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CUMBERLAND SOLAR PROJECT

Limestone County, Alabama

FINAL ENVIRONMENTAL ASSESSMENT

Prepared for:
Tennessee Valley Authority
Knoxville, Tennessee

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CHAPTER 1

1.0 INTRODUCTION

The Tennessee Valley Authority (TVA) proposes to enter into a power purchase agreement (PPA) with Cumberland Land Holdings, LLC, the facility-specific entity affiliated with Silicon Ranch Corporation (SRC), to purchase the electric power generated by a proposed solar photovoltaic (PV) facility in Limestone County, Alabama. The proposed solar facility is known as "Cumberland" solar facility, which would have direct current (DC) generating capacity of 20 megawatts (MW). The proposed solar facility known herein as the "Project" would be constructed and operated by Cumberland Land Holdings, LLC. The PPA would be executed through TVA's Renewable Standard Offer (RSO) program, under which TVA agrees to purchase qualifying renewable energy at set prices for a 20-year period.

The proposed Cumberland solar facility would occupy approximately 140 acres of a 155-acre tract owned by SRC, approximately 20 miles northwest of Huntsville, Alabama. The closest town is Ardmore, approximately 3 miles northeast of the project site (Figure 1, Figure 2, and Figure 3). The 155-acre tract is comprised of four parcels and is known herein as the "project site." The solar generating facility would consist of multiple parallel rows of PV panels on single-axis tracking structures, DC to alternating current (AC) inverters and transformers. The proposed solar facility would be connected to the immediately adjacent TVA-owned Ardmore Substation by an overhead 44-kilovolt (kV) powerline originating at a new on-site substation near the existing TVA Ardmore Substation. The connecting powerline would be constructed and owned by Cumberland Land Holdings, LLC and would terminate at a new pole and switch constructed and owned by TVA on the Ardmore Substation property. TVA's action also includes conveyance of a nonexclusive access easement to SRC along an existing access road from County Road 71 (CR71), also known as Mooresville Road, to TVA's Ardmore Substation.

1.1 PURPOSE AND NEED FOR ACTION

In its 2011 Integrated Resource Plan (IRP; TVA 2011) TVA established the goal of increasing its renewable energy generating capacity by 1,500 to 2,500 MW by 2020. TVA established the Renewable Standard Offer (RSO) program as one of the means of meeting this goal. Under the RSO program, TVA purchases energy at established terms and conditions (the "standard offer") from operators of qualifying renewable energy-generating facilities. Qualifying facilities must be new, located within the TVA service area, and must generate electricity from specific technologies or fuels. Solar PV generation is one of the qualifying technologies. Cumberland Land Holdings, LLC and the Project have met the qualifications for the RSO program, and TVA must decide whether to execute the PPA.

TVA's 2015 IRP (TVA 2015) reinforced the continued expansion of renewable energy generating capacity, including the addition of between 175 and 800 MW (AC) of solar capacity by 2023. The Proposed Action would help meet this need for additional solar capacity.

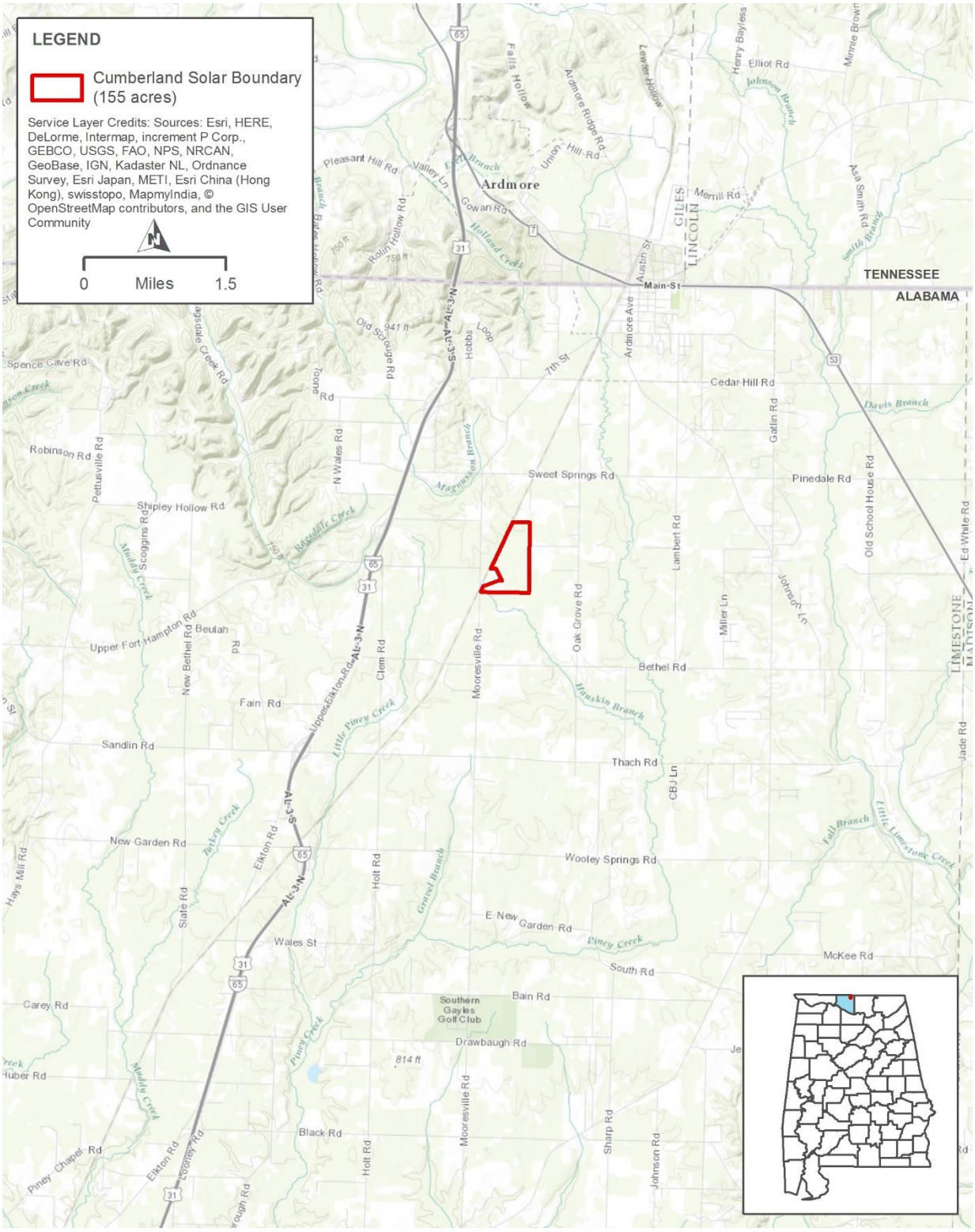


Figure 1. Site location in Limestone County, Alabama.

1.2 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

Pursuant to the National Environmental Policy Act of 1969 (NEPA) and NEPA's implementing regulations promulgated by the Council on Environmental Quality ([CEQ]; 40 Code of Federal Regulations [CFR] §§ 1500–1508), federal agencies are required to evaluate the potential environmental impacts of their proposed actions. This environmental assessment (EA) was prepared in accordance with NEPA and TVA's procedures for implementing NEPA (TVA 1983) to assess the potential impacts of TVA's Proposed Action (the purchase of power under the PPA) and the associated impacts of the construction and operation of the proposed solar facility.

TVA's Proposed Action would result in the construction and operation of the proposed solar facility by Cumberland Land Holdings, LLC, as well as the construction and operation of the electrical interconnection by TVA. The scope of this EA therefore focuses on impacts related to the construction and operation of the proposed solar facility and associated electrical interconnection.

This EA (1) describes the existing environment in the project area, (2) analyzes potential environmental impacts associated with the Proposed Action and the No Action Alternative, and (3) identifies and characterizes cumulative impacts that could result from the proposed Project in relation to other ongoing or reasonably foreseeable proposed activities within the surrounding area of the project site. The "project area" is the potentially affected areas within and beyond the project site and varies by each resource area as defined in Chapter 3.

Under the PPA, TVA's obligation to purchase renewable power is contingent upon the satisfactory conclusion of the environmental review and TVA's determination that the Proposed Action will be "environmentally acceptable." To determine acceptability, TVA must conclude that no significant impacts to the human environment would result from the location, operation, and/or maintenance of the proposed generating facility and that all project activities would be consistent with all applicable federal, state, and local environmental laws and regulations.

Based on internal scoping, identification of applicable laws, regulations, executive orders, and policies, TVA identified the following resource areas listed below as requiring analysis within this EA: Land Use; Geology, Soils, and Prime Farmland; Water Resources; Biological Resources; Visual Resources; Noise; Air Quality and Greenhouse Gases; Cultural Resources; Solid and Hazardous Waste; Transportation; and Socioeconomics and Environmental Justice.

TVA also considered potential effects related to utilities, public and occupational health and safety, recreation, and parks and natural areas. However, TVA found these potential effects to be absent or minor and to not require further evaluation.

This EA consists of six chapters discussing the Alternatives, resource areas potentially affected, and analyses of impacts. Additionally this document includes an appendix, which contains correspondence and supporting information. The structure of the EA is outlined below:

- **Chapter 1:** Describes the purpose and need for the Project, the decision to be made, related environmental reviews and consultation requirements, necessary permits or licenses, and the EA overview.

- **Chapter 2:** Describes the Proposed Action and No Action Alternative, provides a comparison of the Alternatives, and discusses the Preferred Alternative.
- **Chapter 3:** Discusses the affected environment and the potential direct and indirect impacts on these resource areas. Mitigation measures are also proposed, as appropriate.
- **Chapter 4:** Discusses the cumulative impacts in relation to other ongoing or reasonably foreseeable proposed activities within the surrounding area of the project site.
- **Chapters 5 and 6:** Contain the List of Preparers of this EA, and the References cited in preparation of this EA, respectively.
- **Appendix:** Correspondence and supporting information.

1.3 PUBLIC INVOLVEMENT

Public and agency involvement includes publication of the draft EA for a 30-day public and agency review and comment period. TVA notified appropriate local, state, and federal agencies and federally recognized tribes of the draft EA's availability, entering into consultations with those agencies to assess particular impacts. TVA carefully reviewed comments received on the draft EA and addressed them, as appropriate, in the final EA. The public notice period occurred between December 22, 2017 and January 21, 2018. A total of four comments were received. Two of the comments supported the project and renewable energy. One of the comments was from a cooperative-owned utility material distributor wishing to be involved with the project. The final comment was from an individual expressing concern about socioeconomic impacts to the surrounding community. The comments can be found in Appendix E.

1.4 PERMITS AND APPROVALS

Cumberland Land Holdings, LLC's construction contractor, McCarthy Building Company, will be required to apply to the Alabama Department of Environmental Management (ADEM) Water Program for a National Pollutant Discharge Elimination System (NPDES) Notice of Intent (NOI) to obtain coverage under the General Construction Stormwater NPDES permit. This permit will authorize the discharge of stormwater from the solar farm construction site (see Section 2.2.2). In accordance with Construction General Permit requirements, Cumberland Land Holdings, LLC and McCarthy Building Company will develop a site-specific Stormwater Pollution Prevention Plan (SWPPP) and submit it to ADEM. The SWPPP will address the design, inspection, and maintenance of Best Management Practices (BMPs) utilized during construction activities consistent with the requirements and recommendations contained in the Alabama Handbook for Erosion Control, Sediment Control, and Stormwater Management on Construction Sites and Urban Areas.

Open burning of minimal debris from tree clearing on the site would occur and the appropriate open burning permit would be obtained daily from the Alabama Forestry Commission dispatch center for Limestone County. Only vegetation and untreated wood would be burned. Weather conditions would be monitored and considered to ensure safety and minimal degradation to air quality during the open burning of any vegetation cleared from the site. No burning of other construction debris is anticipated.

A Clean Water Act (CWA) Section 404 Nationwide Permit (NWP) Number 51 (Land-Based Renewable Energy Generation Facilities) will be required for the installation of solar arrays and attendant cabling, and pipe culverts for stream crossings associated with access roads on the project site. NWP 51 is a general permit issued by the US Army Corps of Engineers (USACE) that authorizes discharges of dredged or fill material into Waters of the U.S., including streams and wetlands, provided the activity meets specific criteria for the construction, expansion, or modification of land-based renewable energy production facilities, including attendant features. Section 404 permits require water quality certification (WQC) as set forth in Section 401 of the CWA prior to discharging fill materials into Waters of the U.S. Section 401 requires any applicant requesting a federal permit or license for activities that may result in discharges to first obtain a certification from the State that the permitted discharges comply with the State's applicable effluent limitations and water quality standards. Through a joint application process with USACE, the ADEM Water Program issues WQCs in conjunction with the USACE Nashville Regulatory District Section 404 Nationwide Permits. Once the NWP 51 application is developed and submitted for this project, both the NWP 51 and the WQC are expected to be issued concurrently by the respective agencies. Impacts to streams and wetlands will be mitigated cumulatively if the USACE determines mitigation necessary.

CHAPTER 2

2.0 DESCRIPTION OF THE PROPOSED SOLAR PROJECT AND ALTERNATIVES

This chapter describes the Project, explains the rationale for identifying the alternatives to be evaluated, describes each alternative, provides a comparison of alternatives with respect to their potential environmental impacts, and identifies 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 a baseline of conditions against which the impacts of the Proposed Action Alternative can be measured. Under the No Action Alternative, TVA would not purchase the power generated by the Project under the 20-year PPA with Cumberland Land Holdings, LLC (i.e., TVA would not be involved with the Project) and the solar facility would not be constructed and operated by Cumberland Land Holdings, LLC. Existing conditions (land use, natural resources, visual resources, and socioeconomics) in the project area would remain unchanged. The property would be retained by SRC for future development, but the likelihood of its continued use for agricultural development is remote. TVA would continue to rely on other sources of generation described in the 2015 IRP (TVA 2015) to ensure an adequate energy supply and to meet its goals for increased renewable energy and low greenhouse gas (GHG) emitting generation.

2.2 PROPOSED ACTION ALTERNATIVE

Under the Proposed Action Alternative, TVA would enter into the 20-year PPA with Cumberland Land Holdings, LLC, who would construct and operate the 20-MW Cumberland single-axis tracking PV solar power facility in Limestone County, Alabama. The proposed Cumberland solar facility would occupy approximately 140 acres of the project site, which is comprised of four tracts approximately 3.2 miles southwest of the town of Ardmore. The proposed facility would connect to the existing 161-kV TVA Ardmore Substation located adjacent to the site. TVA's action also includes conveyance of a nonexclusive access easement to SRC along an existing access road from County Road 71 (CR71), also known as Mooresville Road, to TVA's Ardmore Substation. This EA assesses the impact of TVA's action to enter into the PPA and the associated impact of the construction and operation of the proposed solar facility and electrical interconnection by Cumberland Land Holdings, LLC.

2.2.1 Solar Facility

The solar facility would be constructed on a 155-acre, forested and agricultural tract owned by SRC, approximately 3.2 miles southwest of the town of Ardmore. This tract is comprised of four land parcels totaling 155 acres. The southern portion has been cleared for agricultural purposes with the majority of the site used for timber production (Figure 2). The CSX Railroad forms the majority of the western property boundary.

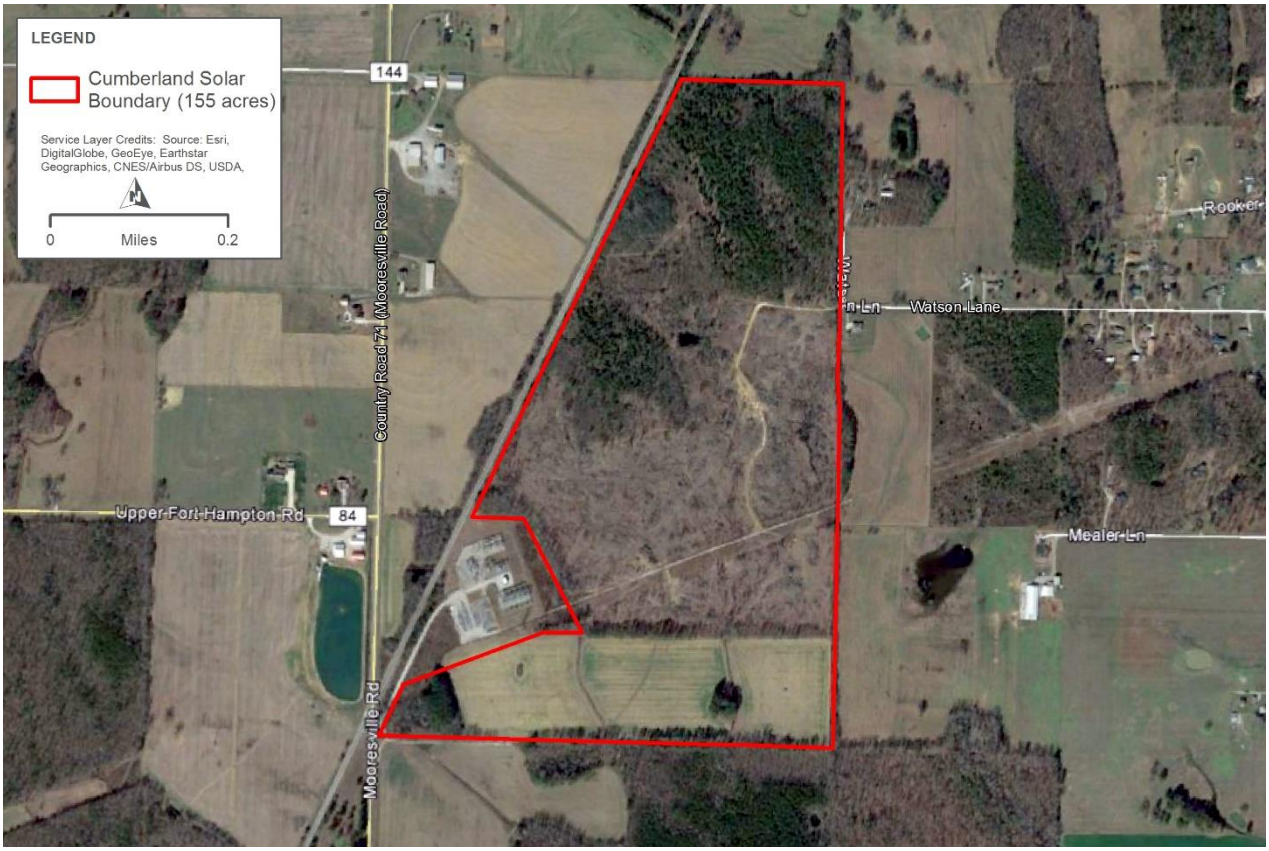


Figure 2. Aerial photograph showing Cumberland solar site boundary.

The project site is located east of County Road 71 (CR 71), also known as Mooresville Road, and accessible by an existing gravel road from Country Road 71 to the south of the railroad. The proposed solar facility would be connected to the existing TVA-owned 161-kV Ardmore Substation, located immediately adjacent to the site, east of Mooresville Road (Figure 3).

The Cumberland solar facility is proposed to be developed on 140 acres of the 155-acre project site. The perimeter of the 140-acre area of solar arrays, access roads, and electrical infrastructure would be enclosed by chain-link fencing. An existing TVA-owned utility easement bisecting the project site, the 2.9 acre wetland in the central eastern portion, and the creeks within the fenced area will have four stream crossings with culverts, two trench crossings for cabling, and stream impacts from grading for the solar panels. Approximately 3.9 acres of the fenced-in area would be graded and covered with gravel for roadway use. Areas of streams and wetlands, which are within the fenced area but not covered with panels or crossed, will remain undeveloped, though brush clearing may occur (Figure 3).

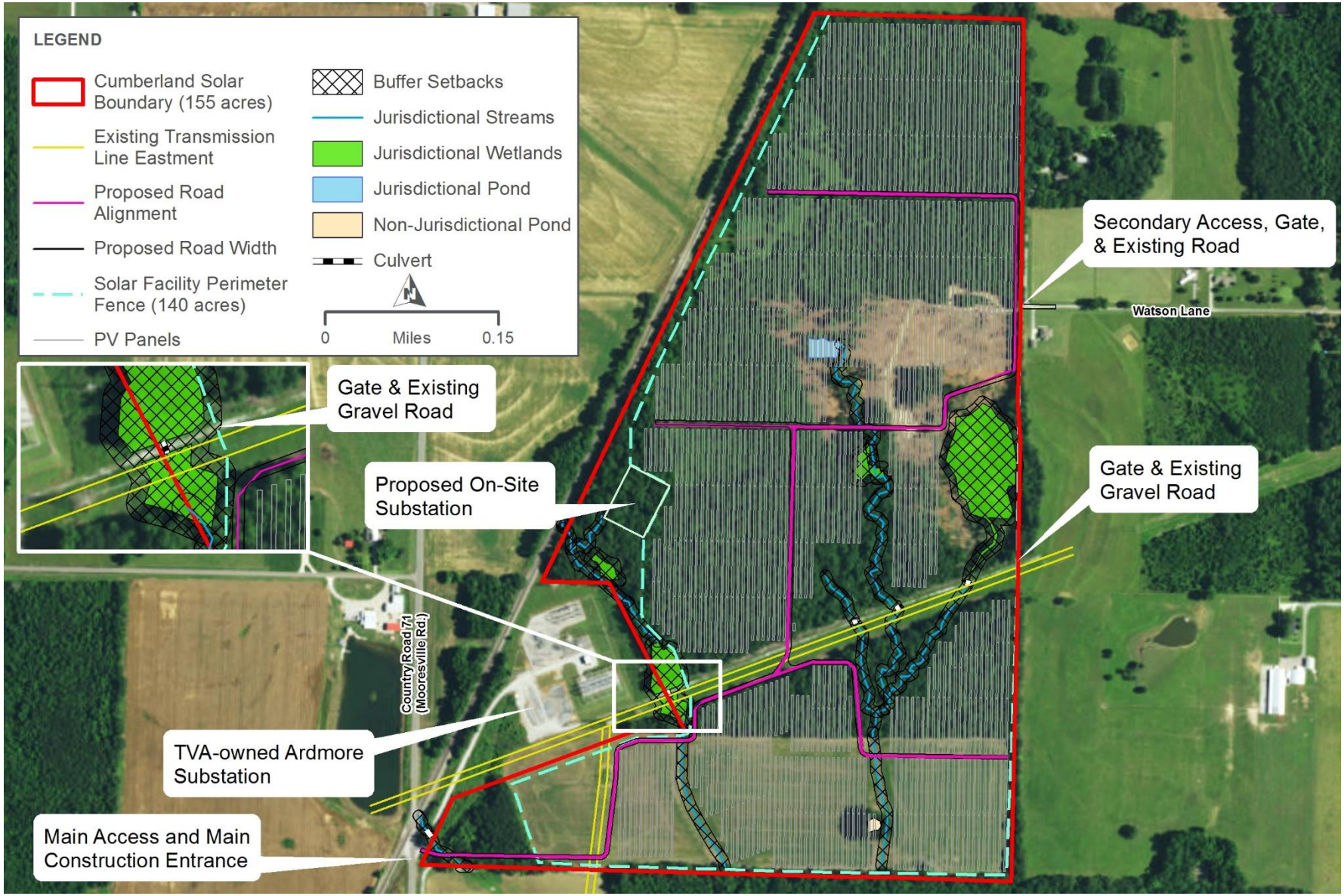


Figure 3. Aerial photograph showing layout of solar facility components.

The remaining 15 acres of the 155-acre project site outside of the fenced-in area would be cleared and remain vacant.

The solar arrays utilized for the Proposed Action would be composed of multiple polycrystalline 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 2015b). This Project would convert sunlight into DC electrical energy within polycrystalline PV panels (Figure 4).

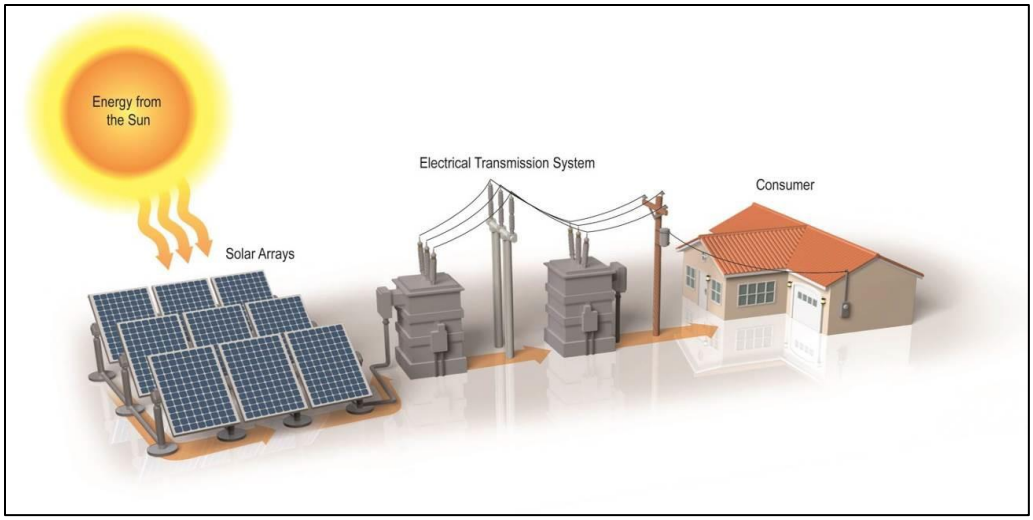


Figure 4. General energy flow diagram of PV solar system (not to scale).

The Cumberland solar facility would be comprised of a total of 170,220 PV panels (modules) each capable of producing approximately 117.5 watts, mounted together in arrays (Figure 3). These arrays would be grouped into five individual blocks, each with an output of approximately 3.3 MW AC. Each block would consist of the PV arrays and a power conversion station (PCS), or inverter station on concrete pads, that includes 1,500V power inverters and transformers to convert the DC electricity generated by the solar panels into AC electricity for transmission across the project's electrical collection system and to the off-site distribution system/substation.

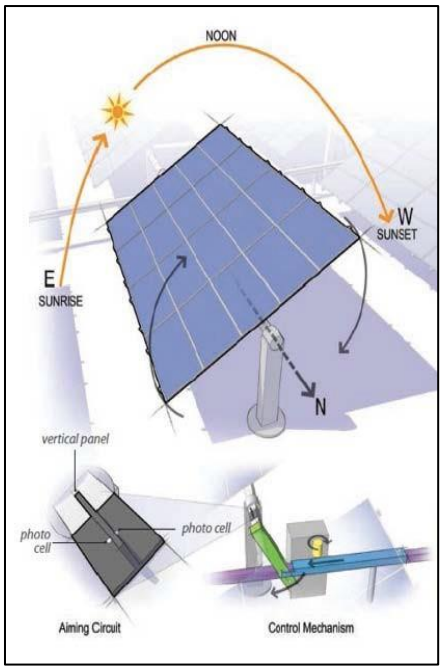


Figure 5. Diagram of single-axis tracking system (not to scale).

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 5).

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 several strings of modules and feed a PCS via cables placed in excavated trenches. The trenches would be approximately 3 feet deep and 1 to 4 feet wide. The bottom of each trench would be lined with clean fill to surround the DC cables, and the remainder of the trench would be backfilled with 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 current from each individual PCS would be transformed into the AC collection voltage, typically 25 kV. The underground voltage collection circuits would deliver AC electricity from the transformers to the project’s on-site pole-mounted riser/switch along two medium voltage trenches which run through the site to the converter.

The PV panels would be installed in parallel north to south rows and arranged to largely avoid streams on the project site to the maximum extent practicable. The five panel array blocks would each contain an inverter and approximately 147 trackers of panels (Figure 3 and Figure 4). Buried electrical cables would connect the rows of PV panels to 1,500V power inverters. The inverters would be connected by buried cables to five pad-mounted 34.5-44 kV transformers. Buried electric cables would continue from each transformer to the on-site substation. Trenches for buried cables on the site would be backfilled and the ground surface returned to its original grade. The on-site substation would combine all the AC power from the project site and would consist of a 34.5-44 kV transformer. All 34.5 kV circuits from the five 640 V–34.5 kV transformers on site will aggregate outside the substation and one circuit of 34.5 kV will connect to the on-site substation and route through the substation transformer. From the on-site substation, the Project would interconnect to a new pole with switch on the TVA-owned Ardmore Substation property via a new overhead 44-kV line. The new overhead 44-kV line would be constructed and owned by Cumberland Land Holdings, LLC and the pole with switch would be constructed and owned by TVA. The existing TVA-owned Ardmore Substation would not require upgrades other than the new pole with switch. The 20-MW DC site will produce 15.9 MW AC of energy output that would be sold to TVA. Existing easements and distribution lines exiting the TVA-owned Ardmore Substation are already in place.

2.2.2 Construction

Construction of the solar power facility generally requires site preparation (surveying and staking, removal of tall vegetation/small trees, light grading/clearing, installation of a perimeter security fence, installation of erosion control 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 testing/verification.

SRC’s standard practice 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 fence, 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 Natural Resource 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 stable. 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. Due to the existing topography of the site and the use of single-axis tracking, cut and fill grading activities would be required to achieve the final design and maximum slope criteria. Grading at the site is expected to result in a net zero balanced cut and fill quantity of earthwork to the extent practical and therefore not require any off-site or on-site hauling. Within the 155-acre project site, approximately 140 acres is proposed for the solar facility. Approximately 49 acres would be cleared and graded by the construction contractor, McCarthy Building Company (see Figure 7) for construction and placement of the solar panels, gravel access roads, accompanying electrical components, and to prevent shading of the solar panels. Open burning of minimal debris from the tree clearing on the site would occur to minimize construction wastes. Only vegetation and untreated wood would be burned and no burning of other construction debris is anticipated. The remainder of the 140-acre area would require minimal clearing, although grubbing of stumps would occur on the 68 acres of recently harvested forest. Although ADEM requires a minimum 25-foot buffer width on all streams, 60-foot-wide buffers would be established along streams and 30-foot-wide buffers along wetland boundaries, as a conservative avoidance measure, prior to any additional clearing, grubbing, or grading activities conducted by the construction contractor. These areas would be avoided during construction to the greatest extent practicable. Construction would take place in wetlands that cannot be practicably avoided in accordance with the authorization provided under Section 404 of the Clean Water Act. 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 fence would be utilized within the 140-acre fenced area. All buffered streams and wetlands would be protected by erosion control silt fence, and sediment traps would be placed in strategic drainage areas to prevent sediment from entering on-site streams and wetlands. During construction, off-site sediment migration will be moderated by the placement of silt fence around the entire land disturbance area within the 140-acre fenced in area. These stormwater BMP practices would prevent sediment from entering on-site streams and wetlands and prevent sediment migration off site.

No larger than 48-inch-diameter corrugated metal pipe (CMP) would be installed at four locations in unnamed streams to provide road access throughout the solar facility while maintaining stream drainage during and after construction.

Construction would be sequenced to minimize the time that bare soil on the disturbed areas is exposed. Silt fence would surround the site perimeter, including buffer areas. 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, office/laydown areas, ditch areas, and other project-specific locations would be seeded post-construction. If conditions require, soil would be stabilized by mulch or sprayable fiber mat. If the area seeded is a steep slope (6:1 or greater), hydroseeding may be employed as an alternative. Where hay mulch is required, it 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 stable. The SWPPP for the project area would be finalized with the final grading/civil design prior to construction.

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. Temporary construction trailers 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.

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 the components are placed on their respective foundations and structures, electricians and other workers would run the electrical cabling throughout the solar field.

After the equipment is electrically connected, electrical service would be tested, and motors and their controllers 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.

The proposed Project will include a new on-site substation near the existing TVA Ardmore Substation, which will exit the site via an overhead 44-kV line and connect to a new pole with switch constructed and owned by TVA on either TVA-owned Ardmore Substation property or the existing right-of-way.

Within the 155-acre solar facility site, 140 acres would be securely fenced during construction and for the duration of the Project operation with 7-foot-high chain-link fencing with three strands of barbed wired on the top. One fence would surround the entire facility, including all panel arrays and access roads. The main entrance and construction access is provided at an existing gravel road on County Road that leads to the TVA-owned Ardmore substation. TVA would convey a nonexclusive access easement to SRC along the existing access road. A secondary access is provided at an existing road at Watson Lane. Double-swing gates are provided at Watson Road and at the west and east side of the existing TVA-owned gravel road that bisects the property. Construction activities would take approximately 6 months to complete using a crew of approximately 80 workers at the peak of construction. Work would generally occur 5 days per week from 7 am to 5 pm. Additional hours could be necessary to make up schedule deficiencies or to complete critical construction activities.

2.2.3 Project Operations

During operation of the solar facility, no major physical disturbance would occur. Moving parts of the solar facility would be restricted to the east-to-west facing tracking motion of the solar modules, which amounts to a movement of less than a 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 TVA power grid. 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 manned during operation; however, inspection and maintenance is required biannually and for equipment failures. Biannual inspections would include identifying any physical damage of panels, wiring, and interconnection equipment and drawing transformer oil samples. Vegetation on the site would be maintained to control growth and prevent overshadowing or shading of the PV panels. Traditional trimming and mowing would be performed on a quarterly basis, depending on growth rate to maintain the vegetation. During operations, 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 were warranted.

2.2.4 Decommissioning and Reclamation

The Project would operate and sell power under a PPA with TVA for the first 20 years of its life. At the end of the PPA, the Project staff and Cumberland Land Holdings, LLC would assess whether to cease operations at the project site or enter into a new power purchase contract or

other arrangement. If TVA or another entity is willing to enter into such an agreement, the Project could continue operating. If no commercial arrangement is possible, then 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 an approved facility.

2.3 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

In determining the suitability for development of a site within TVA's service area that would meet the goals of expanding TVA's renewable energy portfolio as expressed in the IRP, multiple factors were considered to screen potential locations and ultimately eliminate those sites that did not provide the needed attributes. This process of review and refinement ultimately led to the consideration of the current project site.

The site screening process consisted of general solar resource screening within TVA's service area including ensuring the availability of nearby electric infrastructure for interconnection. Additional screening consisted of suitable large-scale landscape features that would allow for utility scale solar development such as:

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

2.4 COMPARISON OF ALTERNATIVES

This EA evaluates the potential environmental effects that could result from implementing the No Action Alternative or the Proposed Action Alternative at the proposed solar facility in Limestone County, Alabama. The analysis of impacts in this EA is based on the current and potential future conditions on the properties and within the surrounding region. A comparison of the impacts of the alternatives is provided in Table 2.4-1.

Table 2.4-1. Comparisons of impacts by alternative.

Resource area	Impacts from the No Action Alternative	Impacts from Proposed Action Alternative
Land Use	No direct impacts anticipated. Indirect impacts are possible as undeveloped land could be developed over the long term.	Minor direct adverse impacts. Land use on the project site would change from undeveloped and agricultural to industrial. The surrounding area, however, is largely agricultural, undeveloped, and residential, which would not change. No indirect impacts.
Geologic Resources and Prime Farmlands	No direct or indirect impacts anticipated.	Minor negative impacts related to erosion and sedimentation during construction. Minor negative impacts due to life-of-project conversion of 118.0 acres of prime farmland and 1.9 acres of farmland of statewide importance. No indirect impacts anticipated.
Water Resources	No direct or indirect impacts anticipated.	**Groundwater**: No direct adverse impacts anticipated. Potential minor beneficial impacts from reducing fertilizer and pesticide runoff from farming operations entering groundwater. **Surface Water:** Minor permanent direct adverse impacts (289 linear feet of unnamed jurisdictional streams). Minor temporary direct adverse impacts during construction with the use of BMPs. Potential minor beneficial impacts from reducing fertilizer and herbicide runoff entering surface waters. **Floodplains:** No direct or indirect impacts anticipated. **Wetlands:** Minor permanent direct adverse impacts (0.07 acre of wetlands). Minor temporary direct adverse impacts during construction with the use of BMPs. Potential minor beneficial impacts from reducing fertilizer and herbicide runoff entering surface waters. **Ponds:** Minor permanent direct adverse impacts (0.25 acre of ponds). Minor temporary direct adverse impacts during construction with the use of BMPs. Potential minor beneficial impacts from reducing fertilizer and herbicide runoff entering surface waters.

