Document Type: EA-Administrative Record
Index Field: Environmental Assessment
Project Name: Puryear Solar
Project Number: 2022-12

SR PURYEAR SOLAR
FINAL ENVIRONMENTAL ASSESSMENT
Henry County, Tennessee

Prepared for:
Tennessee Valley Authority
Knoxville, Tennessee
Submitted By:
Silicon Ranch

Prepared By:
Barge Design Solutions, Inc.

February 2024

For Information, contact:
Neil Schock
NEPA Program
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902
Email: ntschock@tva.gov

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PHOTOS

LIST OF APPENDICES

SYMBOLS, ACRONYMS, AND ABBREVIATIONS

AADT	Average Annual Daily Traffic
AC	alternating current
AJD	approved jurisdictional determination
APE	area of potential effect
ARAP	Aquatic Resource Alteration Permit
BEA	Bureau of Economic Analysis
BG	Block Group
BGEPA	Bald and Golden Eagle Protection Act
BLS	Bureau of Labor Statistics
BMP	Best Management Practice
CAA	Clean Air Act of 1970
CBER	Univ. Tennessee Boyd Center for Business and Economic Research
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CGP	Construction Stormwater General Permit
CH_4	methane
CM	centimeters below surface
CO	carbon monoxide
CO_2	carbon dioxide
CT	Census Tract
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibels
DBH	diameter at breast height
DC	direct current
DNL	day-night average sound level
DOT	U.S. Department of Transportation
EA	Environmental Assessment
ECD	erosion control device
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FPPA	Farmland Protection Policy Act
ft	feet
GHG	greenhouse gas
GPS	global positioning system
IPaC	Information for Planning and Consultation
IRP	Integrated Resource Plan
kV	kilovolt
LPC	Local Power Company
MBTA	Migratory Bird Treaty Act
msl	mean sea level
MVA	mega-volt ampere
MW	megawatts

SYMBOLS, ACRONYMS, AND ABBREVIATIONS

NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSCR	non-site cultural resources
NSSH	National Soil Survey Handbook
O_3	ozone
OSHA	Occupational Safety and Health Administration
Pb	lead
PBPU	Paris Board of Public Utilities
PCS	power conversion station
PEL	permissible exposure limit
PEM	Palustrine Emergent Wetland
PFO	Palustrine Forested Wetland
PGA	peak ground acceleration
PM_{10}	particulate matter whose particles are less than or equal to 10 micrometers
$PM_{2.5}$	particulate matter whose particles are less than or equal to 2.5 micrometers
POI	Point of Interconnection
PPA	Power Purchase Agreement
ppb	parts per billion
ppm	parts per million
PSS	Palustrine Scrub-Shrub Wetland
PUB	Palustrine Unconsolidated-Bottom
PV	photovoltaic
RCRA	Resource Conservation and Recovery Act
REC	recognized environmental conditions
RFFA	reasonably foreseeable future actions
RFP	Request for Proposal
ROW	right-of-way
SHPO	State Historical Preservation Officer
SIP	State Implementation Plan
SO_2	sulfur dioxide
SOW	Scope of Work
SPCC	Spill Prevention, Countermeasure and Control
SRC	Silicon Ranch Corporation
STR	stream
SWPPP	Stormwater Pollution Prevention Plan
T&E	threatened and endangered
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation

SYMBOLS, ACRONYMS, AND ABBREVIATIONS

THC	Tennessee Historical Commission
TLV	threshold limit value
TN	Tennessee
TVA	Tennessee Valley Authority
TWA	time weighted average
U.S.C.	United States Code
ug/m3	micrograms per cubic meter
US	United States
USACE	United States Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	U.S. Geological Survey
WTL	wetland
WWC	wet weather conveyances

GLOSSARY OF TERMS

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

GLOSSARY OF TERMS

Endangered Species	A species in danger of extinction throughout all or a significant portion of its range or territory. Endangered species recognized by the Endangered Species Act (ESA), or similar state legislation have special legal status for their protection and recovery.
Environmental Justice	Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.
Erosion	A natural process whereby soil and highly weathered rock materials are worn away and transported to another area, most commonly by wind or water.
Evergreen	Vegetation with leaves that stay green and persist all year.
Floodplain	Any land area susceptible to inundation by water from any source. For purposes of the National Flood Insurance Program, the floodplain, at a minimum, is that area subject to a 1 percent or greater chance of flooding (100-year flood) in any given year.
Forest	Vegetation having tree crowns overlapping, generally forming 60-100 percent cover (Grossman et al. 1998).
Greenhouse Gas (GHG)	A gaseous compound that absorbs infrared radiation and re-radiates a portion of that back toward the earth's surface, thus trapping heat and warming the earth's atmosphere.
Habitat	A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are food, water, cover, and living space.
Herbaceous Vegetation	Dominated by forbs, generally forming at least 25 percent cover; other life-forms with less than 25 percent cover (Grossman et al 1998).
Historic Property	Defined in 36 CFR § 800.16(l) as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places."
Indirect Impacts	Effects that are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable (40 CFR § 1508.8).
Landscape Features	The land and water form, vegetation, and structures which compose the characteristic landscape.
Landslide	A slope failure that involves downslope displacement and movement of material either triggered by static (i.e., gravity) or dynamic (i.e., earthquake) forces.
NatureServe	An international network of biological inventories (natural heritage programs or conservation data centers) that provides information about the location and status of animals, plants, and habitat communities, and establishes a system for ranking the relative rarity of those resources.

GLOSSARY OF TERMS

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

GLOSSARY OF TERMS

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

GLOSSARY OF TERMS

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

GLOSSARY OF TERMS

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

CHAPTER 1 – INTRODUCTION

1.0 INTRODUCTION

The Tennessee Valley Authority (TVA) has entered into a power purchase agreement (PPA) with SR Puryear, LLC (Puryear Solar), a wholly owned subsidiary of Silicon Ranch Corporation (SRC), to purchase the power generated by Puryear Solar (Project) in Henry County, Tennessee. The Project is anticipated to provide up to 50 megawatts (MW) alternating current (AC) in generating capacity at the Point of Interconnection (POI). The proposed solar facility would be constructed and operated by Puryear Solar. Under the terms of the conditional PPA between TVA and Puryear Solar, dated December 6, 2022, TVA would purchase the electric output generated by the proposed solar facility for an initial term of 20 years, subject to satisfactory completion of all applicable environmental reviews. The POI would be a new substation built by SRC along the southern boundary, entirely within the Project Site (Figure 1-1). The SRC substation would transfer the electricity to the Local Power Company (LPC), Paris Board of Public Utilities' (PBPU) new single breaker switchyard (switchyard), also built on the Project Site. This switchyard would transfer the power through a 69 kilovolt (kV) line to be built and connected to Eagle Creek substation, then transfer power into the TVA grid.

Puryear Solar is located approximately one mile east of the City of Puryear and approximately 10 miles north of Paris, Tennessee. The Project Site is a 611-acre property (Figure 1-1). While design of the facility is being finalized, the conceptual plan includes 147,384 First Solar Series 6 and Series 6475 modules being placed within the 349 fenced acres. Approximately 27 acres of interior access roads would be constructed to access the panels and approximately 235 acres of land would not be disturbed.

The proposed facility was designed to avoid cultural resources and minimize direct impacts to natural resources. The land would be acquired by SRC and leased to Puryear Solar for the project. Under the PPA, Puryear Solar would fund, build, own, and operate the solar energy facility.

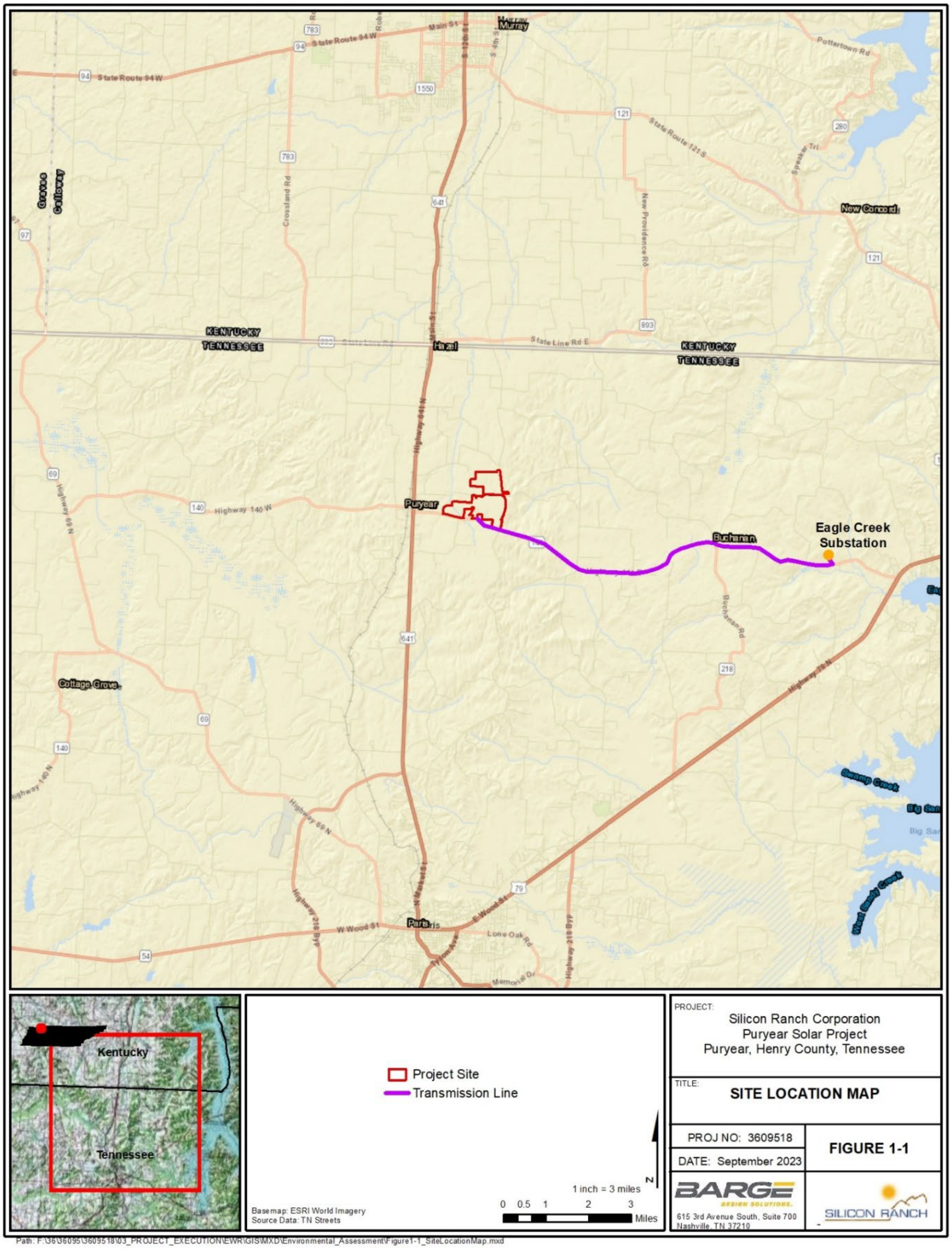


Figure 1-1. Site Location Map

1.1 PURPOSE AND NEED FOR ACTION

TVA is a corporate agency of the United States and the largest public power provider in the country. Through its partnership with 153 local power companies, TVA supplies energy across 80,000 square miles for 10 million people, 750,000 businesses, and 56 large industrial customers, including military installations and the U.S. Department of Energy facilities at Oak Ridge, Tennessee. TVA's service area includes all of Tennessee and parts of six other southeastern states, referred to as the Tennessee Valley. Since 1933, TVA's mission has been to serve the people of the region to make life better.

TVA produces or obtains electricity from a diverse portfolio of energy sources, including solar, hydroelectric, wind, biomass, fossil fuel, and nuclear. In June 2019, TVA completed an Integrated Resource Plan (IRP) and associated Environmental Impact Statement (TVA, 2019). The IRP identified the various resources that TVA intends to use to meet the energy needs of the TVA region over the 20-year planning period while achieving TVA's objectives to deliver reliable, low-cost, and cleaner energy while reducing environmental impacts. The 2019 IRP anticipates growth of solar in all scenarios analyzed, with most scenarios anticipating 5,000-8,000 MW and one anticipating up to 14,000 MW (TVA 2019). TVA began the process of updating its IRP and will issue an updated plan in 2024. With the demand for solar energy increasing, TVA has an expansion target of 10,000 MW of solar by 2035.

Customer demand for cleaner energy prompted TVA to release a Request for Proposal (RFP) for renewable energy resources. New PPAs are needed to help TVA meet immediate needs for additional renewable generating capacity in response to customer demands and fulfill the renewable energy goals established in the 2019 IRP. The purpose of the Proposed Action is to construct a solar facility that provides cost-effective renewable energy consistent with the IRP and TVA goals.

