are listed, or determined to be eligible for listing, on the National Register of Historic Places (NRHP) maintained by the National Park Service are considered historic properties. As a Federal corporate agency, TVA is required by Section 106 of the National Historic Preservation Act (NHPA) to evaluate the potential effects of its actions on historic properties (36 CFR Part 800). When a TVA action would adversely affect a historic property, TVA must, in consultation with state historic preservation officers, federally-recognized Indian tribes, and other stakeholders, consider ways to avoid or minimize the adverse effect. If avoidance or minimization are not feasible, measures to mitigate the adverse effect must be taken.

### *3.8.1 Affected Environment*

In accordance with Section 106 of the NHPA, a Phase I cultural resource survey to document and assess resources located within the survey area associated with the proposed project was conducted. The archaeological survey area consisted of the 367-acre project site where the solar array is proposed for construction, including the TL with a 50-foot right-of-way. The Area of Potential Effects (APE) for the architectural study consisted of the 367-acre project site, in addition to areas visually connected to it via viewshed to and from the project site within a 0.5-mile radius. Areas within the architectural survey radius that were determined not to be within view of the proposed undertaking due to terrain, vegetation, and/or modern built environments were not considered part of the architectural APE.

The survey was conducted to provide an inventory of resources within the survey area, descriptions of the condition of any resources identified, and recommendations regarding their NRHP eligibility. All work was consistent with the Secretary of the Interior's Standards and Guidelines for Identification (NPS1983) and met the minimum requirements established by the TDEC (2018).

The archaeological assessment was conducted in August 2020 via systematic shovel test probes (STPs) excavated at 30 m intervals throughout the site. Positive STPs were further delineated at 10 m intervals, and judgmental STPs were placed within field sites containing historic foundations. Of the 1,637 STPs excavated, 12 were positive for subsurface cultural materials. A total of nine field sites were recorded – three prehistoric and six historic. After conferring with the Tennessee Division of Archaeology (TDOA), only four field sites received state site numbers (40BD253-256), the remainder were considered isolated finds or not archaeological sites. Based on the data gathered, sites 40BD253, 40BD254, 40BD255, 40BD256, and 40BD257 are not recommended eligible for listing on the NRHP.

The architectural survey was completed in September 2020. The survey resulted in the identification of one newly recorded architectural resource (HS-1), a former farmstead that contains a 1952 Ranch house and eight associated outbuildings. HS-1 is not recommended as eligible for listing on the NRHP due to its lack of historical and architectural significance (TRC 2020). No further studies were recommended.

Since September 2020, the proposed TL shifted from the north boundary of Frank Martin Rd to the south boundary. An additional assessment was conducted on February 3, 2021 to review the proposed TL area via STPs excavated at 30 m intervals. As a result of the assessment, no field sites were recorded.

## *3.8.2 Environmental Consequences*

### *3.8.2.1 No Action Alternative*

Under the No Action Alternative, the existing land use would be expected to remain unchanged. Therefore, no impacts to cultural resources would occur as the site would not be developed as a solar facility.

### *3.8.2.2 Proposed Action Alternative*

The Proposed Action Alternative would not impact any listed or eligible NRHP archaeological sites. Unless plans change or new concerns are brought to light, no further archaeological or architectural investigations were recommended in connection with the proposed project. In a letter dated November 20, 2020, TVA consulted with the Tennessee State Historic Preservation Officer (SHPO) regarding TVA's finding of no effect to historic properties. In a letter dated November 23, 2020, the Tennessee SHPO concurred with TVA's "no effect" findings. Based on the revised TL location and additional assessment, TVA is re-coordinating with the SHPO.

Consultation with federally recognized tribes is ongoing. In a letter dated December 4, 2020, The Chickasaw Nation provided support of "the proposed undertaking and is not presently aware of any specific historic properties, including those of traditional religious and cultural significance, in the project area." In a letter dated December 21, 2020, The Cherokee Nation stated, "this Office does not object to the project proceeding" as long as noted stipulations are observed, including: 1) additional consultation if there are any changes to the scope of or activities within the APE, 2) halt all project activities for further consultation if items of cultural significance are discovered

during the course of the project, and 3) 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. Based on the revised TL location and additional assessment, TVA is re-coordinating with federally recognized Indian tribes.

Should previously undiscovered cultural resources be identified during construction or operations, TVA would contact and would consult with the SHPO and relevant federally recognized Indian tribes before any further action is taken.

## 3.9 SOLID AND HAZARDOUS WASTES

This section describes an overview of existing waste management (solid and hazardous waste) within the project site and potential impacts to waste management that would be associated with the No Action Alternative or Proposed Action Alternative.