Resource area	Impacts from the No Action Alternative	Impacts from Proposed Action Alternative
Biological Resources	No direct impacts anticipated. Potential indirect impacts if current human practices are continued.	**Vegetation:** Minor direct and indirect adverse impacts associated with removal of trees and shrubs, grading, and conversion of shrubby areas and forest to permanent grass-herbaceous vegetation. **Wildlife:** Minor direct and indirect adverse impacts associated with displacement of wildlife during site clearing and grading and conversion of site to permanent grass-herbaceous vegetation cover. **Rare, Threatened & Endangered (T&E) Species:** No direct effects to federally listed species. Indirect effects to federally listed Indiana bat and northern long-eared bat and state-listed tricolored bat due to insignificant habitat loss of low quality roosting habitat. Indirect effects to gray bat, Indiana bat, northern long-eared bat, and tricolored bat due to insignificant foraging habitat loss and water source loss.
Visual Resources	No direct or indirect impacts anticipated.	Minor temporary direct and indirect adverse impacts during construction related to vegetation removal and use of heavy equipment. Moderate direct visual impacts in the immediate area; minor direct impacts over a larger scale.
Noise	No direct or indirect impacts anticipated.	Minor temporary direct and indirect adverse impacts during construction. Negligible adverse impacts associated with operation.
Air Quality and Greenhouse Gas Emissions	No direct or indirect impacts anticipated.	Minor temporary adverse impacts during construction. Minor beneficial impacts from operation due to a potential decrease in overall pollutant emissions.
Cultural Resources	No direct or indirect impacts anticipated.	No direct or indirect impacts anticipated.
Utilities	No direct or indirect impacts anticipated.	No direct or indirect adverse impacts anticipated. Beneficial direct impacts to electrical services due to additional renewable services in the region.
Waste Management	No direct or indirect impacts anticipated.	No significant direct or indirect adverse impacts anticipated with the use of BMPs.
Public and Occupational Health and Safety	No direct or indirect impacts anticipated.	Minor temporary adverse impacts during construction. No public health or safety hazards as a result of operations.
Transportation	No direct or indirect impacts anticipated.	Minor temporary direct adverse impacts during construction. No indirect impacts anticipated.

Resource area	Impacts from the No Action Alternative	Impacts from Proposed Action Alternative
Socioeconomics	No direct or indirect impacts anticipated.	Moderate positive and long-term direct impacts from construction and operation of the Project. The local tax base would increase from construction of the solar facility and would be most beneficial to the Limestone County area
Environmental Justice	No direct or indirect impacts anticipated.	No direct or indirect impacts anticipated.

2.5 MITIGATION MEASURES

Cumberland Land Holdings, LLC and the construction contractor, McCarthy Building Company, would comply with the terms of the SWPPP prepared as part of the NPDES permitting process and implement other routine BMPs. Additionally, the civil design would balance cut/fill quantities to alleviate the transportation of soils off the site. Should traffic flow be a problem, SRC would consider staggered work shifts to space out the flow of traffic to and from the project site. SRC would also consider posting a flag person during the heavy commute periods to manage traffic flow and to prioritize access for local residents, if needed. Cumberland Land Holdings, LLC will implement the following measures to avoid and minimize potential impact to threatened and endangered species (Appendix C):

- In accordance with the northern long-eared bat 4d Rule, SRC would only perform tree removal between October 15 and March 31 when the Indiana bat and northern long-eared bat would be hibernating in caves off site.
- Tree removal would be minimized to the greatest extent practicable.
- On-site wetlands and streams would have development buffers of 30 and 60 feet respectively and appropriate sediment and erosion control measures would be put in place to ensure water quality is not degraded due to the project.

2.6 THE PREFERRED ALTERNATIVE

The TVA-preferred alternative for fulfilling its purpose and need is the Proposed Action Alternative. Under this alternative, TVA would enter into a 20-year PPA with Cumberland Land Holdings, LLC. Cumberland Land Holdings, LLC would then construct and operate the proposed 20-MW DC single-axis tracking PV solar power facility. The preferred alternative (Proposed Action Alternative) would produce renewable energy for TVA and its customers with only minor direct and indirect environmental impacts, would have certain environmental benefits, would help meet TVA’s renewable energy goals, and would help TVA meet future energy demands on the TVA system.

CHAPTER 3

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

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

3.1 LAND USE

This section describes an overview of existing land use at and surrounding the project site and potential impacts to land use associated with the No Action and Proposed Action alternatives. The project site is located in Limestone County, Alabama, approximately 3.2 miles southwest of Ardmore, Alabama (Figure 1).

3.1.1 Affected Environment

Land use is defined as the way people use and develop land, including leaving land undeveloped or using land for agricultural, residential, commercial, and industrial purposes. Many municipalities develop zoning ordinances and planning documents to control the direction of development and to keep similar land uses together. The project site is located in unincorporated Limestone County and in an area with no zoning ordinances or other governmental regulations on development. Limestone County does not have a Planning and Zoning Department; however, the County Engineer's Department may be contacted for assistance. The closest town that has zoning is the town of Ardmore, located approximately 3.2 miles northeast of the project site. Land use on the project site is not officially governed by a municipality. Images generated with the National Land Cover mapping tool show the project site as pasture land; cultivated land; evergreen, deciduous, and mixed use forested land (Figure 6) (National Land Cover Database [NLCD] 2011).

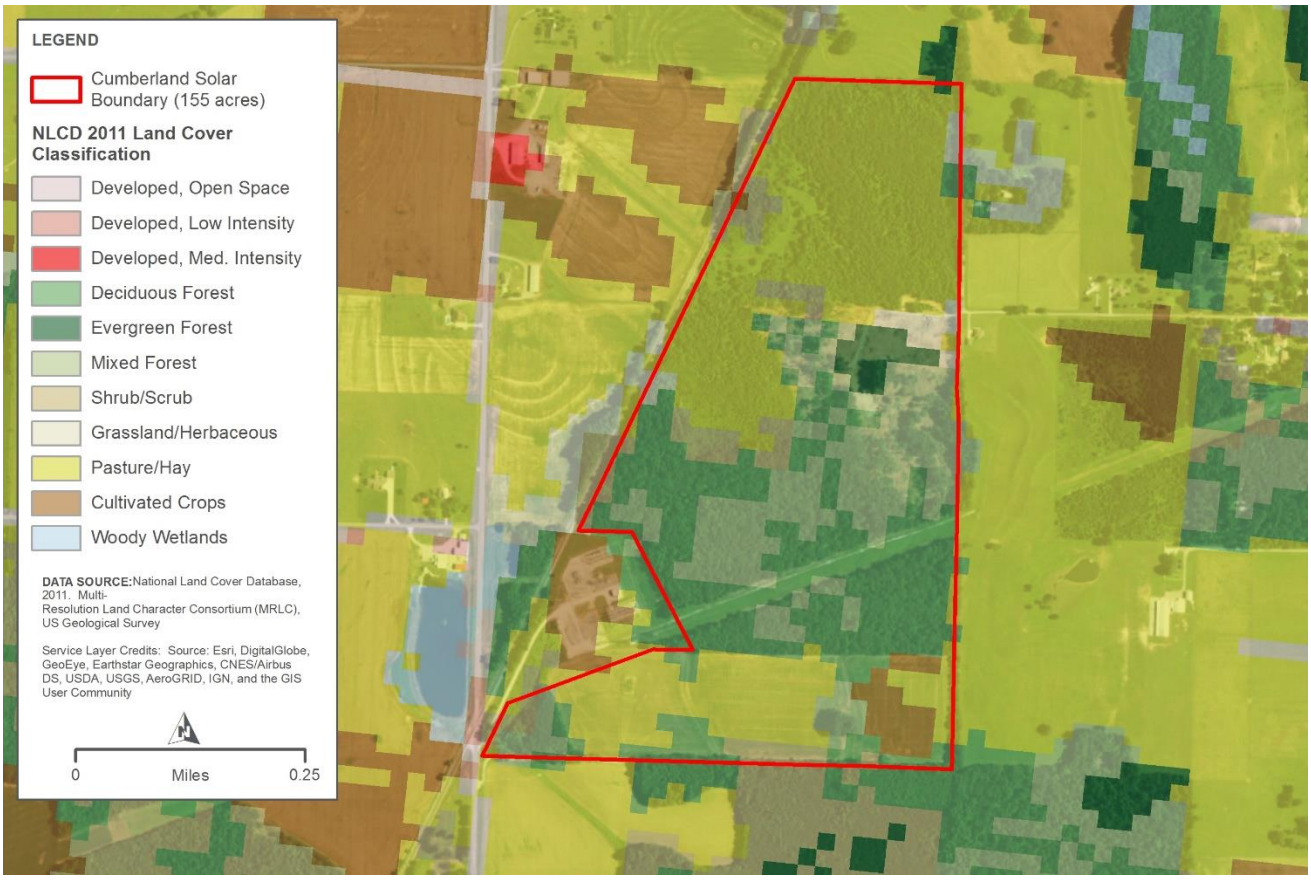


Figure 6. Land cover on the solar facility site and adjacent area.

Merchantable timber was harvested from approximately 68 acres in the center of the project site sometime between March 2016 and August 2016 by the previous property owner (Figure 7). Stumps of harvested trees remain in situ; small stands of trees and few large trees still stand. The early successional forest in the northern part of the site was not timbered. Remaining land uses include agricultural land for corn production in the southern portion of the site, a transmission line right-of-way, a gravel access road, several streams and wetlands, and two farm ponds. The site consists of fairly flat terrain with a few scattered depressions and ranges in elevation from approximately 870 to 900 feet amsl. Currently, the majority of the site is comprised of scrub/shrub land, formerly mixed pine-hardwoods that were recently timbered. Several stands of early successional forest are currently present across the site, primarily along Hauskin Branch in the southwest corner and in the northern half of the project site. Topography is highest on the northern section of the project site, decreasing to the lowest elevation at the southern half of the site. No floodplains are located on the site. No homesteads or habitable buildings were observed within the project site; however, a derelict barn was observed in the northwestern portion of the project site.

Properties immediately adjacent to the western border of the site include a 161-kV TVA substation and a CSX rail line; farmland is west of the rail line. Properties to the north and east include agricultural land and nearby single-family residences. Property to the south includes agricultural

land and an undeveloped forested area. There are two residences to the east of the site along Watson Lane.

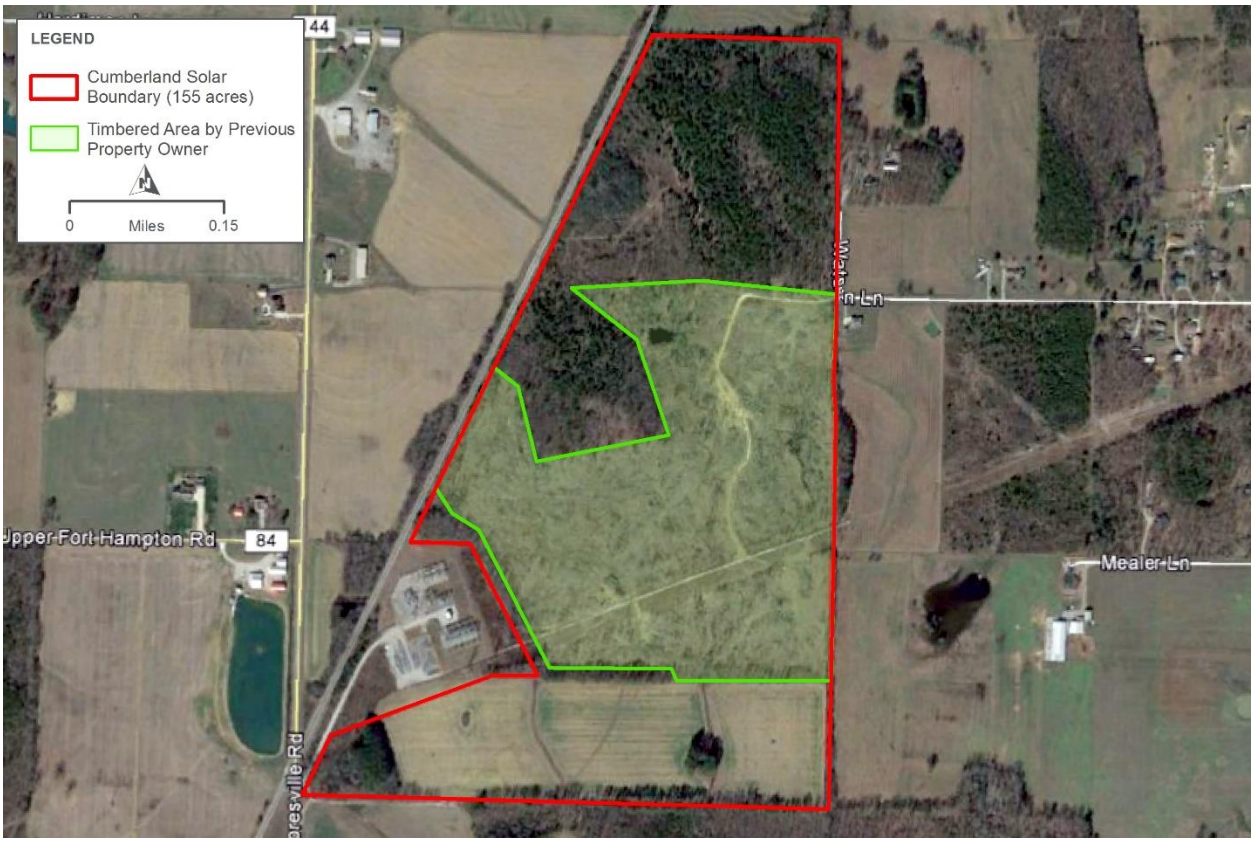


Figure 7. Area timbered by previous property owner, sometime between March and November 2016

The closest populated area is the town of Ardmore, which is located in both Alabama and Tennessee, spanning the border. Ardmore, Alabama is a town with approximately 1,194 residents and the second largest populated area in Limestone County, second to the City of Athens, Alabama (US Census Bureau [USCB] 2010).

3.1.2 Environmental Consequences

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

3.1.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed; therefore, no project-related impacts to land use would result. Existing land use would be expected to remain a mix of farmland and undeveloped land.

Indirect impacts in land use are possible as the town of Ardmore to the northeast or the city of Athens to the southwest grows. Over time, it is possible that the agricultural area on the project

site could become developed if the resident population in the area grows significantly. Additionally, if the agricultural practices on site are discontinued, land use could be converted to undeveloped shrub land and forest. The undeveloped, agricultural, early successional, or recently timbered land would continue as undeveloped and transition to mature forest over time, providing habitat to an increased diversity of species. Indirect impacts to land use are possible under the No Action Alternative as the undeveloped areas may become residential over the long term.

3.1.2.2 Proposed Action Alternative

Under the Proposed Action, the construction and operation of the solar facility would change the land use of the 155-acre project site from agricultural and undeveloped to industrial. The existing TVA-owned Ardmore Substation is an existing industrial land use, which together with the solar facility, would be a unique land use to the area as the surrounding area is largely agricultural, undeveloped and sparsely residential, which is not likely to change significantly over the next 20 years, though there are no zoning restrictions currently in place. Since a relatively small portion of a very large land use category in the project vicinity would be lost, this adverse impact would be minor overall. Following decommissioning of the solar facility, a large portion of the site could return to agricultural and forestry use. The area of the project site owned by SRC, but not developed as a solar facility, will remain cleared and maintained, though vacant, in the southern portion due to its proximity to the CSX railroad line and substation.

The activities associated with the Proposed Action would not have any indirect effects on land use.

3.2 GEOLOGY, SOILS, AND PRIME FARMLAND

This section describes the existing geological resources in the project area and the potential impacts on these geological resources that would be associated with the No Action and Proposed Action. Components of geological resources that are analyzed include geology, geological hazards, soils, and prime farmland.

3.2.1 Affected Environment

The project area is located within the Eastern Highland Rim physiographic ecoregion, which is part of the larger Interior Plateau Level III Interior Plateau ecoregion of Alabama. The Interior Plateau is characterized by Mississippian to Ordovician-age limestone, chert, sandstone, siltstone, and shale that compose the open hills, irregular plains, and tablelands landforms (Griffith et al. 2001). Springs, sinks, and caves typify the region through solution of the underlying limestone that create sinkholes known throughout Limestone County; the closest on record is approximately 250 feet from the northeast corner of the project site, currently utilized as a farm pond (Geological Survey of Alabama [GSA] 2010). Two earthquake epicenters have also been recorded less than 6 miles from the project area since 1990, both less than a 3.0 magnitude (Figure 8). The closest with an Modified Mercalli Intensity (MMI) scale of IV or above was recorded approximately 23 miles to the southeast with a magnitude of 4.2 in 1939 (GSA 2014).

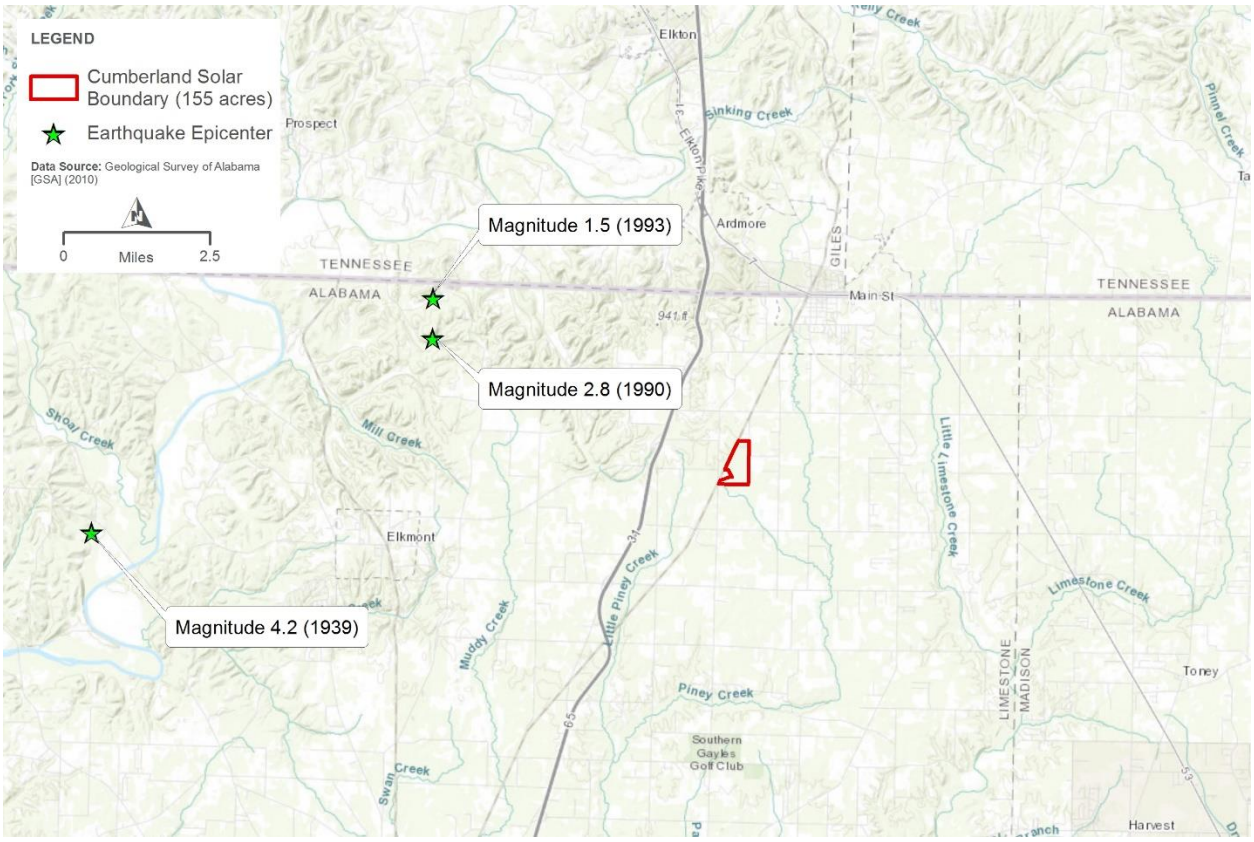


Figure 8. Closest earthquake epicenters to the project area.

Elevations in the project area range from 870 feet to 900 feet above mean sea level (amsl) with topography sloping to the south. The site consists of flat terrain with a few scattered depressions and moderately gentle draws where water collects and drains to the south.

Table 3.2-1 and Figure 9 summarize the soil types on the site as defined by the USDA-NRCS Soil Survey Geographic database (SSURGO) (USDA 2016a). A hydric soil is a soil that is, "formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part" (Federal Register July 13, 1994). All of the soils within the project site have some hydric component. Approximately 14.5 percent of soils in the project site are 90 percent or more hydric.

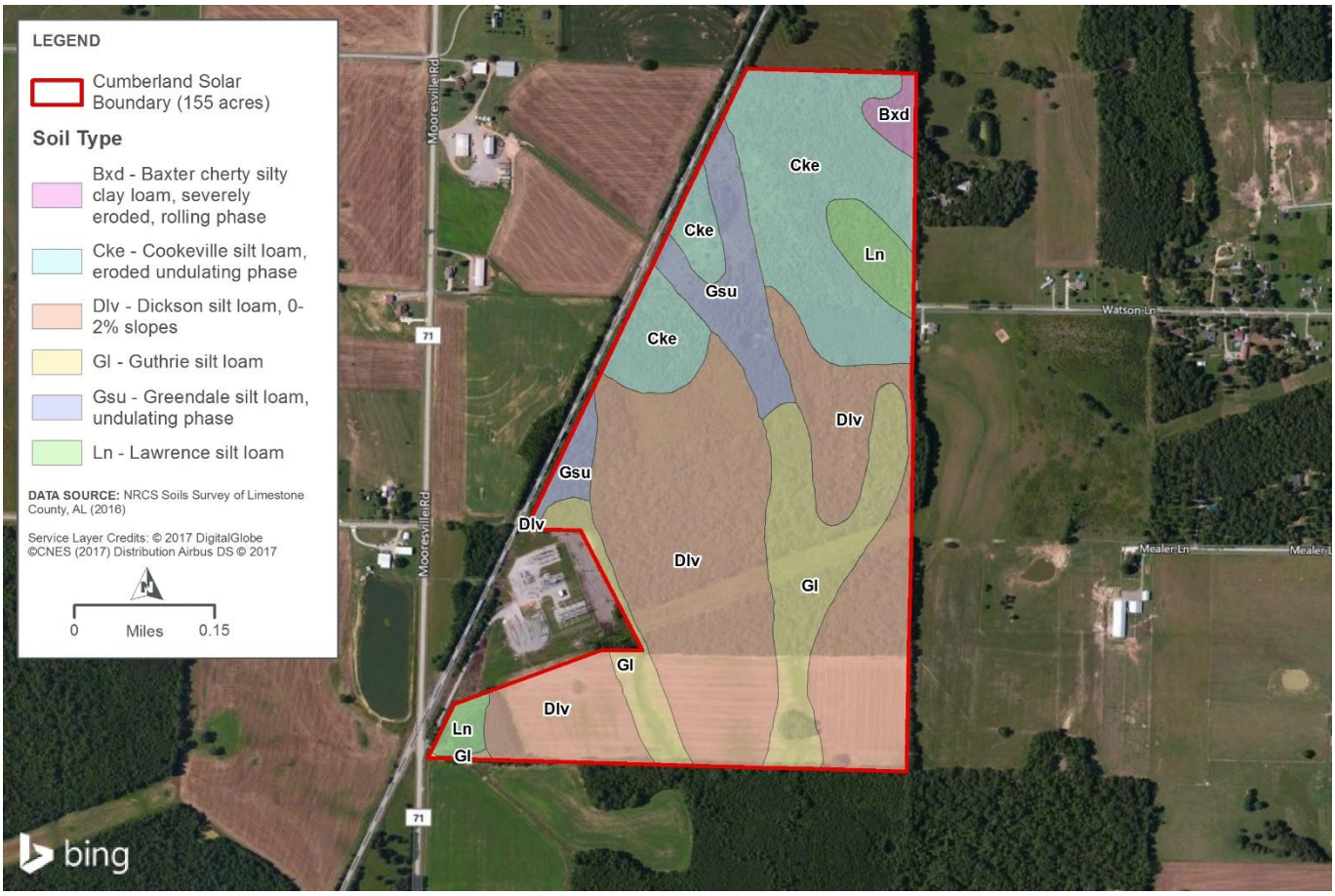


Figure 9. Soils on the project site.

The USDA has defined prime farmlands as soils that are best suited to producing crops, feed, forage, fiber, and oil seed crops, and 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) (Federal Register January 31, 1978, amended June 17, 1994). These soils produce the highest yields with minimal inputs of energy and economic resources. Farmlands of statewide importance are lands that do not meet the requirements for prime farmland but that are of statewide importance for the production of food, feed, fiber, forage, and oil seed crops.

Over 85 percent of soils within the project site are classified as prime farmland or soils of statewide importance. The project site contains six soil types, five of which are considered farmland soils (Table 3.2-1, Figure 10). Prime farmland soils occur on approximately 130.15 acres (83.9 percent) and farmland soils of statewide importance occur on approximately 1.93 acres (1.2 percent) of the 155-acre project site. Recent aerial imagery and a site visit on May 16, 2017 confirmed that only the southern portion of the project area is currently in agricultural production. The majority of the project site consists of recently timbered scrub/shrub areas and early successional old field areas. Table 3.2-2 provides farmland statistics for Limestone County and the state.

Table 3.2-1. Soils on the project site.

Soil type	Farmland classification	Hydric rating	Area (acres)	Percentage of area
Baxter cherty silty clay loam, severely eroded, rolling phase (Bxd)	Farmland of statewide importance	1	1.93	1.2
Cookeville silt loam eroded undulating phase (Ck)	All areas are prime farmland	1	35.97	23.2
Dickson silt loam, 0 to 2 percent slopes (Dlv)	All areas are prime farmland	3	75.75	48.87
Guthrie silt loam (Gl)	Not prime farmland	90	23.22	14.98
Greendale silt loam undulating phase (Gsu)	All areas are prime farmland	1	12.38	7.98
Lawrence silt loam (Ln)	All areas are prime farmland	1	6.05	3.9
Total			**155.0**	**100.0**

***Source*:** USDA 2016b

Table 3.2-2. Farming statistics for Limestone County and Alabama.

	Number of farms	Percentage of total area in farms	Land in farms (acres)	Average size of farms (acres)
Limestone County	1,230	63.5	246,697	201
Alabama	43,223	26.5	8,902,654	206

Source: USDA 2012a, USDA 2012b, and USDA 2012c

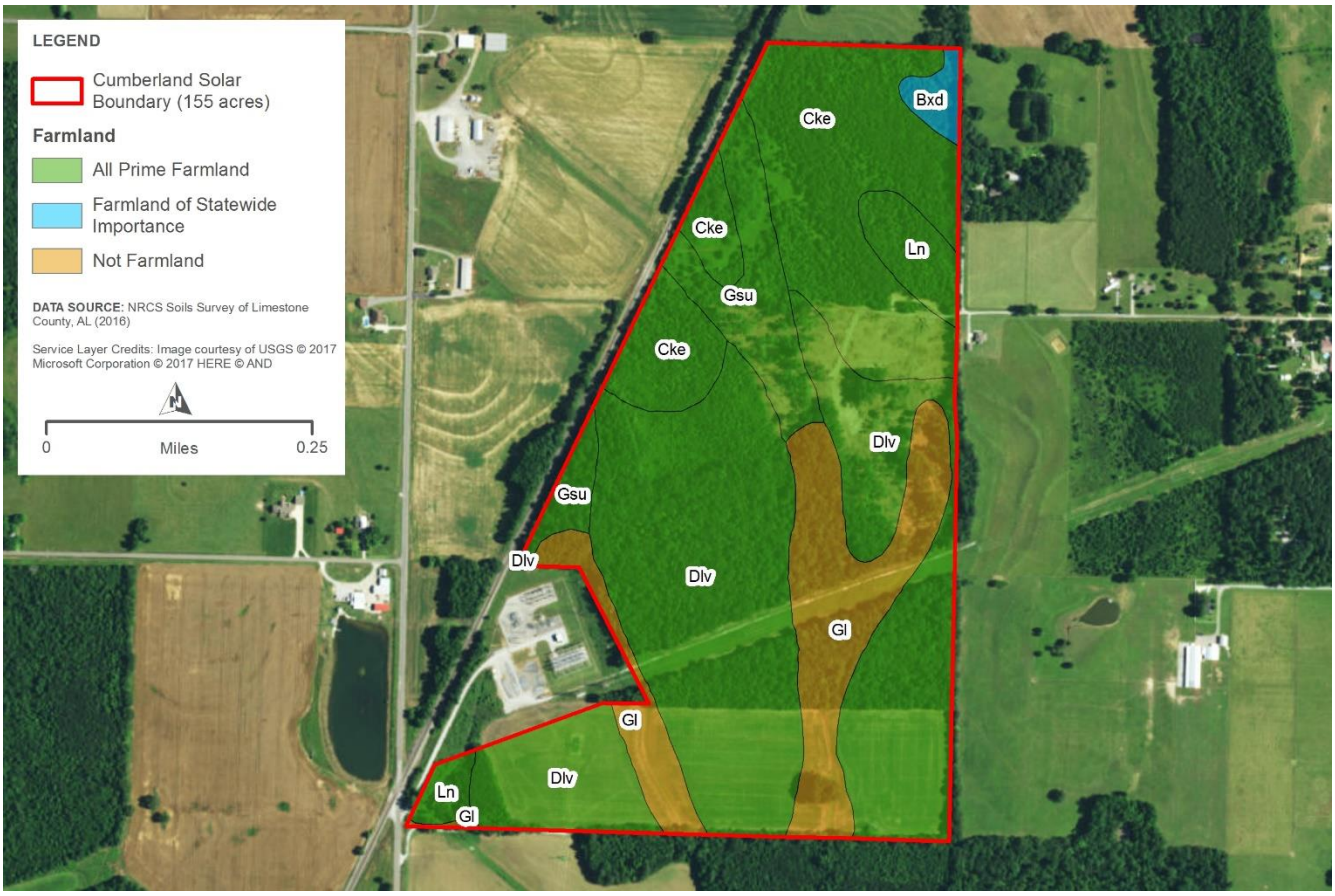


Figure 10. Soils classified as farmland on the project site.

3.2.2 Environmental Consequences

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

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 geologic resources, soils, or prime farmlands would result. Existing land use would be expected to remain a mix of forested, agricultural, and undeveloped land.

Over time, impacts to soils and geology could occur if the current land use practices are changed. If the site were to be developed, changes to the soils on site would occur due to increased erosion and runoff. Conversely, if agricultural practices were continued or were expanded throughout the site without proper conservation practices, soils could eventually become depleted in nutrients or erode, resulting in minor changes on the site. This degradation of soil quality could be mitigated with proper farming practices such as terracing and application of soil amendments.

3.2.2.2 Proposed Action Alternative

Under the Proposed Action, minor direct impacts to geology and soil resources would be anticipated as a result of construction and operation of the Project. Approximately 90 percent (140 acres) of land in the project site would be cleared and/or lightly graded for the solar facility with the exception of biologically sensitive areas such as those associated with jurisdictional streams and areas located within wetlands. The site grading and clearing for the solar facility would cause minor impacts to geology and soils including minor, localized increases in erosion and sedimentation.

Geology and Paleontology

Under the Proposed Action, minor impacts to geology and paleontology could occur. No geotechnical evaluation of the project site was completed.

The solar arrays would be supported by steel piles which would either be driven or screwed into the ground to a depth of 6 to 10 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 about 3 feet deep. Additional minor excavations would be required for the medium voltage transformers associated with each PCS unit. Two or three power pole pads would be required to connect the arrays to the TVA system. The poles would require some foundation work below the ground surface. Due to the small sizes of the subsurface disturbances, only minor direct impacts to potential subsurface geological and paleontological resources are anticipated.

Should paleontological resources be inadvertently discovered 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, to recover these resources, to analyze the potential for additional impacts, and to develop and implement a recovery plan/mitigation strategy.

Geologic Hazards

Hazards resulting from geological conditions would be minor because the project site is in a relatively stable geologic setting; however, there is a small probability for small to moderate intensity seismic activity and an unknown potential for sinkholes. The facility would be designed to comply with applicable seismic standards. Either seismic activity or sinkholes would likely only cause minor impacts to the project site and equipment on the site. Geologic hazard impacts on the site would be unlikely to impact off-site resources.

Soils

As part of the site preparation and development process, approximately 140 acres of the project site would be developed. The project site could be temporarily affected during mowing 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.

The layout plan was designed to minimize impacts to on-site streams. Although not anticipated, should borrow material be required, small amounts of sand and gravel aggregate may be obtained either from on-site activities within the 140-acre portion of the project site, or from local, off-site sources. The creation of new impervious surface, in the form of the access roads, panel footings and the foundations for the inverter stations, would result in a minor increase in stormwater runoff and potential increase in soil erosion. Use of BMPs such as soil erosion and sediment control measures would minimize the potential for increased soil erosion and runoff. Due to the Project disturbance area being at least 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 to reduce pollutants in stormwater discharges from the site. Following construction, implementation of soil stabilization and vegetation management measures would reduce the potential for erosion impacts during site operations.

During operation of the solar facility, very 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 Project may implement traditional mechanized landscaping using 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 spot applications of herbicides may be employed around structures to control weeds. Products used would be limited to post-emergent herbicides and would be applied by a professional contractor. These maintenance activities would not result in any adverse impacts to soils on the project site during operations.

Prime Farmland

Should the Proposed Action be implemented, approximately 90.3 percent (140 acres) of the 155-acre project site would be covered with panels, roads, and project infrastructure and removed from potential farm use; this would include approximately 1.9 acres of farmland of statewide importance or approximately 1.2 percent and approximately 118.0 acres of prime farmland or approximately 76.1 percent of the total farmland soils at the project site. Approximately 32 acres of the 155-acre project site are considered agricultural and actively farmed for corn production prior to the property acquisition by SRC. Approximately 22 acres of the 32-acre agricultural area would be developed with solar arrays; however, all 32 acres of the agricultural area would no longer be available for agricultural production under the Proposed Action for the life span of the solar facility.

The construction and operation of the solar facility would remove approximately 118.0 acres of prime farmland and 1.9 acres of farmland of statewide importance from potential agricultural use and would result in conversion 119.9 acres of farmland soils within the 140-acre fenced in area to a developed solar power facility. Approximately 3.9 acres of 140-acre fenced in area would be graded for the 20-foot-wide gravel access roads located throughout the site. The remaining areas around the wetlands and along the streams would remain undeveloped. Appropriate erosion control measures would be used to control erosion and limit sediment/soil from leaving the project site. Due to the limited amount of grading and excavation on site, the majority of existing soils

would remain in-situ. During grading, topsoil would be removed and stockpiled and, as grading is nearing completion, redistributed over the graded areas. None of the soils within the project area are classified as highly erosive or have other characteristics that would require special construction techniques or other non-routine measures.

Following the expiration of PPAs, the solar facility would be decommissioned as described in Section 2.2.5. Once the facility components are removed and the site is stabilized, farming could resume with little long-term loss of soil fertility and potential agricultural production.

In accordance with FPPA evaluation procedures, a USDA Farmland Conversion Impact Rating Form (Form AD-1006) was completed for the site to quantify the potential impacts to prime farmland (Appendix A). The impact rating considers the acreage of prime farmland to be converted, the relative abundance of prime farmland in the surrounding county, and other criteria such as distance from urban environments, percentage of corridor currently being farmed, and compatibility with existing agricultural use. This form assigns a numerical rating between 0 and 260 based on the area of prime farmland to be disturbed, the total area of farmland in the affected county, and other criteria. Sites with a total score of at least 160 have the potential to adversely affect prime farmland. The impact rating score was 138 points for the project site. Projects with total impact rating scores below the threshold value of 160 do not require further consideration under the FPPA.

Based on the ratings for the project site, the impacts on soils, including prime farmland, from the construction and operation of the solar facility would be insignificant. Following the eventual decommissioning and removal of the solar facility, the site could be returned to agricultural use and/or forested land.

3.3 WATER RESOURCES

This section describes an overview of existing water resources in and surrounding the proposed project site in Limestone County, Alabama and the potential impacts on these water resources that would be associated with the alternatives. Components of water resources that are analyzed include groundwater, surface water, and wetlands.

3.3.1 Affected Environment

3.3.1.1 Groundwater

Groundwater is water located beneath the ground surface, within soils and rock formations. Aquifers are rock units that have sufficient permeability to conduct groundwater and to allow economically significant quantities of water to be produced by man-made water wells and natural springs. To be productive, the aquifer must be permeable and porous and retain qualities that allow water to flow through it easily. Sandstones, conglomerates, and fractured rocks can often be productive aquifers. The aquifer underlying the project area is within the southern extent of the Interior Low Plateaus aquifer, in which a large part is underlain by limestone aquifers in Mississippian rocks. The Interior Low Plateaus aquifer system is located in Illinois, Indiana, Kentucky, Ohio, Tennessee, and northern Alabama (USGS 1990 and USGS 1995).