1.2 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

The National Environmental Policy Act of 1969 (NEPA) (42 United States Code [U.S.C.] §§ 4321-4347) requires federal agencies to evaluate the potential environmental impacts of their proposed actions. This Environmental Assessment (EA) was prepared consistent with 2022 Council on Environmental Quality's (CEQ) regulations for implementing NEPA at 40 CFR 1500-1508 (85 Federal Register [FR] 43304-43376, July 16, 2020, and 87 FR 23453, April 20, 2022). TVA's 2020 NEPA regulations at 18 CFR 1318 were also applied (85 FR 17434, Mar. 27, 2020).

This EA identifies the Proposed Action Alternative (Proposed Action) and No Action Alternative, describes the existing environment where the solar facility would be constructed (Project Site), analyzes potential environmental impacts associated with the Proposed Action and the No Action Alternatives, and identifies and characterizes potential cumulative impacts from the proposed Project in relation to other ongoing and reasonably foreseeable proposed activities within the surrounding area of the Project Site. Implementing TVA's Proposed Action, also referred to in this EA as the Preferred Alternative, would result in the construction and operation of the solar facility by Puryear Solar and actions taken by TVA to connect the solar facility to the TVA transmission system.

Considering the proposed project and identification of applicable laws, regulations, executive orders (EOs), and policies, the following resources are discussed and analyzed in this EA: land use; geology, soils, and prime farmland; water resources; biological resources; visual resources; noise; air quality public and occupational health and safety; transportation; socioeconomics; and environmental justice.

Under the PPA, TVA's obligation to purchase renewable power is contingent upon the satisfactory completion of the appropriate environmental review and TVA's determination that the Proposed Action would be "environmentally acceptable." To be deemed acceptable, TVA must assess the impact of the Project on the human environment to determine whether (1) any significant impacts would result from the location, operation, and/or maintenance of the proposed Project and/or associated facilities, and (2) the Project would be consistent with the purposes, provisions, and requirements of applicable federal, state, and local environmental laws and regulations.

This EA consists of five chapters and three appendices:

- **Chapter 1.0:** Describes the purpose and need for the Project, public involvement, necessary permits or licenses, and the EA overview.
- **Chapter 2.0:** Describes the Proposed Action and No Action Alternatives, provides a comparison of alternatives, and discusses the Preferred Alternative.
- **Chapter 3.0:** Discusses the affected environment and the potential direct, indirect, and cumulative impacts on these resource areas. Mitigation measures are also proposed, as appropriate.
- **Chapter 4.0:** Contains the List of Preparers of this EA and their roles.
- **Chapter 5.0:** Contains the Literature Cited.
- **Appendix A:** Puryear Solar Public Comment and Responses
- **Appendix B:** Summary of the Environmental Features for the Puryear Solar Project
- **Appendix C:** Puryear Solar Site HD concurrence letter
- **Appendix D:** USFWS ESA Concurrence Letter
- **Appendix E:** Cultural Resources Consultation Information

1.3 PUBLIC INVOLVEMENT

An electronic version of the Draft EA was posted on the TVA website for a 30-day public comment period, which included an option for the public to submit comments electronically. TVA notified interested federally recognized Native American Tribes, elected officials, and other stakeholders that the Draft EA was available for review and comment for 30 days. Public notices were published in local newspapers soliciting comments from other agencies, the public, and any interested organizations. In addition, Puryear Solar spoke with members of the community and adjacent property owners about the proposed solar facility and answered questions.

During the 30-day public review and comment period of the draft EA, a total of twelve members of the public submitted comments. The comments and responses are included as Appendix A.

1.4 REQUIRED PERMITS AND LICENSES

Based on the scope of the proposed construction activities, as described in Chapter 2, the project would require an individual Construction Stormwater General Permit (CGP) including a Stormwater Pollution Prevention Plan (SWPPP) from the Tennessee Department of Environment and

Conservation (TDEC). The SWPPP would include the implementation of approved pollution prevention measures.

Any proposed permanent wetland or stream impacts and temporary stream impacts would require an Aquatic Resource Alteration Permit (ARAP) or a §401 Water Quality Certification (§401 certification) from TDEC. In addition, a federal §404 permit may be required from the U.S. Army Corps of Engineers (USACE). If required, Puryear Solar would obtain TDEC and USACE authorization for the project and comply with permit conditions and compensatory mitigation measures as required before construction begins.

TVA initiated consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act on October 4, 2023. Based on information available to TVA and studies conducted at the Project Site, TVA determined the Proposed Action:

- may affect but is not likely to adversely affect Indiana bat, northern long-eared bat (NLEB), and gray bat
- would not jeopardize the continued existence of the tricolored bat (TCB), whooping crane, alligator snapping turtle, or monarch butterfly

USFWS reviewed TVA's recommendations and, in their December 19, 2023, letter, concurred with TVA (Appendix D). Building permits are not required in the unincorporated areas of the county; however, proposed development within mapped and unmapped 100-year floodplains would require a floodplain development permit from the Henry County EMA Director (Floodplain Administrator). If open burning is determined to be the best method for wood waste management, a burn permit would be obtained through the Tennessee Department of Agriculture, Division of Forestry, and TDEC would be notified. A list of potential permits, approvals, and licenses required for the Project is presented in Table 1.4-1.

Table 1.4-1. Puryear Solar Permit and Approval List

Permit/Approval	Associated Documentation	Lead Agency
Federal		
Endangered Species Act Section 7 (ESA)	Informal consultation presenting results of biological survey and protected species habitat assessment and impact determinations.	U.S. Fish and Wildlife Service (USFWS)
Bald and Golden Eagle Protection Act (BGEPA)		
Section 404 of the Clean Water Act – Nationwide Permit 51	Approved Jurisdictional Determination (AJD) Package and concurrence letter	U.S. Army Corps of Engineers (USACE)
Farmland Protection Policy Act (FPPA)	None. FPPA applies to Projects receiving federal funding for construction. Puryear Solar does not receive federal funding.	Natural Resources Conservation Service (NRCS)
Obstruction Evaluation/Airport Airspace Analysis	None. Per the FAA Notice Criteria Tool	Federal Aviation Administration (FAA)
State		
Section 106 National Historical Preservation Act consultation	Cultural Resources Survey Report/Results	Tennessee Historical Commission (THC or SHPO)
Aquatic Resource Alteration Permit (ARAP)/Section 401 Water Quality Certification	Hydrologic Determination (HD) Package and concurrence letter	TDEC – Division of Water Resources
Construction General Permit (NPDES) Permit No. TNR 100000	Stormwater Pollution Prevention Plan (SWPPP)	TDEC – Division of Water Resources
Encroachment Agreement	Permit Application	Tennessee Department of Transportation (TDOT)
Local		
National Flood Insurance Act of 1968	Floodplain Development Permit	Henry County Floodplain Administrator

CHAPTER 2 – ALTERNATIVES

2.0 ALTERNATIVES

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

2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, TVA would not purchase the power generated by the Project under the 20-year PPA with SR Puryear LLC, and TVA would not be involved with the Puryear Solar Project. If TVA were to select this alternative, and Puryear Solar elected not to proceed with the project, Puryear Solar would not construct any facility on any tracts of land in Henry County, Tennessee, and TVA would not make the associated modifications to its transmission system. Puryear Solar would not complete the purchase of the property necessary to construct the Preferred Alternative. Existing conditions (e.g., land use, natural resources, visual resources, physical resources, and socioeconomics) in the Project Site would not change as a result of the Proposed Action, and agricultural activities would likely continue. TVA would continue to rely on other sources of generation described in the 2019 IRP (TVA 2019) to ensure an adequate energy supply and to meet its goals for increased renewable and low greenhouse gas (GHG)-emitting generation.

The No Action Alternative provides a baseline of conditions against which the impacts of the Proposed Action are measured.

2.2 PROPOSED ACTION ALTERNATIVE (PREFERRED ALTERNATIVE)

Under the Proposed Action, Puryear Solar would acquire approximately 611 acres of land in Henry County, Tennessee, and construct, operate, and maintain a single-axis tracking photovoltaic (PV) solar power facility of up to 50 MW AC generating capacity at the POI. The energy generated by the Project would be sold to TVA in accordance with the terms of the PPA. The Project Site would be located on 12 contiguous parcels (8 owners) of agricultural land in Henry County, Tennessee. These parcels comprise the Project Site (Figure 2.2-1). Puryear Solar would construct a substation within the Project Site that would serve as the POI to the PBPU switchyard, also being built onsite. The PBPU switchyard would transfer electricity to the PBPU's future 69-kV Eagle Creek Feeder 734 transmission line (TL) that would be constructed from Puryear Solar to the Eagle Creek substation approximately nine miles east of the Project site along SR 140 (Figure 1-1). Construction of the 69-kV feeder TL is not part of the Puryear Solar project as it is being pursued by PBPU regardless of the execution of the proposed solar project.

This EA assesses the impact of TVA's action of entering into the PPA with SR Puryear LLC, including the impacts of the construction and operation of the proposed Puryear Solar facility, switchyard, substation, and transmission interconnections.

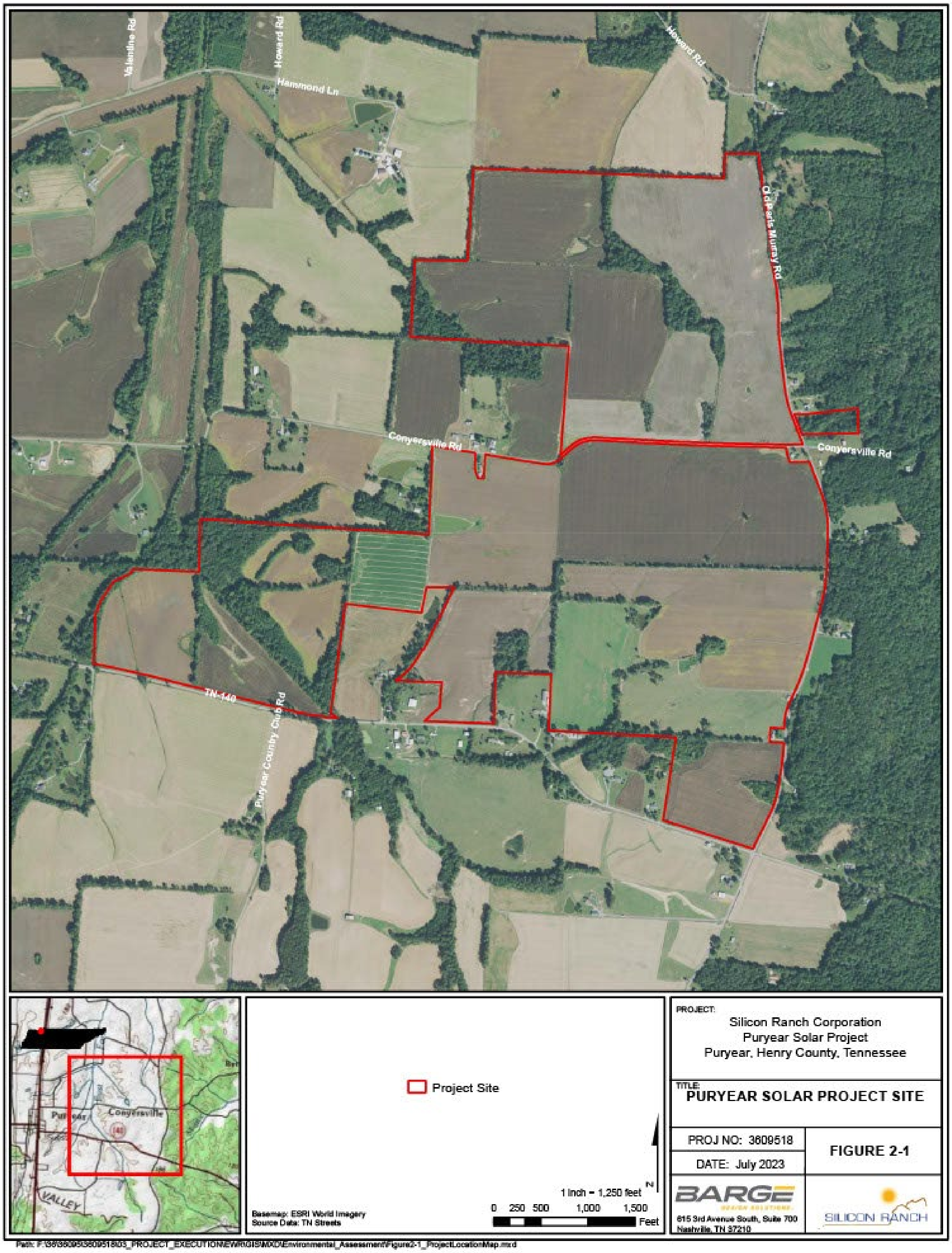


Figure 2.2-1. Puryear Solar Project Site Map

2.2.1 Project Description

The Project Site is located approximately one mile east of the City of Puryear, in Henry County, Tennessee, and approximately 10 miles north of the City of Paris, Tennessee, and east of US Highway 641 in Paris on SR 140. The western boundary of the Project Site begins 0.7 mile from US 641 and extends for 1.4 miles to Old Paris Murray Road (Figure 2.2-1). The Project Site is on land north of SR 140.

The Project Site layout as shown in Figure 2.2-2 would occupy approximately 611 acres, of which approximately 375 acres would be directly impacted. Approximately 235 acres of exclusion areas were identified by Puryear Solar as being restricted from any development or construction activities; these areas, illustrated in red hatching on Figure 2.2-3, are considered not useable for the Project because they contain wetlands, floodplains, sensitive resources, and/or excessive slope.