### *3.9.1 Affected Environment*

An ASTM standard E1527-13 Phase I Environmental Site Assessment (ESA) was performed on the site in June 2020 and resulted in the following findings:

- The GeoSearch Radius Report identified an Underground Storage Tank (UST) listing for the Walmart Distribution Center to the south of the site, south of Frank Martin Road. No violations were recorded for that listing.
- The subject property was not identified in the findings.
- The site contains piles of solid waste associated with the barns and sheds on the proposed site, as well as some within the wooded areas. Removal of the solid waste would occur prior to purchase of the property.
- Additionally, site observations indicated the potential of asbestos containing materials within the former residences.

In order to account for the revised TL location, additional investigations occurred January 2021. The portion of the project site associated with the TL south of Frank Martin Road was not identified in the findings.

### *3.9.2 Environmental Consequences*

#### *3.9.2.1 No Action Alternative*

Under the No Action Alternative, no project-related impacts associated with solid and hazardous waste would occur. Existing land use would be expected to remain agricultural and existing waste management conditions would be expected to remain as they are currently.

#### *3.9.2.2 Proposed Action Alternative*

Construction activities and facility operation under the Proposed Action Alternative would generate solid waste. Oily rags, worn or broken metal and machine parts, defective or broken electrical materials, other scrap metal and plastic, broken down module boxes, empty containers, paper, glass, and other miscellaneous solid wastes would be generated throughout all phases of the proposed project. Waste would be disposed by means of contracted refuse collection and recycling services. All applicable federal, state, and local regulatory requirements would be followed in the collection and disposal of waste to minimize health and safety effects. Decommissioned equipment and materials, including PV panels, racks, and transformers, would be recycled. Materials that cannot be recycled would be disposed of at an approved facility in accordance with applicable local, state, and federal laws and regulations.

Phase I ESA findings would not have an impact on the Proposed Action Alternative as hazardous materials are not likely to be encountered during construction. No hazardous waste would be generated during the construction and operation of the facility. 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. Fuel for construction vehicles may be stored on-site during construction. An SPCC plan would be developed and implemented to minimize the potential of a spill and detailed instructions for on-site personnel on how to contain and clean up any potential spills. Hazardous materials stored on site would not be available to the public. Fueling of construction vehicles would occur within the construction area. During construction and operation of the facility, any materials determined to be wastes would be evaluated (e.g., waste determinations) and managed (e.g., inspections, container requirements, permitted transport, and disposal) in accordance with the Solid and Hazardous Wastes Rules and Regulations of the State of Tennessee (TDEC DSWM Rule 0400 Chapters 11 and 12, respectively). The TVA substation upgrades would occur within the existing substation footprint. All applicable local, state, and federal regulatory requirements would be followed, and waste would be properly disposed of should the upgrade be completed.

Procedures to limit fuel spills would be implemented during construction and operation of the facility. Details regarding the handling of fluid spills and general trash would be included in the SWPPP. Spills would be managed in accordance with standard procedures for spill prevention and cleanup and waste management protocols in accordance with pertinent federal, state, and local requirements. Waste generated during operation would be minimal and would mainly result from replacement of equipment. Nonhazardous wastes would be disposed of in an approved, operating landfill. Bulk chemicals would be stored in storage tanks or in returnable delivery containers. The transport, storage, handling, and use of all chemicals would be conducted in accordance with applicable local, state, and federal laws, ordinances, regulations, and standards.

Upon expiration of the 15-year PPA or an amended or alternative PPA for the sale of power after the 15-year period, SR Bell Buckle would develop a decommissioning plan to document the recycling and/or disposal of solar facility components in accordance with applicable local, state, and federal laws and regulations. Impacts from the generation of hazardous waste during the construction and operation of the proposed facility would be insignificant.

## 3.10 PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY

This section provides an overview of existing public health and safety at the project area and the potential impacts to public health and safety associated with the No Action Alternative and Proposed Action Alternatives. Analyzed issues include emergency response and preparedness and occupational or worker safety in compliance with the Occupational Safety and Health Administration (OSHA).