Rocks comprising the Interior Low Plateau aquifers in Alabama consist mostly of limestone, sandstone, and shale, and also contain beds of siltstone, conglomerate, dolomite, and chert that range in age from the Devonian to Pennsylvanian periods. Groundwater recharge is primarily from precipitation reaching the valley floor that infiltrates down through the residuum layer into underlying limestone through fractures and solution openings. Groundwater flow in this aquifer system is affected by topography, structure, and the development of solution openings in rocks and generally flows in the direction of the Tennessee River to the southwest (USGS 1990).

The water quality in the Interior Low Plateaus aquifer system is generally adequate for most uses or can be treated and made adequate; however, it generally worsens with depth as it becomes mineralized. The water is typically hard and is a calcium magnesium bicarbonate type or a calcium bicarbonate type. Water from wells has a larger proportion of magnesium and sulfate and a slightly larger proportion of chloride than that from springs (USGS 1990).

Hydraulic characteristics of limestone aquifers in Mississippian rocks vary greatly over short distances. Limestone aquifers with large, interconnected solution openings can transmit and yield greater water quantities than that of impermeable blocks of limestone between the solution openings and fractures. Well yields vary from 2 to 50 gallons per minute, with maximum yields from 100 to 1,000 gallons per minute. In 1985, fresh groundwater withdrawals from the Interior Low Plateaus aquifers were estimated to be 64 million gallons per day (mgd), 80 percent of which was withdrawn from Tennessee and Kentucky (USGS 1995). Since then, public supply withdrawals have accounted for more than 50 percent of groundwater withdrawals in Alabama and in 2005, Limestone County was one of four counties that withdrew the largest freshwater amounts in the state, totaling 1,000 to 2,015 mgd of surface water and 10 to 50 mgd of groundwater. Public supply, industrial, commercial, and thermoelectric power in Limestone County accounted for more than 20 percent of total freshwater withdrawals in Alabama, which consisted of 0.66 percent for public supply and 98.9 percent for thermoelectric power (USGS 2005).

3.3.1.2 Surface Water

Surface water is any water that flows above ground and includes, but is not limited, to streams, ditches, ponds, lakes, and wetlands. Surface waters with certain physical and hydrologic characteristics are considered Waters of the U.S. (or jurisdictional waters) and are under the regulatory jurisdiction of USACE. The CWA is the primary federal statute that governs the discharge of pollutants and fill materials into Waters of the U.S. under Sections 402, 404, and 401. The limits of Waters of the U.S. are defined through a jurisdictional determination accepted by USACE. ADEM has jurisdiction over water quality in Alabama.

The proposed project site is located in the Middle Tennessee-Elk Watershed. Elk River begins near the Elkhead community in Tennessee. It flows in a southwesterly direction and is impounded by the Elk River Dam forming Woods Reservoir, farther downstream by the Tims Ford Dam, forming Tims Ford Reservoir in Franklin County, Tennessee, and finally by Wheeler Reservoir, in Limestone County, Alabama, where it joins the Tennessee River northwest of Decatur, Alabama. The Middle Tennessee-Elk Watershed encompasses Guntersville, Wheeler, and Pickwick

reservoirs, as well as the watersheds of Elk River in Tennessee and Alabama, and Bear Creek in Alabama and Mississippi (USGS 2017a and USGS 2017b).

Within the Middle Tennessee-Elk Watershed, the project area is located in the smaller Wheeler Lake (Hydrologic Unit Code [HUC] 06030002) watershed, which occupies approximately 2,650 square miles in Alabama and 236 square miles in Tennessee. The watershed contains approximately 3,767 stream miles, with 90 percent located in Alabama that is largely made up of smaller streams and tributaries that feed into the Tennessee River (TDEC 2003).

On February 16 and 17, 2016, a wetland delineation and waterbody survey of the project site was conducted. The site was revisited and the delineation was reassessed on May 16, 2017. Six stream channels (Streams A-F), four wetlands (Wetlands A-D), and two farm ponds (Ponds 1-2) were identified. Waters of the U.S. were delineated according to the methodology and guidance described in the USACE 1987 Wetland Delineation Manual, USACE Post-Rapanos guidance, the 2012 USACE Eastern Mountains and Piedmont Regional Supplement (Version 2.0), and the Regulatory Guidance Letter (RGL) 05-05. Waters of the U.S. were flagged in the field and mapped using a Trimble® Geo7X Global Positioning System (GPS) unit capable of sub-meter accuracy. GPS points were post-processed utilizing Trimble® GPS Pathfinder Office software.

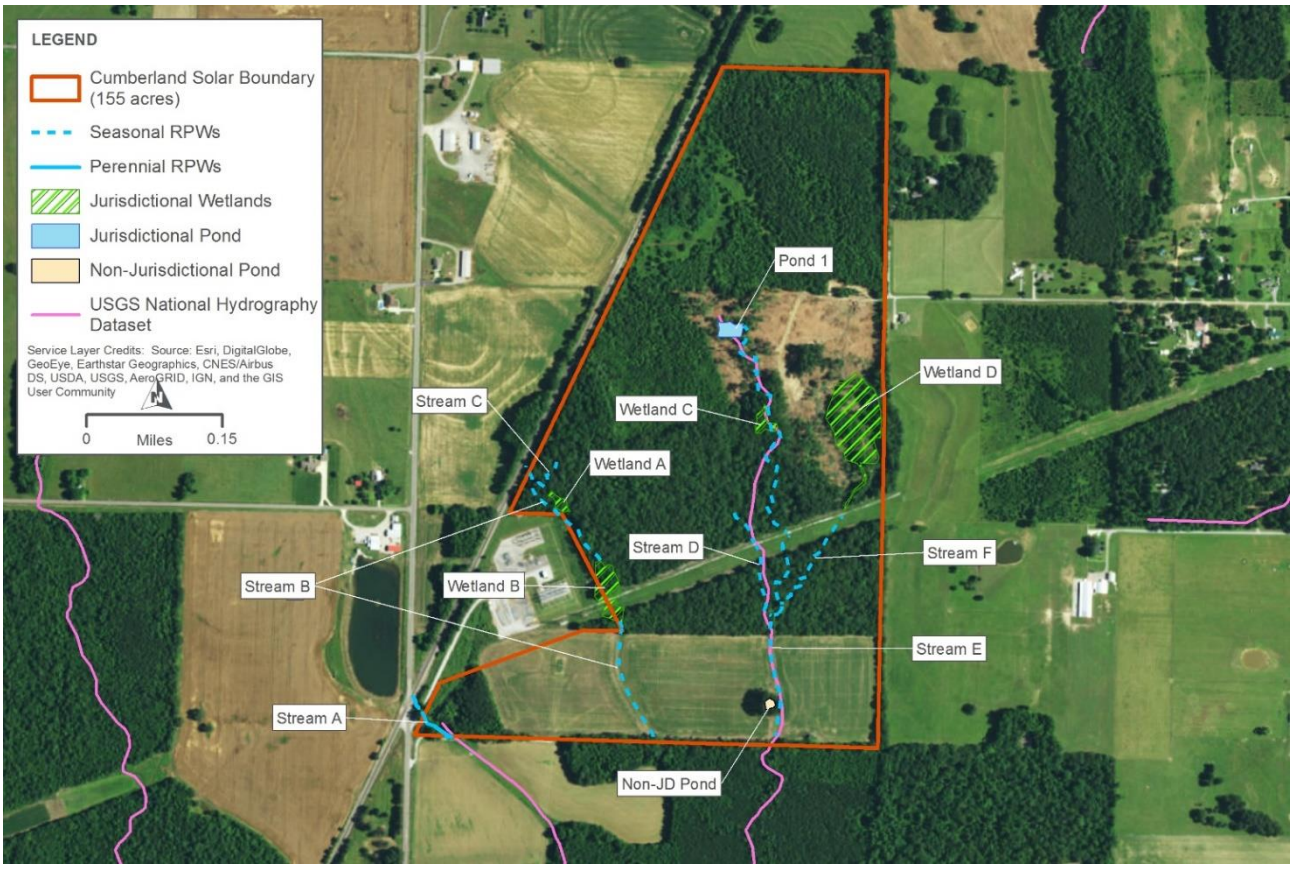


Figure 11. Aerial photograph showing wetlands and streams.

No waterbodies with special designations or listed impairments are on or near the project site. The project site contains six headwater stream channels, four wetlands, and two farm ponds. The

Hauskin Branch headwaters (Stream A), flows southeast in the southwest corner of the site (Figure 11 and Figure 12). After exiting the project site, Hauskin Branch flows for approximately 3 miles to an off-site confluence with Piney Creek. Unnamed tributaries Streams C through E flow southwardly, exit the project site, and continue for approximately 0.15 mile to an off-site confluence with Hauskin Branch, south of the project site. The water quality of Hauskin Branch has not been assessed. Streams A-E all exhibit varying levels of incision, bare banks, and sedimentation within the channels and would be considered low quality channels. A Preliminary Jurisdictional Determination (PJD) was issued by the USACE Nashville District (Appendix B, File No. LRN-2017-00493) on September 29, 2017 approving the jurisdictionality of Streams A-F, Wetlands A-D, and Pond 1. In the same document, an Approved Jurisdictional Determination (AJD) was issued for the non-jurisdictional pond (Non-JD Pond), which confirmed it as non-jurisdictional.

Perennial Stream A originates off site in the southwestern portion of the project site and flows southeast for approximately 342 linear feet before continuing off site. Stream characteristics indicate strong continuity of channel bed and bank, strong baseflow, moderate in-channel structure, strong grade control, strong evidence of particle size of stream substrate, and a moderate presence of macrobenthos and fish. Stream A is classified as a riverine, upper perennial stream with an unconsolidated cobble-gravel bottom (R3UB1), according to the Cowardin Classification hierarchical structure (Cowardin et al. 1979). Ordinary High Water Mark (OHWM) indicators observed during the assessment include a clear, natural line impressed on the bank; shelving; vegetation matted down, bent, or absent; leaf litter disturbed or washed away; sediment deposition; the presence of wrack lines; sediment sorting; and scour. Stream A is incised, exhibits bare banks with little stabilizing vegetation, and the substrate is embedded with sediment.

Stream B originates at a culvert beneath the railway line at the western boundary of the project site and flows for approximately 748 linear feet before losing bed and bank characteristics within Wetland B. Bed and bank characteristics reappear as Stream B exits Wetland B and continues for another 765 linear feet before flowing off site, totaling approximately 1,513 linear feet. Stream C originates within the site near the western boundary and flows for approximately 264 linear feet before its confluence with Stream B. Stream D originates in the central portion of the site, north of the power line right-of-way, and flows for approximately 707 linear feet before its confluence with Stream E. Stream E originates at Pond 1 and flows for approximately 2,916 linear feet before flowing off site. Stream F originates at Wetland D and flows for approximately 730 linear feet before its confluence with Stream E.

Seasonal Streams B through F exhibit similar stream characteristics and have been modified by the recent timber harvesting on the site. Streams B-E exhibit bare banks with little stabilizing vegetation and low variability of substrate that is embedded with sediment. These characteristics indicate moderate to strong continuity of channel bed and bank, weak to moderate sinuosity, weak baseflow, weak in-channel structure, weak to moderate grade control, and weak evidence of particle size of stream substrate. These features are classified as riverine, intermittent with sand streambeds (R4SB4) (Cowardin et al. 1979). OHWM indicators observed during the assessment include vegetation matted down, bent, or absent; leaf litter disturbed or washed away; and scour.

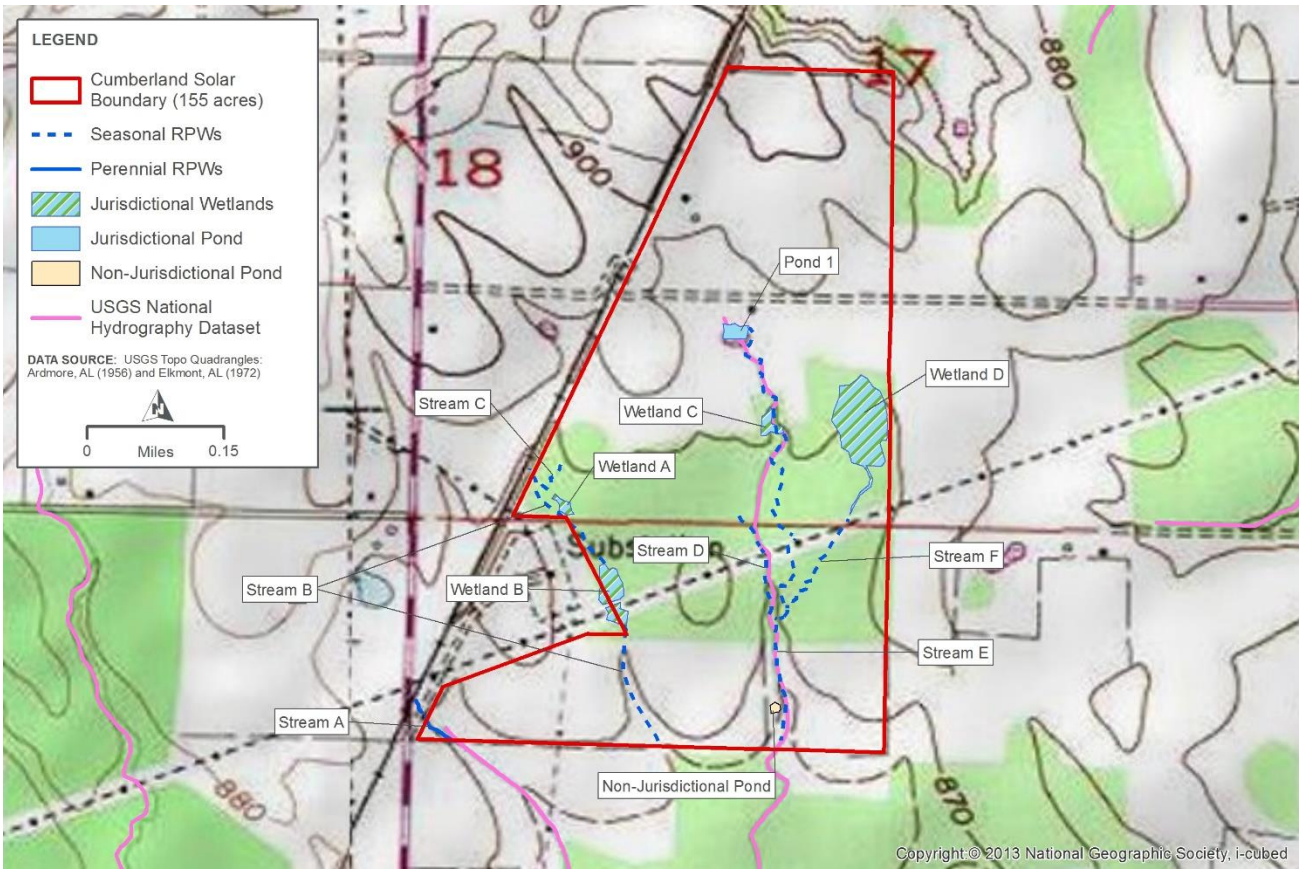


Figure 12. Topographic map showing wetlands and streams.

3.3.1.3 Wetlands

Wetlands are those areas inundated by surface water or groundwater such that vegetation adapted to saturated soil conditions is prevalent. Examples include swamps, marshes, bogs, and wet meadows. Wetlands with specific hydrologic, soil, and vegetation criteria are considered Waters of the U.S. (or jurisdictional waters) and are under the regulatory jurisdiction of the USACE.

A desktop assessment using both the National Wetland Inventory (NWI) and the U.S. Environmental Protection Agency (USEPA) NEPAssist mapping tool was conducted to assess the project site for the presence of wetlands. The NWI map did not depict any wetland areas within the project site.

Four wetlands were observed within the project site during the wetland delineation site visit on February 16 and 17, 2016 (Figure 11 and Figure 12). Wetlands A, B, C, and D were identified as palustrine, scrub/shrub, broad-leaved deciduous, saturated wetlands (PSS1B) (Cowardin et al. 1979). Woody species are dominant and consist of scrub/shrub red maple, sweetgum, slippery elm (*Ulmus rubra*), black gum (*Nyssa sylvatica*), and Chinese privet. Herbaceous species include Gray's sedge (*Carex grayi*), soft rush (*Juncus effusus*), jewelweed (*Impatiens capensis*), and fringed sedge (*Carex crinita*). Primary and secondary wetland hydrology indicators observed during the delineation include high water table, saturation, water marks, water-stained leaves,

algal mat/crust, moss trim lines, and drainage patterns. Hydric soil indicators include a depleted matrix within the upper 12 inches of the soil profile. The wetlands were confirmed in the preliminary JD, File No. LRN-2017-00493 (Appendix B) dated September 29, 2017.

3.3.1.4 Ponds

One jurisdictional pond was observed within the project site (Figure 11 and Figure 12). Pond 1 is an impoundment of the headwaters of Stream E and exhibits a surface water connection to Stream E. There is a non-jurisdictional farm pond that is not in-line with Stream E, is not hydrologically connected, and is not an impoundment of Stream E.

3.3.1.5 Floodplains

The 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.

The entire project area is in Zone X, an area outside of the 100- and 500-year flood zones, having less than a 0.2 percent chance of flooding annually, based on the Flood Insurance Rate Map (FIRM) panel 01083C0080E (effective date of July 7, 2009) (FEMA 2009). It is possible that minor, localized flooding could be associated with the four wetlands even though these features are not located within a mapped flood zone.

3.3.2 Environmental Consequences

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

3.3.2.1 No Action Alternative

Under the No Action Alternative, the proposed project would not be constructed; therefore, no project related impacts to water resources would be expected to occur. Existing land use would remain a mix of agricultural and undeveloped, timbered, privately-owned land and water resources would remain as they are at the present time. Indirect impacts to water resources could result from the continuing use of the project site as agricultural or timbered land. Increases in erosion and sediment runoff could occur if farming practices were not maintained using BMPs. Erosion and sedimentation on site could alter runoff patterns on the project site and impact downstream surface water quality. In addition, if chemical fertilizers and pesticides are continually used, impacts to groundwater may occur if the local aquifers are recharged from surface water runoff.

3.3.2.2 Proposed Action Alternative

Groundwater

No adverse impacts to groundwater would be anticipated as a result of the Proposed Action. Once installed, the solar facility would occupy 140 acres and the total surface area of PV panels would be 33.46 acres of the project site. The elevated, tilted panels would cover roughly 23.9 percent of

the project site; however, they would have relatively little effect on groundwater infiltration and surface water runoff because the panels would not include a runoff collection system. Rainwater would drain off the panels to the adjacent vegetated ground. Hazardous materials that could potentially contaminate groundwater would be stored on site during construction. The use of petroleum fuels, lubricants and hydraulic fluids during construction and by maintenance vehicles would result in the potential for small on-site spills. The use of BMPs to properly maintain vehicles to avoid leaks and spills and procedures to immediately address any spills that did occur, would minimize the potential for adverse impacts to groundwater.

Construction-related Water Needs

No water service is currently available at the proposed project site and no potable water would be available on site after construction. Construction-related water use would support site preparation (including dust control) and grading activities. During earthwork for the grading of access roads, foundations, equipment pads, and other components, the primary use of water would be for compaction and dust control. Smaller quantities would be required for preparation of the equipment pads and other minor uses. Water used during construction would be delivered by truck and would not adversely affect groundwater resources.

Operation and Maintenance-related Water Needs

The primary use of water during operation and maintenance-related activities would be for possible dust control (the proposed PV technology requires no water for the generation of electricity). The internal access roads would not be heavily traveled during normal operations and consequently water use for dust control is not expected.

The precipitation in the area is adequate to minimize the buildup of dust and other matter on the PV panels that would reduce energy production; therefore, no regular panel washing is anticipated. The panels would be cleaned if a specific issue is identified and depending on the frequency of rainfall, proximity of arrays to sources of airborne particulates and other factors. This water would be brought on site in trucks for the specific purpose of panel cleaning and should not impact groundwater resources.

Decommissioning and Site Reclamation-related Water and Wastewater Needs

Because conditions can change during the course of the project life, a final Decommissioning and Closure Plan would be submitted to TVA for review and approval based on conditions as found at the time of facility closure.

The Project would comply with the requirements of the NPDES through preparation and implementation of a SWPPP and filing of a NOI to comply with the General Construction Stormwater NPDES Permit. The plan includes procedures to be followed during construction to prevent erosion and sedimentation, nonstormwater discharges, and contact between stormwater and potentially polluting substances. Cumberland Land Holdings, LLC and McCarthy Building Company will apply for a NPDES permit from the ADEM Water Program.

Decommissioning and site reclamation would likely be staged in phases, allowing for a minimal amount of disturbance and requiring minimal dust control and water usage. It is anticipated that water usage during decommissioning and site reclamation would not exceed operational water usage.

Due to the lack of groundwater use anticipated for the Project in comparison with the overall withdrawal rate for the Interior Low Plateaus aquifer of 10 to 50 Mgal/d (USGS 2005), impacts to the local aquifer and groundwater in general are not anticipated. The use of BMPs and a SWPPP would reduce the possibility of any on-site hazardous materials reaching the groundwater during operations or maintenance. Overall, impacts to groundwater are not anticipated.

Indirect beneficial impacts to groundwater could occur if panel placement and/or the use of buffer zones leads to fewer pollutants and erosion products entering groundwater. Currently most of the on-site land use is undeveloped forested areas and agricultural areas which may allow for the possibility of fertilizer and pesticide runoff entering groundwater. The construction and operation of the Proposed Action could eliminate the source of these damaging impacts, resulting in a beneficial, though minor, indirect impact to groundwater.

Surface Water

During the facility design process, care was taken to avoid jurisdictional streams, wetlands, and ponds. Complete avoidance was not feasible and the construction and operation of the Project would directly affect three streams for four stream crossings and grading, one wetland for grading, and one pond for grading on the project site.

Streams

Impacts to Streams A, B, and E would result from the construction of access roads across the streams, which would result in the placement of new, no larger than 48-inch CMPs with concrete headwalls at the stream crossings (Figure 3). All proposed pipes would be sized to pass stormwater flows without causing appreciable upstream flooding.

Stream A at the site of the proposed road crossing is approximately 6 feet wide and 3 feet deep. The pipe crossing would be approximately 42 feet long and would result in less than 7.2 cubic yards of fill in the stream, totaling approximately 32 linear feet of permanent stream impact. Stream B at the site of the proposed road crossing is approximately 3 feet wide and 1 foot deep. The pipe crossing would be approximately 55 feet long and would result in less than 2.7 cubic yards of fill in the stream, totaling approximately 24 linear feet of permanent stream impact. Stream E is approximately 3 feet wide and 1 foot deep. The pipe at the proposed northern crossing of Stream E would be approximately 90 feet long and would result in less than 6.8 cubic yards of fill in the stream, totaling approximately 61 linear feet of permanent stream impact. The pipe at the proposed southern crossing of Stream E would be approximately 55 feet long and would result in less than 2.7 cubic yards of fill in the stream, totaling approximately 23 linear feet of permanent stream impact. Temporary impacts to Stream B and Stream E would include 3-foot wide trenches for two electric cable crossings, totaling approximately 6 linear feet of temporary stream impact.

An additional 143 linear feet of Stream E would be permanently affected due to grading for panel installation.

Under the Proposed Action, minor permanent direct adverse impacts total approximately 289 linear feet of jurisdictional stream channels due to the placement of pipes for road crossings, grading for panel installation, and cable trenches necessary for the site design to provide the 20 MW proposed. Minor temporary direct adverse impacts during construction are anticipated with the use of BMPs to minimize sediment runoff during construction. Potential minor beneficial impacts are anticipated due to reduced fertilizer and herbicide runoff entering surface waters by conversation of farmland to early successional vegetation.

Floodplains

As a federal agency, TVA is subject 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". 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. The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative. For certain "Critical Actions", the minimum floodplain of concern is the 500-year floodplain. Critical Actions are actions for which even a slight chance of flooding would be too great.

The No Action Alternative would have no impact on current conditions found within the local floodplains. Activities associated with the Proposed Action would include TVA entering into a PPA with Cumberland Land Holdings, construction of a solar PV facility, including concrete pads and PV structures for the solar panels, access roads; a new pole and switch at the Ardmore, Alabama, switching station; site grading, one or more laydown areas, one on-site substation, and a 44-kV transmission line from the Cumberland Land Holdings, LLC substation to the Ardmore switching station. These activities would be located within the project area of the Proposed Action, which is located outside of the 100-year floodplain, which would be consistent with EO 11988, as shown in Figure 13.

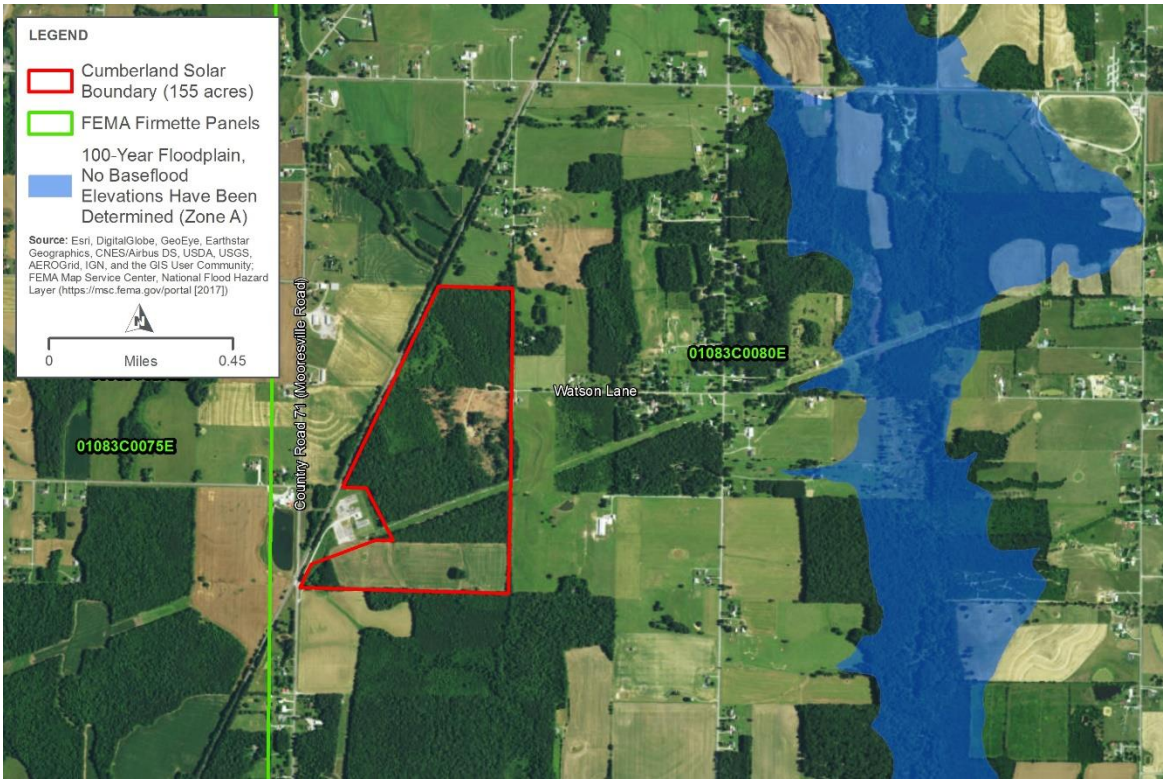


Figure 13. Location of proposed project in relation to mapped floodplains.

Minimal grading and fill would be necessary to construct the project, but no direct or indirect impacts to floodplains are anticipated under the Proposed Action. Additionally, the amount of potential fill required to grade the site should not impact any adjacent properties with respect to flooding frequency or intensity. Therefore, no direct or indirect impacts to floodplains associated with construction and operation of the Proposed Action are anticipated, and the Proposed Action would be consistent with the requirements of EO 11988, Floodplain Management, and thus would have no significant impact on floodplains and their natural and beneficial functions.

Wetlands

Under the Proposed Action, minor impacts to wetlands are anticipated as the site layout for the project area was designed to avoid the majority of wetlands. Approximately 0.07 acre of Wetland C would be permanently affected due to grading associated with panel installation. Due to the previous timbering of this area, the wetland is of lower quality than prior to the property purchase by SRC and impacts to Wetland C would be minimal.

In order for the proposed project to provide the proposed 20 MW output and do so in an economically viable manner, the site design cannot reasonably avoid the minor wetland impact. There is no practicable alternative to avoiding this wetland impact. Steps taken in designing the site layout for the project area has minimized the harm to wetlands. Therefore, this action is consistent with the requirements of EO 11990, Protection of Wetlands.

Ponds

Under the Proposed Action, minor impacts to ponds are anticipated. Pond 1 would be permanently affected due to grading associated with panel installation, totaling approximately 0.25 acre.

Cumulative Surface Water Resources Environmental Consequences

Overall, runoff of sediment and pollutants could reduce surface water quality in on-site streams, wetlands and ponds during construction and these potential impacts to surface waters would be minimized through the use of BMPs for controlling soil erosion and runoff, such as the use of 60-foot buffer zones along streams, 30-foot buffer zones along wetlands, and the installation of erosion control silt fences and sediment traps. Therefore, through the use of BMPs and avoidance measures, impacts to surface waters during construction would be minor. The operation and maintenance of the solar facility would have little impact on surface water and BMPs would be used during any maintenance activities with the potential to cause runoff of sediment and pollutants.

Due to the minimal impacts to streams, wetlands, and ponds, the use of BMPs to prevent sedimentation, and the relatively low quality of the wetlands and streams on site, impacts to on-site jurisdictional waters would be insignificant. These impacts would be the subject of the Section 404 and ADEM WQC permits described in Section 1.4. Impacts to streams and wetlands would be cumulatively mitigated if the USACE determines mitigation is necessary once a Section 404 permit is submitted. Impacts to ponds do not require mitigation.

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

3.4 BIOLOGICAL RESOURCES

This section describes the existing biological resources within the project area and the potential impacts to those resources that would be associated with the Proposed Action and No Action alternatives. The following components of biological resources are analyzed below: vegetation, wildlife, and rare, threatened, and endangered species.

The project site lies within the Eastern Highland Rim subecoregion of the Interior Plateau Ecoregion. The Interior Plateau is characterized by a mosaic of open hills, irregular plains, and tablelands that support a variety of cropland, pasture, woodland, and oak-hickory forests. The Eastern Highland Rim is flatter and less dissected than the subecoregion to the west and caves and springs are common due to the Mississippian-age limestone, chert, shale, and dolomite geology. Streams in this area have generally silty/clayey substrates. The natural vegetation type is transitional between the oak-hickory type to the west and the mixed mesophytic forests of the Appalachian ecoregions to the east (Griffith et al. 2001). During January, the temperature in the Eastern Highland Rim subecoregion ranges between 27 and 48 degrees Fahrenheit; during July,

temperatures range between 67 and 89 degrees Fahrenheit. The area experiences an average of 54 to 58 inches of precipitation per year (Griffith et al. 2001).

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 the field investigations in February 2016 and May 2017. Results of desktop investigations and field evaluations are described in this section.

Biological resources are regulated by a number of federal laws. The laws relevant to the Proposed Action include:

- The Endangered Species Act (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 for Migratory Birds (EO 13186 of January 10, 2001) (for actions of federal entities)
- The Bald and Golden Eagle Protection Act (BGEPA)

A U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) consultation was conducted to obtain the current county list and a preliminary list of known occurrences of federally listed T&E species in Limestone County. USFWS must be consulted during the planning stages of a project with a federal nexus and the potential to affect T&E species. Depending on the nature of potential impacts to listed species, consultation may be informal or formal. Formal consultation is required if the Proposed Action has the potential to adversely affect listed species or their critical habitat. Additionally, TVA provided a list from their Regional Natural Heritage Database of state- and federally listed species within a 10 mile radius of the project site, which includes species in Alabama and in Tennessee. State-listed species in Tennessee that are not state-listed in Alabama, and are also not federally listed are not included in the analysis below. Additionally, species that are commercial or non-game fish (CNGF) or species that are tracked (TRKD) by Alabama, but have lower than a S1 or S2 state conservation priority rank, indicating that their populations are relatively secure, are not included.

3.4.1 Affected Environment

The existing biological resources in the project site include vegetation and wildlife, as well as, rare, threatened, or endangered species with the potential to occur in the project area.

3.4.1.1 Vegetation

The Eastern Highland Rim subecoregion is typically characterized by oak-hickory and mixed mesophytic forests. These forests are characterized by a broad diversity of trees; however, vegetation on the project site has been altered due to farming and land clearing practices over time. Currently, approximately 49 acres of the 155-acre site is forested and is primarily old field, mixed pine/hardwood sawtimber and poletimber, ranging from 8 to 34 inches diameter at breast height (DBH). Tree and shrub species identified during the site visits on February 16 and 17, 2016 and May 16, 2017 were largely dominated by red maple (*Acer rubrum*), sweetgum (*Liquidambar*

styraciflua), loblolly pine (*Pinus taeda*), and Virginia pine (*P. virginiana*) with lesser quantities of Northern red oak (*Quercus rubra*), white oak (*Q. alba*), pignut hickory (*Carya glabra*), mockernut hickory (*C. tomentosa*), tulip poplar (*Liriodendron tulipifera*), and Chinese privet (*Ligustrum sinense*). The understory was primarily composed of greenbriar (*Smilax rotundifolia*), Japanese honeysuckle (*Lonicera japonica*), blackberry (*Rubus* sp.), goldenrod (*Solidago* sp.), and broomsedge (*Andropogon* sp.). Timber was harvested from about 68 acres of the site sometime between March and August of 2016 by the previous property owner (Figure 7). The harvested area is currently sparsely vegetated with stump sprouts, tree and shrub seedlings, and scattered grasses and herbs (Photograph 3.5-1). About 32 acres in the southern portion of the site was cultivated as corn (*Zea mays*) under previous ownership, but is now becoming weedy and unmaintained (Photograph 3.5-2).

3.4.1.2 Wildlife

Habitat assessments for terrestrial animal species were conducted in the field on February 16 and 17, 2016 and May 16, 2017 and the total footprint reviewed was approximately 155 acres in size. Landscape features within and surrounding the project area consist of a variety of fragmented and contiguous forest habitat, wetlands, streams, early successional habitat (i.e. pasture and agricultural), and residential or otherwise disturbed areas. Of the 155-acre project site, approximately 140 acres would be utilized for the solar facility. Each of the varying vegetative community types offers suitable habitat for animal species common to the region, both seasonally and year-round. Individual species and/or evidence of species incidentally observed during field surveys conducted on February 16 and 17, 2016 and on May 16, 2017 are indicated with an asterisk (*).

Early successional, deciduous and mixed deciduous-evergreen forest represents approximately 31 percent of the 140-acre facility footprint. Birds in this region typical of this habitat include wild turkey, red-tailed hawk, eastern screech-owl, yellow-billed cuckoo, Carolina chickadee*, Chuck-will's-widow, tufted titmouse*, white-breasted nuthatch, blue gray gnatcatcher, red-eyed vireo, yellow-throated, black-and-white, Cerulean, and pine warblers, American redstart, common flicker, pileated, red-bellied, red-headed, downy, and hairy woodpeckers, rose-breasted grosbeak, ovenbird, blue jay, wood thrush, and summer tanager (USFS 1995 and Martin et al. 1993). This area also provides foraging and roosting habitat for several species of bat, particularly in areas where the forest understory is partially open. Bat species likely to occur in this habitat include big brown bat, eastern red bat, evening bat, silver-haired bat, and tricolored bat (ACDNR 2014b). Eastern chipmunk, gray squirrel*, gray fox, various mice species, white-tailed deer*, and raccoon* are other mammals likely to occur in this habitat. Common amphibians and reptiles of mixed deciduous forests in this region include southern dusky salamander, red spotted newt, American and Fowler's toads, gray treefrog, box turtle*, five-lined skink*, eastern hognose snake, black rat snake, and corn snake (Sutton and Sutton 1985).

Early successional and herbaceous habitat represents approximately 20 percent of the project site, consisting of agricultural land and approximately 44 percent of the project site, consisting of scrub/shrub land that was recently timbered by the previous property owner. Common inhabitants of these habitat type include American crow*, blue jay, blue-winged warbler, Carolina wren*, gray catbird, eastern towhee*, mourning dove*, brown thrasher, loggerhead shrike, northern

mockingbird*, fox sparrow, American robin*, white-eyed vireo, Kentucky warbler, prairie warbler, common yellow-throat, yellow-breasted chat, ovenbird, northern bobwhite, and wild turkey (Martin et al. 1993). Coyote*, eastern cottontail*, red fox, and various rat, mole, and vole species are common mammals typical of fields, agricultural, and early successional areas (timbered areas). Copperhead, southern black racer, yellow-bellied slider*, and eastern fence lizard are common amphibian and reptile inhabitants of this habitat type (Sutton and Sutton 1985).