There would be multiple entrances to the site. Two entrances would be along SR 140. One entrance is one mile from the intersection with US 641 in Puryear, and the second is 1.5 miles from the US 641 intersection. There would also be four entrances to the Project Site from Conyersville Road. Entrances to the north and south side of the Project Site would be located 0.13 and 0.4 miles west of Old Paris Murray Road (Figure 2.2-2).

In addition to the solar arrays, which would comprise the majority of the Project Site, a new Puryear Solar substation and a PBPU switchyard would be located on approximately five acres along the Project Site's southern boundary.

PV power generation is the direct conversion of light into electricity at the atomic level. Some materials exhibit a property known as the photoelectric effect that causes them to absorb photons of light and release electrons. When these free electrons are captured, an electric current is produced, which can be used as electricity (TVA, 2014). The proposed facility would convert sunlight into direct current (DC) electricity within First Solar Series 6 or 7 thin-film semiconductor PV modules (Figure 2.2-4). The solar arrays utilized for the proposed facility would be composed of ground-mounted thin film cells. The PV modules are each capable of producing approximately 425 to 460 watts and would be mounted together in arrays.

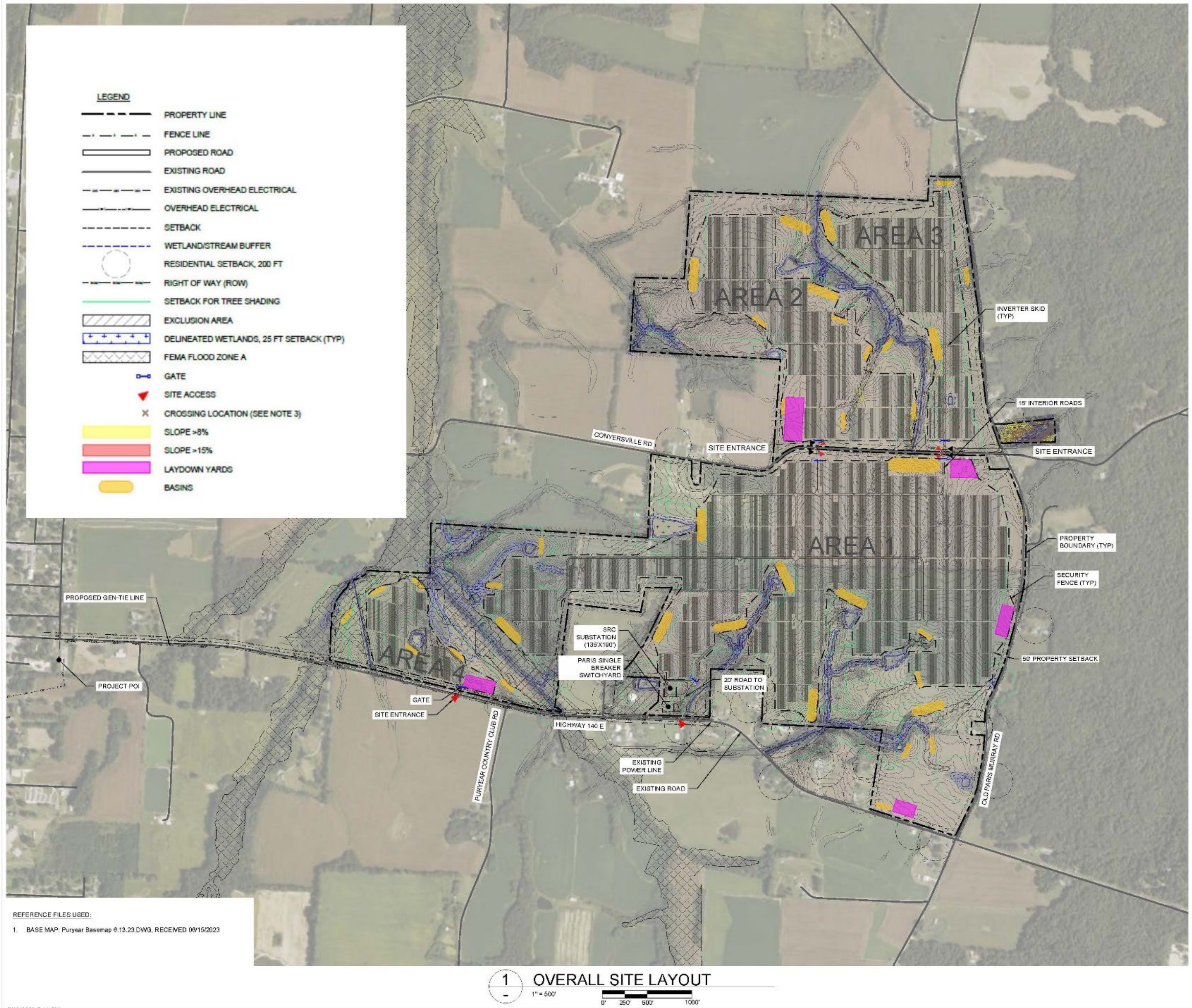


Figure 2.2-2 Project Site Layout Map

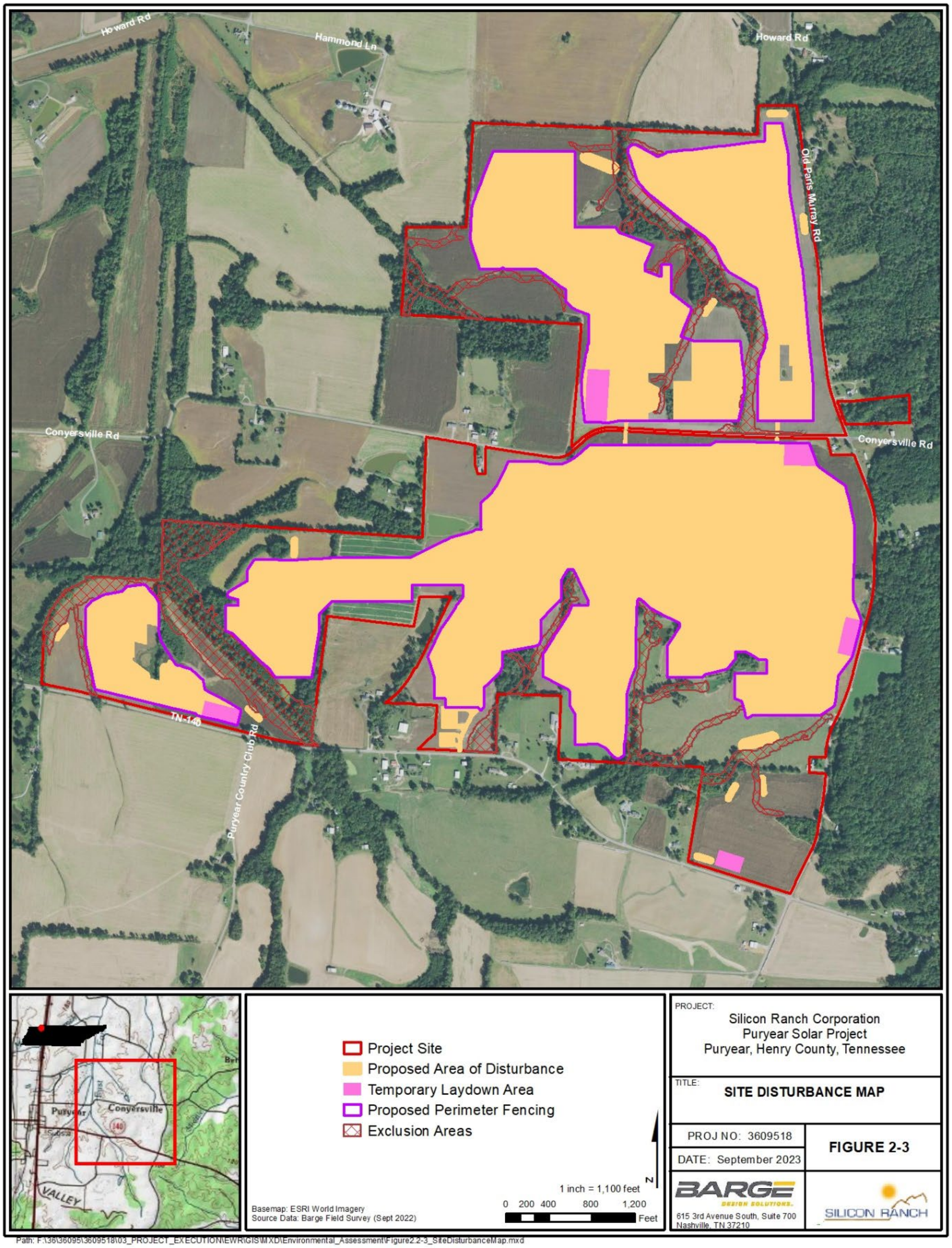


Figure 2.2-3. Site Disturbance Map

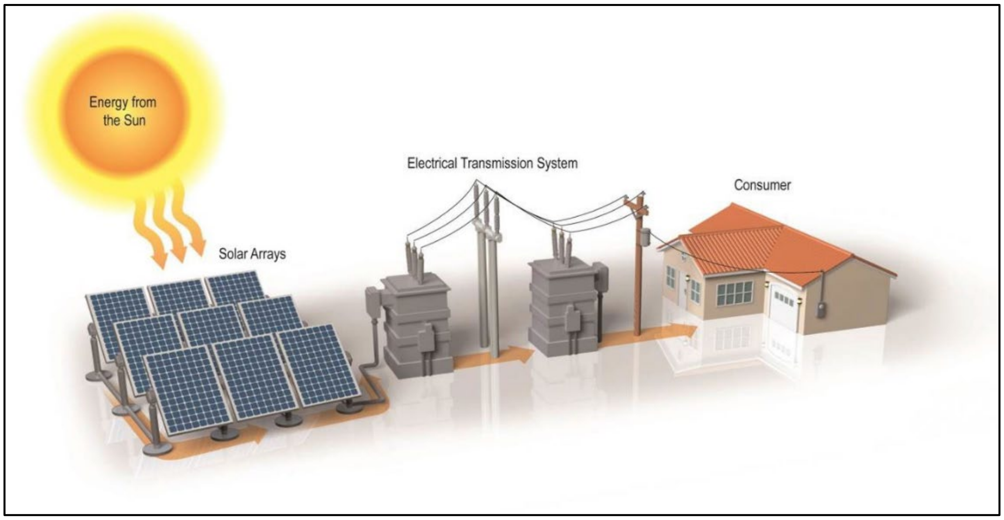


Figure 2.2-4. General energy flow diagram of PV solar system (not to *scale)*

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 sun's path 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 at varying depths below grade (Figure 2.2-5).

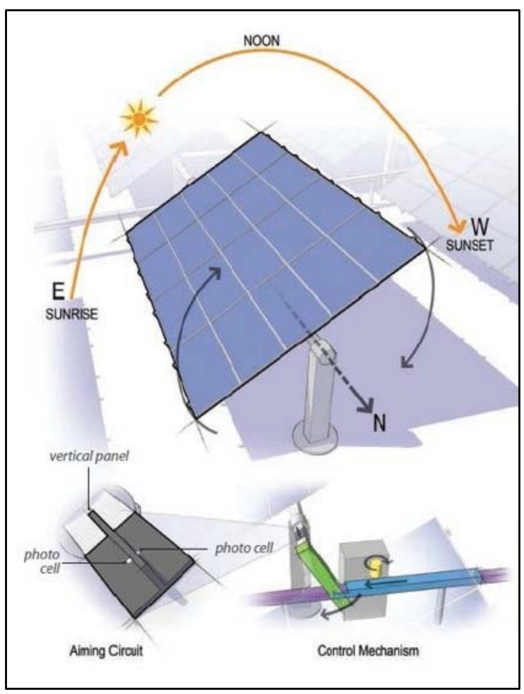


Figure 2.2-5 Diagram of single-axis tracking system (not to scale)

The PV modules would be electrically connected in series (called a “string”) by wire harnesses that conduct DC electricity to combiner boxes. There would be approximately 1,571 13-string, 265 10-string, and 213 7-string trackers. Each combiner box would collect power from strings of modules and feed a power conversion station (PCS) via cables placed in excavated trenches. The excavated trenches would vary in depth and width. Each trench would be backfilled with Project Site native soil and then appropriately compacted. Above-ground cables would connect the modules to harnesses that lead wiring to combiner boxes.

At the PCS stations a total of seventy-nine 0.8 MW power inverters convert the DC electricity generated by the solar panels into AC electricity. The AC power from each inverter would be connected to one of fifteen pad-mounted 4.2 MVA transformers and one 3.2 MVA transformer onsite. Buried cables from each transformer would deliver AC electricity to the new onsite 69 kV transformer located in the new substation. All trenches for buried cables on the site would be backfilled with native soil, and the ground surface would be returned to its original grade. The substation would combine all the AC power from the collection circuits and increase its voltage to match the voltage of the connecting transmission line. This Project substation would include buses, circuit breakers, disconnect switches, and the main step-up transformer. The high-voltage PBPU-owned switchyard’s specific function is to enable the facility to tap into the main transmission line through a radial breaker scheme, which would allow the transmission line to be isolated from the solar array.