### *3.10.1 Affected Environment*

The project site is currently private property, an agricultural and rural-residential area. Public emergency services in the area include urgent care clinics, hospitals, law enforcement services, and fire protection services. A brief description of the public emergency services, relative to the project location is provided below:

- Tennova Urgent Care (Shelbyville, TN) – approximately 5 miles S from the site
- Fast Pace Health Urgent Care (Shelbyville, TN) – approximately 5 miles S from the site
- Tennova Surgical Clinic (Shelbyville, TN) – approximately 0.5-mile SE from the site

- Tennova Medical Clinic (Shelbyville, TN) – approximately 0.5-mile SE from the site
- Murfreesboro Medical Clinic (Shelbyville, TN) – approximately 0.5-mile SE from the site
- Tennova Healthcare (Shelbyville, TN) – approximately 1-mile SE from the site
- Heritage Surgery Clinic (Shelbyville, TN) – approximately 1-mile SE from the site
- Bedford County EMS Operations Center (Shelbyville, TN) – approximately 0.5-mile SE from the site
- Shelbyville Police Department (Shelbyville, TN) – approximately 7 miles S from the site
- Bedford County Sheriff's Office (Shelbyville, TN) – approximately 7 miles SE from the site
- Bedford County Volunteer Fire (Shelbyville, TN) – approximately 7 miles SE from the site
- Unionville Volunteer Fire Department (Unionville, TN) – approximately 8 miles NW from the site

### *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 impacts on public health and safety would result. Existing land use would remain a mix of agricultural and some forested land. No changes to existing public health and safety would occur.

#### *3.10.2.2 Proposed Action Alternative*

Under the Proposed Action Alternative, during construction, workers on the project site would have an increased safety risk. However, standard construction site practice includes the establishment and maintenance of health and safety plans to comply with OSHA regulations. Health and safety plans emphasize BMPs for site safety to minimize risk to construction staff. This may include use of personal protective equipment, regular safety inspections, use of equipment guards, and establishment of emergency shutdown procedures.

Fuel for construction vehicles may be stored on-site during construction. An SPCC plan would be developed and implemented to minimize the potential of a spill and detailed instructions for on-site personnel on how to contain and clean up any potential spills. Hazardous materials stored on site would not be available to the public. Emergency response for any potential incidents on the project site would be provided by the local, regional, and state law enforcement, fire, and emergency responders.

Potential public health and safety hazards could result in increased traffic on nearby roadways due to construction of the site. Communication of increased industrial traffic and establishment of traffic procedures to minimize potential safety concerns would be addressed in the health and safety plans followed by the construction contractor. No impacts to public and occupational health are anticipated from the proposed TVA substation upgrades. No public health or safety hazards are anticipated as a result of the construction of the Proposed Action Alternative.

## 3.11 TRANSPORTATION

This section describes roadways and other transportation infrastructure serving the project site and surrounding area, and potential impacts on transportation that would be associated with the No Action Alternative and Proposed Action Alternative.

### *3.11.1 Affected Environment*

The project site is located between the towns of Deason and Shelbyville, Tennessee. More specifically, the site is north of Frank Martin Road. The area is largely rural and characterized by nearby residential and agricultural areas.

One industrial facility, Walmart Distribution Center, is located south of the project site, south of Frank Martin Road. Chassix, a metal fabricator is located south of the project site, along Northcreek Drive. Approximately 160 residences are located within a 0.5-mile radius of the project site, scattered southwest and north of the project site. The Bedford County EMS Operations Center is located south of the project along Frank Martin Road. There are also three healthcare facilities located south of Frank Martin Road and Airport Business Park Road. Lastly, Uncle Nearest Distillery is located east of the site, along US-231.

The closest airport is the Bomar Field-Shelbyville Municipal Airport, located approximately 0.7-mile east of the project site.

There are no existing Tennessee Department of Transportation (TDOT) stations immediately adjacent to the project site to provide traffic volume at nearby intersections. However, TDOT traffic count data was obtained using the TDOT Enhanced Tennessee Roadway Information Management System (E-TRIMS). The values provided are annual average daily traffic (AADT) volumes. AADT volumes are based on 24-hour, two directional count at a given location. The raw traffic data is mathematically adjusted for vehicle type, determined by an axle correction factor. The data is then statistically corrected by seasonal variation factor that considers time of year and day of the week. Midland Road AADT includes 2,650 vehicles/day. US 231/SR 82 AADT includes 20,680 vehicles/day. SR 82 includes 2,040 vehicles per day.

### *3.11.2 Environmental Consequences*

#### *3.11.2.1 No Action Alternative*

Under the No Action Alternative, the proposal solar facility would not be constructed. Therefore, no project related impacts on transportation resources would result. Existing land use would be expected to remain a mix of farmland and unused land, and the existing transportation network and traffic conditions would be expected to remain as they are presently.

#### *3.11.2.2 Proposed Action Alternative*

Under the Proposed Action Alterative, the construction and operation of the proposal solar facility would have no effect on operation of the nearby Bomar Field-Shelbyville Municipal Airport, located approximately 0.7-mile east of the project site, across US-231. The distance between the regional airport and the proposed solar facility, coupled with the existing industrial development and roadways between the proposed solar facility, serve to minimize any effects the proposed solar facility may have on air traffic. The operation of the solar facility would not affect commercial air passenger or freight traffic in the region.