Scrub/shrub wetland and scrub/shrub streamside riparian habitat occur within the project site. These habitat types have been highly disturbed due to the timbering by the previous property owner and are more representative of the early successional and herbaceous habitat described above, including common species that may occur within them.

Review of the TVA Regional Natural Heritage database indicated that five caves were documented within a 10-mile radius of the project site, the closest one documented approximately 590 feet from the project site. No caves were identified during the field reviews of the project site. No other unique or important terrestrial or aquatic habitats were identified within the project area. In addition, no migratory or wading bird colonies were observed on the site or in its immediate vicinity.

Migratory Birds

The EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds) directs federal agencies to take certain actions to further implement the MBTA. The MBTA prohibits the “take” of migratory birds. The regulatory definition of “take” as defined by 50 CFR § 10.12, “means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue hunt, shoot, wound, kill, trap, capture, or collect.” The following prohibitions apply to migratory bird nests: “possession, sale, purchase, barter, transport, import and export, take, and collect (USFWS 1918).” The MBTA is executed and enforced by the USFWS. The construction contractor will responsible for ensuring that its actions are consistent with the prohibitions under the MBTA.

The USFWS IPaC report identified 15 species of migratory birds (not including the bald eagle) of concern (i.e., birds of conservation concern, which are species not already federally listed that represent USFWS’ highest conservation priorities) that have the potential to occur in the vicinity of the project site (Table 3.4-1). On the project site, early successional, deciduous and mixed deciduous-evergreen forest may provide habitat for the chuck-will’s-widow, red-headed woodpecker, and wood thrush. Early successional and herbaceous habitat on the project site may provide habitat for blue-winged warbler, fox sparrow, Kentucky Warbler, loggerhead shrike, and prairie warbler. Other migratory birds not on the USFWS list of species of concern likely present on the site are listed above.

Table 3.4-1. Migratory bird species of concern potentially occurring in the vicinity of the project area.

Species	Seasonal Occurrence in Project Area	Habitat on Project Site
Blue-winged warbler (*Vermivora pinus*)	Breeding	Yes
Chuck-will's-widow (*Caprimulgus carolinensis*)	Breeding	Yes
Dickcissel (*Spiza americana*)	Breeding	No
Fox sparrow (*Passerella iliaca*)	Wintering	Yes
Kentucky warbler (*Oporornis formosus*)	Breeding	Yes
Least bittern (*Ixobrychus exilis)*	Breeding	No
Loggerhead shrike (*Lanius ludovicianus)*	Year-round	Yes
Prairie warbler *(Dendroica discolor)*	Breeding	Yes
Prothonotary warbler *(Protonotaria citrea)*	Breeding	No
Red-headed woodpecker *(Melanerpes erythrocephalus)*	Year-round	Yes
Rusty blackbird (*Euphagus carolinus)*	Wintering	No
Sedge wren *(Cistothorus platensis)*	Migrating	No
Short-eared owl *(Asio flammeus)*	Wintering	No
Wood thrush *(Hylocichla mustelina)*	Breeding	Yes
Worm eating warbler *(Helmitheros vermivorum)*	Wintering	No

***Source**:* USFWS 2016.

3.4.1.3 Rare, Threatened, and Endangered Species

Rare, threatened and endangered species are regulated by both the federal and state governments (see Section 3.4 above). Information provided by the USFWS IPaC report revealed 17 federally listed species that includes 14 listed as endangered and three listed as threatened in Limestone County, Alabama. Within a 10-mile radius of the project site, TVA's Heritage Database included an additional six federally listed species that includes four listed as endangered, one listed as threatened, and one listed as partial status (PS). The TVA Heritage Database also indicated 25 Alabama state-listed species reported within a 10-mile radius, seven of which are also federally listed (Table 3.4-2). No designated critical habitats are present in the project.

Although the bald eagle has been delisted, it is still protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Bald eagles typically nest in large mature trees capable of supporting their massive nests near large waterways where the eagles forage. No large bodies of water that are likely to provide ample sources of food are present in the project area or immediately adjacent. It is unlikely that the bald eagle would be found on the project site or within the immediate vicinity of the project area. No eagles or eagle nests were observed during the field surveys.

Alabama does not have a state law that protects state endangered or threatened species; however, some species do receive regulatory protection through the Alabama Regulations on Game Fish and Fur Bearing Animals and the Alabama Nongame Species Regulation, administered by the Alabama Department of Conservation and Natural Resources (ADCNR) and Alabama Wildlife and Freshwater Fisheries (AWFF) (ADCNR 2014a and AWFF 2016-2017).

Table 3.4-2. Federally and state-listed species potentially occurring within a 10-mile radius of the project site (TVA) and in Limestone County, Alabama (USFWS)

Scientific name	Common name	Federal status	AL State status/rank	USFWS concurrence	Habitat present?
Mollusks					
Actinonaias ligamentina	Mucket	--	PSM/S2	--	No
Athearnia anthonyi	Anthony's riversnail	LE	--	No effect	No
Campeloma decampi	Slender campeloma	LE	--	No effect	No
Cumberlandia monodonta	Spectaclecase	LE	SP/S1	No effect	No
Cyprogenia stegaria	Fanshell	LE	--	No effect	No
Dromus dromas	Dromedary pearlymussel	LE	--	--	No
Ellipsaria lineolata	Butterfly	--	PSM/S4	--	No
Epioblasma triquetra	Snuffbox mussel	LE	--	No effect	No
Hemistena lata	Cracking pearlymussel	LE	SP/S1	No effect	No
Lampsilis abrupta	Pink mucket	LE	--	No effect	No
Lampsilis fasciola	Wavy-rayed lampmussel	--	PSM/S2	--	No
Lampsilis ovata	Pocketbook	--	PSM/S2	--	No
Lampsilis virescens	Alabama lampmussel	LE	--	--	No
Lasmigona complanata	White heelsplitter	--	PSM/S2	--	No
Lemiox rimosus	Birdwing pearlymussel	LE	--	--	No
Marstonia pachyta (= *Pyrgulopsis pachyta*)	Armored marstonia	LE	SP/S1	No effect	No

Scientific name	Common name	Federal status	AL State status/rank	USFWS concurrence	Habitat present?
Pegias fabula	Littlewing pearlymussel	LE	--	No effect	No
Plethobasus cyphyus	Sheepnose mussel	LE	--	No effect	No
Pleurobema plenum	Rough pigtoe	LE	--	No effect	No
Pleurocera pyrenella	Skirted hornsnail	--	TRKD/S2	--	No
Pleuronaia barnesiana (formerly *Fusconaia*)	Tennessee pigtoe	--	PSM/S1	--	No
Quadrula intermedia	Cumberland monkeyface	LE	SP/SX	--	No
Quadrula metanerva	Monkeyface	--	PSM/S3	--	No
Truncilla truncata	Deertoe	--	PSM/S1	--	No
Villosa taeniata	Painted creekshell	--	PSM/S2	--	No
Mammals					
Myotis grisescens	Gray bat	LE	SP/S2	--	Yes (foraging)
Myotis septentrionalis	Northern long-eared bat	LT	SP/S2	May affect, is not likely to adversely affect if tree clearing occurs between Oct. 15 and March 31	Yes (foraging and roosting)
Myotis sodalis	Indiana bat	LE	SP/S2	May affect, is not likely to adversely affect if tree clearing occurs between Oct. 15 and March 31	Yes (foraging and roosting)
Perimyotis subflavus	Tricolored bat	--	NOST/S3	--	Yes (foraging and roosting)

Birds					
Haliaeetus leucocephalus	Bald eagle	BGEPA	--	--	No
Thryomanes bewickii altus	Appalachian Bewick's wren	--	SP/SHB	--	Yes
Amphibians					
Cryptobranchus alleganiensis	Hellbender	PS	SP/S2	--	No
Fishes					
Elassoma alabamae	Spring pygmy sunfish	LT	--	No effect	No
Etheostoma boschungi	Slackwater darter	LT	SP/S1	No effect	No
Etheostoma wapiti	Boulder darter	LE	SP/S1	No effect	No
Notropis micropteryx	Roseyface shiner	--	TRKD/S2	--	No
Notropis photogenis	Silver shiner	--	TRKD/S1	--	No
Percina evides	Gilt darter	--	TRKD/S2	--	No
Percina shumardi	River darter	--	TRKD/S3	--	No
Percina tanasi	Snail darter	LT	--	--	No
Plants					
Silphium mohrii	Mohr's rosin-weed	--	SLNS/S1	--	No
Trillium sessile	Sessile trillium	--	SLNS/S2	--	No

Sources: TVA Heritage Database, data extracted May 26, 2017
USFWS IPaC data, accessed February 9, 2016: http://ecos.fws.gov/ipac

Alabama Status Abbreviations:
SP – State Protected; PSM – Partial Status Mussel; TRKD – Tracked by Alabama Natural Heritage Program; NOST – Listed by state, but no status has been assigned; SLNS – Listed by State of Alabama, but not assigned a status
[The Alabama Natural Heritage Program State Status Code Definitions (http://www.alnhp.org/state_status.php)]

Rank Abbreviations: S1 – critically imperiled, S2 – imperiled; S3 – vulnerable; S4 – widespread/abundant; SHB – Historical occurrence/breeds in Tennessee; SX – extirpated from state

Federally and State-Listed Species

A desktop database search and aerial/street-view photograph review was conducted to identify the types of habitats present on the proposed project site, including habitats that potentially could support listed species. A survey of biological resources on the project site was conducted on February 16 and 17, 2016 and on May 16, 2017. The survey focused on the general characteristics of the land cover, vegetation communities, and wildlife habitats currently present

within and adjacent to the site and, in particular, to support a preliminary evaluation of the potential for special status species to occur on the site. This section summarizes the evaluation of those biological resources that potentially may constrain development of the proposed project.

The IPaC and TVA Heritage Database federally listed species that were identified as having the potential to occur in the area include 15 mollusk species, 4 fish species, 3 mammal species, and 1 amphibian species, totaling 23 federally listed species (Table 3.4-2). The TVA Heritage Database also provided a list of state-listed species that were identified as having the potential to occur in the area, which include 25 species, 7 of which are also federally listed (Table 3.4-2). These species include 10 mollusk species, 4 fish species, 2 plant species, 1 mammal species, and 1 bird species.

The project site contains suitable habitat for three federally listed bats, one state-listed bat, one state-listed bird, and one stated-listed plant.

Mollusks

There are 15 federally listed and 10 state-listed mollusk species that may occur in the project area. The federally listed spectaclecase, fanshell, dromedeary pearlymussel, snuffbox mussel, cracking pearlymussel, pink mucket, Alabama lampmussel, birdwing pearlymussel, littlewing pearlymussel, sheepnose mussel, rough pigote, and Cumberland monkeyface and the state-listed mucket, butterfly, wavy-rayed lampmussel, pocketbook, white heelsplitter, Tennessee pigtoe, monkeyface, deertoe, and painted creekshell require medium-sized to large rivers, where most of them occupy sand and gravel shoal areas with at least moderate current velocities and clean water. These suitable rivers are much larger than Hauskin Branch and its tributaries (Parmalee and Bogan 1998, NatureServe Explorer accounts). The closest records of most of these species are in the stretch of the Elk River between Tims Ford Dam and Wheeler Reservoir.

The federally listed Anthony's riversnail prefers habitat of large rivers in fast flowing water, known only from Limestone Creek in Alabama (NatureServe Explorer 2017b) and the state-listed skirted hornsnail prefers habitat of medium sized river tributaries to the Tennessee River (NatureServe Explorer 2017h).

The one on-site perennial stream in the project site is too small, too low gradient, and exhibits flows too low to support the spectaclecase, fanshell, dromedeary pearlymussel, snuffbox mussel, cracking pearlymussel, pink mucket, Alabama lampmussel, birdwing pearlymussel, littlewing pearlymussel, sheepnose mussel, rough pigote, Cumberland monkeyface, mucket, butterfly, wavy-rayed lampmussel, pocketbook, white heelsplitter, Tennessee pigtoe, monkeyface, deertoe, painted creekshell, Anthony's riversnail, or skirted hornsnail (NatureServe Explorer 2017-2017k). Therefore, suitable habitat does not exist for these species within the project site due to stream size, gradient, and flow requirements.

The federally listed slender campeloma and armored marstonia prefer medium sized rivers, slow to moderate currents, and are known to occur in Piney Creek, which is hydrologically connected to the project site. The closest known locations in Piney Creek of the slender campeloma and

armored marstonia are approximately 14 river miles and approximately 19 river miles downstream from the project site, respectively (Haggerty and Garner 2008 and NatureServe Explorer 2017i).

Although the project site is hydrologically connected to Piney Creek, which supports known locations of the slender campeloma and armored marstonia, there is only one on-site perennial stream, which is too small to support these species. Additionally, the significant distance between the project site and the closest known locations in Piney Creek would indicate that these species would not be found in the upper headwaters of the Piney Creek system and prefers habitat lower in the watershed. Therefore, suitable habitat does not exist for these species within the project site.

Fish

Four federally listed and four state-listed fish species may occur on the project site. The federally listed spring pygmy sunfish prefers habitat of dense, submergent vegetation and is known only from spring pools and associated features confluent with the middle to upper Beaverdam Spring/Creek watershed (USFWS 2013). The federally listed boulder darter prefers deep, rocky flowing pools in large tributaries and rivers. The federally listed slackwater darter is only known in Alabama from Swan Creek (Limestone County), Flint River (Madison County), and Cypress Creek (Lauderdale County) (USFWS 2005). The federally listed snail darter is considered extirpated in the project area and its habitat preference includes creeks and medium-sized river systems of moderate gradients (NatureServe Explorer 2017g).

Four fish species are state-listed as potentially occurring in the project area: roseyface shiner, silver shiner, gilt darter, and river darter. All four species prefer medium to large-sized rivers with clean water, fast-moving flows, and cobble-gravel substrate, usually in riffle areas (IUCN 2015, IUCN 2013a, IUCN 2013b, IUCN Red List and NatureServe Explorer 2017f).

The one perennial stream located on the project site is too small to support any of the federally or state-listed fish species that may occur in the area. Additionally, the on-site perennial stream exhibits slow-moving flows over a low gradient, exhibits substrate embeddedness, is incised, and does not provide suitable habitat for any of these state-listed fish species.

Mammals

Three species of federally listed mammals potentially occur on the project site: the gray bat, the northern long-eared bat, and the Indiana bat. One state-listed mammal species, the tricolored bat, also potentially occurs on the project site.

The gray bat prefers cave habitat year-round. Winter habitat includes deep vertical caves with domed halls and summer habitat includes warm caves with restricted ceiling access (USFWS 1997). The Indiana bat, northern long-eared bat, and tricolored bat all prefer winter habitats that include caves and mines (NatureServe Explorer 2017k, USFWS 2017, and USFWS 2015). No caves or mines are located within the project site; however, the closest cave location is approximately 590 feet from the project site. The closest gray bat and tricolored bat cave record is approximately 9 miles from the project site near the town of Elkmont from the same location. There are no other records of gray bat, tricolored bat, Indiana bat, or northern long-eared bat from

within a 10-mile radius of the project site. No suitable habitat for the gray bat or suitable winter habitat for the Indiana bat, northern long-eared bat, or the tricolored bat exists on the project site.

During the summer the Indiana bat, northern long-eared bat, and tricolored bat roost singly or in colonies underneath bark, in cavities, or crevices of both live and dead trees of varying size, age, and species (NatureServe Explorer 2017k, USFWS 2017, and USFWS 2015). Suitable summer roost habitat for the Indiana bat, northern long-eared bat, and the tricolored bat consisting of trees of varying ages, including dead snags, is located on the project site.

Foraging habitat for all four bat species occurs over ponds, wetlands, and streams located on the project site. Additional foraging habitat for Indiana bat, northern long-eared bat, and tricolored bat occurs over forested habitat, forest edges, and tree lines. Water resources for all four species of bats include two small ponds primarily fed by rainwater and small, headwater stream channels located on the site.

Amphibians

One federally listed amphibian species, the hellbender, has been reported from the vicinity of the project site. The hellbender is a large salamander that prefers medium river systems. It prefers rivers with rocky substrate and large shelter rocks of high quality channel characteristics and water quality with moderate to strong flows (NatureServe Explorer 2017j). The one on-site perennial stream in the project site is too small, too low gradient, does not exhibit the appropriate rocky substrate, and exhibits flows too low; therefore, suitable habitat for this species does not exist within the project site.

Plants

Two state-listed plant species potentially occur on the project site, the Mohr's rosin-weed and sessile trillium. Mohr's rosin-weed habitat includes prairies, clearings, fence rows, and rocky to sandy, well-drained soils (FNA 2016). Sessile trillium prefers rich, mesic, deciduous woodlands often over calcareous substrate, floodplain woodlands, and riverbanks (USFS 2017). The project site does not contain rich, mesic deciduous woodlands or floodplain woodlands and does not exhibit prairie-like conditions, rocky to sandy, well-drained soil; however, fence row-like areas and clearings are present on the site. Therefore, suitable habitat does not exist for the sessile trillium, but does exist for the Mohr's rosin-weed in the fence row-like areas and in cleared areas on the project site. TVA biologists surveyed for Mohr's rosin-weed on the project site in 2012 and HDR biologists surveyed for Mohr's rosin-weed again in February 2016 and May 2017. Mohr's rosin-weed was not observed during these three surveys.

Birds

One state-listed bird species potentially occurs on the project site, the Appalachian Bewick's wren. This bird species favors brushy areas, scrub, and thickets in open country, or open woodland and includes oak woodlands, evergreen forests, and hedgerows. This species normally breeds in areas that contain a mixture of thick scrubby vegetation and open woodland (Cornell 2015). The project site contains young forested land, and recently timbered land that exhibits scrubby-like vegetation with abundant logging debris; therefore, suitable habitat for this species does exist

within the project site. The project area records of the Appalachian Bewick's wren are historical and this bird is considered to be extirpated from most of its historic range, including Limestone County. The probability of it being present in the project area is therefore very low.

3.4.2 Environmental Consequences

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

3.4.2.1 No Action Alternative

Vegetation

Under the No Action Alternative, there would be no project-related impacts to the existing vegetation on the project site. It is assumed that the actively farmed area on the project site would continue to be agricultural. If these practices were discontinued, the site would likely become entirely forested in the far future.

Wildlife

Under the No Action Alternative, impacts to wildlife would be similar to those occurring to vegetation. If current practices continue, the agricultural fields and forested areas would continue to support the wildlife currently present on the site. If these current practices were abandoned, over time, the wildlife type would shift toward that which prefers forested areas.

Rare, Threatened, and Endangered Species

Under the No Action Alternative, no project-related impacts to rare, threatened, and endangered species are anticipated. However; as with vegetation and wildlife, indirectly, over time, shifts in habitat types caused by either the continuation or abandonment of human practices on project site could affect their suitability for listed species. For example, a shift towards a more forested vegetative cover would make it more habitable for forest-dwelling species, such as bats, but whether these species would be found there in the future is unknown.

3.4.2.2 Proposed Action Alternative

Vegetation

Under the Proposed Action Alternative, the proposed solar facility would be constructed on the project site with direct impacts to vegetation. Tall vegetation and tree stumps would be removed from the approximately 49 acres of forested area, 68 acres of early successional, recently harvested forest, and 32 acres of agricultural land within the buildable area for the PV arrays, electrical components, and access roads. Following construction, the graded area within the fencing, as well as areas excavated to install underground wiring and for other purposes, would be seeded with various grasses and the solar facility would be maintained as described in Section 2.2.3 to prevent vegetation from growing taller than about 2 feet. This would result in the long-term conversion of most of the project site from forested areas and seasonal row crops to a mix of grass and herbaceous vegetation. No trees outside the buildable area or within buffer areas would be cleared.

Taking into consideration the large amount of similar habitats in the area regionally and locally, the clearing of the existing vegetation and light grading on the site would be considered a minor impact. Approximately 20 percent of the project site is agricultural and used for growing annual crops. Approximately 31 percent of the project site is forested and undeveloped and approximately 44 percent of the project site was recently timbered. The 140-acre facility site would require minimal vegetation removal from the agricultural portion, low to moderate vegetation removal throughout the remainder of the site, and stump grubbing in the recently timbered area and currently forested area. Because the surrounding area consists of very similar vegetative habitats, the effects of the conversion of 140 acres to maintained grass/herbaceous vegetation in this context would be relatively small. The construction and operation of the solar facility would not result in indirect impacts to vegetation on adjacent lands.

Wildlife

Direct impacts to wildlife are also anticipated under the Proposed Action. Much of the wildlife living on the project site in areas which would be cleared of vegetation, grubbed, and graded and converted to solar arrays would be displaced by construction activities. Localized adverse effects would occur to species inhabiting woodland, including a few species of migratory birds of conservation concern. Due to the acreage involved, regional impacts to these species would be insignificant. Following the completion of construction and site revegetation, some species adapted to grass and herbaceous fields such as field mice, eastern cottontail, common yellowthroat, and red-winged blackbird would likely reoccupy parts of the site. Minor shifts in species composition may occur due to the presence of the PV arrays, change in disturbance regime, and shift to periodically mowed grass and herbaceous fields. These impacts would be greatest on the 68-acre forested area and least on the 32-acre agricultural area.

Overall, direct impacts to wildlife would be long-term and adverse but, given the relatively small acreage involved and prevalence of the affected habitat types in the project area, insignificant to regional populations.

Rare, Threatened and Endangered Species

In May 2016, HDR consulted with USFWS for the 17 species listed on the IPaC report. In a reply dated May 25, 2016, the USFWS concurred that proposed actions may affect, but are not likely to adversely affect the Indiana bat and the northern long-eared bat. This concurrence was based on the condition that tree removal must occur between October 15 and March 31 (Table 3.4-2) (Appendix C, USFWS Correspondence). Merchantable timber was harvested from approximately 68 acres in the center of the project site sometime between March 2016 and August 2016 by the previous property owner. TVA consulted with USFWS on the remainder of forested areas to be cleared for the proposed action, and in a letter dated January 12, 2018, USFWS concurred with TVA's determination that the project may affect, but is not likely to adversely affect the Indiana bat and the northern long-eared bat (Appendix C).

The project site contains one headwater perennial stream in the Piney Creek watershed that exhibits low flows, low gradients, incision, and sediment-embedded substrates. Due to these stream characteristics, suitable habitat does not exist for any of the federally listed or state-listed

mollusks, fish, or amphibian species described in Section 3.4.1.3. Therefore, under the Proposed Action, no direct effects to any federally listed or state-listed mollusk, fish, or amphibian species are anticipated. The implementation of BMPs to control on-site sedimentation during construction and the small gradient change over the project site, the likelihood of adverse downstream sedimentation impacts is low; therefore, under the Proposed Action, no indirect effects to any federally or state-listed mollusk, fish, or amphibian species are anticipated.

The project site is a mix of early successional forested areas, timbered areas, and agricultural land; no caves potentially suitable as winter hibernacula for the four species of bars occur on the site. No suitable roosting habitat for gray bat occurs on the project site; however, suitable foraging habitat over ponds, wetlands, and streams does occur. Suitable spring/summer roosting habitat does exist on the project site for the Indiana, northern long-eared, and tricolored bats in the form of dead, dying, or living trees over 5 inches in diameter with exfoliating bark or crevices. Suitable foraging habitat for these species also occurs over forested habitat, forest edges, tree lines, ponds, wetlands, and streams. In order to avoid impacting summer roost habitat for the three species of bats, no tree removal would occur during the summer roosting window of April 1 to October 14 and therefore, these species would not be directly affected. Given the habitat conditions on the site and the seasonal restriction on tree clearing, the Proposed Action would not directly affect any of the four listed bat species. Indirect effects to the Indiana bat, the northern long-eared bat, and the tricolored bat may occur in the form of roosting habitat loss due to tree clearing. Indirect effects to all four bat species may occur due to loss of water resources (i.e., pond impacts during construction), but a small positive indirect effect to water resources (bat water sources) would result from the reduction of fertilizer and herbicide runoff from entering surface waters with the removal of a portion of the site from agricultural practices. As noted above, USFWS concurred that the proposed actions may affect, but are not likely to adversely affect the Indiana bat and northern long-eared bat provided tree removal occurs between October 15 and March 31.

The project site does not contain rich, mesic deciduous woodlands or floodplain woodlands and does not exhibit prairie-like conditions, rocky to sandy, well-drained soil; however, fence row-like areas and clearings are present on the site. No suitable habitat exists on the project site for the state-listed sessile trillium, but suitable habitat does exist for the state-listed Mohr's rosin-weed in the fence row-like areas and in cleared areas on the project site. Under the Proposed Action no direct or indirect effects to the sessile trillium are anticipated due to lack of habitat for the species on the project site. Under the Proposed Action, the Mohr's rosin-weed would not be affected due to the absence of the species on the project site based on surveys performed by TVA and HDR biologists. No indirect effects are anticipated for this species.

Due to the high likelihood that Appalachian's Bewick's wren is extirpated from the area and because most vegetation removal would occur during the winter months, under the Proposed Action, no direct or indirect effects to this species are anticipated.

Overall, under the Proposed Action, no direct effects to federally listed threatened or endangered species are anticipated as long as tree removal occurs between October 15 and March 31. Potential indirect effects to the federally listed Indiana bat and the northern long-eared bat and

the state-listed tricolored bat may occur due to summer habitat loss and potential indirect effects to all four bat species may occur due to the loss of foraging habitat and water resource loss.

No impacts to other rare, threatened, or endangered species are anticipated due to the Proposed Action.

3.5 VISUAL RESOURCES

This section describes an overview of the visual resources in and surrounding the project area and the potential impacts on these visual resources that would be associated with the Proposed Action and No Action Alternative.

3.5.1 Affected Environment

Visual resources are the visual characteristics of a place and include both natural and man-made attributes. Visual resources can determine how an observer experiences a particular location. Visual resources are very important to people living in the area, people going through an area, and in the context of historical and culturally significant settings.

Generally, the project site is in a rural area with agricultural fields, tree lines, and dirt and paved roads to the west, north and east, and agricultural and forested land to the south. Scattered single family homes are located to the west, north, and east. The surrounding terrain is comprised of moderately flat land with some gently rolling hills and several slight wetland and stream depressions amidst woodlands and maintained cropland. Visual resources in the project area include a 161-kV TVA substation immediately adjacent to the west of the site, a CSX rail line along the western border of the site, agricultural and open fields, mature hardwood forested area, several rural roads, and residential areas.

Mooresville Road (County Road 71) is a two-lane roadway with a 55 miles per hour (mph) speed limit that leads north from Thach Road and Highway 65 to the southwest corner of the project site. It continues north approximately 3.2 miles to the town of Ardmore on the Alabama/Tennessee border. Agricultural and residential properties surround the project site, though blocked visually by the CSX rail line along the western site border. The residential properties to the north of the property are on Puckett Lane, though their line of sight is obscured by an approximately 20 foot drop in elevation from the site to the properties. East of the site on Watson Lane, there are two nearby residences with unobstructed views of the project site.

Scenic attractiveness (a measure of human perceptions of landscape beauty and sense of place) of the area is common and scenic integrity (a measure of the degree of intactness or wholeness of landscape character) is moderate within the immediate 2 miles of the site. Land uses that influence the measures of scenic attractiveness and integrity include the 161 kV TVA substation and CSX rail line on the western border of the site, forested land to the south, the recently timbered area, and agricultural fields throughout.

The project site is mostly forested and timbered land, with an active agricultural field in the southern portion of the site (Photographs 3.5-1 and 3.5-2). Several dirt roads are located throughout the site. A transmission line right-of-way and a maintained gravel road bisect the

property (Photograph 3.5-3). Bordering the western boundary of the site is a CSX rail line and a TVA substation (Photograph 3.5-4).

Photograph 3.5-1. View of the project site, in a recently timbered area.

Photograph 3.5-2. View of agricultural field on project site.

Photograph 3.5-3. View of transmission line and gravel road, bisecting the project site.

Photograph 3.5-4. View of CSX rail line and TVA substation west of the project site.

3.5.2 Environmental Consequences

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

3.5.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed; therefore, no project related impacts to visual resources would result. Existing views of the site would be expected to remain relatively unchanged from the present mix of farmland and undeveloped land. Impacts to visual resources are possible as the town of Ardmore grows. Additionally, visual changes may occur over time as vegetation on the properties changes. If the land is no longer mowed, farmed, or timbered, vegetation would change from low profile plants to bushes and trees. Furthermore additional solar farms may be developed in the area.

3.5.2.2 Proposed Action Alternative

Visual concerns are often associated with both large- and small-scale solar facilities, as well as the associated power lines and electrical substations. Construction on the Project would convert farmland, which has been actively cultivated for at least 20 years, and forested land, the majority of which was densely wooded until fairly recently, to a commercial/industrial land use type. During the February 2016 and May 2017 site visits, the HDR field team assessed the potential for visual impacts from the Proposed Action on the project site.

The majority of the project site is visible from County Road 71, located to the west of the site. The site consists of flat terrain with a few scattered depressions and moderately gentle draws where water collects and drains to the south, but the relatively stable elevations and tree-lined roads/site boundaries block views of the site from most other vantage points. Generally speaking, the site is/was more wooded than the surrounding open agricultural fields, though a large wooded tract is located immediately south of the site. Local travelers along County Road 71 may see a striking difference when the Project is completed, though a narrow fringe of mature trees located off-site along the western boundary of the railroad may obscure the view of the Project from the road. The change in viewshed of the property from agriculture and timber to a large solar facility is not expected to result in adverse impacts.

Visually speaking, the PV panels would be dramatically different from the current scenery on the site. The viewshed would change from a peaceful natural setting to a manufactured and structured appearance. Sitewide, after construction of the Project, open landscape of cultivated cropland, as well as formerly wooded lands, would be replaced by industrial highly geometric patterns formed by the rows of PV arrays. In the morning and evening, the top of the panels would be upright (approximately 7.6 feet from the ground at full tilt) and visible from the north, east and west of the project site. The surface of the panels would alter the view, as the dark, almost black surfaces would provide some reflection of the sky and would not conform to the surrounding agricultural, forested, and open views which have softer tones and angles. During mid-day, this effect would not be as pronounced because the panels would be relatively flat (approximately 4.5-feet-tall when lying flat).

The construction of the proposed solar facility would change the visible environment of the project area. During construction, heavy machinery would be present, changing the visual aspects of the project area to the south of the transmission line corridor, which is now an agricultural landscape with few other man-made features. Additionally, remaining tall vegetation across the site would

be removed, and part of the site would be graded, changing the contouring, coloring and texture of the scenery attributes. During construction, the project site would appear as a mixture of browns and grays due to earthmoving, road construction, and concrete activities. Water would be used to keep soil from aerosolizing; therefore dust clouds are not anticipated. These visual impacts would likely be most noticeable from County Road 71, though the fringe of mature trees located to the west of the railroad tracks would largely shield views of the facility from this road. The properties with views most affected by the Project are several houses just east of the site, as well as a grouping of houses approximately 0.14 mile north of the site.

Indirect impacts to visual resources around the project site may occur due to increased traffic and movement of heavy machinery throughout the site and along local roads. Overall, there would be minor temporary direct and indirect impacts to visual resources during the construction phase of the Proposed Action. Construction machinery and vegetation removal would change the views from a natural landscape to an active construction site. However, these impacts are considered minor as they would be temporary (less than 1 year) and there are few onlookers in the vicinity that would be affected by the appearance of the activities.

During the operation phase, minor visual impacts would continue to occur. The solar facility site, which includes the PV panels and the on-site substation, would be revegetated by natural regrowth and the site would be surrounded by chain-link security fencing topped with barbed wire. Photographs 3.5-5 and 3.5-6 show typical tracking solar panel arrays.

Photograph 3.5-5. Single-axis, tracking photovoltaic system with panels close to maximum tilt as viewed from the east or west.

Photograph 3.5-6. The back of the solar panels.

Figure 3 shows the site layout including the solar panels, on-site substation, perimeter fencing, access gates, the existing transmission line corridor, and the existing TVA substation. The proposed solar facility would have no lighting during operation. Construction would generally take place during daylight hours; therefore, no lighting would be needed during construction. Trees are located along much of the perimeter of the project site, including to the west of the railroad to the west of the site, to the south of the road and fence line to the south of the site, to the east of the fence line and road to the east of the site, and to the north of the fence line to the north of the site. Trees along the eastern edge of the site would largely screen the proposed main construction entrance. These trees would screen the site from some angles, other than from within the project boundary. The general public may see small portions of the site while driving on County Road 71 and the smaller adjacent public roads, including Puckett Lane and Watson Lane. Though up to 4,740 vehicles pass the site each day, the view of these structures would not cause negative impacts such as glare. Travelling the speed limit of 55 mph on County Road 71 would put the view of solar panels at less than one minute when traveling from either direction.

Any erosion control silt fence or sediment traps installed will be removed once construction is complete and bare areas from removal will be revegetated. Therefore, the erosion control silt fence and sediment traps would not create any direct, adverse impacts to visual resources in the area.

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

These impacts would be minimized, however, due to the sparsely populated immediate area, maintained buffers, and trees around parts of the periphery of the site.

3.6 NOISE

This section provides an overview of the existing ambient sound environment in the project area, and the potential impacts to the ambient sound environment that would be associated with the Proposed Action and No Action Alternative.

3.6.1 Affected Environment

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

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

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

Noises occurring at night generally produce a greater annoyance than do noises of the same levels occurring during the day. It is generally agreed that people perceive intrusive noise at night as being 10 dBA louder than the same level of noise during the day. This perception is largely because background environmental sound levels at night in most areas are about 10 dBA lower than those during the day (USEPA 1974). Ambient noise at the project area consists mainly of agricultural, transportation, rural, and natural sounds such as wind and wildlife. Generally, noise levels in these types of areas range from 45 to 55 dBA.

A ½-mile radius around the project site was examined to characterize existing land uses and identify potential noise sensitive receptors. Noise sensitive receptors can best be defined as those locations or areas where dwelling units or other fixed, developed sites of frequent human use occur. The project site is located within a rural area of Limestone County. Approximately 60 single family residential properties are located within ½ mile of the project site with one residence south of Watson Lane approximately 85 feet east of the eastern project boundary and approximately 130 feet from the solar panels. A second residence north of Watson Lane is located approximately 150 feet east of the eastern project boundary and approximately 170 feet from the solar panels (Figure 14). Surrounding land uses include residential, agricultural, forestry, commercial/industrial, and the CSX Railroad. Ambient noise at the project site consists mainly of agricultural, railroad, moderate traffic, rural, and natural sounds (farming equipment, moderate traffic, moderate voice, wind, wildlife, and similar sounds). Generally, noise levels in these types of areas range from 45 to 55 dBA, although the proximity to the railroad raises the range from 85 to 95 dBA (USDOT 2015).

Figure 14. Sensitive noise receptors in the vicinity of the project site.

3.6.2 Environmental Consequences

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

3.6.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed and no project related impacts on the ambient sound environment would occur. Existing land use would be expected to remain a mix of agricultural land and undeveloped land; therefore, the ambient sound environment would be expected to remain as it is at present.

3.6.2.2 Proposed Action Alternative

Direct and indirect noise impacts associated with implementation of the Proposed Action would primarily occur during construction. Construction equipment produces a range of sounds while operational. The noisiest construction equipment, such as delivery trucks, dump trucks, water trucks, service trucks, bulldozers, chain saws, bush hogs, or other large mowers for tree clearing produce maximum noise levels at 50 feet of approximately 84 to 85 dBA. This type of equipment may be used for approximately 6 months in the project area.

Construction noise would cause temporary and short-term adverse impacts to the ambient sound environment around the project area. The closest sensitive receptors, two occupied residences, one north and one south of Watson Lane, are nearby to the eastern boundary of the project site, approximately 85 to 170 feet from the proposed solar arrays. The adjacent residences would temporarily experience heightened noise during construction, primarily from the pile driving activities. Construction would only occur during daylight hours, so the Project would not affect ambient noise levels at night. Most of the proposed equipment would not be operating on site for the entire construction period, but would be phased in and out according to the progress of the Project. The equipment most likely to make the most noise would be the pile driving activities during the construction of the array foundations, which would be completed in 3 to 5 weeks. Standard construction pile drivers are estimated to produce between 90 to 95 dBA (calculated at a distance of 50 feet) at close range (USDOT 2015). The specialty pile drivers proposed to be used for solar panel installation produce less noise and the piles supporting solar panels would be driven into soil with little to no rock drilling anticipated. Construction workers would wear appropriate hearing protection in accordance with Occupational Safety and Health Act (OSHA) regulations.

Existing ambient noise periodically includes tractors, other farm equipment, the railroad, and highway traffic. As construction would occur during the day, presumably when farm activities and more traffic would occur, there would not be a substantial difference in noise levels other than during pile driving.