Of the energy produced from the 64 MW AC site, 50 MW would be fed through the interconnection and sold to TVA. The loss of 14 MW is due to expected line loss before reaching the POI.

There would be several internal roads to allow access to the arrays and PCS skids for operations and maintenance purposes. These unpaved roads typically consist of compacted native soils or aggregate base gravel where needed. Five temporary laydown or staging areas would be used for parking by workers and for stockpiling and storage of construction materials during different phases of construction. Detention basins would be utilized onsite to protect against flooding and downstream erosion into protected jurisdictional wetlands and waterways.

2.2.2 Solar Facility Construction

Construction of the solar power facility generally requires site preparation (surveying and staking, removal of tall vegetation and small trees, light grading and clearing, installation of security fencing, installation of erosion control Best Management Practices [BMPs], and preparation of construction laydown areas before solar array assembly and construction). Construction includes driving steel piles for the tracker support structures, installing solar panels and electrical connections, and completing system testing and verification. Tree removal would occur from October 15 to March 31. Construction access would be from two locations on SR 140 and four locations on Conyersville Road. (Figure 2.2-2).

Appropriate BMPs would be implemented and maintained during the construction and operation of the facility. SRC’s standard practice, which Puryear Solar would use, 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, resulting in a consistent slope to the land. Prior to grading, native topsoil would be removed from the area to be graded and stockpiled onsite for redistribution over the disturbed area after the grading is completed. Silt fences, sedimentation basins, and other appropriate controls would be used as needed to minimize exposure of soil and to prevent eroded soil from leaving the work area. Disturbed areas may be seeded. If a seed mix is used, it would be obtained from a reputable seed dealer and follow any guidance established by the local Natural Resources Conservation Service (NRCS) office. Erosion control measures would be inspected and maintained until vegetation in the disturbed areas has returned to preconstruction conditions or the site is permanently stabilized. Water would be used for soil compaction and dust control during construction.

Grading would consist of the excavation and compaction of earth to meet the final design requirements. Minimal grading is expected at the Project Site location as the site is relatively flat and would not require any offsite or onsite hauling. Some vegetation and untreated wood may be burned onsite. No burning of other construction debris is anticipated. If open burning is determined to be the best method for wood waste management, a burn permit would be obtained from the Tennessee Department of Agriculture, Division of Forestry. TDEC would be notified, and any additional permits needed to comply with local, state, and federal permitting requirements would be obtained.

Per TDEC erosion and sediment control requirements, a minimum 30-foot buffer width surrounding all streams and wetlands would be established as an avoidance measure prior to any clearing, grubbing, or grading activities conducted by the construction contractor (TDEC, 2012). Once sensitive areas are marked, construction areas would be mowed and cleared of vegetation and miscellaneous debris. Mowing would continue as needed to contain growth during construction.

Thirty-six onsite stormwater detention basins (totaling approximately 16.2 acres) would be constructed in appropriately designed locations on the Project Site (Figure 2.2-2). The final design and exact position of these conceptual detention basins within the Project Site boundaries would be based on the most recent hydrology study and would function to temporarily store stormwater, minimize erosion, and reduce the rate of runoff. These basins would be constructed either by impoundment of a natural depression(s) or by excavating the existing soil. The bottom elevation and embankments of the basins would be allowed to naturally reestablish native vegetation after construction (or be replanted as necessary) to provide natural stabilization, minimizing subsequent erosion. If the basins overflow, they would discharge through an emergency spillway, which generally consists of rip rap channel with multiple check dams. The SWPPP will be designed to prevent discharge onto adjacent private properties. Discharge into streams or wetlands would be avoided where possible.

Water would be needed for soil compaction and dust control during construction, including on access roads, as a standard BMP. Water would be required to a lesser extent during operations for minor dust control and domestic use. During construction, the primary water use would be for dust control during grading activities. As grading activities are completed, overall Project water requirements would decrease, and construction-related dust control would be the primary water use. Portable toilets would be available onsite for the duration of the construction period. There are no habitable buildings onsite that would need potable water or septic systems for waste disposal. The contractor is responsible for establishing either wells or a municipal water tap to meet construction and land management water needs. Once design is complete, a decision can be made on which option best serves the project. If wells are needed, a licensed well driller will be selected, and all appropriate permits will be obtained.

Under the Proposed Action's current layout, Puryear Solar would clear less than 20 acres of trees within the 611-acre project footprint to accommodate the proposed solar facility and reduce shading on the panels. The current layout (subject to change) indicates up to 0.2 acres of non-mechanical tree clearing is proposed within wetlands to reduce shading of the panels. Stumps would be left in place to reduce ground disturbance within the buffer areas. SRC would direct the site design team to create the design to avoid these wetland impacts if possible. If wetland impacts are unavoidable, SRC would apply for and obtain the required permits and comply with any required mitigation. The SWPPP would reflect the proposed tree clearing, including a justification for impact and proposed erosion and sediment control measures to maintain water quality. Tree removal would occur from October 15 to March 31.

Stormwater BMPs would minimize sediment from entering onsite streams and wetlands and prevent sediment migration offsite. To manage stormwater during construction, sediment traps and erosion control silt fences would be utilized. A minimum 30-foot buffer will be used to avoid impacting wetlands and streams. The buffer would be protected by erosion control silt fences. Sediment traps would be placed in strategic drainage areas to prevent sediment from entering onsite wetlands.

Five onsite construction assembly areas (laydown areas) would be required for worker assembly, vehicle parking, and material storage during construction (Figure 2.2-2). A temporary construction trailer, used for material storage and office space, would be parked onsite. Following completion of construction activities, all trailers, unused materials, and construction debris would be removed from the site. No operations or maintenance buildings or other permanent structures would be constructed onsite.

Construction would be sequenced to minimize the time that bare soil within the construction area is exposed. As described above, silt fences would surround the perimeter of the development footprint to be cleared and graded. Other appropriate controls such as temporary cover would be used as needed to minimize soil exposure and prevent eroded soil from leaving the work area. Disturbed areas including but not limited to road shoulders, laydown areas, ditches, and other project-specific locations would be seeded post-construction. If conditions require, soil would be stabilized by mulch or seed. Where required, hay mulch would be applied at three tons per acre and well distributed over the area. Erosion control measures would be inspected and maintained until vegetation in the disturbed areas have returned to the pre-construction conditions or the site is considered permanently stable. As part of National Pollutant Discharge Elimination System (NPDES) permit authorization (see Section 1.4), a site-specific SWPPP would be finalized with the final grading and civil design and would address all construction-related activities prior to construction commencement.

The design of the tracker support structures could vary depending on the final PV technology and vendor selected. Typical installations of this type are constructed using steel support piles. The driven steel pile foundation is typically galvanized and used where high load-bearing capacities are required and would be driven with a hydraulic ram machine. Soil disturbance is restricted to the pile insertion location with temporary disturbance from the hydraulic ram machinery, which is about the size of a small tractor. Adverse soil conditions may necessitate the use of screw piles which are driven into the ground with a truck-mounted auger. Screw piles create a similar soil disturbance footprint as driven piles.

Solar panels would be manufactured offsite 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 most components are placed on their respective foundations and structures, electricians and other workers would run electrical cabling throughout the solar field.

The Project would connect to the existing Eagle Creek, TN 161.69-kV substation via the PBPU's future Eagle Creek Feeder 734 TL. The feeder TL would be constructed as a separate project and is independent of the proposed solar project. PBPU planned to construct the feeder TL before Puryear Solar Project intended to interconnect. PBPU will build the TL regardless of the status of the Puryear Solar Project interconnection. The future Eagle Creek Feeder 734 TL would connect to the Puryear Solar 69-kV substation intended to be built on land in the south-central portion of the Project Site. After the equipment is electrically connected, electrical service would be tested, and motors and their controllers would be checked. As the solar arrays are installed, the balance of the facility would continue to be constructed and installed, and the instrumentation would be installed. Once all the individual systems have been tested, integrated testing of the project would occur.

Within the 611-acre solar facility site, the approximately 349-acre area containing the solar arrays and associated electrical infrastructure would be securely fenced with 6-foot-high chain-link fencing with three strands of barbed wire on the top throughout construction and the operation of the project.

Construction activities would take approximately 8-12 months to complete using a crew of approximately 70-100 people at the peak of construction activity. Work would generally occur six days per week (Monday through Saturday) from 7 am to 5 pm. Additional hours could be necessary to make up schedule deficiencies or to complete critical construction activities. During the Project startup phase, equipment and system testing and similar activities could continue 24 hours per day, 7 days a week.

2.2.3 LPC Electrical Interconnection

The electrical interconnection of the solar facility would occur on the PBPU's Eagle Creek 69-kV TL, and the transfer of electricity to TVA's grid would occur at the Eagle Creek substation. The construction of the PBPU 69-kV is an independent project as it is being pursued by PBPU regardless of the execution of the proposed solar project and is not part of this project.

2.2.3.1 Right-of-Way Clearing

The project does not include any work in the right-of-way. No right-of-way clearing would be required.

2.2.3.2 Transmission Line Construction

The Eagle Creek Feeder 734 TL would be constructed from Puryear Solar to the Eagle Creek substation approximately nine miles east of the Project Site along SR 140 (Figure 1-1). Construction of the feeder TL is not part of the Puryear Solar project.

2.2.3.3 Substation Construction

The Proposed Action includes the construction of an onsite substation owned by Puryear Solar to step up medium-voltage power to high-voltage power for subsequent transfer to PBPU and a PBPU-owned single breaker switchyard. The substation and PBPU switchyard would be near each other located along the southern boundary of the Project Site. The substation would combine all the AC power from the collection circuits and increase its voltage to match the voltage of the connecting transmission line. It would include buses, circuit breakers, disconnect switches, and the main step-up transformer. The high-voltage PBPU-owned switchyard's specific function is to enable the facility to tap into the main transmission line through a radial breaker scheme, which would allow the transmission line to be isolated from the solar array.

The substation and switchyard would occupy less than 10 acres and would consist of a 69-kV main transformer, single 69-kV gen-tie line, and multiple 34.5-kV breakers, manually operated switches, a control enclosure, instrument transformers for metering, and galvanized steel support structures within a 6-foot-tall, fenced enclosure (height subject to change). The control enclosure would measure approximately 15 feet by 40 feet (maximum) and would house the protection and control equipment, metering equipment, automation relay panels, and communication equipment.

Galvanized steel would support most of the substation/switching station equipment. Concrete foundations and embedments for equipment would be installed with trenching machines, concrete trucks and pumpers, vibrators, forklifts, boom trucks, and large cranes. Above-ground and below-ground conduits from this equipment would run to the control enclosure. A station service transformer would be installed for auxiliary AC power requirements, such as operating the solar array tracker motors. Battery banks and chargers would be installed inside the enclosure to provide backup DC power. For personnel safety and equipment protection during faulted conditions, a ground grid would be installed in the area. This would consist of appropriately sized conductors meshed and buried below ground. After the final voltage step-up, the Project would be interconnected to the proposed 69-kV Eagle Creek Feeder 734 TL to connect to the bulk electrical system.

2.2.3.4 Transmission Line Operation and Maintenance

Construction of a new or upgrades to an existing TL are not part of this project. The construction of the PBPU 69-kV feeder TL is an independent project as it is being pursued by PBPU regardless of the execution of the proposed solar project.

2.2.4 Operations

During operation of the solar facility, no major physical disturbance would occur. Routine maintenance would include periodic motor replacement, inverter air filter replacement, fence repair, vegetation control, and periodic array inspection, repairs, and maintenance. Traditional trimming and mowing would be performed periodically (about four mowing events per year) to maintain the vegetation at a height ranging from 6 inches to 2 feet. Selective use of herbicides may also be employed around structures to control weeds. Products would be used per state and federal regulations. To minimize any possibility of runoff or drift when using herbicides, care would be taken to follow manufacturer's directions and avoid herbicide application prior to predicted rainfall events or high winds.

No major physical disturbance would occur because of facility operation. Moving parts of the solar facility would be restricted to the east-to-west facing tracking motion of the solar modules, which amounts to a movement of less than a one-degree angle every few minutes. This movement would barely be 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 distribution system. Except for 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 needed onsite during operations.

The Project Site would not be staffed during operation. However, the site would be inspected weekly. Maintenance would be required biannually. This includes drawing transformer oil samples and identifying physical damage to panels, wiring, and interconnection equipment.

Precipitation in this region is adequate to remove dust and other debris from the PV panels while maintaining energy production. However, to ensure panel performance does not decrease due to buildup of dust and debris, panels would be washed if deemed necessary. Puryear Solar would obtain water from nearby water sources such as wells or hydrants. If no local sources are available, Puryear Solar would truck water to the site. In case of equipment failures, staff would respond as soon as possible.