During construction of the solar facility, a maximum of 200 workers would be present at the site from 7am to 5pm, 6 days a week (Monday through Saturday) for approximately 10 months. A majority of the workers would likely come from the local or regional area, and approximately 40 percent of the workforce would be supervisory personnel that would likely come from out-of-state and many would stay in local hotels near or within Shelbyville, TN. Workers would either drive their own vehicles or carpool to the project site. Parking would be on site during the day. Some work teams may visit local restaurants and business during work hours. Additional traffic due to

deliveries and waste removal would consist of a maximum of approximately 15 vehicles per day during construction.

Traffic flow around the work site would be heaviest at the beginning of the workday, at lunch, and at the end of the workday. Deliveries and most workers would access the project site from Frank Martin Road. No major industries are located at the site access points. Should traffic flow be a problem for local residences or businesses, SR Bell Buckle would consider staggered work shifts to space out the flow of traffic to and from the project site. Use of such mitigation measure would minimize potential adverse impacts to traffic and transportation to less than significant levels.

Several on-site 16-20-foot-wide maintenance roads would be constructed and maintained on the project site. These roadways would serve for periodic access for site inspection and maintenance and closed for through traffic.

No impacts to transportation are anticipated from the proposed TVA substation upgrades.

The proposed solar facility would not be manned during operation; however, maintenance would be required quarterly and for equipment failures and would require minimal personnel. Therefore, the operation of the solar facility would not have a noticeable impact on local roadways. Overall, the Proposed Action would not result in indirect impacts to transportation.

If the site were to be decommissioned, traffic resulting from waste removal activities would be temporary and a short term. Should substantial traffic occur near the project site access locations, SR Bell Buckle, or its contractor, would implement staggered work shifts to assist traffic flow near the project site access locations to minimize potentially adverse impacts to traffic and transportation levels.

## 3.12 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

This section describes an overview of existing socioeconomic conditions and environmental justice considerations that would be associated with the No Action Alternative and Proposed Action Alternative.

EO 12898 on Environmental Justice directs Federal agencies to consider the impacts of their actions on minority and low-income populations and to avoid disproportionate impacts to those populations. While TVA is not listed as a Federal agency subject to EO 12898, TVA typically addresses environmental justice concerns through its NEPA analysis for Federal projects.

### *3.12.1 Affected Environment*

The proposed project is located in a rural area of Bedford County between Deason and Shelbyville. Based on U.S. Census data available through the EPA's EJSCREEN, 673 people live within a one-mile radius of the project site, approximately 0.01 percent of the Bedford County population of 47,558 (Census 2018). Tables 8 and 9 below provide a breakdown of relevant population, income, and poverty data. Since the proposed project site falls immediately adjacent to Shelbyville city limits, Shelbyville population, income, and poverty data are provided for comparison and reference.

***Table 8. Project Site Population***

| BELL BUCKLE SOLAR PROJECT POPULATION DATA | | | | | |
|---|---|---|---|---|---|
| | Population | Minority Population | | | |
| Geography | Total | White | Percent White | Minority | Percent Minority |
| Tennessee | 6,829,174 | 5,354,072 | 78.40% | 1,475,102 | 21.60% |
| Shelbyville, TN Metro Area | 21,319 | 15,179 | 71.20% | 6,140 | 28.80% |
| Bedford County, Tennessee | 47,558 | 40,063 | 84.24% | 7,495 | 15.76% |
| 1-Mile Radius - Project Site | 673 | 593 | 88% | 80 | 12% |

***Sources:***

*U.S. Census Bureau. American Fact Finder; 2018 ACS 5-year estimates. Accessed September 25, 2020. https://factfinder.census.gov/faces/nav/jsf/pages/index/xhtml.

*USEPA. EJSCREEN. Accessed September 25, 2020. Available at: https://ejscreen.epa.gov/mapper/

Recorded population within the one-mile radius is predominantly white, with 88 percent reporting race as white and 12 percent minority (USEPA 2020a). The reported minority population within the one-mile radius is about 4 percentage points lower than the Bedford County minority population of 15.76 percent, which is less than Tennessee's 21.60 percent minority population.

Within one mile of the project site, a slightly higher per capita income, $25,150, has been reported as compared to Bedford County's per capita income of $23,988. While median household income is not reported at this level through EJSCREEN, it is likely that the median household income within one mile of the project site is slightly above the median Bedford County household income of $48,945.