Following completion of construction activities, the ambient sound environment would be expected to return to existing levels. The moving parts would be electric-powered and produce little noise. Consequently, the Proposed Action would have minimal effects on noise levels as a result of normal continuous operation. The periodic mowing of the site to manage the height of

vegetation would produce sound levels comparable to those of agricultural operations in the surrounding area although at less frequent intervals.

Overall, implementation of the Proposed Action would result in minor, temporary adverse impacts to the ambient noise environment for those residents living near the project area during construction. Noise impacts during operation and maintenance of the solar farm would be negligible.

3.7 AIR QUALITY AND GREENHOUSE GAS EMISSIONS

This section describes an overview of existing air quality and GHG emissions in the project area and the potential impacts on air quality and GHG emissions that would be associated with the Proposed Action and No Action Alternative.

3.7.1 Affected Environment

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

The primary NAAQS were promulgated to protect public health, and the secondary NAAQS were promulgated to protect public welfare (e.g., visibility, crops, forests, soils and materials) from any known or anticipated adverse effects of air pollutants. Areas in compliance with the NAAQS are designated "attainment" areas. Areas in violation of the NAAQS are designated as "nonattainment" areas, and new sources being located in or near these areas may be subject to more stringent air permitting requirements. Nonattainment areas are usually defined by county. National standards, other than annual standards, are not to be exceeded more than once per year (except where noted). Areas that cannot be classified on the basis of available information for a particular pollutant are designated as "unclassifiable" and are treated as attainment areas unless proven otherwise (USEPA 2016).

3.7.1.1 Regional Air Quality

In Alabama, the air quality surveillance system is operated by the state environmental agency, ADEM (ADEM 2016). Limestone County, Alabama is part of the Huntsville Metropolitan Statistical Area (MSA) and is in attainment for NAAQS pollutants by the USEPA as of February 13, 2017 (USEPA 2015a). The National Emissions Inventory (NEI) is a comprehensive and detailed estimate of air emissions of both Criteria and Hazardous air pollutants from all air emissions sources. The NEI is prepared every 3 years by the USEPA based on emission estimates and emission model inputs provided by state, local, and tribal air agencies for sources in their jurisdictions, and supplemented by data developed by USEPA. The emissions in Limestone

County for 2014 are presented in Table 3.5-1. These emissions are from the fuel combustion, industrial, fuel combustion other, petroleum and related industries, other industrial processes, waste disposal and recycling, highway vehicles, off highway, solvent utilization, storage and transport, and miscellaneous sectors (USEPA 2015a).

Table 3.7-1. Emission of NAAQS pollutants in Limestone County for 2014.

Pollutant	Emissions (tons per year)
Carbon Monoxide	17,681.4
Nitrogen Oxides	4,294.8
PM_{10} Primary	11,418.2
$PM_{2.5}$ Primary	2,351.6
Sulfur Dioxide	292.0
Volatile Organic Compounds	3,683.1
Ammonia	851.8

Source: USEPA 2014a.

3.7.1.2 Greenhouse Gas Emissions

GHGs are compounds found naturally within the earth's atmosphere that trap and convert sunlight into infrared heat. In this way, GHGs act as insulation in the stratosphere and contribute to the maintenance of global temperatures. The most common GHG emitted from natural processes and human activities include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The primary GHG emitted by human activities in the US is CO_2, representing approximately 82 percent of total GHG emissions (USEPA 2017b). The largest source of CO_2 and of overall GHG emissions is fossil fuel combustion. CH_4 emissions, which have declined from 1990 levels, result primarily from enteric fermentation (digestion) associated with domestic livestock, decomposition of wastes in landfills, and natural gas systems. Agricultural soil management and mobile source fuel combustion are the major sources of N_2O emissions in the US (USEPA 2015a). Limestone County GHG emissions from 2014 are shown in Table 3.5-2. GHG emissions from the TVA power system are described in TVA's Integrated Resource Plan Final Supplemental Environmental Impact Statement (2015).

Table 3.7-2. Emissions of GHGs in Limestone County for 2014.

Pollutant	Emissions (tons per year)
Carbon Dioxide	1,024,027.5
Methane	146.6
Nitrous Oxide	22.6

Source: USEPA 2014b.

3.7.2 Environmental Consequences

This section describes the potential impacts to climate and air quality should the Proposed Action be implemented.

3.7.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed. Therefore, no project related impacts on climate or air quality would result. Existing land use would be expected to remain a mix of farmland and undeveloped land, and the existing habitat would be expected to remain as it is at present, with little effect on climate and air quality.

3.7.2.2 Proposed Action Alternative

The majority of potential air quality impacts associated with the Proposed Action would occur during construction. Construction activities would create emissions from the construction equipment and vehicles, contracted employee's personal vehicles, and fugitive dust mobilization from clearing, grading and other activities. Open burning of debris from the minimal tree clearing on the site would occur. The appropriate open burning permit would be obtained and weather conditions would be monitored and considered to ensure safety and minimal degradation to air quality during the open burning of any vegetation cleared from the site. No burning of other construction debris is anticipated. Fugitive emissions from vehicular traffic over paved and unpaved roads would be comprised mainly of particles that would be deposited near the roadways along the routes the construction and contractors' vehicles would travel to reach the site. As necessary, fugitive dust emissions from construction areas, paved, and unpaved roads would be mitigated using BMPs including wet suppression. Wet suppression can reduce fugitive dust emissions from roadways and unpaved areas by as much as 95 percent (USEPA 1998). Therefore, it is anticipated that air quality impacts associated with construction of the solar energy system would be negligible and limited in duration.

No noticeable direct or indirect impacts to regional climate would be associated with the construction of the proposed Project. The use of construction equipment would cause a minor temporary increase in GHG emissions during the construction activities. Combustion of gasoline and diesel fuels by internal combustion engines (haul trucks and off-road vehicles) would generate local emissions of PM, nitrogen oxides (NO_x), CO, volatile organic compounds (VOCs), and SO_2. The total amount of these emissions would be small and would result in negligible impacts.

The conversion of the site from the existing row agriculture fields to permanent grassland would likely result in a small overall increase in soil carbon sequestration.

The operation of the proposed solar facility is not anticipated to have adverse impacts to air quality or GHG emissions. No emissions would be produced by the operation of the solar facility. Minor emissions would occur during maintenance activities, including facility inspections and periodic mowing. Conversely, overall emissions of air pollutants from the TVA power system would decrease during operations as the emissions-free power generated by the solar facility would offset power that would otherwise be generated, at least in part, by the combustion of fossil fuels. The reduction in GHG emissions resulting from the operation of the solar facility would have little noticeable effect at regional or larger scales. It would, however, be a component of the larger planned system-wide reduction in GHG emissions by the TVA power system. The adverse

impacts of GHG emissions and the beneficial impacts of TVA's reduction in GHG emissions are described in more detail in TVA (2015).

3.8 CULTURAL RESOURCES

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

3.8.1 Affected Environment

3.8.1.1 Regulatory Background

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

Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended (54 U.S.C. § 300101 *et seq.*) is specifically designed to address the effects of federal and/or federally funded projects on tangible cultural resources—that is, physically concrete properties—of historic value. The NHPA provided for a national program to support both public and private efforts to identify, evaluate, and protect the nation's important cultural resources. Once identified, these resources are evaluated for inclusion in the National Register of Historic Places (NRHP) maintained by the National Park Service. Tangible cultural resources may qualify for inclusion in the NRHP if they are 50 years of age or older (unless in exceptional cases) and if found to embody one or more of four different types of values, or criteria, in accordance with 36 CFR § 60.4:

- *Criterion A:* association with events that have made a significant contribution to the broad patterns of our history. Such events may include a specific occurrence or pattern of occurrences, cultural traditions, or historic trends important at a local, regional, or national level. To be considered in association with a cultural resource, events must be important within the particular context being assessed.
- *Criterion B:* association with the lives of persons significant in our past. People considered may be important locally, regionally, or nationally, and the cultural resources considered are limited to properties illustrating a person's achievements rather than commemorating them.
- *Criterion C*: embodiment of the distinctive characteristics of a type, period, or method of construction; representative of the work of a master; possessing high artistic values; or representative of a significant and distinguishable entity whose components may lack individual distinction. Cultural resources considered generally include architectural resources such as buildings, objects, districts, and designed landscapes.

- *Criterion D*: cultural resources that have yielded, or may be likely to yield, information important in prehistory or history. Considered cultural resources typically include archaeological sites but may also include buildings, structures, and objects if they are the principal source of important information not contained elsewhere.

Cultural resources that are listed or considered eligible for listing in the NRHP are called "historic properties." Federal agencies are required by the NHPA to consider the possible effects of their undertakings on historic properties and take measures to avoid, minimize, or mitigate any adverse effects. NEPA requires federal agencies to consider how their undertakings may affect the quality of the human environment, including both cultural resources and those defined as historic properties, so that the nation may "preserve important historic, cultural, and natural aspects of our national heritage." "Undertaking*"* includes any project, activity, or program that has the potential to have an effect on a historic property and that is under the direct or indirect jurisdiction of a federal agency or is licensed or assisted by a federal agency.

Considering an undertaking's possible effects on historic properties is accomplished through a four-step review process outlined in Section 106 of the NHPA (36 CFR § 800). These steps are

1. Initiation (defining the undertaking and the Area of Potential Effect [APE] and identifying the parties to be consulted in the process);
2. Identification (studies to determine whether cultural resources are present in the APE and whether they qualify as historic properties);
3. Assessment of adverse effects (determining whether the undertaking would affect the qualities that make the property eligible for the NRHP); and
4. Resolution of any adverse effects (by avoidance, minimization, or mitigation).

Throughout the process, the lead federal agency must consult with the appropriate State Historical Preservation Officer (SHPO), federally recognized American Indian tribes that have an interest in the undertaking, and any other party with a vested interest in the undertaking. Through various regulations and guidelines, federal agencies are encouraged to coordinate Section 106 and NEPA review to improve efficiency and allow for more informed decisions. Under NEPA, impacts to cultural resources that are part of the affected human environment but not necessarily eligible for the NRHP must also be considered by federal agencies. Generally these considerations are accomplished through consultation with parties having a vested interest in the undertaking, as described above.

3.8.1.2 Cultural Resources Identification Methods

As part of the evaluation process, an archaeological survey and a separate architectural survey were conducted in May 2017 to determine the presence of prehistoric and historic cultural resources that are listed or eligible for listing in the NRHP. The project area for cultural resources includes approximately 162 acres that may be affected by the Proposed Action. An archaeological APE and an historic architectural APE were also defined for the Proposed Action. The archaeological APE is defined as the area that would be directly affected by potential site construction, clearing, and operations. The archaeological APE consists of the 162-acre project area. The historic architectural APE is defined as a 1-mile radius surrounding the project area.

The 162-acre project area and a 1-mile radius surrounding the project area were evaluated during background research. The cultural resources assessment for the direct and indirect effects APEs consisted of background research, field surveys, archaeological analysis, initial NRHP evaluations, and results summary (Futch 2017).

Background research was conducted to identify any previously recorded cultural resources and historic properties, to establish the cultural setting in the project area, and to develop an effective method to newly identify cultural resources in the archaeological and historic architectural APEs. Field surveys were conducted in May 2017 to identify newly buried and aboveground cultural resources in the archaeological and historic architectural APEs. The archaeological field survey consisted of systematic surface and subsurface investigation of the archaeological APE. Findings of three or more artifacts within a 30-meter area were delineated and recorded as archaeological sites and registered with the Alabama Office of Archaeological Research. The architectural field survey consisted of documentation of each property 50 years of age or older, noting characteristics of design, construction, and other aspects of its architectural integrity needed to evaluate the property's eligibility for listing in the NRHP. Each property was photographed to the extent feasible from publicly accessible right-of-ways and documented on Alabama Historical Commission Historic Building Survey Forms.

Recovered artifacts were processed, cleaned, cataloged, and analyzed in a fully-equipped archaeological laboratory. Using information compiled during background research, survey, and analysis, identified cultural resources were evaluated based on the four NRHP criteria, discussed above.

3.8.1.1 Background Research

Background research showed that no archaeological resources or historic architectural resources were previously recorded within the project site, or within 1 mile of the project site. Additionally, ethnohistoric research was conducted prior to initiating fieldwork. This included a review of potential Native American place names and Traditional Cultural Properties (TCPs) located within the project area and surrounding county. TCPs are important for the "role the property plays in a community's historically rooted beliefs, customs and practices" (Parker and King 1998). Similarly, a Traditional Cultural Landscape (TCL) has been described as "a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values" (Birnbaum 1996). Investigators identified no known TCPs or TCLs within the project area. However, it is likely that many areas of surrounding Limestone County hold importance to descendants of historic communities and Native American groups. One example that may be considered a TCP is the Drane Route of the Trail of Tears, which passes though Limestone County and its county seat, Athens, along the modern route of US Highway 72, approximately 12 miles south of the project site (National Park Service 2012). In addition, the location of natural phenomena such as shoals, summits, and river crossings can hold importance, as can the location of schools, churches, and other community gathering areas.

Based on background research, the archaeological APE was considered to have a low probability for both prehistoric and historic resources. The archaeological APE was expected to minimally

contain evidence of twentieth century homesteads along the railroad and possibly prehistoric resources on terraces along water sources. The historic architectural APE was expected to contain an inventory of early to mid-twentieth century architectural resources representative of residential housing development trends that occurred in Limestone County in the twentieth century.

3.8.1.2 Survey Results

One archaeological site (1AL850) was recorded during survey of the archaeological APE. Site 1AL850, the remnants of a twentieth century homestead, is recommended not eligible for listing in the NRHP. No historic architectural resources were identified within the 162-acre project tract, but 13 historic architectural resources (Resources Li00001-Li00013) were encountered within the 1-mile historic architectural APE. All 13 resources are houses that date in age from the 1920s to the 1960s. All identified historic architectural resources are recommended not eligible for the NRHP because most of the houses have been heavily modified with modern materials and additions, and the integrity of these resources is low.

3.8.2 Environmental Consequences

No cultural resources listed or eligible for listing in the NRHP were identified during background research or during field survey of the archaeological or historic architectural APEs. Given the extensive survey completed within the archaeological and historic architectural APEs, the potential for additional, unidentified cultural resources in the archaeological and historic architectural APEs is considered very low. Any undiscovered archaeological resources that may exist in the archaeological APE would likely be highly-disturbed, low density artifact scatters also ineligible for listing in the NRHP. TVA concurs with the recommendation in the cultural resources survey report that no historic properties would be affected by the construction and operation of the proposed solar facility (Futch 2017). TVA has consulted with the Alabama SHPO and federally recognized Indian tribes on this determination (Appendix D). In a letter dated October 24, 2017, the Alabama SHPO concurred with TVA's determination that no historic properties would be affected (Appendix D). Indian tribes that have responded include the Cherokee Nation, Muscogee (Creek) Nation, and United Keetoowah Band of Cherokee Indians in Oklahoma. These Indian tribes commented that there should be no effects to any known historic/cultural properties and that work should proceed as planned (Appendix D).

3.9 SOLID AND HAZARDOUS WASTE

3.9.1 Affected Environment

Portions of the project site have been farmed since at least 1936. An ASTM standard E1527-13 Phase I Environmental Site Assessment (ESA) was performed on August 12, 2016 (Quarry and Hong 2016). The Phase I ESA was conducted during a timber harvest on the property; land use at the time was predominately wooded with agricultural fields to the south and a transmission line corridor. The Phase I ESA did not identify the presence, former use or spillage of hazardous substances or petroleum products or recognized environmental conditions.

Garbage collection is conducted by CCS Garbage Service, Inc., located at 15450 New Cut Road in Athens, Alabama. Garbage is hauled to Republic Services (out of the Athens Transfer Station), located at 16100 BFI Lane in Athens. Finally, garbage is disposed of at the Republic Services Morris Farm Landfill, located at 4 Co. Road 418 in Hillsboro, Alabama. The Republic Services Morris Farm Sanitary Landfill is designated as a municipal solid waste (MSW) landfill. Industrial wastes, construction and demolition debris (C&D), commercial waste, rubbish, treated medical waste, drill cuttings, appliances, whole tires, trees, limbs, stumps, dried sludge, ashes, paper and other similar type materials are acceptable, including Special Waste as approved by ADEM. This landfill has ample capacity for disposing of any waste generated by the construction and operation of the proposed solar facility. The Republic Services Morris Farm Sanitary Landfill is located approximately 27 miles to the southwest of the proposed solar facility.

3.9.2 Environmental Consequences

3.9.2.1 No Action Alternative

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

3.9.2.2 Proposed Action Alternative

Minimal waste, consisting mainly of trees and other tall vegetation, would be generated during site preparation. The materials used for construction of the project would include PV panels, metal racking and mounting systems, electrical connectors, cable, wire and general building materials such as crushed stone, concrete and asphalt. These materials would be delivered to the site and utilized in the manner specified in project drawings. Packaging waste and other waste generated during construction would be collected and segregated by type in on-site receptacles prior to removal from the site. Wastes would be recycled to the extent feasible and remaining wastes would be trucked to the Republic Services Morris Farm Sanitary Landfill for disposal. The landfill has ample capacity for disposing of waste generated during construction of the solar facility and transmission interconnection.

No hazardous waste would be generated during the construction and operation of the facility. If the total volume of on-site oil (used in the 6 transformers) exceeds 1,320 gallons, a Spill Prevention, Control, and Countermeasure (SPCC) plan will be required. TVA would implement procedures to minimize fuel spills during construction and operation of the facility. Waste generated during operation would be minimal and would mainly result from replacement of equipment. Upon expiration of the 20-year PPA or an amended or alternative PPA for the sale of power after the 20-year period, SRC would develop a decommissioning plan to document the recycling and/or disposal of solar facility components in accordance with applicable regulations. Impacts from the generation of solid and hazardous waste during the construction and operation of the proposed facility would be insignificant.

3.10 TRANSPORTATION

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

3.10.1 Affected Environment

3.10.1.1 Roads

The southwest corner of the project site is 0.25 mile south of the intersection of County Road 84 (Upper Fort Hampton Road) and County Road 71 (Mooresville Road). County Road 71 is a two-lane paved road that provides direct access into the town of Ardmore, located approximately 3.2 miles northeast of the project site. County Road 84 provides access west to the town of Elkmont, approximately 6 miles southwest of the project site. Interstate 65 (I-65) extends north-south approximately 1.2 miles west of the project site. The nearest I-65 exit is at County Road 84, approximately 1.2 miles west of the project site. The construction entrance on the eastern boundary of the project site is accessed by Watson Lane, which leads to County Road 97 (Oak Grove Road). No public roads are present within the project site. Gravel and dirt roads on site provide vehicular access to the agricultural field in the southern portion of the project site and wooded/timbered areas in the central and northern portions of the project site.

3.10.1.2 Traffic

Existing traffic volumes were determined using Average Annual Daily Traffic (AADT) counts measured at existing Alabama Department of Transportation (ALDOT) stations. Approximately 3 miles northeast of the project site, the 2015 AADT was 4,120 vehicles at the station along County Road 71 just east of its intersection with 1st Avenue West. Approximately 3.3 miles northeast of the project site in downtown Ardmore, the 2015 AADT was 4,930 vehicles at the station near the intersection of Ardmore Avenue and 4th Street. Approximately 2.8 miles northeast of the project site in downtown Ardmore, the 2015 AADT was 4,060 vehicles at the station on Ardmore Avenue just south of its intersection with 7th Street. Approximately 2.25 miles to the north of the project site, the 2015 AADT was 4,740 vehicles at the station on 7th Street, just east of its intersection with Hobbs Loop (ALDOT 2017). The county and state roads around the project site support levels of traffic relatively typical for rural Alabama (ALDOT 2017).

3.10.1.3 Rail and Air Traffic

The CSX Railroad passes northeast-southwest along the western boundary of the project site. The project site will be accessed via an existing TVA gravel road from County Road 71 to the south of the railroad. TVA would convey a nonexclusive access easement to SRC along the access road.

The closest major airport is the Huntsville International Airport, in Huntsville, Alabama approximately 20 miles southeast of the project area. The closest regional airport is the Ardmore

Airport (1M3), which is a public-use, privately-owned grass-runway airport located approximately 1.75 miles northwest of the project site.

3.10.2 Environmental Consequences

This section describes the potential impacts to transportation resources should the Proposed Action be implemented.

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 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 at present.

3.10.2.2 Proposed Action Alternative

The construction and operation of the proposed solar facility would have no effect on operation of the airports in the region. Huntsville International Airport, the closest major airport, is located approximately 20 miles southeast of the project area. Ardmore Airport, the closest regional airport, is located approximately 1.75 miles northwest of the project site. There are several areas of trees between Ardmore Airport and the proposed solar facility. Also, there is a fringe of trees along the western boundary of the proposed solar facility that will remain in place. The distance between the major and regional airports and the proposed solar facility, coupled with the areas of trees between the airport(s) and 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 and would not adversely affect any crop dusters operating in the vicinity of the project area.

During construction of the proposed solar facility, an average crew of approximately 60 with a maximum of 80 workers would be present at the project site from approximately 7 am to 5 pm, 5 days a week, for approximately 6 months. A majority of these workers would likely come from the local or regional area (within a 50-mile radius). Approximately 40 percent of the workforce would be supervisory personnel that would mostly likely come from out-of-state and many would likely stay in local hotels in Ardmore and Athens. Workers would either drive their own vehicles or carpool to the project site. Parking would be on site during the day. Some of the work teams would likely visit local restaurants and businesses during working hours. Additional traffic due to deliveries and waste removal would consist of a maximum of approximately 10 vehicles per day during construction.

Traffic flow around the work site would, therefore, be heaviest at the beginning of the work day, at lunch, and at the end of the work day. Deliveries and most workers would access the project site from the west on County Road 71. No major industries are located along County Road 71 and a limited number of residences are present alongside the road in the vicinity of the project site. Cedar Hill Elementary School and Ardmore High School are located in Ardmore. Some traffic to Cedar Hill Elementary School may travel County Road 71 north to Sweet Springs Road, which leads east to Gatlin Road, which leads north to Cedar Hill Road. The majority of traffic to the

school is likely from Ardmore Avenue, to the west of the school, and Cedar Hill Road, which passes to the south of the school. Some traffic to Ardmore High School may travel County Road 71 north to County Road 97 (1st Avenue West), which leads to the school. Though both schools are over 3 miles to the northeast of the project site, should traffic flow be a problem, SRC would consider staggered work shifts to space out the flow of traffic to and from the project site. SRC would also consider posting a flag person during the heavy commute periods to manage traffic flow and to prioritize access for local residents. Use of such mitigation measures would minimize potential adverse impacts to traffic and transportation to less than significant levels.

Construction equipment and material delivery would require up to approximately 10 semitractor trailer trucks or other large vehicles visiting each project site per day during the construction periods. The project site can both be accessed via routes which do not have load restrictions. These vehicles should be easily accommodated by existing roadways; therefore, only minor impacts to transportation resources in the local area would be anticipated as a result of construction vehicle activity.

Several on-site maintenance access roads would be maintained on the project site. Following construction, the gravel roads would be maintained to allow periodic access for site inspection and maintenance. They would be closed to through traffic.

Due to the project area's proximity to the town of Ardmore, possible minor traffic impacts along County Road 71 through the town of Ardmore could occur as workers could potentially commute from Ardmore. However, the proposed workforce would consist of a maximum of approximately 80 employees for only part of the construction period; therefore, the addition of these vehicles to the existing traffic on County Road 71 would be considered minor.

The solar facility is not manned during operation; however, maintenance is 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 the local roadways.

Overall, direct impacts to transportation resources associated with implementation of the Proposed Action would be anticipated to be minor and mitigated. The Proposed Action would not result in any indirect impacts to transportation.

3.11 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

This section describes an overview of existing socioeconomic conditions and environmental justice considerations within the project area and the potential impacts that would be associated with the Proposed Action and No Action Alternative. Components of socioeconomic resources that are analyzed include population and employment, while components of environmental justice that are analyzed include minority and low income population.

3.11.1 Affected Environment

The proposed project area is located in the northeastern corner of the county, approximately 14 miles northeast of the city of Athens, the county seat. The project area falls within the 2010

Census Tract (CT) 201.02 for socioeconomic resources (Figure 15) and Table 3.11-1 lists census, demographic, and economic data for the project area, Limestone County, and Alabama.

The 2010 U.S. Census Bureau (Census) total population is 648 in a 1-mile radius of the project site (USEPA 2017a), 82,782 for Limestone County, and 4,779,736 for the state (USCB 2010). Minorities make up 6 percent within a 1-mile radius (USEPA 2017a), and 7.9 percent of CT 201.2, 13.3 percent of the county, and 31.4 percent of the state population based on the 2011 to 2015 Census American Community Survey (USCB ACS 2017). The proportion of the population classified as living below the poverty level in 2015 was 14.7 percent for CT 201.2, 14.3 percent for the county, and 18.3 percent for the state (USCB ACS 2017). Estimated CT 201.2, county, and state per capita incomes based on 2015 inflation-adjusted dollars were $24,020, $25,569, and $24,091, respectively (USCB ACS 2017). Population trends and projections are presented in Table 3.11-1. Census and demographic data for the project area, Limestone County, and Alabama.

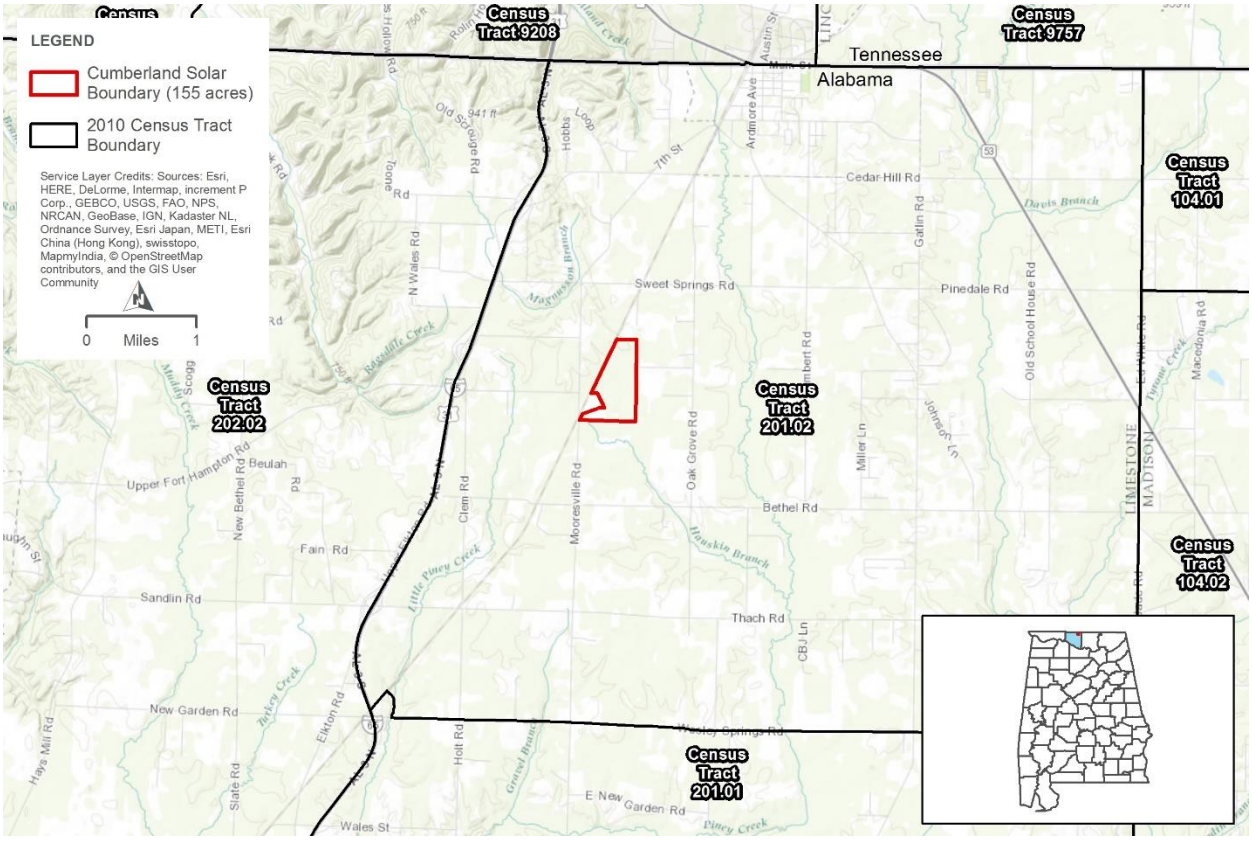


Figure 15. 2010 US Census tracts in Limestone County.

Table 3.11-1. Census and demographic data for the project area, Limestone County, and Alabama.

Census categories	Project Area	Limestone County	Alabama
Population 2010	648[a]	82,782	4,779,736
Population, 2016 estimate	--	92,753	4,863,300
Population, percent change, 2010-2016	--	12.04	1.74
Total Employment, June 2016	--	22,139	142,717,157
Unemployment Rate, annual 2016 average (%)	--	5.3	4.9
Minority population, 2015 (%)	7.9[b]	13.3	31.4
Hispanic population, 2015 (%)	0.6[b]	6.1	4.2
Median household annual income, 2011-2015	$44,988[b]	$49,570	$43,623
Per capita annual income, 2011-2015	$24,020[b]	$25,569	$24,091
Persons below poverty (%), 2015	14.7[b]	14.3	18.5

[a]Within 1-mile radius of project area

[b]For CT201.02

Sources: USCB 2010, USCB 2017, USCB ACS 2017, USDL 2016

EO 12898 (59 FR 7629) directs federal agencies to identify and address, as appropriate, potential disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. Although TVA is not subject to this EO, its policy is to consider environmental justice in its environmental reviews. This section provides demographic information that characterizes the distribution of minority populations and low-income populations in the project area.

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

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

According to CEQ guidance, US Census data are typically used to determine minority and low-income population percentages in the affected area of a project in order to conduct a quantitative assessment of potential environmental justice impacts. The project area that would be affected by the Proposed Action is located in the northeast part of Limestone County, near the town of Ardmore. CT 201.2, Block Group 4 which contains the proposed Project are identified as the impact area for environmental justice.

3.11.2 Environmental Consequences

This section describes the potential impacts on socioeconomic resources or to low-income or minority populations in the project area should the Proposed Action or No Action Alternative be implemented.

3.11.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed; therefore, no short-term beneficial socioeconomic impacts or no disproportionately high and adverse direct or indirect impacts on minority or low-income populations from the proposed project would occur. Existing land use would be expected to remain a mix of farmland and unused land and existing socioeconomic conditions and environmental justice considerations would be expected to remain as they are at present.

3.11.2.2 Proposed Action Alternative

Under the Proposed Action, a new solar facility would be built in the project area. Construction activities at the project site would take approximately 6 months to complete with a maximum crew of 80 workers at the site during the peak of construction. Workers would include a mix of general laborers, electrical technicians, and journeyman-level electricians. Work would generally occur 5 days a week from 7 am to 5 pm. Short-term beneficial economic impacts would result from construction activities associated with the project, including the purchase of materials, equipment, and services and a temporary increase in employment and income. This increase would be local or regional, depending on where the goods, services, and workers were obtained. It is likely some construction materials and services would be purchased locally in the Limestone County area, as well as in adjacent counties. Also, approximately 60 percent of the construction workforce would likely be from local or regional sources within a 50-mile radius of the project site. Approximately 40 percent of the workforce would be supervisory personnel that would mostly likely come from out-of-state. The direct impact to the economy associated with construction would be short-term and beneficial.

The majority of the indirect employment and income impacts would be from expenditure of the wages earned by the workforce involved in construction activities, as well as the local workforce used to provide materials and services. Construction of the proposed facility could have minor beneficial indirect impacts to population and short-term employment and income levels in Limestone County and the nearby town of Ardmore and city of Athens. During operation of the solar facility, a temporary workforce of six to eight employees would be on site for mowing the site on a quarterly basis. One to two people would also be on site during biannual inspections of the solar facility. Grounds maintenance and some other operation and maintenance activities

would be conducted by local contractors. The facility would not receive a tax abatement, thus increases in property and business tax payments would be expected, but minor. Therefore, operations of the solar facility would have a small positive impact on employment in Limestone County. Overall, socioeconomic impacts for the operation of the proposed solar facility would be positive and long-term, although small relative to the total economy of the region

The proportion of minority and low income populations near the proposed solar facility is similar or less than the proportions for the county and state. The per capita income within the project site's CT is slightly less than the county and the state. The overall impacts of the solar facility, most of which would occur during the short construction period, would be minor and 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 resulting from the Proposed Action.

CHAPTER 4

4.0 CUMULATIVE IMPACTS

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

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

- Local and regional news sources
- Town of Ardmore website
- City of Athens government website records, including city council meeting agendas and meeting minutes and public notices
- Limestone County website
- Limestone County Chamber of Commerce website
- Limestone County Economic Development Association website
- TVA website
- ALDOT website

Most major developments in the vicinity of the project site occur in Huntsville, located approximately 20 miles to the southwest. The proposed Project would result in minor direct impacts to land use, water resources, geological resources and farmlands, visual resources, noise, and air quality. The cumulative impact of the effects of the Proposed Action when added to ongoing and future actions in the general area surrounding the project would be insignificant.

4.1 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

The Proposed Action could cause some unavoidable adverse environmental effects. Specifically, construction activities would temporarily increase noise and traffic as well as impact the aesthetics of the general area. Construction activities would be limited to daytime hours during the work week, which would help minimize noise impacts. With the application of appropriate BMPs, few unavoidable adverse effects are expected to groundwater and surface waters. There are no unavoidable adverse environmental impacts to federally listed species as any tree clearing would occur between October 15 and March 31.

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

Short-term uses are those that generally occur on a year-to-year basis. Examples are wildlife use of forage, timber management, recreation, and uses of water resources. Long-term productivity is the capability of the land to provide resources, both market and nonmarket, for future generations. In this context, long-term impacts to site productivity would be those that last beyond the life of the project. The Proposed Action would affect short-term uses of the project site by converting it from agricultural, timbered, and undeveloped forested land to solar power generation. The effects on long-term productivity would be minimal as agricultural production and forested land could be readily restored on all but a very small portion of the solar facility site following the decommissioning and removal of the solar facility.

4.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

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

4.4 FEDERAL PROJECTS

No federally funded projects are in the vicinity of the project site with the potential to contribute to cumulative impacts associated with the Proposed Action.

4.5 STATE AND LOCAL PROJECTS

No state or locally funded projects are in the vicinity of the project site with the potential to contribute to cumulative impacts associated with the Proposed Action.

CHAPTER 5

5.0 LIST OF PREPARERS

Table 4.5-1 summarizes the expertise and contribution made to the EA by the Project Team.