The site vegetation would be maintained with mechanical equipment and potentially grazing animals to comply with SRC's vegetation management Scope of Work (SOW), allowing for safe and efficient operation of the solar facility. In general, it is expected that four to five vegetation management events would occur during the March to October growing season. SRC reserves the right to use herbicides as needed to maintain safe working conditions at the site and protect/maintain site infrastructure. Typically, herbicide applications would be limited to broadleaf control along fence lines and bare ground spray around inverters, substation, and switchyard. If Puryear Solar decides to self-perform vegetation management, full-time staff would be onsite. Further, to minimize any possibility of runoff or drift when using herbicides, care would be taken to follow manufacturer's directions and avoid herbicide application prior to predicted rainfall events or high winds.

2.2.5 Decommissioning and Reclamation

Following the expiration of the 20-year PPA with TVA, Puryear Solar would reassess the site operation and determine whether to cease operation or attempt to enter into a new PPA or another arrangement. If TVA or another entity is willing to enter into such an agreement, the Project could continue operating. If no commercial arrangement is possible, and if TVA opts not to exercise its option for purchase at the end of the 20-year term, the facilities would be decommissioned and dismantled, and the Project Site restored.

In general, most decommissioned equipment and materials would be recycled. Key components, including the Series 6 or 7 solar modules to be used by Puryear Solar, realize high recycling rates at the component supplier's state-of-the-art recycling facilities. With respect to the Series 6 or 7 solar modules, up to 90 percent of the semiconductor material can be reused in new modules and 90 percent of the glass can be reused in new glass products. Materials that cannot be recycled would be disposed of at approved facilities in accordance with local, state, and federal laws and regulations.

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

- Dismantling and removal of above-ground equipment (solar panels, panel supports, transformers, substation, etc.)
- Removal of below-ground electrical connections
- Removal of posts
- Break-up and removal of concrete pads and foundations
- Abandonment of underground utilities
- Stabilization of site soils per NPDES construction permit (if required for decommissioning activities)
- Scarification of compacted areas within and contiguous to the solar facility

2.3 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

In determining the most suitable parcels for the Project, SRC worked in conjunction with PBPU to determine a general region of its service territory that could support the development of the Project with a planned interconnection to a substation that could handle the electricity load.

With this information in mind, SRC conducted a site search in the general vicinity of the area that PBPU advised might work for the Project. In this search, the SRC site search team utilized software to review the following criteria: stream and wetland mapping, topography maps, biological resources, cultural resource maps, substation and transmission line locations, subsurface geology, land value, road access, and more (Table 2.3-1).

During this search, the SRC site search team reviewed multiple potential alternate sites along with the Project Site. The Project Site was located and determined to be suitable for this solar Project because it contains enough acreage to support the full Project size while alternate sites were not large enough to support. Additionally, the Project Site is flat and would not require substantial grading, and it has enough space to have very minimal impacts to water and biological resources onsite. The Project Site is not affected by substantial flood plains while alternate sites were affected by flood plains. The interconnection opportunity was more favorable for the Project Site compared to alternate possibilities because a PBPU transmission line was previously planned to be built out adjacent to the Project Site and this would allow for onsite POI.

In comparison, alternate sites would have required additional transmission line buildouts that were not already planned to support interconnection. From a desktop search, the Project Site was not affected by any cultural or historical sites. Finally, the cost of acquiring the Project Site was suitable to support the Project while other alternate sites had potential for being more expensive which would have reduced the viability of the Project.

With all these criteria in mind, SRC selected the current Project Site because it best reduced impacts to biological and cultural resources while utilizing an ideal interconnection location. In addition, as part of the proposal/project selection process, TVA considers multiple factors before selecting to pursue a PPA such as cost, schedule, developer’s experience, environmental and cultural resources, transmission, and economic development.

Table 2.3-1. Alternative Site Screening Process

Consideration	Puryear	Potential Alternate Sites
Suitable Landscape	Yes	Yes
Suitably Sized and Contiguous Parcels	Yes	No
Suitable Geology	Yes	Yes
Minimal Biological Impacts	Yes	No
Minimal Stream, Floodplain & Wetland Impacts	Yes	No
Minimal Listed Species Impacts	Yes	Yes
Minimal Cultural Resources Impacts	Yes	No
Avoids Major Network Upgrades	Yes	No
Cost of Land Acquisition	Yes	No
Suitable Interconnection Requirements	Yes	No
Viable Access to Property	Yes	Yes

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 at the proposed solar facility in Henry County, Tennessee. The analysis of impacts in this EA is based on current and potential future conditions on the property and within the surrounding region. The summary and comparison of impacts by alternative for each resource area evaluated are in Table 2.4-1.

Table 2.4-1. Summary and Comparison of Alternatives by Resource Area

Resource Area	Impacts from the No Action Alternative (Status Quo)	Impacts of the Proposed Action
Land Use	No direct impacts anticipated. Land would remain primarily farmland and undeveloped. Indirect impacts are possible if current land uses are converted to residential or become abandoned over time.	Minor direct adverse impacts to the Project Site. Land use on the Project Site would change from agricultural to industrial. As a relatively small portion of a very large land use category in the vicinity would be lost, the Proposed Action would have an overall minor adverse impact. Henry County does not require building permits in unincorporated parts of the County.
Geology, Soils and Prime Farmland	No direct impacts anticipated. Indirect impacts to geologic and paleontological resources are possible over time if current land uses change as a result of human activity. Continuing agricultural practices, if not properly implemented, could result in soil degradation.	Minor adverse impacts to geology and paleontology at excavation locations within the Project Site. Minor adverse impacts to soils within the Project Site related to erosion and sedimentation from site construction and operation, in addition to maintenance activities. Minor adverse reduction in the percentage of prime farmland in Henry County. No indirect impacts anticipated within the Project Site.
Water Resources	No direct impacts anticipated. Indirect impacts to water resources could result due to the continuing use of the Project Site as agricultural land. Increases in erosion and sediment runoff could occur if farming practices were not maintained to prevent erosion and runoff. Erosion and sedimentation on the Project Site could alter runoff patterns and impact downstream surface water quality. In addition, if chemical fertilizers and pesticides are continually used, impacts to groundwater may occur if the local aquifers are recharged from surface water runoff.	Minor permanent impacts to water resources may occur to forested wetlands if the SRC project design team cannot design the layout to avoid all wetland impacts. The current design may result in up to 0.2 acres of wetland impact. Wetland impacts would be considered insignificant on a watershed scale with the adherence to CWA 401/404 permitting and mitigation. All required permits will be secured before construction begins. There would be limited ground disturbance required for initial construction, operation, maintenance, or decommissioning. With implementation of mitigation measures, there would be only minor impacts on floodplains and their natural and beneficial values. Establishing buffers as specified in TVA's BMPs will help improve water quality and habitat conditions. If functioning groundwater wells are present, water may be used to control fugitive dust. An analysis of the well's capacity to provide sufficient water would be done prior to using the water. If groundwater from the project site is available and is used, the volume extracted would not exceed a level that would impact groundwater. Thus, no indirect impacts to groundwater are anticipated.

Resource Area	Impacts from the No Action Alternative (Status Quo)	Impacts of the Proposed Action
Biological Resources	No direct impacts anticipated. Ongoing agricultural activity would continue and impacts to biological resources would remain the same as they are currently. If the land is taken out of agricultural use and restored to a natural condition, there would be direct and indirect beneficial impacts. Similarity, negative direct and indirect impacts could occur if the land is converted to residential or industrial uses.	**Vegetation:** Vegetation impacts would be minor. Conversion of 341 acres of farmland to native and non-invasive herbaceous land may result in some improvement for wildlife. Up to 20 acres of trees on the Project site would be converted to herbaceous land representing a small loss of forested land. **Wildlife:** Overall, there would be minor direct and indirect impacts on wildlife. During construction, mobile species would be able to avoid construction activities by moving offsite. Once construction is completed, displaced species that can use industrialized/urbanized landscapes could move back onsite. **Rare, Threatened & Endangered Species:** No state or federal listed species were found onsite, thus direct impacts to these species are not anticipated. Minor adverse impacts to federally listed bat species may occur due to removal of potentially suitable bat roosting and foraging habitat.
Visual Resources	No direct or indirect impacts anticipated. Potential indirect impacts may occur if current land use changes to open field successional, residential, or industrial development over time.	Construction of the Project would convert farmland to commercial/industrial land use and alter the visual character of the Project Site. During construction there would be temporary visual impacts from the construction machinery. When operational, the panels would be visible from the roads that border the Project. Puryear Solar would coordinate with Henry County to determine the appropriate screening measures necessary to further minimize any potential visual impacts from the Project.

Resource Area	Impacts from the No Action Alternative (Status Quo)	Impacts of the Proposed Action
Noise	No direct or indirect impacts anticipated. The land would remain primarily agricultural. Potential minor direct impacts if current land use changes to residential or industrial development over time.	Construction noise would cause temporary and short-term adverse impacts to the ambient sound environment near the Project Site. The loudest noise would be due to pile driving but would be minimal and short-term. Negligible adverse impacts associated with operation.
Air Quality and Climate Change	No direct or indirect impacts anticipated from ongoing agricultural activities. Some direct and indirect impacts may occur if land use changes.	Minor direct and indirect impacts resulting from localized dust and exhaust fumes from equipment during construction. Negligible impacts due to operation activities.
Cultural Resources	No direct or indirect impacts anticipated. Some direct and indirect impacts may occur If land use changes.	No NRHP archaeological or architectural sites were identified. Thus, no impacts to cultural resources are anticipated.
Natural Areas and Recreation	No direct or indirect impacts anticipated. Some direct or indirect impacts may occur If land use changes.	With no natural or recreational areas within 5 miles of the Project Site, there would not be any direct or indirect impact on these resources.
Utilities	No direct or indirect impacts anticipated. Some direct or indirect impacts may occur If existing utilities are expanded.	No direct or indirect impacts anticipated. Constructing the project would not significantly increase the need for any utilities.
Waste Management	No direct or indirect impacts anticipated.	No direct or indirect impacts anticipated. Constructing the project would not result in a significant increase in waste that would create concerns at the landfills used for this project.

Resource Area	Impacts from the No Action Alternative (Status Quo)	Impacts of the Proposed Action
Public and Occupational Health and Safety	No direct or indirect impacts anticipated.	Minor direct and indirect impacts may occur for workers on the project site during construction. This would be mitigated by implementing standard construction site BMPs and maintaining health and safety plans to comply with OSHA regulations.
Transportation	No direct or indirect impacts anticipated.	Minor direct and indirect impacts may occur for motorists using SR 140 during work hours due to increased traffic. Once construction is complete, there would be no direct or indirect impacts to transportation during the operational phase.
Socioeconomics	No direct or indirect impacts anticipated.	Minor direct and indirect impacts may occur due to the increased number of workers on the Project Site during construction. These impacts may be beneficial to local businesses.
Environmental Justice	No direct or indirect impacts anticipated.	The potential exists for there to be a minority and low-income population near the Project Site. The minor impacts to surface and groundwater, biological, and cultural resources would be offset by buffers protecting the resources and would not have an adverse impact on minority or low-income populations. None of the impacts mentioned above rises to a level where they create a disproportionately high and adverse human health or environmental any EJ populations living near the Project Site.

2.5 BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

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

2.5.1 Standard Practices and Routine Measures

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

- Geology and Soils
    - Utilize standard BMPs, as described in A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities – Revision 4 (TVA, 2022) to minimize erosion during construction, operation, and maintenance activities.
    - Install silt fences, sedimentation basins, and other appropriate controls as needed to minimize erosion and sedimentation.
    - Implement other soil stabilization and vegetation management to minimize soil exposure and limit soil erosion from the project site.
    - Make an effort to balance cut-and-fill quantities to alleviate the transportation of soils offsite during construction if necessary.
- Water Resources
    - Comply with the terms of the SWPPP prepared as part of the TDEC permitting process.
    - Maintain existing landscape and aquatic resource buffers.
    - Implement other routine BMPs as necessary, such as nonmechanical tree removal within surface water buffers, placement of silt fences and sediment traps along buffer edges, selective herbicide treatment to restrict application near receiving water features, and proper vehicle maintenance to reduce the potential for adverse impacts to surface water and groundwater as identified in TVA (n.d.).
    - Use only U.S. Environmental Protection Agency (USEPA)-registered and TVA-approved herbicides per label directions designed to restrict applications near receiving waters and prevent unacceptable aquatic impacts in areas requiring chemical treatment.
    - Design the final layout to minimize direct and indirect impacts on aquatic features.
    - Comply with the conditions of the TDEC Section 401 and USACE 404 of the Clean Water Act (CWA) (33 U.S.C. § 1251 et seq.) permits and required compensatory mitigation, as applicable.
    - Protect intermittent streams by implementing Standard Stream Protection (Category A), Protection of Important Steams, Springs, and Sinkholes (Category B), or Protection of Unique Habitat (Category C) as defined by TVA (2017b).
    - Any manual tree cutting in wetlands will leave the stumps in place to preserve hydric soils.
    - Ensure construction and maintenance activities occur during dry periods as much as possible.
    - If hauled offsite for disposal, excavated material and debris when the facility is decommissioned and dismantled would be spoiled outside 100-year floodways.