***Table 9. Project Site Income and Poverty***

| BELL BUCKLE SOLAR PROJECT INCOME AND POVERTY DATA | | | | | | |
|---|---|---|---|---|---|---|
| | Median and Per Capita Income | | | Poverty Level | | |
| Geography | Total Households | Median Household income | Per Capital income in the past 12 months | Population for whom poverty status is determined | Population below poverty level | Percent below poverty level |
| Tennessee | 2,567,061 | $50,972 | $28,511 | 13.90% | 1,024,376 | 15% |
| Shelbyville, TN Metro Area | 7,387 | $39,665 | $18,766 | 21.80% | N/A | N/A |
| Bedford County, Tennessee | 16,882 | $48,945 | $23,988 | 14.40% | N/A | N/A |
| 1-Mile Radius - Project Site | 247 | N/A | $25,150 | N/A | N/A | N/A |

***Sources:***

*U.S. Census Bureau. American Fact Finder; 2018 ACS 5-year estimates. Accessed September 25, 2020. https://factfinder.census.gov/faces/nav/jsf/pages/index/xhtml.

*USEPA. EJSCREEN. Accessed September 25, 2020. Available at: https://ejscreen.epa.gov/mapper/

## *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 socioeconomic impacts within Bedford County would occur. Further, no disproportionate impacts to the low-income or minority populations in the project site would occur.

#### *3.12.2.2 Proposed Action Alternative*

Under the Proposed Action Alternative, the proposed solar facility would be constructed. Approximately 200 workers would be employed during construction, lasting approximately 10 months. Most of these workers would be based in the local area, leading to a short-term beneficial impact on the local economy.

No impacts to socioeconomics or environmental justice would occur from the proposed TVA substation modifications.

Operation of the facility would not result in an increase in local employment as no workers would be needed for day-to-day operation of the solar facility. While periodic maintenance activities, primarily mowing, would be done by local workers, this would not result in an increase in employment. Although it is too early to quantify, the project would benefit the local tax base through the increased property taxes due to site improvements.

While there are only limited and short-term benefits to the labor force, the project and the diversification of energy sources better positions Bedford County and the State of Tennessee in economic development ventures.

When compared to state and county data, there is a slightly lower concentration of minority population near the project. While there is what would potentially be considered a low-income population near the project site, the overall impacts of the solar facility, most of which would occur during the short construction period, would be minor. The off-site impacts (i.e., to surrounding properties) would be negligible. Consequently, there would be no disproportionately adverse impacts to minority and low-income populations.

## 3.13 CUMULATIVE IMPACTS

CEQ regulations define a cumulative impact as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 CFR § 1508.7 issued in 1978). Cumulative impacts should be considered early in the project development process, as identification of potential cumulative impacts may assist in the design and selection of alternatives and mitigation measures to minimize a project’s environmental impacts.

As described above, the construction and operation of the solar facility under the Proposed Action Alternative would result in minor direct impacts to land use, geological resources and farmlands, water resources, biological resources, visual resources, noise, air quality, public health and safety, and transportation. More specifically, two direct impacts to streams are required to accommodate the proposed access road on-site. There are no known planned projects in the area that would likely contribute to cumulative impacts associated with the proposed solar facility. Desktop research of potential past, present, and future actions in the Bedford County, Tennessee area was conducted. Resources examined included:

- TDOT transportation projects
- TVA environmental reviews website;
- Local and regional news sources; and
- Bedford County and Town of Shelbyville government website records.

Tennessee Department of Transportation 2020-2023 Tennessee Transportation Improvement Program was reviewed for potential present and future actions within the vicinity of the project site. No projects within the vicinity of the proposed solar facility were identified. Therefore, no adverse cumulative impacts have been identified from TDOT transportation projects.

Upon review of TVA's environmental reviews, no existing or proposed projects were identified within Bedford County. Therefore, no cumulative impacts have been identified from TVA's environmental reviews.

The City of Shelbyville 2008-2028 Comprehensive Plan includes an overview and inventory of the existing land use within the Shelbyville municipality limits. A long-range plan is included with maps and text for future land use, streets, and major road development. The plan reflects planned growth areas, including an increase to the City of Shelbyville Urban Growth Boundary (UGB). The project site falls within the proposed increased UGB. No major roadway improvement projects or development projects were identified within the vicinity of the proposed solar facility in the comprehensive plan. Based on review of available Bedford County planning and zoning information and local and regional news, there are no known recent or planned state and local projects in the project site vicinity. Therefore, no adverse cumulative impacts have been identified.

# CHAPTER 4

## 4.0 LIST OF PREPARERS

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**Ashley Pilakowski (TVA)**
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# CHAPTER 5

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