Table 4.5-1. Environmental Assessment project team

Name/Education	Experience	Project role
TVA		
Elizabeth B. Hamrick M.S., Geography; Minor, Ecology	4 years in biological surveys and environmental compliance	Wildlife; threatened and endangered terrestrial animals
Michaelyn Harle Ph.D., Anthropology; M.A. Anthropology; B.A. Anthropology	15 years in cultural resource management	Cultural resources, NHPA Section 106 compliance
Britta P. Lees M.S., Botany-Wetlands Ecology Emphasis; B.A., Biology	14 years in wetlands assessments, botanical surveys, wetlands regulations, and/or NEPA compliance	Wetlands
Ashley A. Pilakowski B.S., Environmental Management NEPA Specialist	6 years in environmental planning and policy and NEPA compliance	NEPA compliance and document preparation
Dana M. Vaughn Program Manager Environmental Support	12 years in natural resources and environmental compliance	Environmental resources coordination, document preparation
HDR		
Thomas Blackwell, PWS B.A. Natural Science (Geography); M.S., Environmental Resource Management	12 years in stream and wetland delineations and restoration design, permitting, NEPA documentation, and project management	Project Manager, EA document contributor and QA/QC, project coordination, jurisdictional delineation
Benjamin Burdette, EIT M.S., Environmental Engineering	Over 2 years in NEPA coordination and document preparation at the EIS level	Environmental Planner, document preparation, GIS mapping, field work

Name/Education	Experience	Project role
Josh Fletcher, RPA B.S., Architectural Design; M.A., Anthropology (Archaeology)	20 years in cultural resources management, regulatory compliance, NEPA documentation, and project management	Environmental Planner, document preparation
Jason McMaster, PWS B.S., Business Administration; M.S., Environmental Science; M.A., Biology	10 years in combined regulatory compliance, preparation of environmental review documents, and project management	Environmental Scientist, field work
Renee Mulholland B.S., Marine Science; Masters of Earth and Environmental Resource Management (MEERM)	12 years in regulatory compliance, permitting, and NEPA documentation and project management	Environmental Planner, document QA/QC
Charles P. Nicholson Ph.D., Ecology and Evolutionary Biology; M.S., Wildlife Management; B.S., Wildlife and Fisheries Science	36 years in zoology, endangered species studies, and NEPA compliance	NEPA Compliance, document QA/QC
Kelly Thames, PWS B.A., Environmental Science; M.S., Plant Biology	6 years in combined regulatory compliance, preparation of environmental review documents, and project management	Environmental Scientist, Document preparation, GIS mapping, field work
Blair Goodman Wade, ENV SP B.S., M.E.M.	13 years in regulatory compliance, NEPA documentation, and mitigation planning	Sr. Environmental Planner, Document preparation

CHAPTER 6

6.0 REFERENCES

Alabama Department of Conservation and Natural Resources (ADCNR). 2014a. Nongame Vertebrates Protected by Alabama Regulations: 220-2-92 Nongame Species Regulation. Accessed on June 6, 2017 at http://www.outdooralabama.com/nongame-vertebrates-protected-alabama-regulations

_____. 2014b. ADCNR Wildlife Management Programs – Alabama Nuisance Animal Control. Bats: Overview of Damage Prevention and Control Methods. Accessed on December 13, 2017 at http://www.outdooralabama.com/sites/default/files/images/file/NuisanceAnimals/Bats_Final.pdf

Alabama Department of Environmental Management (ADEM). 2016. State of Alabama Ambient Air Monitoring. 2016 Consolidated Network Review. Accessed on June 5, 2017 at http://www.adem.state.al.us/programs/air/airquality/2016AmbientAirPlan.pdf

Alabama Department of Transportation (ALDOT) Website. 2017. Alabama Traffic Data. Accessed June 28, 2017 at https://aldotgis.dot.state.al.us/atd/default.aspx

Alabama Natural Heritage Program State Status Code Definitions. Accessed May 26, 2017 at http://www.alnhp.org/state_status.php

Alabama Wildlife and Freshwater Fisheries (AWFF). 2016-2017. Alabama Regulations: Game, Fish, Furbeareres, and other Wildlife. Division of Wildlife and Freshwater Fisheries, Montgomery Office. 64 N. Union Street, Suite 567, Montgomery, Alabama. Accessed June 6, 2017 at http://www.outdooralabama.com/sites/default/files/2016-2017%20REG%20BOOK%20FINAL%20COPY.pdf

Birnbaum, Charles A. 1996. *Protecting Cultural Landscapes: Planning, Treatment and Management of Historic Landscapes*. Preservation Briefs 36. U.S. Department of the Interior, National Park Service, Cultural Resources. Washington, D.C.

Cornell Lab of Ornithology. 2015. All About Birds: Bewick's Wren. Accessed on June 9, 2017 at https://www.allaboutbirds.org/guide/Bewicks_Wren/id

Cowardin, L.M., Carter, V., Golet, F.C., and LaRoe, E.T. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish and Wildlife Service, Washington, D.C.Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss. Technical Report Y-87-1. 207 p.

Federal Emergency Management Act (FEMA) FEMA Flood Map Service Center.2009. FEMA Flood Map Service Center. Accessed on June 6, 2017 at https://msc.fema.gov/portal/

_____. 2015. Executive Order 119988: Floodplain Management. Accessed on June 6, 2017 at https://www.fema.gov/executive-order-11988-floodplain-management

Futch, Jana. 2017. *Phase I Cultural Resources Survey of the 162-Acre Hampton Solar Tract, Limestone County, Alabama*. Prepared by Brockington and Associates, Inc., Norcross, Georgia for HDR Engineering, Charlotte, North Carolina on behalf of Silicon Ranch Corporation Nashville, Tennessee.

Flora of North America (FNA). 2016. Silphium mohrii (Shaggy rosinweed). FNA Vol. 21, Page 78; published online on June 30, 2006. Accessed on November 15, 2017 at http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250067528

Geological Survey of Alabama (GSA). 2010. Sinkholes in Alabama. Accessed on June 1, 2017 at: http://gsa.state.al.us/gsa/geologichazards/Sinkholes_AL.htm

_____. 2014. Earthquake epicenters in Alabama (12-2014). Accessed on June 1, 2017 at: http://gsa.state.al.us/gsa/geologichazards/Data_Maps.htm

Griffith, G.E., Omernik, J.M., Comstock, J.A., Lawrence, S., Martin, G., Godard, A., Hulcher, V.J., and Foster, T. 2001. Ecoregions of Alabama and Georgia, (color poster with map, descriptive text, summary tables, and photographs): U.S. Geological Survey, Reston, Virginia. Map scale 1:1,700,000.

Haggerty, T.M. and J.T. Garner. 2008. Distribution of the Armored Snail (Marstonia pachyta) and Slender Campeloma (Campelmoa decampi) in Limestone, Piney, and Round Island Creeks, Alabama. Southeastern Naturalist 7(4): 729-736. (http://www.buildingthepride.com/faculty/tmhaggerty/023%20635%20Haggerty%208.pdf)

International Union for Conservation of Nature and Natural Resources (IUCN). 2015. Notropis photogenis (Silver Shiner). Accessed on November 15, 2017 at http://www.iucnredlist.org/details/202318/0

_____. 2013a. Notropis micropteryx (Highland Shiner). Accessed on November 15, 2017 at http://www.iucnredlist.org/details/202312/0

_____. 2013b. Percina evides (Gilt Darter). Accessed on November 15, 2017 at http://www.iucnredlist.org/details/202577/0

Limestone County Website. Accessed on May 31, 2017 at https://limestonecounty-al.gov/doing-business/faqs/

Martin, W.H., Boyce, S.G., and Echternacht, A.C. 1993. *Biodiversity of the Southeastern United States, Upland Terrestrial Communities*. Sponsored by the Southeastern Chapter of the Ecological Society of America.

National Land Cover Database (NLCD). 2011. Multi-Resolution Land Characteristics Consortium (MRLC). Accessed on June 19, 2017 at http://www.mrlc.gov/nlcd11data.php

National Park Service. 2012. Official map of the Trail of Tears. Electronic document, Accessed June 2017 at https://www.nps.gov/trte/planyourvisit/maps.htm

NatureServe Explorer. 2017a. *Dromus dromas*. Accessed on June 9, 2017 at http://explorer.natureserve.org

_____.2017b. *Athearnia anthonyi*. Accessed on November 15, 2017 at http://explorer.natureserve.org

_____.2017c. *Lampsilis virescens*. Accessed on June 9, 2017 at http://explorer.natureserve.org

_____.2017d. *Lemiox rimosus.* Accessed on June 9, 2017 at http://explorer.natureserve.org

_____.2017e. *Quadrula intermedia*. Accessed on June 9, 2017 at http://explorer.natureserve.org

_____.2017f. *Percina shumardi*. Accessed on November 15, 2017 at http://explorer.natureserve.org

_____.2017g. *Percina tanasi*. Accessed on June 9, 2017 at http://explorer.natureserve.org

_____.2017h. *Pleurocera pyrenella*. Accessed on November 15, 2017 at http://explorer.natureserve.org

_____.2017i. *Marstonia pachyta*. Accessed on June 9, 2017 at http://explorer.natureserve.org

_____.2017j. *Cryptobranchus alleganiensis*. Accessed on June 9, 2017 at http://explorer.natureserve.org

_____.2017k. *Perimyotis subflavus.* Accessed on June 9, 2017 at http://explorer.natureserve.org

Parker, Patricia L. and Thomas F. King. 1998. (revised) *Guidelines for Evaluating and Documenting Traditional Cultural Properties.* National Register Bulletin 38. U.S. Department of the Interior, National Park Service, Cultural Resources. Washington, D.C.

Parmalee, P. W., and A. E. Bogan. 1998. The Freshwater Mussels of Tennessee. Univ. Tennessee Press, Knoxville.

Quarry, Sean and Hong T. Spores. 2016. *Phase I Environmental Site Assessment, Hampton Project, Ardmore, Limestone County, Alabama*. Prepared by HDR for Silicon Ranch Corporation.

Sutton, A. and M. Sutton. 1985. Eastern Forests: A comprehensive field guide, fully illustrated with color photographs, to the trees, wildflowers, birds, mammals, and insets of North America's forests and woodlands, from Hudson Bay to Florida. Sponsored by the Audubon Society Nature Guides.

Tennessee Department of Environment and Conservation (TDEC) Division of Water Pollution Control: Watershed Management Section. 2003. Wheeler Lake Watershed (0603002) of the Tennessee River Basin, Watershed Water Quality Management Plan.

Tennessee Valley Authority (TVA). 1983. Procedures for Compliance with the National Environmental Policy Act. Available at https://www.tva.com/file_source/TVA/Site%20Content/Environment/Environmental%20Stewardship/Environmental%20Reviews/tvanepa_procedures.pdf.

_____.2011. Final Integrated Resource Plan, TVA's Environmental & Energy Future. TVA, Chattanooga, Tennessee.

_____.2015. Integrated Resource Plan. Final Supplemental Environmental Impact Statement. Accessed May 26, 2017 at https://www.tva.com/Environment/Environmental-Stewardship/Integrated-Resource-Plan

Tennessee Valley Authority (TVA) Heritage Database. 2017. Data extracted May 26, 2017. USFWS IPaC data, accessed February 9, 2016: http://ecos.fws.gov/ipac

US Census Bureau (USCB), American Community Survey (ACS). 2011-2015. Accessed on June 21, 2017 at https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

US Census Bureau (USCB), Population Division. 2010. 2010 Census Interactive Population Search. Accessed on June 21, 2017 at https://www.census.gov/2010census/popmap/ipmtext.php?fl=01:01001:01083

_____.2017. Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2016. Accessed on June 21, 2017 at https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

US Department of Agriculture (USDA)-Natural Resources Conservation Service (USDA-NRCS). 2012a. Census of Agriculture – Alabama. Accessed on June 2, 2017 at https://www.agcensus.usda.gov/Publications/2012/Full_Report/Census_by_State/Alabama/

_____.2012b. Census of Agriculture: State Profile of Alabama. Accessed on June 2, 2017 at https://www.agcensus.usda.gov/Publications/2012/Online_Resources/County_Profiles/Alabama/cp99001.pdf

_____.2012c. Census of Agriculture: County Profile of Limestone County, Alabama. Accessed June 2, 2017. (https://www.agcensus.usda.gov/Publications/2012/Online_Resources/County_Profiles/Alabama/cp01083.pdf)

_____.2016a. Web Soil Survey. Accessed on June 1, 2017 at http://websoilsurvey.nrcs.usda.gov/

_____. 2016b. Web Soil Survey. Accessed on June 1, 2017 at http://websoilsurvey.nrcs.usda.gov/

US Department of Labor (USDL) Bureau of Labor Statistics. 2016. Accessed on June 21, 2017 at https://www.bls.gov

US Department of Transportation (USDOT). 2015. "Construction Noise Handbook." Federal Highway Administration. Available at: https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/

US Environmental Protection Agency (USEPA). 1974. Information on Levels of Environmental Noise Requisite To Protect Public Health And Welfare With An Adequate Margin of Safety. March 1974. Prepared By the U.S. Environmental Protection Agency Office Of Noise Abatement And Control.

_____.1998. *Emission Factor Documentation for AP-42 Section 12.3.3. Unpaved Roads. Final Report.* Accessed on November 3, 2017 at https://www3.epa.gov/ttnchie1/ap42/ch13/bgdocs/b13s02-2.pdf

_____. 2011a. The 2011 National Emissions Inventory. Accessed on 01/14/2016 at: https://www.epa.gov/air-emissions-inventories/2011-national-emissions-inventory-nei-data.

_____.2014a. *The 2014 National Emissions Inventory for Criteria Air Pollutants*. Accessed on June 21, 2017 at: https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data

_____.2014b. *The 2014 National Emissions Inventory for Greenhouse Gases*. Accessed on June 21, 2017 at: https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data

_____.2015a. *Alabama Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants*. Accessed on June 5, 2017 at https://www3.epa.gov/airquality/greenbook/anayo_al.html

_____.2015b. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013. EPA 430-R-15-004. Accessed on June 20, 2017 at http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2015-Main-Text.pdf

_____.2017a. Environmental Justice Screening and Mapping Tool (EJScreen). Accessed June 22, 2017 at https://ejscreen.epa.gov/mapper/

_____.2017b. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015. EPA 430-P-17-001. Accessed on November 3, 2017 at http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2015-Main-Text.pdf

US Fish and Wildlife Service (USFWS). 1918. *The Migratory Bird Treaty Act of 1918*. Accessed on June 6, 2017 at https://www.fws.gov/laws/lawsdigest/migtrea.html

_____. 1997. Gray bat (*Myotis grisescens*) Fact Sheet. USFWS Ecological Services Field Offices-Midwest Region. September 19, 1997. (https://www.fws.gov/midwest/endangered/mammals/pdf/gray-bat.pdf)

_____.2005. 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition to Delist the Slackwater Darter and Initiation of a 5-Year Review. Federal Register 70(153) 46465-46467 (https://www.gpo.gov/fdsys/pkg/FR-2005-08-10/pdf/05-15720.pdf#page=1)

_____.2013. 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; Threatened Status for Spring Pygmy Sunfish, final rule. Federal Register 78(191) 60766-60783 (https://www.gpo.gov/fdsys/pkg/FR-2013-10-02/pdf/2013-23726.pdf)

_____. 2015. Threatened Species Status for the Northern Long-eared Bat with 4(d) Rule. April 2015. (https://www.gpo.gov/fdsys/pkg/FR-2015-04-02/pdf/2015-07069.pdf)

_____.2016. Information for Planning and Conservation (IPaC). Accessed on June 5, 2017 at http://ecos.fws.gov/ipac/

_____. 2017. Indiana Bat (*Myotis sodalis*) Fact Sheet. USFWS Ecological Services Field Offices-Midwest Region. October 23, 2017. (https://www.fws.gov/midwest/endangered/mammals/inba/pdf/inbafctsht.pdf)

US Forest Service (USFS). 1995. Descriptions of Ecoregions in the US. Accessed on June 5, 2017 at https://www.fs.fed.us/land/ecosysmgmt/colorimagemap/images/222.html

_____. 2017. Toadshade (*Trillium sessile*). Accessed on November 15, 2017 at https://www.fs.fed.us/wildflowers/plant-of-the-week/trillium_sessile.shtml

US Geological Survey (USGS).1990. *Ground Water Atlas of the United States: Segment 6 – Alabama, Florida, Georgia, and South Carolina.* Accessed on June 1, 2017 at https://pubs.usgs.gov/ha/730g/report.pdf

_____.1995. *Ground Water Atlas of the United States: Segment 10 –Illinois, Indiana, Kentucky, Ohio, and Tennessee*. Accessed on June 1, 2017 at https://pubs.usgs.gov/ha/730k/report.pdf

_____.2005. *Alabama Water Use, 2005*. Accessed on June 2, 2017 at https://pubs.usgs.gov/fs/2009/3081/pdf/Alabama_2005_water_use_FS_508.pdf

_____.2017a. *National Hydrography Dataset*. Accessed on June 2, 2017 at http://nhd.usgs.gov/

_____.2017b. The National Map: Topographic Maps (1:24,000-scale) Quadrangles. Accessed June 2, 2017 at https://nationalmap.gov/ustopo/

Appendix A

USDA Farmland Conversion Impact Rating Form

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*		Date Of Land Evaluation Request 11/13/2017	
Name of Project Cumberland Solar		Federal Agency Involved NRCS	
Proposed Land Use Solar		County and State county and state	
PART II *(To be completed by NRCS)*		Date Request Received By NRCS	Person Completing Form: Jason McMaster
Does the site contain Prime, Unique, Statewide or Local Important Farmland? *(If no, the FPPA does not apply - do not complete additional parts of this form)*	YES ☐ NO ☐	Acres Irrigated	Average Farm Size 203
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %	Amount of Farmland As Defined in FPPA Acres: %	
Name of Land Evaluation System Used	Name of State or Local Site Assessment System	Date Land Evaluation Returned by NRCS	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	140			
B. Total Acres To Be Converted Indirectly	0			
C. Total Acres In Site	140			
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	118			
B. Total Acres Statewide Important or Local Important Farmland	1.8			
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted	0			
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value	0			
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)	72			

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)*	**Maximum Points**	Site A	Site B	Site C	Site D
1. Area In Non-urban Use	(15)	15			
2. Perimeter In Non-urban Use	(10)	9			
3. Percent Of Site Being Farmed	(20)	2			
4. Protection Provided By State and Local Government	(20)	0			
5. Distance From Urban Built-up Area	(15)	15			
6. Distance To Urban Support Services	(15)	3			
7. Size Of Present Farm Unit Compared To Average	(10)	6			
8. Creation Of Non-farmable Farmland	(10)	10			
9. Availability Of Farm Support Services	(5)	4			
10. On-Farm Investments	(20)	1			
11. Effects Of Conversion On Farm Support Services	(10)	1			
12. Compatibility With Existing Agricultural Use	(10)	0			
TOTAL SITE ASSESSMENT POINTS	160	66	0	0	0
PART VII ***(To be completed by Federal Agency)***					
Relative Value Of Farmland *(From Part V)*	100	72	0	0	0
Total Site Assessment *(From Part VI above or local site assessment)*	160	66	0	0	0
TOTAL POINTS ***(Total of above 2 lines)***	260	138	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? YES ☐ NO ☑

Reason For Selection:

Name of Federal agency representative completing this form:	Date:

(See Instructions on reverse side) **Form AD-1006 (03-02)**

STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form. For Corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, http://fppa.nrcs.usda.gov/lesa/.

Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s)of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. (NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/ndISAPI.dll/oip_public/USA_map**,** or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.)

Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. (When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.

Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.

Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.

Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.

Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.

2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160.
Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \text{ X } 160 = 144 \text{ points for Site A}$$

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.

Appendix B

USACE Jurisdictional Determination Verification

DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
West Regulatory Field Office
2424 Danville Road, Suite N
Decatur, Alabama 35603
September 29, 2017

REPLY TO
ATTENTION OF:

Regulatory Division

Subject: File No. LRN-2017-00493; Silicon Ranch Corporation; Preliminary and Approved Jurisdictional Determinations; Abutting Wetlands of Unnamed Tributaries to Hauskin Branch, Tributaries of Tennessee River Mile 310.7R, Limestone County, Alabama

Silicon Ranch Corporation
Attn: Ms. Ali Weaver
150 3rd Avenue South, Suite 2000
Nashville, Tennessee 37201

Dear Ms. Weaver:

This letter is in regard to a report submitted on your behalf entitled "Hampton Solar Project, Preliminary Jurisdictional Determination Request, Limestone County, Alabama, July 27, 2017", which documented potential waters of the United States (WOUS) on a survey area of approximately 161 acres. The JD report associated with Hampton Solar Project, Elkmont, Limestone County, Alabama, indicated your preference for potential waters of the U.S. on the survey area to be reviewed as a preliminary jurisdictional determination (PJD). This project has been assigned File No. LRN-2017-00493, please refer to this number in any future correspondence.

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

a. Preliminary Jurisdictional Determination: Based on a field review of the survey area on July 11, 2017, six reaches of stream totaling 6,472 linear feet (6,130' intermittent and 342' perennial), 4.1 acres of wetlands, and one open water impoundment were documented within the survey area. This office has determined these features **may** be jurisdictional waters of the U.S. in accordance with 33 C.F.R. 331.2 and a PJD has been prepared. The PJD is non-binding, cannot be appealed and only provides a written indication that waters of the U.S, including wetlands, may be present on-site. For purposes of computation of impacts, compensatory mitigation requirements and other resource protection measures, a permit decision made on the

basis of a PJD will treat all waters that would be affected in any way by the permitted activity on the site as if they are jurisdictional waters of the U.S. This determination is only valid for the survey area shown on the attached map entitled "File No. LRN-2017-00493, Sheets 2-3", attached to this letter.

Enclosed with this letter are two copies of the PJD. If you agree with the findings of this PJD and understand your options regarding the same, please sign and date one copy of the form and return it to this office within 30 days of receipt of this letter. You should submit the signed copy to the following address:

U.S. Army Corps of Engineers
Nashville District
2424 Danville Road SW, Suite N
Decatur, Alabama 35603
Attn: Gary L. Davis

b. Approved Jurisdictional Determination: Also enclosed is an approved jurisdictional determination for aquatic resources identified as Pond 2, which was determined to be non-jurisdictional. The approved jurisdictional determination expires five years from the date of this letter unless specifically revalidated by this office. This approved jurisdictional determination is only valid for the footprint of Pond 2 as shown on the map labeled "LRN-2017-00493 Sheets 2-3".

If you object to this decision, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeals Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this decision you must submit a completed RFA form to the Great Lakes and Ohio River Division, Division Office at the following address:

LRD Appeals Officer
U.S. Army Corps of Engineers
Great Lakes and Ohio River Division
550 Main Street, Room 10032
Cincinnati, OH 45202-3222
TEL (513) 684-6212; FAX (513) 684-2460

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the date listed on the RFA form. **It is not necessary to submit an RFA form to the Division Office if you do not object to the decision in this letter.**

Please contact this office if you would like to schedule a pre-application meeting to further discuss alternatives for site development to assist you in avoiding and minimizing impacts to waters of the United States. If your development plan requires the discharge of material into waters of the U.S., a Department of the Army Permit would be required.

We appreciate your awareness of the USACE regulatory program. If you have any questions, please contact Mr. Gary L. Davis at gary.l.davis@usace.army.mil, the above address, or telephone (256) 350-5620.

Sincerely,

Timothy C. Wilder
Chief, West Branch
Regulatory Division
U.S. Army Corps of Engineers

Enclosures:

PJD Form (2 copies)
Approved Jurisdictional Determination
Drawings "LRN-2017-00493; Sheets 1-4"
NAP Fact Sheet
RFA Form

Electronic Copies Furnished:

Kelly Thames (HDR, Inc.)
Thomas Blackwell (HDR, Inc.)

ATTACHMENT

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR (PJD): September 29, 2017

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:

Silicon Ranch Corporation
Attn: Ms. Ali Weaver
150 3rd Avenue South, Suite 2000
Nashville, Tennessee 37201

C. DISTRICT OFFICE, FILE NAME, AND NUMBER:

Nashville District
Silicon Ranch Corporation
File No. LRN-2017-00493

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:

The project site includes 161 acres of land located in a rural setting approximately one mile northeast of the Moorseville and Bethel Road intersection in Limestone County, Alabama. The proposed project is a photovoltaic solar power generating facility that would likely tie into the existing Tennessee Valley Authority (TVA) substation located immediately adjacent to the project site. On July 11, 2017, Gary Davis and David Medina (Corps of Engineers representatives) met with Mr. Thomas Blackwell (HDR, Inc.), to conduct a Jurisdictional Determination (JD) site visit and wetland delineation verification. Upon arrival to the project site, it was discovered the previous owner had clear cut the property. The abutting wetlands and unnamed tributaries flow into Hauskin Branch Mile 2.7L, which flows into Piney Creek Mile 34.0R, which flows into Limestone Creek Mile 1.7R, which flows into the Tennessee River Mile 310.7R.

State: Alabama County: Limestone City: Elkmont
Center coordinates of site (lat/long in degree decimal format):
Lat. 34.949484° **N**, Long. -86.867765° **W**.

Universal Transverse Mercator:

Name of nearest waterbody: Hauskin Branch

Identify (estimate) amount of waters in the review area:

Non-wetland waters:
6,130 linear feet of Intermittent Stream
XXXX linear feet of Ephemeral Stream
342 linear feet of Perennial Stream

Wetlands: 4.1 acres

Open Waters 0.26 acres

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: 09/29/2017

☒ Field Determination. Date(s): 7/11/2017

Site number	Latitude	Longitude	Cowardin Class	Estimated amount of aquatic resource in review area	Class of aquatic resource
LRN-2017-00493 Stream A	34.945228	-86.87624	Riverine, Perennial	Length:342 lf Width: 6 lf Acres: 0.05	Section 404, Non-wetland
LRN-2017-00493 Stream B	34.949038	-86.871577	Riverine, Intermittent	Length: 1513 lf Width: 3 lf Acres: 0.10	Section 404, Non-wetland
LRN-2017-00493 Stream C	34.949189	-86.871	Riverine, Intermittent	Length: 264 lf Width: 3 lf Acres: 0.01	Section 404, Non-wetland
LRN-2017-00493 Stream D	34.948476	-86.867583	Riverine, Intermittent	Length: 707 lf Width: 3 lf Acres: 0.10	Section 404, Non-wetland
LRN-2017-00493 Stream E	34.95138	-86.877394	Riverine, Intermittent	Length: 2916 lf Width: 3 lf Acres: 0.20	Section 404, Non-wetland
LRN-2017-00493 Stream F	34.946936	-86.866587	Riverine, Intermittent	Length: 730 lf Width: 2 lf Acres: 0.03	Section 404, Non-wetland
LRN-2017-00493 Wetland A	34.948531	86.870932	Palustrine Emergent	0.14 acre	Section 404, Wetland
LRN-2017-00493 Wetland B	34.947272	86.870017	Palustrine Emergent	0.82 acre	Section 404, Wetland
LRN-2017-00493 Wetland C	34.94985	86.866967	Palustrine Emergent	0.24 acres	Section 404, Wetland
LRN-2017-00493 Wetland D	34.949874	86.865187	Palustrine Emergent	2.90 acre	Section 404, Wetland
LRN-2017-00493 Pond 1	34.951322	86.867651	Palustrine Open Water	0.26 acre	Section 404, Non-wetland

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following:

(1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters;

(2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions;

(3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization;

(4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary;

(5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable;

(6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and

(7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Reference report prepared and submitted by Thomas Blackwell, HDR, Inc., dated July 26, 2017.

☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant. Reference report prepared and submitted by Thomas Blackwell, HDR, Inc., dated July 26, 2017.

☒ Office concurs with data sheets/delineation report.

☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study:
Navigable water as listed in District Public Notice #86-23, dated 8 May 1986.
☐ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: Scale: 1:24000; Ardmore, AL. Reference report prepared and submitted by Thomas Blackwell, HDR, Inc., dated July 26, 2017.
☒ USDA Natural Resources Conservation Service Soil Survey.
Citation: Limestone County, AL; NRCS Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov. Reference report prepared and submitted by Thomas Blackwell, HDR, Inc., dated July 26, 2017.
☒ National wetlands inventory map(s). Cite name: USFWS NWI (2017). Reference report prepared and submitted by Thomas Blackwell, HDR, Inc., dated July 26, 2017.
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps:
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs:
☒ Aerial (Name & Date): USGS Imagery, dated 2017. Reference report prepared and submitted by Thomas Blackwell, HDR, Inc., dated July 26, 2017.
☒ Other (Name & Date): Photos taken during his site visits on February 26, 2016 and May 16, 2017. Reference report prepared and submitted by Thomas Blackwell, HDR, Inc., dated July 26, 2017. Digital Photos taken by Gary Davis, USACE, during site visit on July 11, 2017.
☐ Previous determination(s). File no. and date of response letter: .
☐ Other information (please specify):.

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

September 28, 2017

Timothy C. Wilder
Chief, West Branch
Regulatory Division
U.S. Army Corps of Engineers

Signature and date of
person requesting preliminary JD
(REQUIRED, unless obtaining
the signature is impracticable)

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 9/29/2017

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Nashville District; Silicon Ranch Corporation; File No. LRN-2017-00493

C. PROJECT LOCATION AND BACKGROUND INFORMATION: The project site includes 161 acres of land located in a rural setting approximately one mile northeast of the Moorseville and Bethel Road intersection in Limestone County, Alabama. The proposed project is a photovoltaic solar power generating facility that would likely tie into the existing Tennessee Valley Authority (TVA) substation located immediately adjacent to the project site. On July 11, 2017, Gary Davis and David Medina (Corps of Engineers representatives) met with Mr. Thomas Blackwell (HDR, Inc.), to conduct a Jurisdictional Determination (JD) site visit and wetland delineation verification. The previous owner had clear cut the property prior to the site visit. Abutting wetlands of unnamed tributaries of Hauskin Branch Mile 2.7L, which flows into Piney Creek Mile 34.0R, which flows into Limestone Creek Mile 1.7R, which flows into the Tennessee River Mile 310.7R.

State: Alabama County/parish/borough: Limestone City: Elkmont
Center coordinates of site (lat/long in degree decimal format): Lat. 34.949484° N, Long. -86.867765° W.
Universal Transverse Mercator:
Name of nearest waterbody: Hauskin Branch
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Limestone Creek
Name of watershed or Hydrologic Unit Code (HUC): 0603000208
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☒ Office (Desk) Determination. Date: 9/29/2017
☒ Field Determination. Date(s): 7/11/2017

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** *"navigable waters of the U.S."* within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** *"waters of the U.S."* within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or acres.
      Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Pick List**
      Elevation of established OHWM (if known): .

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).

2. **Non-regulated waters/wetlands (check if applicable):**[3]

☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **The review area is approximately 0.07 acre in size and includes a pond dominated by upland plants and has approximately 7 feet of freeboard. A review of the area determined the pond is not an impoundment located on waters of the U.S. and does not display any evidence or indicators that it is hydrologicallly connected to any jurisdictional feature or water would flow the pond into the adjacent stream. Based on information submitted by Mr. Thomas Blackwell, HDR, Inc., Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2, April 2012) and field visit, it has been determined the review area does not contain any waters of the U.S. that may be considered jurisdictional under Section 404 of the Clean Water Act as defined by 33 CFR Part 328.3(a).**

[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. **TNW**
   Identify TNW: .

   Summarize rationale supporting determination: .

2. **Wetland adjacent to TNW**
   Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. **Characteristics of non-TNWs that flow directly or indirectly into TNW**

   (i) **General Area Conditions:**
   Watershed size: Pick List
   Drainage area: Pick List
   Average annual rainfall: inches
   Average annual snowfall: inches

   (ii) **Physical Characteristics:**
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☐ Tributary flows through Pick List tributaries before entering TNW.

   Project waters are Pick List river miles from TNW.
   Project waters are Pick List river miles from RPW.
   Project waters are Pick List aerial (straight) miles from TNW.
   Project waters are Pick List aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain: .

   Identify flow route to TNW[5]: .
   Tributary stream order, if known: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is:
- ☐ Natural
- ☐ Artificial (man-made). Explain: .
- ☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
- Average width: feet
- Average depth: feet
- Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):
- ☐ Silts
- ☐ Sands
- ☐ Concrete
- ☐ Cobbles
- ☐ Gravel
- ☐ Muck
- ☐ Bedrock
- ☐ Vegetation. Type/% cover:
- ☐ Other. Explain: .

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:

Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: .
Other information on duration and volume: .

Surface flow is: **Pick List.** Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
- ☐ Dye (or other) test performed: .

Tributary has (check all that apply):
- ☐ Bed and banks
- ☐ OHWM[6] (check all indicators that apply):
  - ☐ clear, natural line impressed on the bank
  - ☐ changes in the character of soil
  - ☐ shelving
  - ☐ vegetation matted down, bent, or absent
  - ☐ leaf litter disturbed or washed away
  - ☐ sediment deposition
  - ☐ water staining
  - ☐ other (list):
  - ☐ the presence of litter and debris
  - ☐ destruction of terrestrial vegetation
  - ☐ the presence of wrack line
  - ☐ sediment sorting
  - ☐ scour
  - ☐ multiple observed or predicted flow events
  - ☐ abrupt change in plant community
- ☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
- ☒ High Tide Line indicated by:
  - ☐ oil or scum line along shore objects
  - ☐ fine shell or debris deposits (foreshore)
  - ☐ physical markings/characteristics
  - ☐ tidal gauges
  - ☐ other (list):
- ☒ Mean High Water Mark indicated by:
  - ☐ survey to available datum;
  - ☐ physical markings;
  - ☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: .
Identify specific pollutants, if known: .

---

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: Pick List. Explain: .

Surface flow is: Pick List

Characteristics: .

Subsurface flow: Pick List. Explain findings: .

- ☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are Pick List river miles from TNW.

Project waters are Pick List aerial (straight) miles from TNW.

Flow is from: Pick List.

Estimate approximate location of wetland as within the Pick List floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: Pick List

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
   - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   - ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   - ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   - ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   - ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ which are or could be used for industrial purposes by industries in interstate commerce.
- ☐ Interstate isolated waters. Explain: .
- ☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

---

[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☒ Other: (explain, if not covered above): **Uplands. See rationale provided in Section II (B)(2)..**

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

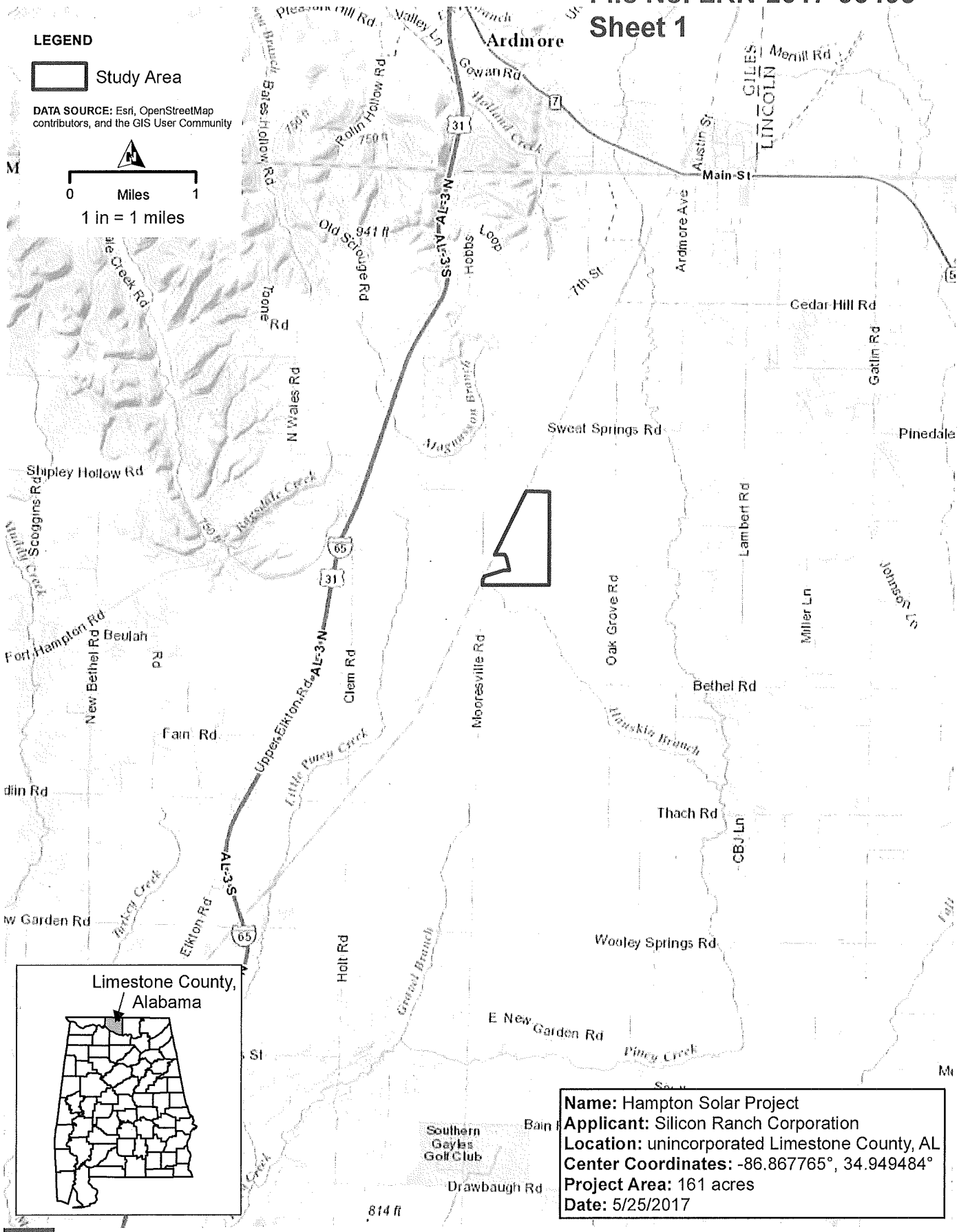
Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Reference report prepared and submitted by Thomas Blackwell, HDR, Inc., dated July 27, 2017.
☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study:Navigable water as listed in Nashville District Public Notice #86-23, dated 8 May 1986.
☐ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: 1:24000; Ardmore, AL.
☒ USDA Natural Resources Conservation Service Soil Survey. Citation: Limestone County, AL; NRCS Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov. Reference report prepared and submitted by Thomas Blackwell, HDR, Inc., dated July 27, 2017.
☒ National wetlands inventory map(s). Cite name: USFWS NWI (2017); Reference report prepared and submitted by Thomas Blackwell, HDR, Inc., dated July 27, 2017.
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☐ Aerial (Name & Date): .
or ☒ Other (Name & Date): Digital photos taken by Gary Davis on July 11, 2017 during the site visit.
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: POC Gary Davis, Decatur AL Field Office, 256-350-5620.