    - The solar panels would be elevated at least one foot above the 100-year flood elevation.
    - The stormwater basin that would be in the 100-year floodplain of the unnamed tributary of the East Fork Clarks River and serving Area 4 would be designed to withstand flooding with minimum damage.
    - Ensure construction or improvement of access roads within 100-year floodplains would be done in such a manner that upstream flood elevations would not be increased by more than one foot.
- Biological Resources
    - Revegetate with native and/or noninvasive vegetation to reintroduce habitat, reduce erosion, and limit the spread of invasive species consistent with EO 13112 (Invasive Species) for revegetating with noninvasive plant species as defined by TVA (2017a).
    - Follow USFWS recommendations regarding biological resources, including pollinator species.
    - Use downward facing and timer- and/or motion-activated lighting to limit attracting wildlife, particularly migratory birds, and bats.
    - Instruct personnel on wildlife resource protection measures, including (1) applicable federal and state laws such as those that prohibit animal disturbance, collection, or removal, (2) the importance of protecting wildlife resources, and (3) avoiding vegetation disturbance in undisturbed and buffer areas.
    - Conduct tree clearing only during the winter window (October 15 – March 31) when federally protected bats are not present.
- Visual Resources
    - If buffers are required by the county or state, Puryear Solar would install landscape buffers along the Project Site boundary to minimize visual impacts from the proposed solar facility.
    - Use downward-facing and timer- and/or motion-activated lighting to minimize impacts to surrounding areas.
- Noise
    - Limit construction activities primarily to daytime hours and ensure that heavy equipment, machinery, and vehicles utilized at the Project Site meet all federal, state, and local noise requirements.
- Air Quality and GHG Emissions
    - Comply with the conditions of the Tennessee Department of Agriculture, Division of Forestry burn permits if burning of vegetative debris is required and use BMPs such as periodic watering, covering open-body trucks, and establishing a speed limit to mitigate fugitive dust.

- Waste Management
    - Develop and implement various plans and programs to ensure the safe handling, storage, and use of hazardous materials.
- Public and Occupational Health and Safety
    - Implement BMPs for site safety management to minimize potential risks to workers.
- Transportation
    - Implement staggered work shifts during daylight hours to manage traffic flow near the Project Site if needed.

2.6 THE PREFERRED ALTERNATIVE

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

CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

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

In addition to the action alternative identified in Chapter 2, this analysis also considers the past, present, and reasonably foreseeable future actions (RFFAs) listed in Table 3.1-1. These actions were identified within the overall 5-mile geographic area of analysis surrounding the Proposed Action as having the potential to, in aggregate, result in larger and potentially adverse effects to the resources of concern. Potential indirect effects for resources in which adverse effects from the proposed project are anticipated are discussed in each resource section.

Table 3.1-1. Summary of other past, present, or reasonably foreseeable future actions within a 5-mile radius of the Action Alternatives Action Description Project Type

Action	Local	State	Federal
Past	Based on imagery from Google Earth Pro, there has been little change in land use since 1998.	There is no known significant past activity within 5 miles of the Project Site.	There is no known significant past activity within 5 miles of the Project Site.
Present	Based on imagery from Google Earth Pro, there has been little change in land use since 1998.	There is no known present activity planned within 5 miles of the Project Site.	There is no known present activity planned within 5 miles of the Project Site.
Future	The City of Paris & Henry County recently completed purchasing 400-acre industrial park 10 miles south of the proposed Project Site.	There is no known future activity planned within five miles of the Project Site.	There is no known future activity planned within five miles of the Project Site.

3.1 LAND USE

This section describes an overview of the 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 in Henry County, Tennessee, approximately 10 miles north of the City of Paris, Tennessee, along SR 140 (Figure 1-1). The City of Murray, Kentucky, is located approximately 11 miles north of the Project Site. The Project Site is not part of any recognized metropolitan area.

3.1.1 Affected Environment – Land Use

Land use is defined as the way people use and develop land, including uses such as agricultural, residential, recreational, and industrial. 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 in an unincorporated part of Henry County. The County does not have local zoning regulations in unincorporated areas of the county and building permits are not required.

The National Land Cover database classifications show the Project Site as primarily cultivated crops and hay/pasture as the dominant land uses with lesser amounts of deciduous forested and mixed forested (Figure 3.1-1). The Project Site consists of nearly flat terrain across the Project Site and ranges in elevation from approximately 570 to 630 feet above mean sea level (msl). The East Fork of the Clark’s River crosses a portion of the western part of the project site.

The only structure on the project site is a transverse crib barn approximately 1,620 feet north of SR 140 on Old Paris Murray Road. Scattered residences and farms surround the Project Site.

Land use to the north, west, and south of the Project Site is also primarily agricultural (cultivated crops, hay/pasture). A mostly forested area is to the east of the Project Site. Low-density rural residential development surrounds the Project Site to the north, west and south. The City of Puryear is approximately 1 mile to the west. There is no nearby industrial development.

3.1.2 Environmental Consequences – Land Use

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

3.1.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed. There would not be any project-related impacts to land use. Existing land use would be expected to remain primarily farmland.

3.1.2.2 Proposed Action

Land use on the Project Site would be converted from agricultural to industrial. Figure 2.2-2 shows the Proposed Project layout of the solar array and associated facilities; Figure 2.2-3 shows the proposed ground disturbance (both temporary and permanent) and exclusion areas. Within the Project Site, jurisdictional streams and wetlands and culturally sensitive areas would be avoided except for the possible loss of 0.2 acres of wetland.

The surrounding area is largely agricultural and undeveloped with some low-density rural residential areas and is not likely to change significantly over the next 20 years. As a relatively small portion of a very large land use category in the vicinity would be lost, the Proposed Action would have an overall minor adverse impact.

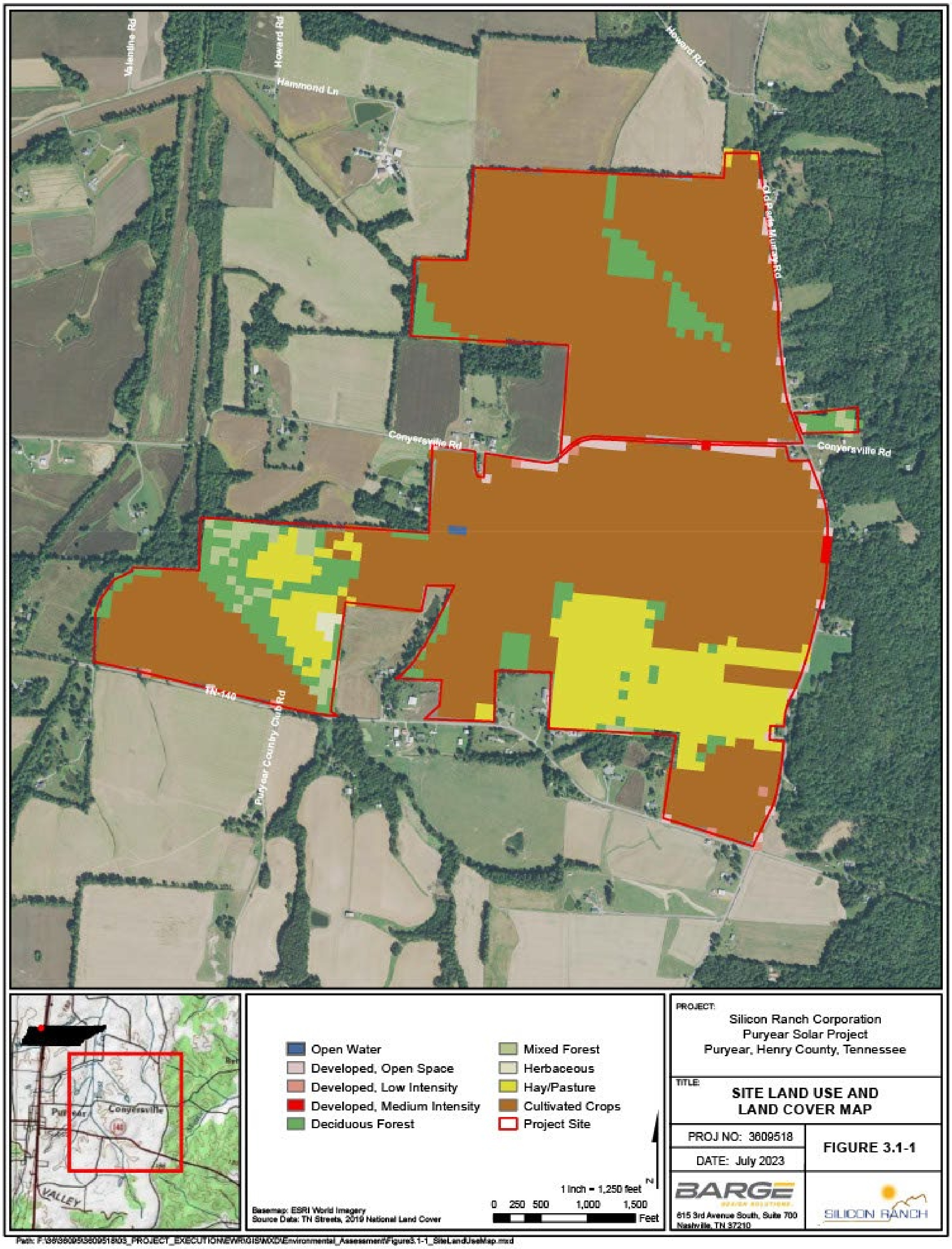


Figure 3.1-1. Site Land Use and Land Cover Map

Decommissioning of the solar facility would remove above-ground equipment, concrete pads and foundations, posts, and below-ground electrical connections from the Project Site. Some underground utilities may be abandoned in place. Reclamation activities, including breaking up soil compacted areas, could allow a large portion of the Project Site to be returned to agricultural use. The activities associated with the Proposed Action would not have any indirect effects on land use within the Project Site.

3.2 GEOLOGY, SOILS, AND PRIME FARMLAND

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

3.2.1 Affected Environment – Geology, Soils, and Prime Farmlands

3.2.1.1 Geology

The Project Site is in the Gulf Coastal Plain section of the Coastal Plain physiographic province in West Tennessee. As shown in Figure 3.2-1, the Site is primarily underlain Quaternary-aged loess deposits. The loess deposits that characterize the area consist of floodplain silts that were distributed throughout the eastern portion of the Mississippi River alluvial valley by dust storms that occurred during the last ice age (Dockery and Thompson, 2016). These deposits consist of clayey and sandy silt up to 4 feet thick within the Project Site.

3.2.1.2 Paleontology

Paleontological resources are likely present in Western Tennessee. The Project Site was flooded by the ocean during the Cretaceous Age leaving behind fossil beds including dinosaurs.

3.2.1.3 Geological Hazards

Potentially hazardous geological conditions can include the following: landslides, volcanoes, earthquakes/seismic activity, and subsidence/sinkholes. The Project Site is located on relatively stable ground. No potential geologic hazards were identified. No significant slopes are present within several miles; therefore, landslides are not a potential risk. No volcanoes are present within several hundred miles of the project site. Quaternary-aged loess deposits do not develop Karst topography seen in Middle and East Tennessee; thus, no sinkholes are found in the vicinity of the Project Site.

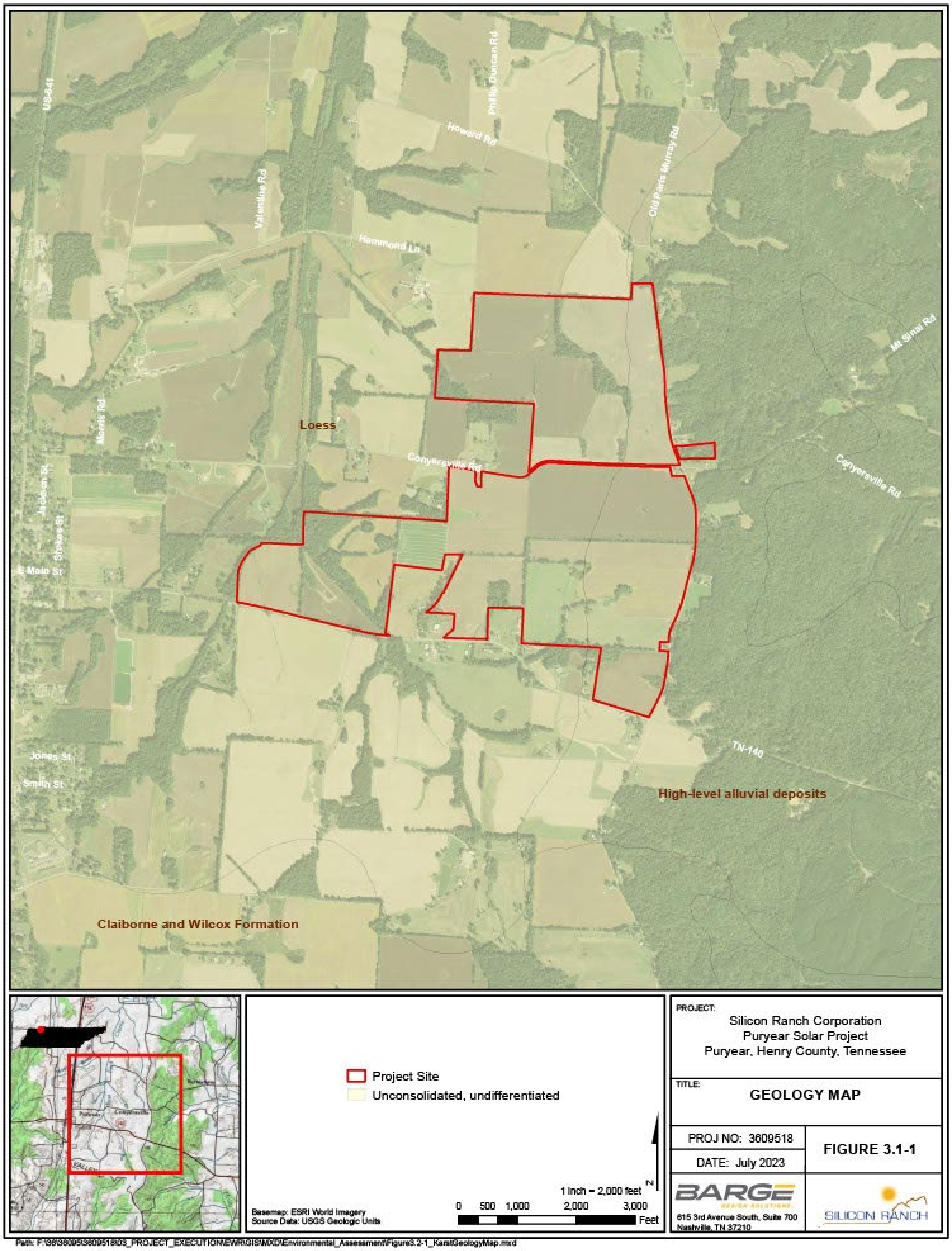


Figure 3.2-1. Geology Map

Seismic activity at the Project Site could cause surface faulting, ground motion, ground deformation, and conditions including liquefaction and subsidence. The Modified Mercalli Scale is used within the United States to measure the intensity of an earthquake. The scale arbitrarily quantifies the effects of an earthquake based on the observed effects on people, the natural environment, and development. Mercalli intensities are measured on a scale of I through XII, with I denoting the weakest intensity and XII denoting the strongest intensity. The lower degrees of the scale generally deal with how people feel the earthquake. The higher numbers of the scale are based on observed structural damage. This value is translated into a peak ground acceleration (PGA) value to measure the maximum force experienced. The PGA is the maximum acceleration experienced by a building or object at ground level during an earthquake on uniform, firm-rock site conditions. The PGA is measured in terms of percent of "g," the acceleration due to gravity. The United States Geological Survey (USGS) Earthquake Hazards Program publishes a seismic hazard map (Figure 3.2-2) that displays the PGA with 10 percent (1 in 500-year event) probability of exceedance in 50 years (USGS, n.d.). The potential ground motion for the proposed Project Site is in the 15-20%-g range for a PGA with a 10 percent probability of exceedance within 50 years (USGS, n.d.). This indicates a relatively low chance of an earthquake causing damage to the Project Site.

3.2.1.4 Soils

A total of 22 soil units consisting of loams, silt loams, silty clay loams, and complexes were identified onsite (Figure 3.2-3). Grenada silt loam, 2 to 5 percent slopes, eroded (GrB2) is the dominant soil unit for the project, which accounts for 36.4 percent of the Project Site. Providence silt loam, 5 to 8 percent slopes, moderately eroded (PoC2) is the second most dominant soil unit, which accounts for 10 percent of the Project Site. The complete Soil Survey can be found in Appendix B of Summary of Environmental Features for the Puryear Solar Project (Appendix B).

Table 3.2-1 provides an overview of the soil characteristics. The percent slopes of the soils indicate that the majority of the Project Site is gently sloping, moderately well drained, and the soils are not prone to flooding or ponding. None of the 22 soil units are listed as potentially hydric for Henry County. However, the Chenneby silt loam, 0 to 2 percent slopes, occasionally flooded (Cn), Enville silt loam, 0 to 2 percent slopes, occasionally flooded (Ea), and Iuka loam, 0 to 2 percent slopes, occasionally flooded (Ik) are known to flood.

3.2.1.5 Prime Farmland

The National Soil Survey Handbook (NSSH) and 7 CFR 657 Prime and Unique Farmlands, defines Prime Farmlands as follows: "Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be in cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air.

Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding" (USDA, n.d.-a)

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

As detailed in Table 3.2-1, 142 acres of the 611-acre Project Site (23.2%) are prime farmland. Only seven soil types are classified as prime farmland: Calloway silt loam, Feliciana silt loam, Chenneby silt loam, Iuka silt loams, Providence silt loam, Enville silt loam, and the Calloway-Kurk complex. The Chenneby silt loam, 0 to 2 percent slopes, occasionally flooded soil type only qualified as a prime farmland if the land is drained. The Calloway-Kurk complex, 0 to 2 percent slopes only qualifies as a prime farmland if it is protected from flooding or not frequently flooded. The remaining 15 non-prime farmland soil types comprise 487 acres (77.4%).

Farmland of Statewide Importance is not federally recognized prime farmland, but land that is important in the production of food, feed, fiber, forage, and oil seed crops. Individual states delineate their own important farmland (USDA, n.d.). Farmland of Statewide Importance usually has areas of soils that nearly meet the requirements for prime farmland and produce high yields of crops when treated and managed using sound farming methods. Only Lexington silt loam, 5 to 8 percent slopes, moderately eroded soil is designated as Farmland of Statewide Importance. It accounts for 12.3 acres (2.0%) of the project site.

Table 3.2-2 documents the changes in the number of farms and acreage of land in farms from 2012 to 2017 for Henry County and Tennessee. The FPPA requires federal agencies to consider the adverse effects of their actions on prime or unique farmlands. The purpose of the Act is “to minimize the extent to which Federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses…” (USDA, n.d.-b).

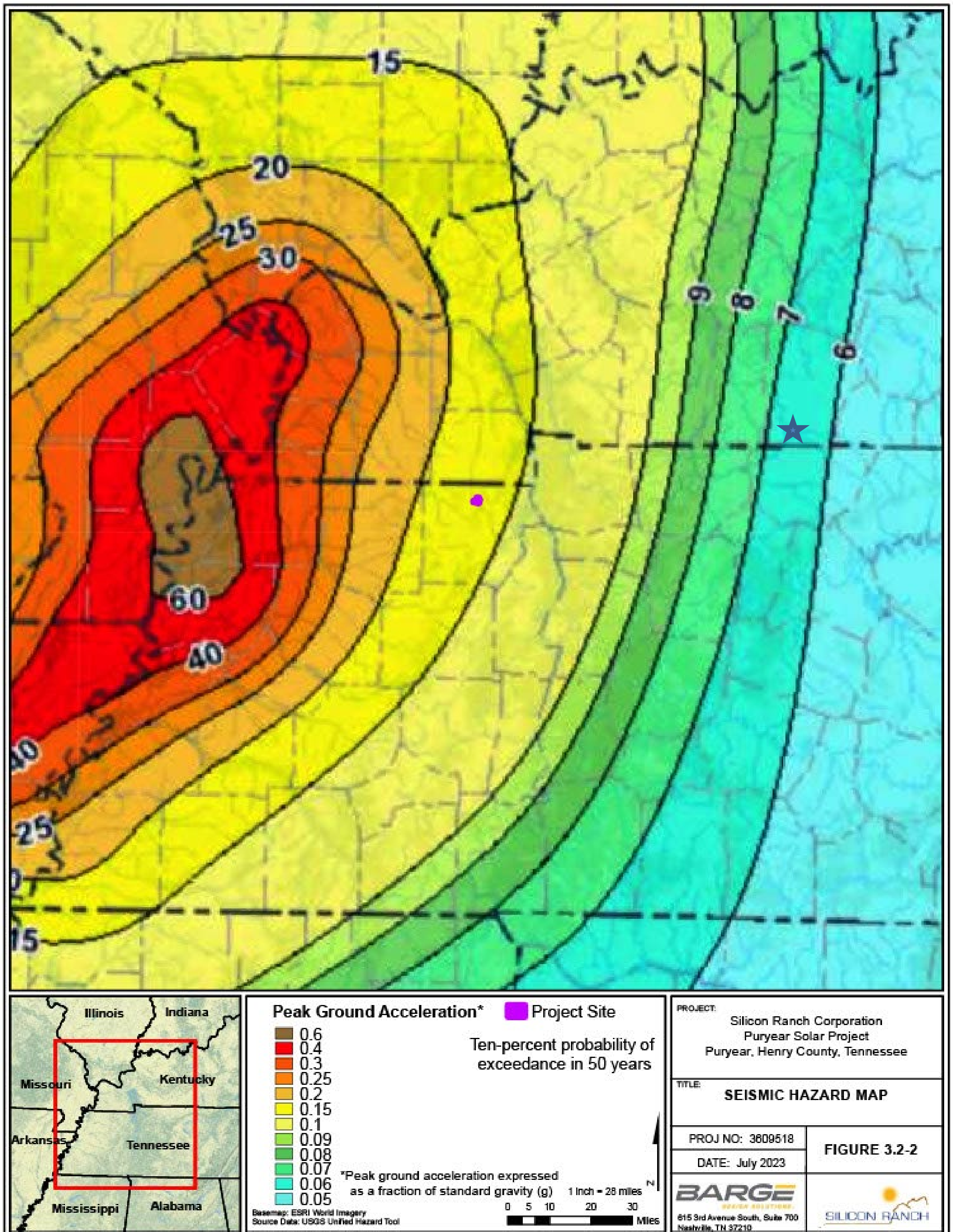


Figure 3.2-2. Earthquake hazard map showing peak ground accelerations having a 10 percent probability of being exceeded in 50 years, for a firm rock site.
Source: https://www.usgs.gov/maps/seismic-hazard-maps-conterminous-united-states-2014