File No. LRN-2017-00493
Sheet 1



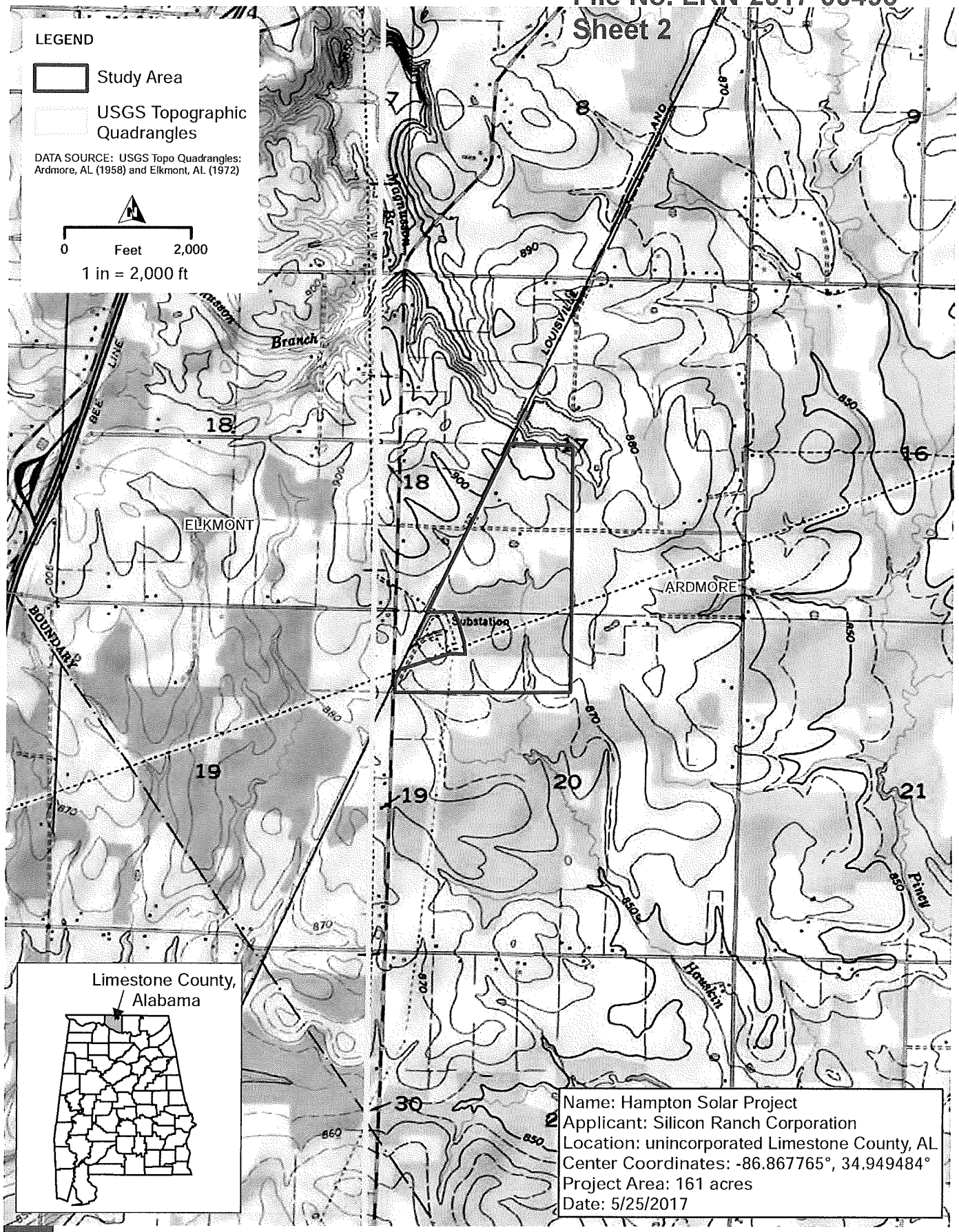
Name: Hampton Solar Project
Applicant: Silicon Ranch Corporation
Location: unincorporated Limestone County, AL
Center Coordinates: -86.867765°, 34.949484°
Project Area: 161 acres
Date: 5/25/2017

HDR SILICON RANCH

SITE LOCATION
HAMPTON SOLAR PROJECT

FIGURE 1

JURISDICTIONAL DETERMINATION REQUEST

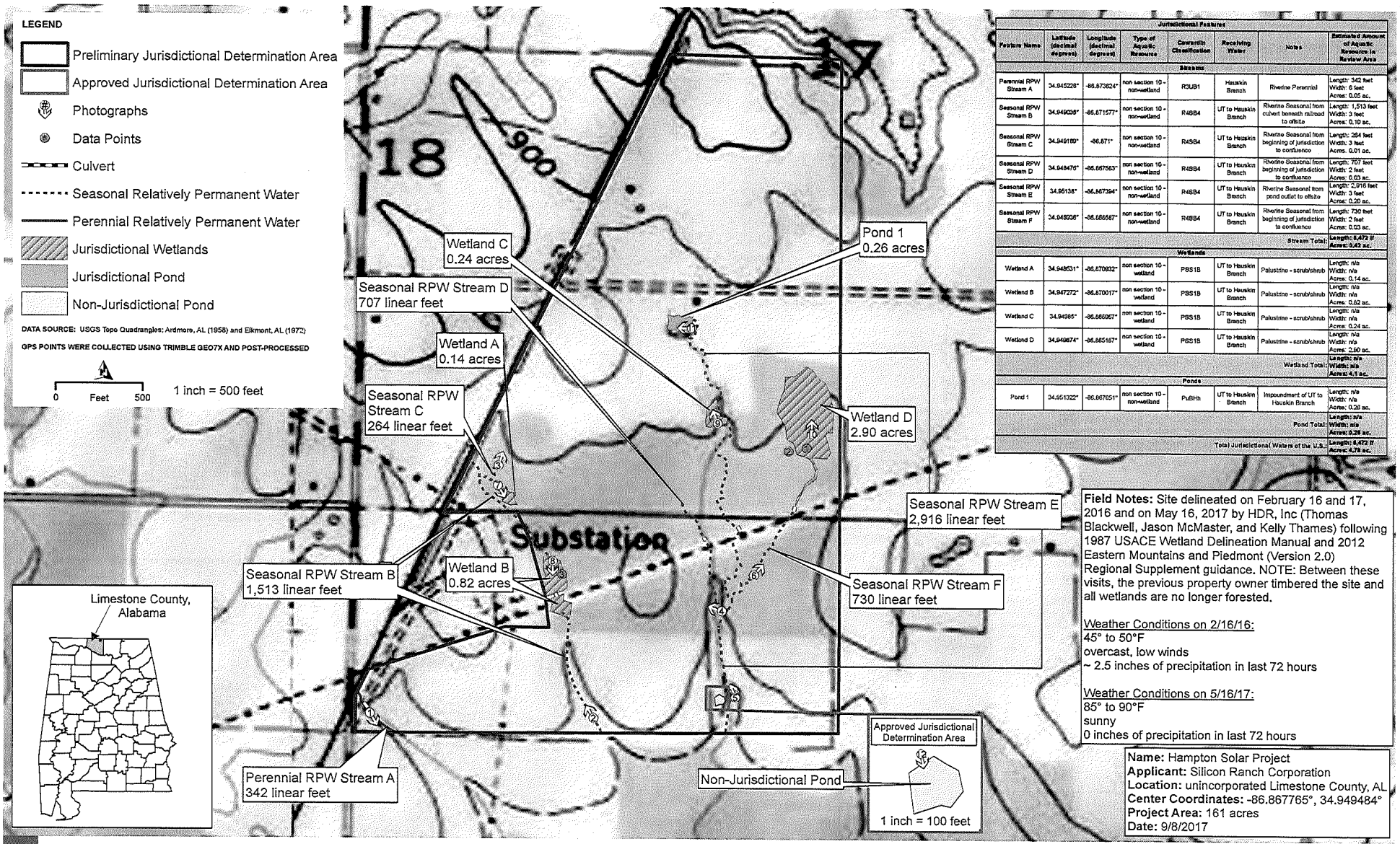


HDR SILICON RANCH

USGS TOPOGRAPHIC QUADRANGLES

HAMPTON SOLAR PROJECT

FIGURE 2



Jurisdictional Features							
Feature Name	Latitude (decimal degrees)	Longitude (decimal degrees)	Type of Aquatic Resource	Cowardin Classification	Receiving Water	Notes	Estimated Amount of Aquatic Resource in Review Area
Streams							
Perennial RPW Stream A	34.945228°	-86.873624°	non section 10 - non-wetland	R3UB1	Hauskin Branch	Riverine Perennial	Length: 342 feet Width: 6 feet Acres: 0.05 ac.
Seasonal RPW Stream B	34.949038°	-86.871577°	non section 10 - non-wetland	R4SB4	UT to Hauskin Branch	Riverine Seasonal from culvert beneath railroad to offsite	Length: 1,513 feet Width: 3 feet Acres: 0.10 ac.
Seasonal RPW Stream C	34.949189°	-86.871°	non section 10 - non-wetland	R4SB4	UT to Hauskin Branch	Riverine Seasonal from beginning of jurisdiction to confluence	Length: 264 feet Width: 3 feet Acres: 0.01 ac.
Seasonal RPW Stream D	34.948476°	-86.867563°	non section 10 - non-wetland	R4SB4	UT to Hauskin Branch	Riverine Seasonal from beginning of jurisdiction to confluence	Length: 707 feet Width: 2 feet Acres: 0.03 ac.
Seasonal RPW Stream E	34.95138°	-86.867394°	non section 10 - non-wetland	R4SB4	UT to Hauskin Branch	Riverine Seasonal from pond outlet to offsite	Length: 2,916 feet Width: 3 feet Acres: 0.20 ac.
Seasonal RPW Stream F	34.948036°	-86.865567°	non section 10 - non-wetland	R4SB4	UT to Hauskin Branch	Riverine Seasonal from beginning of jurisdiction to confluence	Length: 730 feet Width: 2 feet Acres: 0.03 ac.
						Stream Total:	Length: 5,472 ft Acres: 0.42 ac.
Wetlands							
Wetland A	34.948631°	-86.870932°	non section 10 - wetland	PSS1B	UT to Hauskin Branch	Palustrine - scrub/shrub	Length: n/a Width: n/a Acres: 0.14 ac.
Wetland B	34.947272°	-86.870017°	non section 10 - wetland	PSS1B	UT to Hauskin Branch	Palustrine - scrub/shrub	Length: n/a Width: n/a Acres: 0.82 ac.
Wetland C	34.94985°	-86.868967°	non section 10 - wetland	PSS1B	UT to Hauskin Branch	Palustrine - scrub/shrub	Length: n/a Width: n/a Acres: 0.24 ac.
Wetland D	34.949674°	-86.865167°	non section 10 - wetland	PSS1B	UT to Hauskin Branch	Palustrine - scrub/shrub	Length: n/a Width: n/a Acres: 2.90 ac.
						Wetland Total:	Length: n/a Width: n/a Acres: 4.1 ac.
Ponds							
Pond 1	34.951322°	-86.867651°	non section 10 - non-wetland	PuBHh	UT to Hauskin Branch	Impoundment of UT to Hauskin Branch	Length: n/a Width: n/a Acres: 0.26 ac.
						Pond Total:	Length: n/a Width: n/a Acres: 0.26 ac.
						Total Jurisdictional Waters of the U.S.:	Length: 5,472 ft Acres: 4.78 ac.

Field Notes: Site delineated on February 16 and 17, 2016 and on May 16, 2017 by HDR, Inc (Thomas Blackwell, Jason McMaster, and Kelly Thames) following 1987 USACE Wetland Delineation Manual and 2012 Eastern Mountains and Piedmont (Version 2.0) Regional Supplement guidance. NOTE: Between these visits, the previous property owner timbered the site and all wetlands are no longer forested.

Weather Conditions on 2/16/16:
45° to 50°F
overcast, low winds
~ 2.5 inches of precipitation in last 72 hours

Weather Conditions on 5/16/17:
85° to 90°F
sunny
0 inches of precipitation in last 72 hours

Name: Hampton Solar Project
Applicant: Silicon Ranch Corporation
Location: unincorporated Limestone County, AL
Center Coordinates: -86.867765°, 34.949484°
Project Area: 161 acres
Date: 9/8/2017

HDR SILICON RANCH

File No. LRN-2017-00493
Sheet 3

DELINEATED WATERS OF THE U.S ON USGS TOPOGRAPHIC QUADRANGLES
HAMPTON SOLAR PROJECT
FIGURE 7
JURISDICTIONAL DETERMINATION REQUEST

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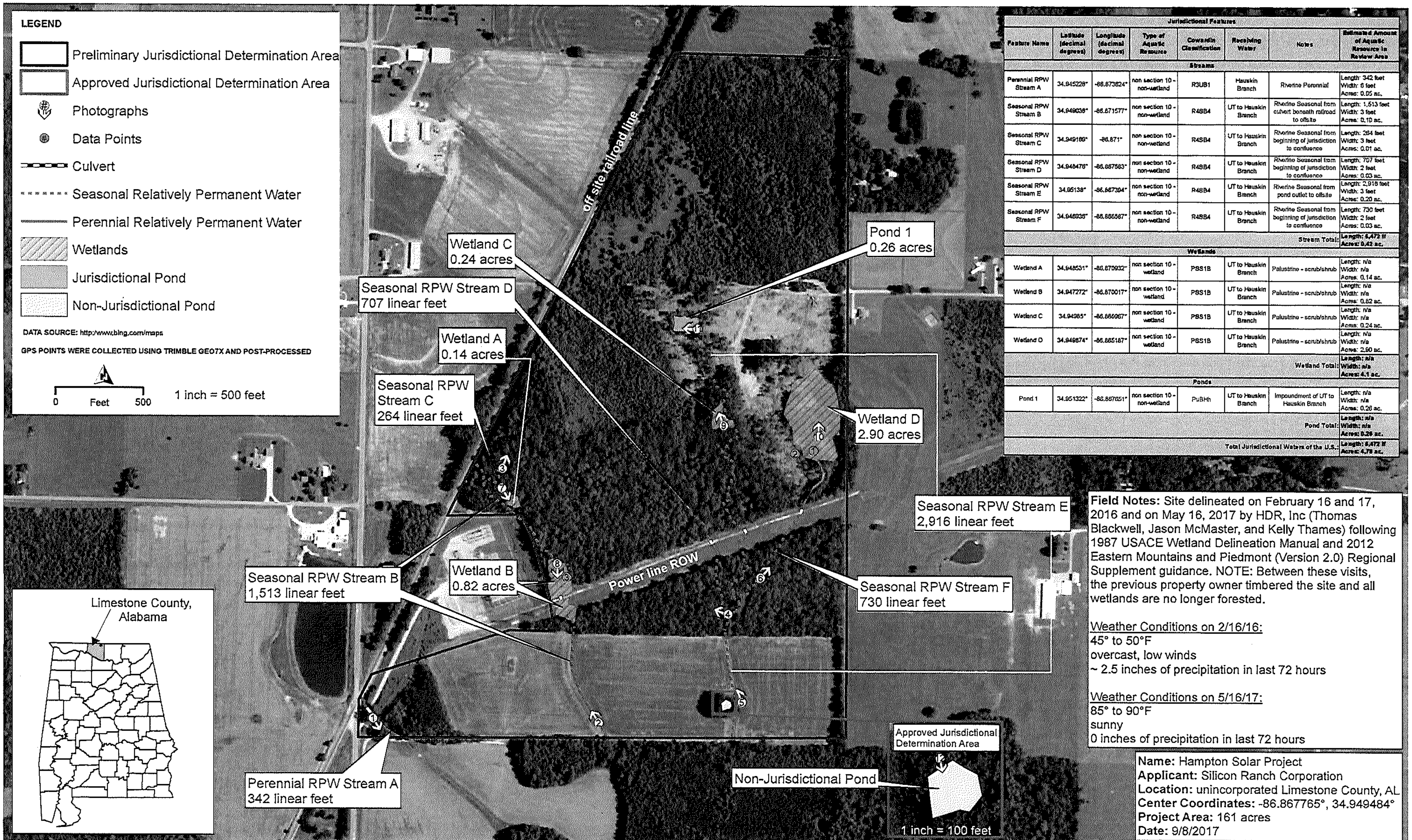

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Wetland D	34.949874°	-86.865187°	non section 10 - wetland	PSS1B	UT to Hauskin Branch	Palustrine - scrub/shrub	Length: n/a Width: n/a Acres: 2.90 ac.
						Wetland Total:	Length: n/a Width: n/a Acres: 4.1 ac.
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Applicant: Silicon Ranch Corporation
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Center Coordinates: -86.867765°, 34.949484°
Project Area: 161 acres
Date: 9/8/2017

HDR SILICON RANCH

File No. LRN-2017-00493
Sheet 4

DELINEATED WATERS OF THE U.S. ON AERIAL IMAGERY
HAMPTON SOLAR PROJECT
FIGURE 6

PATH: V:\PROJECTS\10532_SILICONRANCHCORPORATION\10028579_TO22HAMPTON\7.2_WORK_IN_PROGRESS\MAP_DOCS\MXD\JD\06_HAMPTON_JDAERIAL_11X17.MXD - USER: KTHAMES - DATE: 9/8/2017

JURISDICTIONAL DETERMINATION REQUEST

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Silicon Ranch Corporation	File Number: LRN-2017-00493	Date: 09/29/2017
Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of Permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of Permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
X	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/CECW/Pages/reg_materials.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:

U.S. Army Corps of Engineers
Western Regulatory Field Office
2424 Danville Road SW, Suite N
Decatur, AL 35603

If you only have questions regarding the appeal process you may also contact:

Appeals Officer
U.S. Army Corps of Engineers
Great Lakes and Ohio River Division
550 Main Street, Room 10032
Cincinnati, OH 45202-3222
TEL (513) 684-6212; FAX (513) 684-2460

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or agent.	Date:	Telephone number:

Appendix C

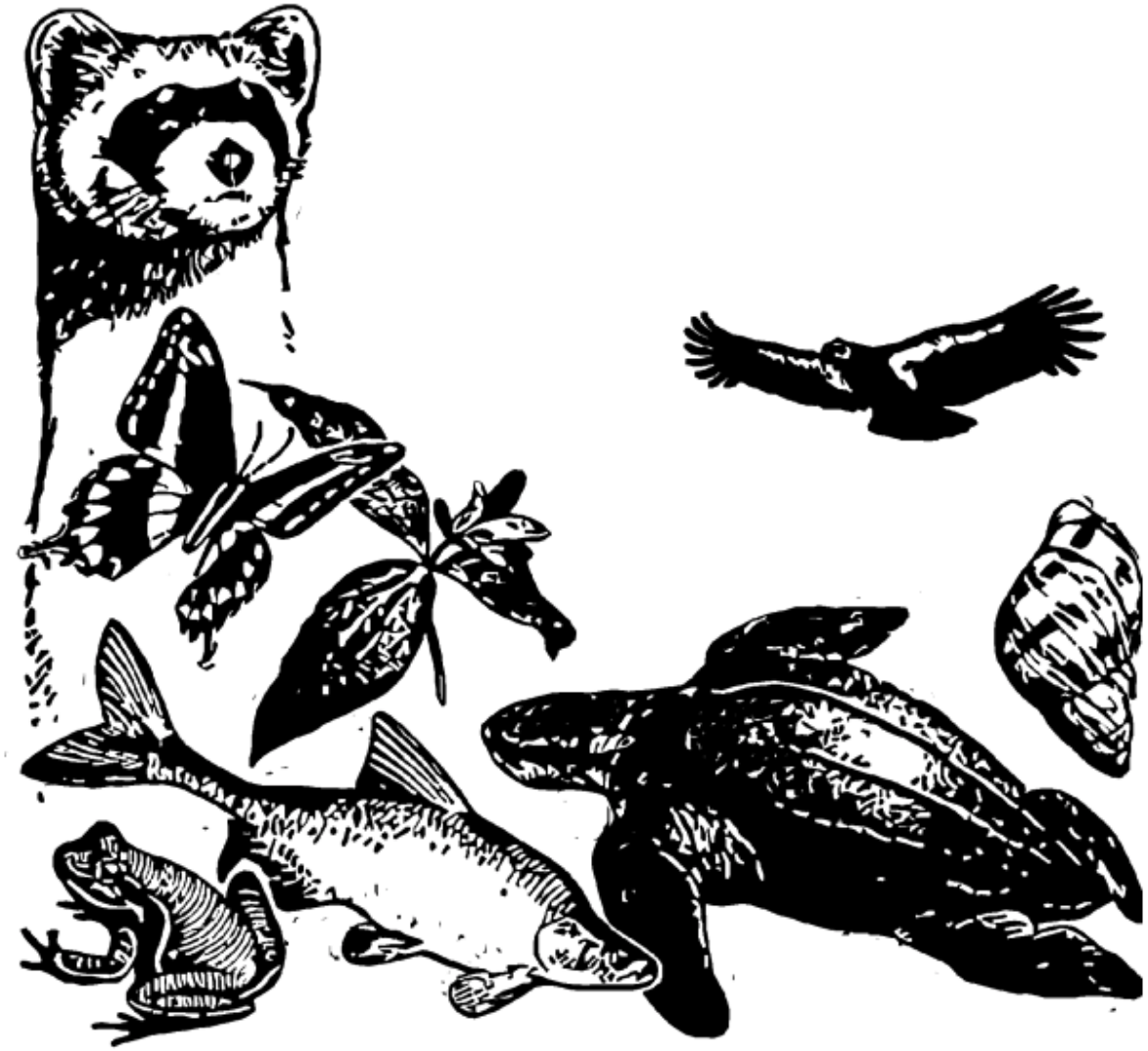
IPaC Trust Resources Report and USFWS Concurrence

SRC - Teichos

IPaC Trust Resource Report

Generated February 09, 2016 07:03 AM MST, IPaC v2.3.2

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

US Fish & Wildlife Service

IPaC Trust Resource Report

NAME

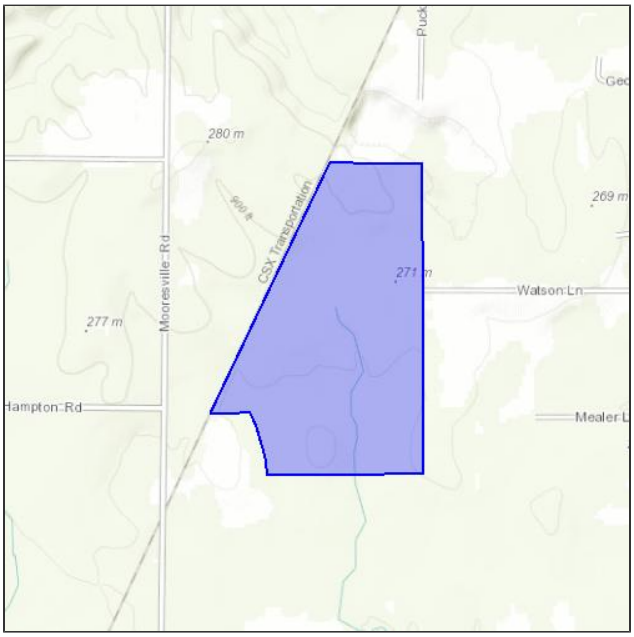
SRC - Teichos

LOCATION

Limestone County, Alabama

IPAC LINK

https://ecos.fws.gov/ipac/project/AZ56A-K66FN-AMRJC-FG6MN-A7GI6Q



U.S. Fish & Wildlife Contact Information

Trust resources in this location are managed by:

Alabama Ecological Services Field Office
1208 B Main Street
Daphne, AL 36526-4419
(251) 441-5181

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require FWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list from the Regulatory Documents section in IPaC.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Clams

Cracking Pearlymussel Hemistena lata — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=F01X

Fanshell Cyprogenia stegaria — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=F02H

Littlewing Pearlymussel Pegias fabula — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=F00L

Pink Mucket (pearlymussel) Lampsilis abrupta — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=F00G

Rough Pigtoe Pleurobema plenum — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=F00P

Sheepnose Mussel Plethobasus cyphyus — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=F046

Snuffbox Mussel Epioblasma triquetra — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=F03J

Spectaclecase (mussel) Cumberlandia monodonta — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=F00X

Fishes

Boulder Darter Etheostoma wapiti — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E05P

Slackwater Darter Etheostoma boschungi — Threatened

CRITICAL HABITAT
There is **final** critical habitat designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E01B

Spring Pygmy Sunfish Elassoma alabamae — Threatened

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E05B

Mammals

Gray Bat Myotis grisescens — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A04J

Indiana Bat Myotis sodalis — Endangered

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A000

Northern Long-eared Bat Myotis septentrionalis — Threatened

CRITICAL HABITAT
No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=A0JE

Snails

Anthony's Riversnail Athearnia anthonyi — Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=G016

Armored Snail Pyrgulopsis (=Marstonia) pachyta — Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=G03B

Slender Campeloma Campeloma decampi — Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=G098

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Any activity which results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service (1). There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/akn-histogram-tools.php

The following species of migratory birds could potentially be affected by activities in this location:

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Year-round
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Blue-winged Warbler Vermivora pinus — Bird of conservation concern
Season: Breeding

Chuck-will's-widow Caprimulgus carolinensis — Bird of conservation concern
Season: Breeding

Dickcissel Spiza americana — Bird of conservation concern
Season: Breeding

Fox Sparrow Passerella iliaca — Bird of conservation concern
Season: Wintering

Kentucky Warbler Oporornis formosus — Bird of conservation concern
Season: Breeding

Least Bittern Ixobrychus exilis — Bird of conservation concern
Season: Breeding

Loggerhead Shrike Lanius ludovicianus — Bird of conservation concern
Year-round
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FY

Prairie Warbler Dendroica discolor — Bird of conservation concern
Season: Breeding

Prothonotary Warbler Protonotaria citrea — Bird of conservation concern
Season: Breeding

Red-headed Woodpecker Melanerpes erythrocephalus — Bird of conservation concern
Year-round

Rusty Blackbird Euphagus carolinus — Bird of conservation concern
Season: Wintering

Sedge Wren Cistothorus platensis — Bird of conservation concern
Season: Migrating

Short-eared Owl Asio flammeus — Bird of conservation concern
Season: Wintering
https://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Wood Thrush Hylocichla mustelina — Bird of conservation concern
Season: Breeding

Worm Eating Warbler Helmitheros vermivorum — Bird of conservation concern
Season: Breeding

Refuges

Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuges in this location

Wetlands in the National Wetlands Inventory

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

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

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

Freshwater Pond

PUBHh 0.386 acre

A full description for each wetland code can be found at the National Wetlands Inventory website: http://107.20.228.18/decoders/wetlands.aspx

TA/KM
2016-TA-0517

MAY 10 2016

May 4, 2016

Project Lead
U.S. Fish and Wildlife Service
Alabama Ecological Services Field Office
1208 Main Street
Daphne, AL 36526

RE: Threatened and Endangered Spec
Silicon Ranch – Hampton Solar Fa
Limestone County, Alabama

U.S. Fish and Wildlife Service
1208-B – Daphne, Alabama 36526
Phone: 251-441-5181 Fax: 251-441-6222

Your project site contains suitable spring/summer habitat for the endangered Indiana bat and/or threatened northern long-eared bat. However, you have stated that tree removal will occur between October 15 and March 31; therefore, we concur that your proposed project is not likely to adversely affect the Indiana bat and/or northern long-eared bat. No other federally listed species/critical habitat are known to occur in the project area. IF PROJECT DESIGN CHANGES ARE MADE, PLEASE SUBMIT NEW PLANS FOR REVIEW. SITE MAY CONTAIN WETLANDS. Contact U.S. Army Corps of Engineers for a jurisdictional wetlands determination. We recommend the use of best management practices specific to your project (See http://www.fws.gov/daphne/section7/bmp.html).

William J. Pearson, Field Supervisor 5/25/2016 Date # 10

To Whom it May Concern:

In March 2016 HDR Inc. (HDR), prepared a Critical Issues Analysis (CIA) report on behalf of Silicon Ranch Corporation (SRC), for an approximately 161-acre site in Limestone County, Alabama. The purpose of the CIA was to evaluate the suitability of the site for development as a utility-scale photovoltaic (PV) solar generating facility. The proposed project would consist of the construction of a solar farm on a 161 acre parcel in an unincorporated area of Limestone County, Alabama (Figures 1–3, attached). The project is anticipated to generate approximately 15 to 20 megawatts (MW) alternating current (AC) of output power and would likely tie into the existing Tennessee Valley Authority (TVA) substation located immediately adjacent to the project site.

HDR's CIA primarily included a desktop evaluation of the environmental characteristics of the project site. HDR's desktop evaluation identified existing land use, infrastructure, soils, geologic resources, recreational and scenic resources, hydrologic resources, biological resources, and cultural resources within the project site and immediate vicinity. HDR collected and used all publicly available information through database research and Geographic Information System (GIS) mapping.

As part of the CIA, HDR also conducted a limited field review of the project site for potential habitat for federally threatened and endangered species. The field review was conducted on February 16 and 17, 2016. The results of the field review are provided below.

Existing Site Conditions

The project site is an undeveloped area consisting primarily of forest land with a smaller area of agricultural land in the south. The project site is bisected by a maintained transmission line corridor. Approximately 46 percent of the 161-acre project site currently exists as mixed hardwood/pine forests, 19 percent is agricultural land, 32 percent is an

early successional/old field community, and the remainder is located within a maintained transmission line corridor. Figures 4 and 5 illustrate the approximate boundaries of the various natural communities located on the site. Representative photographs of the site are attached.

The mixed pine hardwood forests contain slash pine (*Pinus elliottii*), loblolly pine (*Pinus taeda*), willow oak (*Quercus Phellos*), tulip poplar (*Liriodendron tulipifera*), sweetgum (*liquidambar styraciflua*) and water oak (*Quercus nigra*) in the canopy layer. The understory is composed primarily of red maple (*Acer rubrum*), sweetgum, Chinese privet (*Ligustrum sinense)* and sweetbay magnolia (*Magnolia virginiana*). The herbaceous stratum was very sparse due in part to the time of year; however, green briar (*Smilax rotundifolia*) and Japanese honeysuckle (*Lonicera japonica*) was observed.

The northern portion of the project site is a mix of old field and early successional forest. The early successional forest is dominated by red maple and sweetgum. Old field areas contain a mix of saplings and herbaceous species. Dominant species include blackberry (*Rubus sp.*), golden rod (*Solidago* sp.), and broomsedge (*Andropogon virginicus*).

A jurisdictional delineation of on-site Waters of the U.S. was also conducted. Figure 6 (attached) shows the location of streams and wetlands identified within the project site.

Federally Listed Species

"Listed" species are recognized by federal, state, or other agencies in an effort to protect them and their habitat under the federal Endangered Species Act (1973). These species are vulnerable to habitat loss and population decline because of their rarity. The analysis also considers species protected under the Bald and Golden Eagle Protection Act (BGEPA).

The U.S. Fish and Wildlife Service (USFWS) provides federally threatened and endangered species data at the county level for public use. Table 3 provides the USFWS list of endangered and threatened species that were listed on the Information for Planning and Conservation (IPaC) report for the project site.

Table 3 Federally listed/candidate species – USFWS IPaC site specific report

Species	Federal status	Likelihood of occurrence
Clams		
Cracking Pearlymussel *(Hemistena lata)*	Endangered	Unlikely; considered a large river mussel. Not expected outside of a large river system.
Fanshell *(Cyprogenia stegaria)*	Endangered	Unlikely; considered a large river mussel. Not expected outside of a large river system.
Littlewing pearlymussel *(Pegias fabula)*	Endangered	Unlikely; considered a large river mussel. Not expected outside of a large river system.
Pink mucket *(Lampsilis abrupta)*	Endangered	Unlikely; considered a large river mussel. Not expected outside of a large river system.
Rough pigtoe *(Pleurobema plenum)*	Endangered	Unlikely; considered a large river mussel. Not expected outside of a large river system.
Sheepnose mussel *(Plethobasus cyphyus)*	Endangered	Unlikely; considered a large river mussel. Not expected outside of a large river system.
Snuffbox mussel *(Epioblasma triquetra)*	Endangered	Unlikely; considered a large river mussel. Not expected outside of a large river system.
Spectaclecase *(Cumberlandia monodonta)*	Endangered	Unlikely; considered a large river mussel. Not expected outside of a large river system.

Species	Federal status	Likelihood of occurrence
Fishes		
Boulder darter *(Etheostoma wapiti)*	Endangered	Unlikely; habitat includes deep, rocky, flowing pools in rivers and large tributaries.
Slackwater darter *(Etheostoma boschungi)*	Threatened	Unlikely; only known populations are in tributaries not connected to Piney Creek River System.
Spring pygmy sunfish *(Elassoma alabamae)*	Threatened	Unlikely; requires dense submergent vegetation which does not exist within the project site
Mammals		
Gray bat *(Myotis grisescens)*	Endangered	Unlikely; no caves or sinkholes were observed within the project site.
Indiana bat *(Myotis sodalis)*	Endangered	Possible; Limestone County has large numbers of sinkholes and a possibility for caves along with trees of sufficient size for roosting.
Northern long-eared bat *(Myotis septentrionalis)*	Threatened	Possible; Limestone County has large numbers of sinkholes and a possibility for caves along with trees of sufficient size for roosting.
Snails		
Anthony's riversnail *(Atheamia anthonyi)*	Endangered	Unlikely; this species is located in Limestone Creek and is not connected to the Piney Creek River System.
Armored snail *(Pyrgulopsis pachyta)*	Endangered	Possible; habitat includes the Piney Creek River System which connects to the project site.
Slender Campeloma *(Campeloma decampi)*	Endangered	Possible; habitat includes the Piney Creek River System which connects to the project site.

3955 Faber Place Drive, Suite 300, North Charleston, SC 29405-8580
(843) 414-3700

Based on the site conditions observed during the field review, HDR believes that there is no suitable habitat within the project site, and therefore the proposed project would have no effect on the following species:

CRACKING PEARLYMUSSEL *(HEMISTENA LATA)* – T

This mussel is a large river mussel which is abundant in sand, gravel, and cobble substrates in swift currents or mud and sand in slower currents. The species has been reduced to possibly three reproducing populations in the Tennessee River System (NatureServe 2015a). Suitable habitat for this species does not exist within the project site. Therefore, the proposed project would have no effect on this species.

FANSHELL *(CYPROGENIA STEGARIA)* – E

This mussel is a large river mussel with a rounded shell exhibiting numerous pustules, elevated growth lines, and broken green rays. Habitat is medium to large streams and rivers with gravel substrates and a strong current (NatureServe 2015b). The water features in the project site do not share these characteristics and therefore, the proposed project would have no effect on this species.

LITTLEWING PEARLYMUSSEL *(PEGIAS FABULA)* – E

This is a small freshwater mussel which reaches an average length of 24 millimeters. Mature individuals typically have an eroded shell. This mollusk is commonly found at the head of or right below riffles on sand and gravel substrates, particularly between rocks, cobbles and boulders. Most commonly these mussels are found in medium rivers (NatureServe 2015c). Suitable habitat for this species does not exist within the project site; therefore, the proposed project would have no effect on this species.

PINK MUCKET *(LAMPSILIS ABRUPTA)* – E

This is a large river species associated with fast-flowing waters or slow-moving deep waters. Since the waters in the project site do not meet these characteristics no suitable habitat exists within the project site. The proposed project would have no effect on this species (NatureServe 2015d).

ROUGH PIGTOE *(PLEUROBEMA PLENUM)* – E

A relatively large, rounded freshwater mussel, the rough pigtoe is found in medium to large rivers at least 20 meters wide with a sand, gravel, or cobble substrate (NatureServe 2015e). No such waters or habitat exist in or near the project site; therefore, the proposed project would have no effect on this species.

SHEEPNOSE MUSSEL *(PLETHOBASUS CYPHYUS)* – E

The sheepnose mussel has an oblong shell which has a single row of bumps running from the umbo to the ventral margin. It can grow up to 12.7 centimeters in length and can be found in medium to large-sized rivers with slight to swift currents (NatureServe 2015f). Since there are no such waters or habitat in or near the project site, the proposed project would have no effect on this species.

SNUFFBOX MUSSEL *(EPIOBLASMA TRIQUETRA)* – E
A triangular-shaped mussel, the snuffbox mussel can be found in riffles of small to large rivers and wave-washed shores of lakes. This species would not be found on the project site due to the lack of any fast-moving current which would create riffle conditions or create wave action needed to suspend the algae or dissolved organic material needed to sustain a population (NatureServe 2015g). Therefore, the proposed project would have no effect on this species.

SPECTACLECASE *(CUMBERLANDIA MONODONTA)* – E
This is a large river mussel growing up to 20 centimeters in size. They require medium and large rivers such as the Missouri River. This species rarely moves with the exception of burrowing deeper into the substrate (NatureServe 2015h). No suitable habitat for this species exists within or adjacent to the project site. Therefore, the proposed project would have no effect on this species.

BOULDER DARTER (*ETHEOSTOMA WAPITI*) – E
This darter inhabits fast rocky riffles of small to medium rivers. Adults have been found only in areas of boulder/rubble substrate (natural or from broken mill dams and bridges), usually in water 0.6 to1.2 meters deep. Typical habitat is deep, rocky, flowing pools in rivers and lower portions of large tributaries. Juveniles have been collected from gravel riffles (NatureServe 2015f). Streams within the project site are small in size with poorly developed substrate consisting of silt and mud. No areas of boulder or rubble substrate were observed. Suitable habitat does not exist within the project site. Therefore, the proposed project would have no effect on this species.

SPRING PYGMY SUNFISH (*ELASSOMA ALABAMAE*) – T
The spring pygmy sunfish prefers patches of dense submergent vegetation for foraging, refuge from predators, and spawning. Suitable habitat does not exist within the project site. Therefore, the proposed project would have no effect on this species.

ANTHONY'S RIVERSNAIL *(ATHEAMIA ANTHONYI)* – E
This is a large freshwater snail which can be found in medium to large rivers or creeks located at the lower stretches of large rivers. Preferring fast-moving currents, the Anthony's river snail population identified in and around Limestone County is found primarily in Limestone Creek, which does not have connections to the project site (NatureServe 2015l). No fast-moving waters or large waterbodies that would provide suitable habitat are in the project site. Therefore, the proposed project would have no effect on this species.

BALD EAGLE (*HALIAEETUS LEUCOCEPHALUS*) – BGEPA
Adult bald eagles are large raptors with a distinctive white head and tail, dark brown body, and bright yellow bill and feet.Bald eagle nests are typically found within approximately ½ mile of open water. Coastal areas, bays, large river systems, and lakes provide adequate foraging opportunities for fish, waterfowl, and water birds. Preferred nesting habitat is usually found in large conifer trees with open limb structure (NatureServe 2015d). No open

water bodies are in the project site vicinity; therefore, the proposed project would have no effect on this species.

GRAY BAT *(MYOTIS GRISESCENS)* – E
The gray bat is a light brown to brown bat with long ears, typically growing up to 10 centimeters as an adult. Gray bat populations which breed in Florida migrate to hibernate in cooler caves of northern Alabama and central Tennessee starting in September through October. Roosting requires deep vertical caves with domed halls in the winter, while summer caves need warm air with restricted ceiling access. Foraging takes place parallel to streams or in forests. While sinkholes are present in Limestone County (Figure 7, attached), it is unknown if they meet the strict requirements for roosting. No caves or sinkholes were observed within the project site and there are no structures present on the site. Therefore, the proposed project would have no effect on this species.

Based on the site conditions observed during the field review of the site HDR believes that there may be suitable habitat within the project site for the following species:

SLACKWATER DARTER (*ETHEOSTOMA BOSCHUNGI*) – E
This darter is a migratory species and has two distinct, but adjacent habitats: nonbreeding and breeding. For most of the year they live in gravel-bottomed pools of creeks. In November they migrate approximately 3 to 6 kilometers to their breeding habitat. The breeding habitat is shallow water (5 to 10 centimeters deep), that originates in spring seeps, spring boils, or flooded fields that slowly run off into adjacent streams. The slackwater darter is known from only six tributary streams to the south bend of the Tennessee River. While there were some areas of shallow water adjacent to streams within the project site at the time of the field survey it is unclear how persistent these areas are since recent heavy rainfall had occurred. Furthermore, the project site does not drain to any of the tributary streams know to support, or have supported, populations of slackwater darter. Therefore, HDR believes that the proposed project is would not affect this species.

INDIANA BAT *(MYOTIS SODALIS)* – E
The Indiana bat is in decline due to the white-nose syndrome, which is a rapidly spreading fungal disease. Northern breeding populations migrate to limestone caves in several states including Alabama and can be found hibernating in these caves, particularly if there are any pools. Roosting bats outside of hibernation can be found in caves, mines, or in trees. Sink holes are located in Limestone County and there are large, loose barked trees within project site which could provide potential roosting sites. If this species is present, impacts can be minimized by clearing the project site during the winter when the Indiana bat is in hibernation deep within caves. By limiting tree cutting to the period from October to March, the proposed project would have no effect on this species.

NORTHERN LONG-EARED BAT *(MYOTIS SEPTENTRIONALIS)* – T

This species of bat is typically 9 centimeters in length with long ears. Currently the population is in a swift decline due to the white-nose syndrome, with populations decreasing up to 99 percent in caves where white-nose fungi are present. During the winter, these bats will typically hibernate in caves, mines, or tunnels with cool temperatures, high humidity, and no air currents. Foraging and roosting outside of hibernation takes place in and around forests. Dead or dying trees are central to the bat's social groups. While the project site contains trees which could be used as potential roosts, according to the USFWS Daphne Ecological Field Office website there are known hibernacula or known maternity roost trees in Limestone County. To mitigate impacts to the species, tree-clearing on the project site would be conducted during the winter months when the bat will be hibernating in cave systems. By following the requirements of the Final 4d Rule for Northern Long-Eared Bat, the proposed project would have no effect on this species

ARMORED SNAIL *(PYRGULOPSIS PACHYTA)* – E

The armored snail is a small snail, less than 4 millimeters in length typically found in submerged roots, leaves, and bryophytes along the edges. They prefer slow to moderate current and can only be found in two creeks, both of which are in Limestone County; these include the Piney Creek and Limestone Creek. The project site is connected hydrologically to Piney Creek; therefore, it is possible for the species to be adversely affected by the proposed project (USFWS 2016). However, no individual snails were observed during the site visit and all on-site streams are small first order channels with limited suitable habitat for this species. Potential for negative impacts on this species would be minimized through the preservation of wooded stream buffers, the use of appropriate sediment and erosion control measures during construction, and limiting the number of stream crossings necessary for access to the site.

SLENDER CAMPELOMA *(CAMPELOMA DECAMPI)* – E

A medium freshwater snail between 5 millimeters and 35 millimeters in length, it can typically be found burrowing in soft sediment or detritus in slow to moderate currents. The species can only be found in isolated segments of Limestone Creek, Piney Creek, and Round Island Creek systems. The project site is connected to Piney Creek; therefore it is possible for the species to be adversely affected by the proposed project. However, no individual snails were observed during the site visit and all on-site streams are small first order channels with limited suitable habitat for this species. Potential for negative impacts on this species would be minimized through the preservation of wooded stream buffers, the use of appropriate sediment and erosion control measures during construction, and limiting the number of stream crossings necessary for access to the site.

To avoid and minimize potential impacts to threatened and endangered species, SRC is proposing the following measures:

- In accordance with the Northern Long-Eared Bat 4d Rule, SRC would only perform tree removal during the winter months when the Indiana bat and northern long-eared bat would be hibernating in caves off site
- Tree removal would be minimized to the greatest extent practicable.
- On-site creeks would have a development buffer of 25 feet and appropriate sediment and erosion control measures would be put in place to ensure water quality is not degraded due to the project.

HDR is initiating informal consultation with the USFWS to request any additional information that may be relevant to the project. In particular, we would like to request any available information on known bat hibernacula or known maternity roost trees in the vicinity of the project site. We also welcome any recommendations on measures to avoid impacts to federally listed species as well as any additional studies or surveys that are likely to be required for the proposed project. Enclosed are project photographs and figures for your reference.

Thank you in advance for your assistance. If you have any questions or require additional information after your review of the enclosed information, please contact me at (704) 964-2723 or at Thomas.blackwell@hdrinc.com.

Kind regards,

Thomas Blackwell

Thomas Blackwell, PWS
Environmental Scientist
HDR

Cc: Pete Candelaria, SRC

Attachments: USFWS Official Species List Consultation (IPac Report)
Figure 1 to 7
Site Photographs

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1208-B Main Street
Daphne, Alabama 36526

IN REPLY REFER TO:
2016-I-0517

JAN 12 2018

Mr. John T. Baxter, Jr., Manager
Tennessee Valley Authority
Endangered Species Act Compliance
Safety, River Management and Environment
400 West Summit Hill Drive
Knoxville, TN 37902

Dear Mr. Baxter:

Thank you for your letter of January 5, 2018, requesting Endangered Species Act (ESA) Section 7 concurrence on the Tennessee Valley Authority (TVA) effects determination for the proposed Cumberland Solar Facility, the facility-specific entity affiliated with Silicon Ranch Corporation (SRC); for which TVA is proposing to execute a Power Purchase Agreement with Cumberland Land Holdings, LLC, to purchase the electric power generated by a proposed solar photovoltaic (PV) facility. This facility is located in Limestone County, Alabama. We understand that the facility would occupy approximately 140 acres of a 155-acre tract, in which 49 acres would be cleared and graded and the remainder would require minimal clearing.

We previously reviewed this project for HDR Inc., on May 25, 2016, for impacts to summer roosting habitat of Indiana and northern long-eared bats. We understand that sometime between the initial biological survey and second biological survey on August 24, 2016, the previous landowner harvested merchantable timber from approximately 68 acres of the mixed hardwood/pine forest before selling the property to SRC. As a result, most of the remaining activity would occur within 68 acres of the remainder of the 140-acre area and would require minimal clearing, though grubbing of stumps would occur on the 68 acres of recently harvested forest. TVA is reinitiating informal consultation with the Service.

We understand that TVA is proposing the following measures to avoid and minimize potential impact to threated and endangered species:

- In accordance with the northern long-eared bat 4d Rule, SRC would only perform tree removal between October 15 and March 31 when the Indiana bat and northern long-eared bat would be hibernating in caves off site.
- Tree removal would be minimized to the greatest extent practicable.
- On-site wetlands and streams would have development buffers of 30 and 60 feet respectively and appropriate sediment and erosion control measures would be put in place to ensure water quality is not degraded due to the project.

PHONE: 251-441-5181 FAX: 251-441-6222

TVA has determined this project may affect, but is not likely to adversely affect the following federally listed bat species:

Indiana bat (*Myotis sodalis*) – Endangered
Northern long-eared bat (*Myotis septentrionalis*) – Threatened.

Upon review, and given the proposed measures mentioned above to avoid and minimize potential impact to threated and endangered species, we concur with the TVA's determination that this project will not likely adversely affect the Indiana or northern long-eared bats. For further discussion, please contact Mr. Anthony Ford of my staff at (251) 441-5838.

Sincerely,

William J. Pearson
Field Supervisor
Alabama Ecological Services Field Office

Appendix D

Cultural Resources Correspondence

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

July 27, 2017

TO THOSE LISTED:

TENNESSEE VALLEY AUTHORITY (TVA), HAMPTON SOLAR PROJECT, LIMESTONE COUNTY, ALABAMA (Latitude 34.950, Longitude -86.868)

TVA proposes to enter into a Power Purchase Agreement with Silicon Ranch Corporation to buy electric power generated from the proposed Hampton Solar Farm near Elkmont, Limestone County, Alabama. The archaeological Area of Potential Effects (APE) consists of the project tract and was estimated to be 162 acres in size, while the architectural APE also included a 0.5-mile radius potential viewshed (Figures 1-2).

The applicants contracted Brockington and Associates, Inc. (Brockington) to complete a Cultural Resources survey of the APE. The report titled *Phase I Cultural Resources Survey of the 162-Acre Hampton Solar Tract, Limestone County, Alabama* can be downloaded https://atl.brockington.org (instructions attached).

Background research identified no previously recorded archaeological sites or Cultural Resource surveys within one mile of the project tract. As a result of this survey, one newly recorded archaeological site, 1LI850, was identified within the project tract (Figure 2). Site 1LI180 consists of the remnants of a twentieth-century farmstead with surface features such as a chimney pile and dilapidated outbuildings, a surface artifact scatter, and an intact, shallow, subsurface deposit. Archival and background research did not identify historical associations that would qualify this property for National Register of Historic Places (NRHP) eligibility under Criteria A (*events*) or B (*people*). In addition, while 1LI180 does contain portions of buildings, they are dilapidated and this site does not appear to qualify for the NRHP under Criterion C (*architecture*). Site 1LI180 retains integrity despite its more recent use a trash dump, but it does not contain significant deposits that will yield information important to understanding the history of Limestone County. Brockington recommends that 1LI180 is ineligible under Criterion D (*information potential*), and further, that it is not eligible for inclusion in the NRHP.

Background research identified no previously recorded architectural resources within the project tract. No architectural resources were identified within the 162-acre project tract during this survey, but 13 architectural resources were encountered within the one-mile architectural APE (Resources Li00001- Li00013) (Figure 2). All 13 resources are houses that date from the 1920s to the 1960s, most of which have been heavily modified with modern materials and additions. Due to the low degree of architectural integrity, Brockington recommends that none of these resources are eligible for the NRHP.

TVA has reviewed the draft report and agrees with the findings and recommendations of the authors. TVA finds that no historic properties would be affected by the proposed undertaking.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with the federally recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for listing in the National Register of Historic Places (NRHP): Absentee Shawnee Tribe of Oklahoma, Alabama-Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town, Cherokee Nation, The Chickasaw Nation, Coushatta Tribe of Louisiana, Eastern Band of Cherokee Indians, Eastern Shawnee Tribe of Oklahoma, Kialegee Tribal Town, Muscogee (Creek) Nation of Oklahoma, Poarch Band of Creek Indians, Seminole Nation of Oklahoma, Shawnee Tribe, Thlopthlocco Tribal Town, and the United Keetoowah Band of Cherokee Indians in Oklahoma.

By this letter, TVA is providing notification of these findings and is seeking your comments regarding this undertaking and any properties that may be of religious and cultural significance and may be eligible for listing in the NRHP pursuant to 36CFR §§§ 800.2(c)(2)(ii), 800.3 (f)(2), and 800.4 (a)(4)(b). TVA finds that no historic properties would be affected by the proposed undertaking.

Please respond by August 26, 2017, if you have any comments on the proposed undertaking. If you have any questions, please contact me by phone, (865) 632-6461 or by email, pbezzell@tva.gov.

Sincerely,

Pat Bernard Ezzell

Patricia Bernard Ezzell
Senior Program Manager
Tribal Relations and Corporate History

MSH:ABM
Enclosures
cc (Enclosures):

IDENTICAL LETTER MAILED TO THE FOLLOWING ON JULY 27, 2017:

Ms. Holly Austin (NHPA)
Federal Cultural Resource Law Liaison
Tribal Historic Preservation Office
Eastern Band of Cherokee Indians
Post Office Box 455
Cherokee, North Carolina 28719

cc: Mr. Russell Townsend
Tribal Historic Preservation Officer
Eastern Band of Cherokee Indians
Post Office Box 455
Cherokee, North Carolina 28719

Ms. Karen Brunso
Tribal Historic Preservation Officer
Division of Historic Preservation
Department of Culture & Humanities
The Chickasaw Nation
Post Office Box 1548
Ada, Oklahoma 74821-1548

Ms. RaeLynn Butler
Manager
Historic & Cultural Preservation Department
Muscogee (Creek) Nation
Post Office Box 580
Okmulgee, Oklahoma 74447

cc: Ms. Corain Lowe-Zepeda
Tribal Historic Preservation Officer
Historic & Cultural Preservation Department
Muscogee (Creek) Nation
Post Office Box 580
Okmulgee, Oklahoma 74447

Mr. Bryant Celestine
Tribal Historic Preservation Officer
Alabama-Coushatta Tribe of Texas
571 State Park Road 56
Livingston, Texas 77351

Mr. David Cook
Tribal Administrator
Kialegee Tribal Town
Post Office Box 332
Wetumka, Oklahoma 74883

Ms. Dee Gardner
Acting Tribal Historic Preservation Officer
Eastern Shawnee Tribe of Oklahoma
127 West Oneida
Seneca, Missouri 64865

Mr. Theodore Isham
Tribal Historic Preservation Officer
Seminole Nation of Oklahoma
12555 NS 3540 Road
Seminole, Oklahoma 74868

Dr. Linda Langley
Tribal Historic Preservation Officer
Coushatta Tribe of Louisiana
Post Office Box 10
Elton, Louisiana 70532

Mr. Eric Oosahwee-Voss
Tribal Historic Preservation Officer
United Keetoowah Band of Cherokee Indians in Oklahoma
Post Office Box 1245
Tahlequah, Oklahoma 74465

cc: Ms. Karen Pritchett
United Keetoowah Band of Cherokee Indians in Oklahoma
Post Office Box 1245
Tahlequah, Oklahoma 74465

Ms. Samantha Robison
Tribal Historic Preservation Officer
Alabama-Quassarte Tribal Town
Post Office Box 187
101 East Broadway
Wetumka, Oklahoma 74883

Mr. Emman Spain
Thlopthlocco Tribal Town
Tribal Historic Preservation Officer
Post Office Box 188
Okemah, Oklahoma 74859

Ms. Erin Thompson
Tribal Historic Preservation Officer
Absentee-Shawnee Tribe of Oklahoma
2025 S. Gordon Cooper Drive
Shawnee, Oklahoma 74801

Tribal Historic Preservation Officer
Poarch Band of Creek Indians
5811 Jack Springs Road
Atmore, Alabama 36502

Ms. Tonya Tipton
Shawnee Tribe
Post Office Box 189
Miami, Oklahoma 74355

Ms. Elizabeth Toombs
Cherokee Nation
Post Office Box 948
Tahlequah, Oklahoma 74465

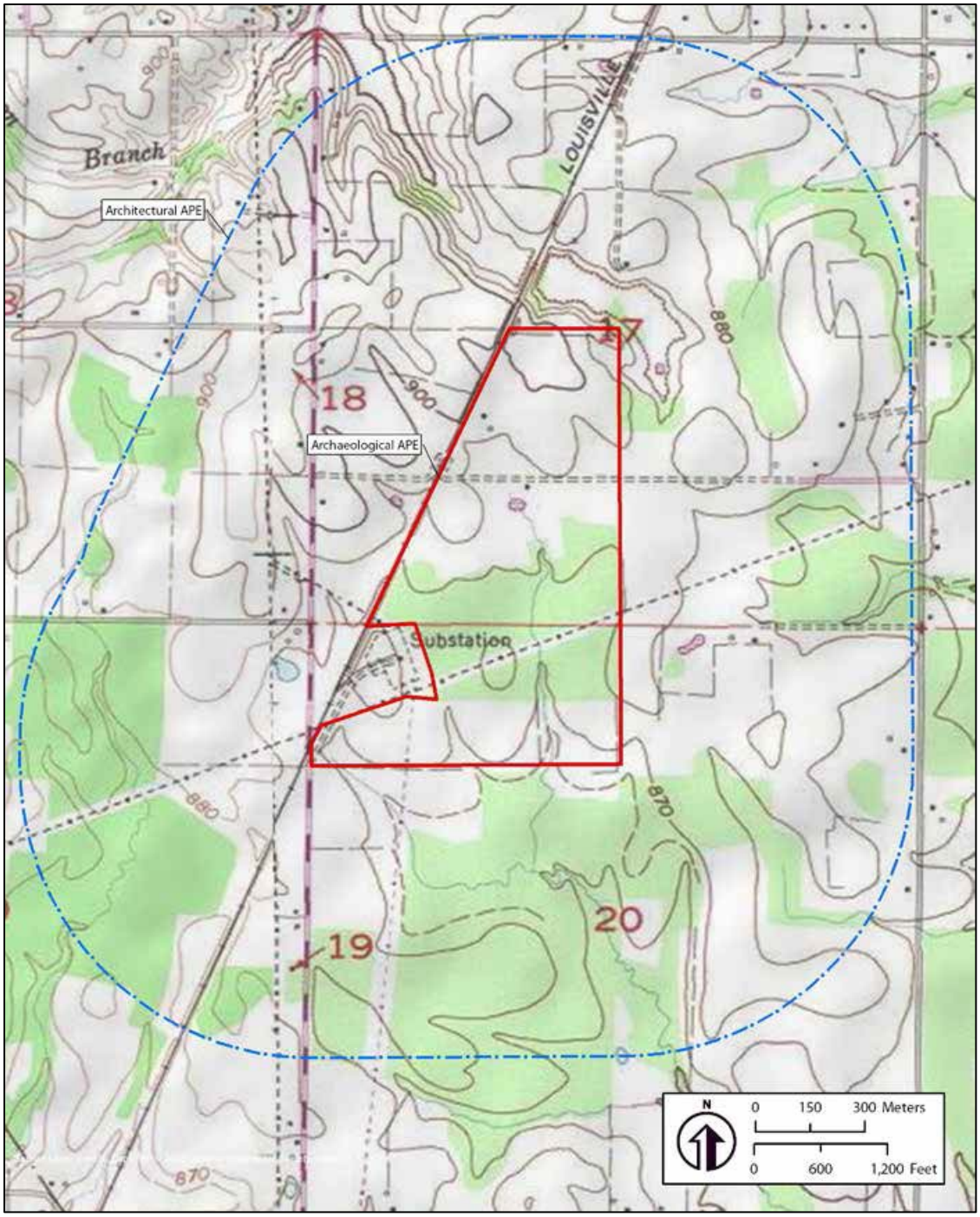


Figure 1. Location of the Hampton Solar Tract and the 0.5-mile Potential Viewshed on the USGS 1976 Ardmore, AL quadrangle.

Figure 2. Aerial image depicting the location of the Hampton Solar Tract, the 0.5-mile Potential Viewshed, Site 1, and the identified architectural resources.

GWYꮝ DBᏢ
CHEROKEE NATION®
P.O. Box 948 • Tahlequah, OK 74465-0948 • 918-453-5000 • cherokee.org

Office of the Chief

Bill John Baker
Principal Chief
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S. Joe Crittenden
Deputy Principal Chief
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ᏔᎵᏁ ᎠᏝᎴᏁ ᎤᎬᏫᏳᎯ

September 6, 2017

Patricia Ezzell
Tennessee Valley Authority
400 W Summit Hill Drive
Knoxville, TN 37902

Re: Hampton Solar Project, Limestone County, Alabama

Ms. Patricia Ezzell:

The Cherokee Nation (CN) is in receipt of your correspondence about **Hampton Solar Project, Limestone County, Alabama**, and appreciates the opportunity to provide comment upon this project. The CN maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project, cross referenced the project's legal description against our information, and found no instances where this project intersects or adjoins such resources. Thus, the CN does not foresee this project imparting impacts to Cherokee cultural resources at this time.

However, the CN requests that Tennessee Valley Authority (TVA) halt all project activities immediately and re-contact our Offices for further consultation if items of cultural significance are discovered during the course of this project, or if there are any changes to the scope of or activities within the Area of Potential Effect.

Additionally, the CN requests that TVA conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the CN databases or records.

If you require additional information or have any questions, please contact me at your convenience Thank you for your time and attention to this matter.

Wado,

Elizabeth Toombs

Elizabeth Toombs, Special Projects Officer
Cherokee Nation Tribal Historic Preservation Office
elizabeth-toombs@cherokee.org
918.453.5389

From:	Ezzell, Patricia Bernard
To:	"Section106"
Cc:	Shuler, Marianne M; McCampbell, Amy Boardman; Harle, Michaelyn S
Subject:	RE: TVA, HAMPTON SOLAR PROJECT, LIMESTONE COUNTY, ALABAMA
Date:	Tuesday, October 31, 2017 12:33:33 PM
Attachments:	image001.png

Thank you for your comments.-_pat

From: Section106 [mailto:Section106@mcn-nsn.gov]
Sent: Tuesday, October 31, 2017 12:07 PM
To: Ezzell, Patricia Bernard
Subject: RE: TVA, HAMPTON SOLAR PROJECT, LIMESTONE COUNTY, ALABAMA

TVA External Message. Please use caution when opening.

Patricia Bernard Ezell
Senior Program Manager and Federal Preservation Officer
Community Relations
Tennessee Valley Authority
400 W. Summit Hill Drive
Knoxville, Tennessee 37902

Ms. Ezzell,

Thank you for the correspondence regarding the proposal to enter into a Power Purchase Agreement with Silicon Ranch Corporation to buy electric power generated from the proposed Hampton Solar Farm. The project area located in Elkmont, Limestone County, Alabama is within our historic are of interest. The Muscogee (Creek) Nation is unaware of any Muscogee cultural or sacred sites located within the immediate project area. We concur that there should be no effects to any known historic/cultural properties and that work should proceed as planned. However, as the project is located in an area that is of general historic interest to the Tribe, we request that work be stopped and our office contacted immediately if any Native American cultural materials are encountered. This stipulation should be placed on the construction plans to insure contractors are aware of it. Please feel free to contact me with any further questions or concerns.

Ms. Corain Lowe-Zepeda
Historic and Cultural Preservation Department, THPO
Muscogee (Creek) Nation
P. O. Box 580
Okmulgee, OK 74447
T 918.732.7835
clowe@mcn-nsn.gov

From: Ezzell, Patricia Bernard [mailto:pbezzell@tva.gov]
Sent: Thursday, July 27, 2017 12:04 PM
To: ethompson@astribe.com; Bryant Celestine (celestine.bryant@mail.actribe.org); AQhpo@mail.com; elizabeth-toombs@cherokee.org; HPO@chickasaw.net; 'Llangley@coushatta.org'; hollymaustin94@gmail.com; 'Dee Gardner'; dc13.dc4@gmail.com; Section106; thpo@pci-nsn.gov; Theodore Isham (isham.t@sno-nsn.gov); Tonya Tipton (tonya@shawnee-tribe.com); 'thpo@tttown.org';

Eric Oosahwee-voss (eoosahwee-voss@ukb-nsn.gov)
Cc: 'Russell Townsend'; David.Cook@kialegeetribe.net; 'karen pritchett'
Subject: TVA, HAMPTON SOLAR PROJECT, LIMESTONE COUNTY, ALABAMA

Good Afternoon,
By this email message, I am transmitting the attached letter regarding TVA's proposal to enter into a Power Purchase Agreement with Silicon Ranch Corporation to buy electric power generated from the proposed Hampton Solar Farm near Elkmont, Limestone County, Alabama.

The referenced report can be downloaded https://atl.brockington.org. Instructions for accessing the report are attached.

Please let me know if you have any questions, and please respond with your comments on this proposed undertaking no later than August 26, 2017.

Thank you.

Sincerely,

Pat

Pat Bernard Ezzell
Senior Program Manager and Federal Preservation Officer
Community Relations

Tennessee Valley Authority
400 W. Summit Hill Drive
Knoxville, TN 37902

(865) 632-6461 (w)
(865) 806-0370 (m)
pbezzell@tva.gov

Dudley, Cynthia S

From: Ezzell, Patricia Bernard
Sent: Monday, January 13, 2014 2:02 PM
To: Dudley, Cynthia S; Cole, Stephen C; Yarnell, W Richard
Subject: FW: TVA, HAMPTON SOLAR PROJECT, NE CORNER OF BRASSTOWN ROAD AND HEMPHILL ROAD, CHEROKEE COUNTY, NORTH CAROLINA

Comments from UKB re: subject project.--Pat

From: Lisa LaRue-Baker - UKB THPO [mailto:ukbthpo-larue@yahoo.com]
Sent: Thursday, January 09, 2014 10:05 AM
To: Ezzell, Patricia Bernard
Cc: verna; Ernestine Berry
Subject: Re: TVA, HAMPTON SOLAR PROJECT, NE CORNER OF BRASSTOWN ROAD AND HEMPHILL ROAD, CHEROKEE COUNTY, NORTH CAROLINA

Hi Pat, loving all the solar projects, and luckily, no worries with Section 106 at this point!

The United Keetoowah Band of Cherokee Indians in Oklahoma has reviewed your project under Section 106 of the NHPA. At this time, we have no comments or objections. However, if any human remains are inadvertently discovered, please cease all work and contact us immediately.

Thank you,

Lisa C. Baker
Acting THPO
United Keetoowah Band of Cherokee Indians in Oklahoma
PO Box 746
Tahlequah, OK 74465

c 918.822.1952
ukbthpo-larue@yahoo.com

Please FOLLOW our historic preservation page and LIKE us on FACEBOOK

From: "Ezzell, Patricia Bernard" <pbezzell@tva.gov>
To: "'ukbthpo-larue@yahoo.com'" <ukbthpo-larue@yahoo.com>
Sent: Friday, January 3, 2014 2:38 PM
Subject: FW: TVA, HAMPTON SOLAR PROJECT, NE CORNER OF BRASSTOWN ROAD AND HEMPHILL ROAD, CHEROKEE COUNTY, NORTH CAROLINA

Hi there,
I just realized I sent this to the wrong address. My apologies for merging work world with other worlds.--Pat

---

From: Ezzell, Patricia Bernard
Sent: Thursday, January 02, 2014 4:28 PM
To: 'rallen@cherokee.org'; 'Tyler B. Howe (tylehowe@nc-cherokee.com)'; 'Lisa LaRue-Baker (lisalaruekeyboard@yahoo.com)'
Cc: 'Russell Townsend (RussellT@nc-cherokee.com)'; 'Miranda Panther (mirapant@nc-cherokee.com)'
Subject: TVA, HAMPTON SOLAR PROJECT, NE CORNER OF BRASSTOWN ROAD AND HEMPHILL ROAD, CHEROKEE COUNTY, NORTH CAROLINA

Hello Again,
I hope this email message finds you well. By this email message, I am transmitting the attached letter regarding TVA's proposal to enter into power purchase agreements (PPAs) with Energy Renewal Partners,LLC (ERP) through the Renewable Standard Offer (RSO) and Solar Solutions Initiative (SSI) programs, for the construction, operation, and maintenance of three solar projects in North Carolina. This letter is for the second project proposed which is the Hampton Solar Project, located at the northeast corner of Brasstown Road and Hemphill Road near Brasstown and Murphy, North Carolina. The Hampton Solar Project would be built on an approximately 6.4 acre site on private property.

The referenced report is attached.

Please do not hesitate to contact me if you have any questions. Please respond by February 2, 2014, if you would like to provide comments on the proposed undertaking.

Thank you.

Sincerely,

Pat

Pat Bernard Ezzell
Tribal Liaison and Corporate Historian
Public Relations and Corporate Information
Communications
Tennessee Valley Authority
400 W. Summit Hill Drive
460 WT 7D-K
Knoxville, Tennessee 37902
Office Phone: (865) 632-6461
Cell phone: 865-304-9251
E-mail: pbezzell@tva.gov

Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

September 25, 2017

Ms. Lee Anne Wofford
Deputy State Historic Preservation Officer
Alabama Historical Commission
468 South Perry Street
Montgomery, Alabama 36130-0900

Dear Ms. Wofford:

RE: TENNESSEE VALLEY AUTHORITY (TVA) HAMPTON SOLAR PROJECT, LIMESTONE COUNTY, ALABAMA (AHC 2017-1304)

Please find enclosed a copy of the report titled *Phase I Cultural Resources Survey of the 162-Acre Hampton Solar Tract, Limestone County, Alabama* reflecting the revisions you requested. Based on the identification efforts, it is TVA's finding that the proposed undertaking would have no effect on any historic properties eligible for or listed on the NRHP. Pursuant to 36 CFR Part 800.4(d)(1), TVA seeks your concurrence with these findings and determinations.

If you have any questions or comments, please contact Michaelyn Harle by telephone, (865) 632-2248 or by email, mharle@tva.gov.

Sincerely,

Clinton E. Jones
Manager
Cultural Compliance

MSH:ABM
Enclosures

INTERNAL COPIES ONLY, NOT TO BE INCLUDED WITH OUTGOING LETTER:

A. Michelle Cagley, KFP 1T-KST
Michaelyn S. Harle, WT 11D-K
Susan R. Jacks, WT 11C-K
Ashley A. Pilakowski, WT 11D-K
M. Susan Smelley, BR 4A-C
Dana M. Vaughn, WT 11D-K
ECM, WT CA-K

Phase I Cultural Resources Survey of the 162-Acre Hampton Solar Tract

Limestone County, Alabama

September 2017

Brockington®

CULTURAL RESOURCES CONSULTING

ALABAMA HISTORICAL COMMISSION

468 South Perry Street
Montgomery, Alabama 36130-0900
334-242-3184 / Fax: 334-240-3477

Lisa D. Jones
Executive Director
State Historic Preservation Officer

October 24, 2017

Clinton E. Jones
TVA
400 West Summit Hill Drive
Knoxville, TN 37902

Re: AHC 17-1304
Hampton Solar Project
Limestone County

Dear Mr. Jones:

Upon review of the additional information forwarded by your office, we have determined that project activities will have no effect on any cultural resources listed on or eligible for the National Register of Historic Places. Therefore, we concur with the proposed project activities.

However, should artifacts or archaeological features be encountered during project activities, work shall cease and our office shall be consulted immediately. Artifacts are objects made, used or modified by humans. They include but are not excluded to arrowheads, broken pieces of pottery or glass, stone implements, metal fasteners or tools, etc. Archaeological features are stains in the soil that indicate disturbance by human activity. Some examples are post holes, building foundations, trash pits and even human burials. **This stipulation shall be placed on the construction plans to insure contractors are aware of it.**

We appreciate your commitment to helping us preserve Alabama's historic archaeological and architectural resources. Should you have any questions, please contact Amanda McBride at 334.230.2692 or Amanda.McBride@ahc.alabama.gov. Have the AHC tracking number referenced above available and include it with any future correspondence.

Sincerely,

Lee Anne Wofford
Deputy State Historic Preservation Officer

LAW/EDS/amh

Appendix E

Comment Response Matrix

Memo

Date:	Tuesday, January 23, 2018
Project:	Cumberland (Hampton) Solar Project, Limestone County, Alabama
To:	Ashley Pilakowski, Ali Weaver, Blair Wade, Kelly Thames, and Thomas Blackwell
From:	Josh Fletcher
Subject:	Public comments on the EA

#	**Date**	**Name**	**Comments**	**Responses**
1	12/27/17	Rebecca Mai	Hello, I am in favor for the Ardmore solar panel project. I think this will really benefit the community long term by improving public health and the environment. Thanks, Rebecca Mai	Comment noted.
2	12/27/17	Mike Williams	Ashley, My name is Mike Williams, I work with Gresco Utility Supply in Forsyth, GA. Gresco is a cooperative owned utility material distributor covering the Southeast, Georgia, Alabama,	Comment noted.

			Florida, Mississippi, Louisiana and Tennessee, providing material and service to the rural electric cooperatives. We have some cooperatives that have and are installing solar on their systems, so we are trying to find a way to serve our owners in this market. Please visit our web page @ www.gresco.com. We are currently working with the AMEA, Alabama Municipal Electric Authority on 11 projects for their members and involved with a couple 1.2 MW projects with our cooperative members in Georgia and Florida. We were hoping to talk to you about this project to see if there was an opportunity to participate with TVA or the EPC contractor. My cell number is 478.719.8931 and e-mail is mike.williams@gresco.com. Thank you for considering this request, Sincerely, Mike	
3	12/27/17	Toni Bolton	Dear Ms Pilakowski, Thank you for making the report of the proposed solar construction available for review by the public.	The cost of production margin is proprietary to Silicon Ranch Corporation. For the low income/minority information, see

			I see that this report is very thorough in reference to environmental impacts however, this will also impact economics. What is the cost to production margin? It seems that 20 Mgw is very little power production for 155 acres of land. That's only a 1 Mgw to 9 acre ratio. Not to mention, the low income/minority study provided in the report indicates having no impact. Having no impact isn't good enough! TVA was originally drafted to help low income families by providing better jobs. Construction of a power plant should provide higher wages for a community. That would be much better for the environment, too. Yours truly, Toni Bolton	Section 3.11.2.2 in the EA. Construction activities at the project site would take approximately 6 months to complete with a maximum crew of 80 workers at the site during the peak of construction. Workers would include a mix of general laborers, electrical technicians, and journeyman-level electricians. There would be moderate positive and long-term direct impacts from construction and operation of the Project. The local tax base would increase from construction of the solar facility and would be most beneficial to the Limestone County area.
4	12/27/17	Phillip Birkholz	Hello, I am writing in support of TVA's proposed solar development near Ardmore. As a North Alabama resident, it is important to me that we transition to renewable energy	Comment noted.

			sources as soon as it is feasible. This proposed 20MW facility is a great way to bring more solar in to the mix. I hope to see much more of these solar developments in the future. Sincerely, Phillip Birkholz	