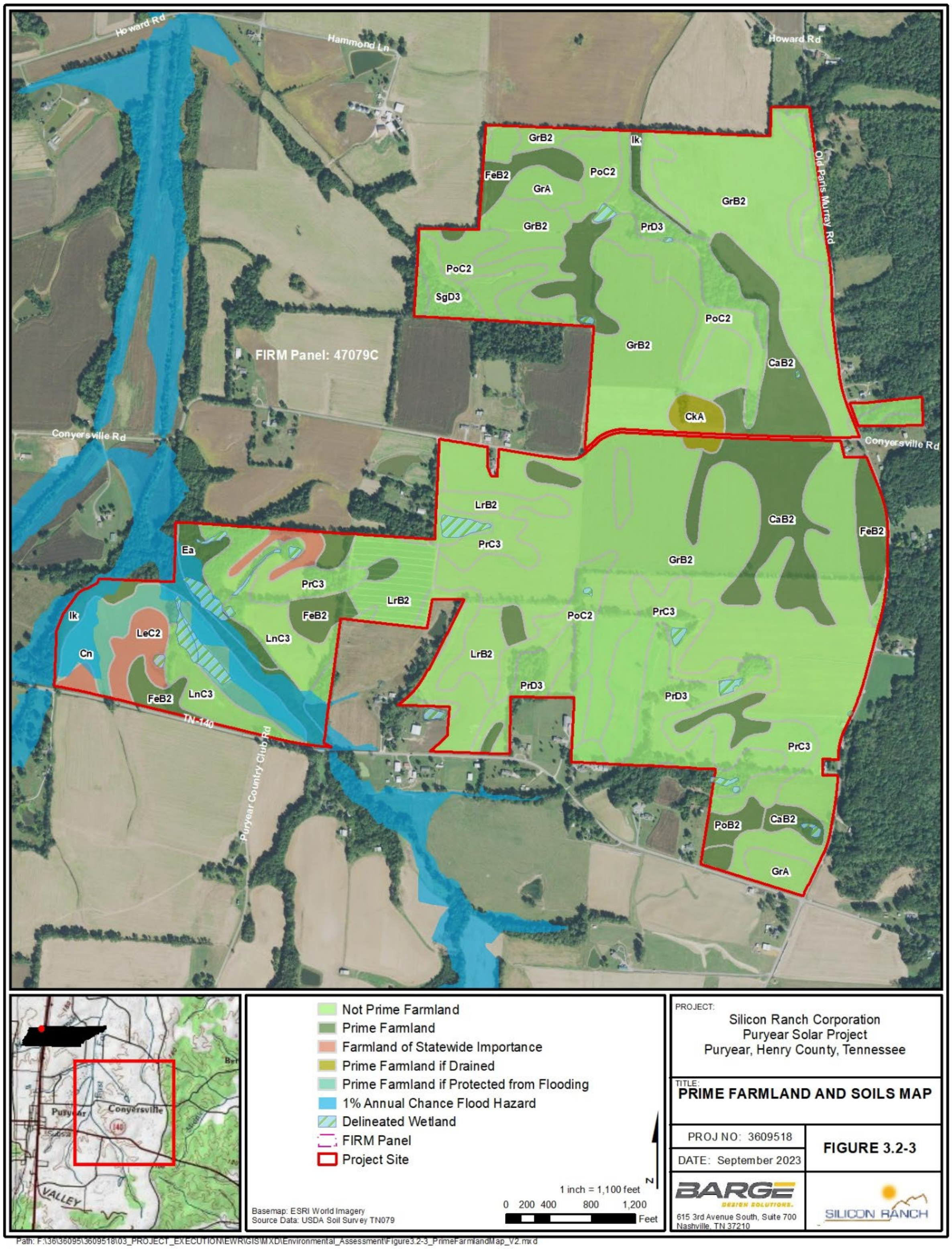


Figure 3.2-3. Prime Farmland, Floodplains, Wetlands, and Soils Map

Table 3.2-1. Soil Type Occurrence on the Project Site

Soil Type	Acreage/ Percent	Prime Farmland	Parent Material	Slope	Runoff Class	Drainage	Flooding/ Ponding	Hydric
Grenada silt loam, 2 to 5 percent slopes, eroded (GrB2)	228.9 (36.4%)	No	Loess	Gently Sloping	Low	Mod well drained	No/No	No
Providence silt loam, 5 to 8 percent slopes, moderately eroded (PoC2)	62.9 (10.0%)	No	Loess over loamy marine deposits	Gently Sloping	Very High	Mod well drained	No/No	No
Calloway silt loam, 2 to 5 percent slopes, moderately eroded (CaB2)	58.8 (9.4%)	Yes	Fine-silty noncalcareous loess	Gently Sloping	Low	Well drained	No/No	No
Providence silty clay loam, 5 to 8 percent slopes, severely eroded (PrC3)	52.1 (8.3%)	No	Loess over loamy marine deposits	Gently Sloping	Very High	Mod well drained	No/No	No
Providence silty clay loam, 8 to 12 percent slopes, severely eroded (PrD3)	44.8 (7.1%)	No	Loess over loamy marine deposits	Strongly Sloping	Very High	Mod well drained	No/No	No
Feliciana silt loam, 2 to 5 percent slopes, moderately eroded, northern phase (FeB2)	25.6 (4.1%)	Yes	Fine-silty noncalcareous loess	Gently Sloping	Low	Well drained	No/No	No
Loring silt loam, 2 to 5 percent slopes, eroded (LrB2)	24.6 (3.9%)	No	Loess over loamy marine deposits	Gently Sloping	Low	Mod well drained	No/No	No
Lexington silty clay loam, 5 to 8 percent slopes, severely eroded (LnC3)	21.9 (3.5%)	No	Loess over marine deposits	Gently Sloping	Medium	Well drained	No/No	No

Table 3.2-1. Soil Type Occurrence on the Project Site (cont.)

Soil Type	Acreage/ Percent	Prime Farmland	Parent Material	Slope	Runoff Class	Drainage	Flooding/ Ponding	Hydric
Chenneby silt loam, 0 to 2 percent slopes, occasionally flooded (Cn)	20 (3.2%)	Yes*	Silty alluvium over loamy alluvium	Nearly Level	Very High	Somewhat poorly drained	Occasional, None /None	No
Smithdale-Lexington complex, 8 to 12 percent slopes, severely eroded (SgD3)	16.1 (2.6%)	No	Loamy marine deposits	Strongly Sloping	Medium	Well drained	No/No	No
Iuka loam, 0 to 2 percent slopes, occasionally flooded (Ik)	14.4 (2.3%)	Yes	Coarse-loamy allivium	Nearly Level	Low	Mod well drained	Occasional, None /No	No
Lexington silt loam, 5 to 8 percent slopes, moderately eroded (LeC2)	12.3 (2.0%)	No^	Loess over marine deposits	Gently Sloping	Low	Well drained	No/ No	No
Grenada silt loam, 0 to 2 percent slopes (GrA)	11.1 (1.8%)	No	Loess	Nearly level	Low	Mod well drained	No/No	No
Providence silt loam, 2 to 5 percent slopes, moderately eroded, north (PoB2)	10.4 (1.7%)	Yes	Loess over marine deposits	Gently Sloping	Medium	Mod well drained	No/No	No
Enville silt loam, 0 to 2 percent slopes, occasionally flooded (Ea)	8.1 (1.3%)	Yes	Coarse-loamy alluvium over sandy alluvium	Nearly Level	Low	Somewhat poorly drained	Occasional, None /None	No
Calloway-Kurk complex, 0 to 2 percent slopes (CkA)	4.7 (0.8%)	Yes**	Loess/Loess over fluviomarine deposits	Nearly Level	Very Low/Very High	Somewhat poorly drained	None/None	No

Table 3.2-1. Soil Type Occurrence on the Project Site (cont.)

Soil Type	Acreage/ Percent	Prime Farmland	Parent Material	Slope	Runoff Class	Drainage	Flooding/ Ponding	Hydric
Smithdale loam, 12 to 25 percent slopes, eroded (SeE2)	4 (0.6%)	No	Loamy marine deposits	Mod Steep	Medium	Well drained	No/No	No
Providence silt loam, 8 to 12 percent slopes, moderately eroded (PoD2)	3.8 (0.6%)	No	Loess over loamy marine deposits	Strongly Sloping	Very High	Mod well drained	No/No	No
Hapludults-Gullied land complex, very steep (HgF)	2 (0.3%)	No	Loess and/or loamy marine deposits	Very Steep	High	Well drained	No/No	No
Smithdale-Lexington complex, 12 to 25 percent slopes, eroded (SgE2)	1.1 (0.2%)	No	Loamy marine deposits/ Loess over marine deposits	Mod Steep	Medium	Well drained	No/No	No
Smithdale, Toinette and Luverne soils, 25 to 60 percent slopes (STF)	0.8 (0.1%)	No	Loamy marine deposits	Steep	High	Well drained	No/No	No
Lexington silty clay loam, 2 to 5 percent slopes, severely eroded (LnB3)	0.5 (0.1%)	No	Loess over marine deposits	Gently Sloping	Low	Well drained	No/No	No

* If protected from flooding or not frequently flooded during the growing season

** If drained

^ Farmland of Statewide Importance

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

	Number of Farms		Change 2012 - 2017		Land in Farms (Acres)		Change 2012 - 2017
	2012	2017			2012	2017	
Henry County	826	710	-116 (-14%)		204,557	203,991	-566 (-0.28%)
Tennessee	68,050	69,983	+1,933 (+ 2.8%)		10,867,812	10,874,238	+6426 (+0.6%)

Source: https://www.nass.usda.gov/AgCensus/

3.2.2 Environmental Consequences – Geology, Soils, and Prime Farmlands

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

3.2.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed. There would not be any direct or indirect project-related impacts on geological, paleontological, or soil resources or prime farmlands. Existing land use would be expected to remain a mix of farmland and forested areas. If current land use remains unchanged, soil impacts from continued agricultural use could result from a depletion of nutrients, causing minor changes to the site. Should the site be developed for some other purpose than agricultural use, changes to the soils onsite and possibly the geology could occur.

3.2.2.2 Proposed Action

Under the Proposed Action, construction and operation of the Project could result in minor direct impacts to geology and soil resources by contributing to erosion and sedimentation, and in the conversion of approximately 22.6 percent of the Project Site's prime farmland. Approximately 341 acres of agricultural land, including 56 acres of prime farmland, and 20-25 acres of forested land would be cleared and permanently impacted. Clearing and grading would disturb existing soil profiles and any surficial paleontological resources. Both grading and mowing would cause minor, localized increases in erosion and sedimentation.

Geology and Paleontology

Under the Proposed Action, minor impacts to geology could occur. The solar arrays would be supported by steel piles that would be mechanically driven into the ground to a depth of 6 to 9 feet. Trenching depths of approximately 2 to 3 feet would also be required for underground wiring connections between solar panels. Onsite drainage basins would be shallow and, to the extent feasible, utilize the existing terrain without requiring extensive excavation. The PV panels would be connected with underground wiring placed in excavated trenches and backfilled with Project Site native soil. Due to the small sizes of the subsurface disturbances, only minor direct impacts and no indirect impacts to potential subsurface geological resources would be anticipated.

As excavation would be limited, only minor direct impacts and no indirect impacts to geological and paleontological resources would be anticipated. Should paleontological resources be exposed during site construction (i.e., grading and foundation placement) or operation activities, a paleontological expert would be consulted to determine the nature of the paleontological resources, recover these resources, analyze the potential for additional impacts, and develop and implement a recovery plan/mitigation strategy. Construction of the substation and switchyard would occur within the footprint of the Project Site and result in minor direct impacts and not indirect impacts to geological and paleontological resources.

Geologic Hazards

Hazards resulting from geological conditions would be minor because the project site is in a relatively stable geologic setting. There is a moderate potential for minor to moderate intensity seismic activity. The facility would be designed to comply with applicable seismic standards prescribed in state building codes. A seismic event could cause minor impacts to the Project Site and equipment on the site. The Project could be subject to potential adverse effects from ground failure associated with liquefaction during a strong seismic event. Structural damage to PV panels, PV panel support structures, and other associated equipment could occur. Since the site would not be staffed during operation, potential damage to onsite structures would pose minimal human risk. Geologic hazard impacts on the site would be unlikely to impact offsite resources. No indirect impacts are anticipated.

Soils

Site preparation and construction of the solar arrays, substation, and switchyard may include a minimal amount of grading. Any excess topsoil would be stockpiled and redistributed over the site as needed. Trenching depths of approximately 2 to 3 feet would also be required for underground wiring connections between solar panels. Soil from this work would be used to refill the trenches once the electrical wiring is in place. Additionally portions of the site could be temporarily affected during mowing/vegetative maintenance and construction activities. Soils located in areas where only vegetation clearing is proposed would remain unless a circuit trench or foundation is constructed. It is unlikely that offsite soil resources would be necessary for construction. However, if borrow materials, such as sand and gravel, or other aggregate are necessary during site preparation, resources may be obtained from nearby previously permitted offsite sources.

Due to the project disturbance area being greater than one acre, a Construction General Permit and NPDES Permit for discharges of stormwater associated with construction activities would be required. Application for the permit would require submission of a SWPPP describing the management practices that would be utilized during construction to prevent erosion and runoff and reduce pollutants in stormwater discharges from the Project Site. Following construction, the implementation of soil stabilization and vegetation management measures would reduce the potential for erosion impacts during site operations.

Minor disturbance to soils would occur during operation of the Proposed Action. Creating new semi-pervious internal access roads and impervious, panel footings, and foundations for the inverter stations and substation, would result in a minor increase in stormwater runoff and potentially an increase in soil erosion. The use of BMPs such as soil erosion and sediment control measures would minimize the potential for increased soil erosion and runoff and result in minor indirect impacts to soils.

During maintenance of the solar facility, minor disturbances could occur to soils. The Proposed Action would implement an integrated vegetation management plan including the use of mechanical equipment and potentially grazing animals, along with chemical controls as needed. Mechanized landscaping may include the use of lawnmowers, weed eaters, etc. Traditional trimming and mowing would be performed periodically to maintain the vegetation at a height ranging from 6 inches to 2 feet. Electric-powered equipment such as utility vehicles may be used on the site during operations and maintenance. Selective use of herbicides may also be employed around structures to control weeds. Products would be applied per local, state, and federal regulations. Weather events, e.g., predicted rainfall or high winds, would be considered prior to the application of herbicides in efforts to reduce potential runoff or drift.

Prime Farmland

The construction and operation of the Proposed Action would result in temporary adverse effects to prime farmland. Approximately 142 of the 611 acres (22.6%) are considered prime farmland (Table 3.2-1). Most of the solar arrays, which would cover approximately 349 fenced acres within the Project Site, would be installed on 56 acres designated as prime farmland.

The one soil type designated as Farmland of Statewide Importance, Lexington silt loam, 5 to 8 percent slopes, moderately eroded, accounts for 12.3 acres (2.0%) of the project site and would be impacted by the placement of arrays on this soil type.

Any area within the Project Site not developed for the solar facility would remain undeveloped with no agricultural or other activities, aside from general vegetation maintenance. Adhering to BMPs during construction and operation of the solar facility, including installing erosion control devices (ECDs) during stockpiling events, would preserve topsoil and limit erosion, resulting in negligible impacts to prime farmland. Due to the limited amount of grading and excavation onsite, most soils would remain in-situ.

Moreover, solar projects do not result in the permanent or irreversible conversion of farmland. During operations, soils would have an opportunity to develop in place with minimal ground disturbance and possibly regenerate while not in active agricultural production. When the solar and supporting materials are removed, the site could be readily returned to agricultural production. Based on the limited site disturbance, there would be minimal direct and indirect adverse impacts on prime farmland under the Proposed Action.

3.3 WATER RESOURCES

This section describes an overview of existing water resources within the Project Site and the potential impacts on these water resources that would be associated with the Proposed Action. Components of water resources that are analyzed include groundwater, surface water, floodplains, and wetlands.

3.3.1 Affected Environment – Water Resources

3.3.1.1 Groundwater

Groundwater is water found in cracks and spaces in rocks and soil. The source of groundwater in western Tennessee is primarily from rainfall. When rain falls to the ground, it would percolate through the soil and into the porous layer of rocks that make up the aquifer, a process known as recharging. Aquifers of sufficient size would store enough water that some can be withdrawn from them via wells. The PBPU provides water to approximately 12,600 people and uses groundwater as its source.

Western Tennessee, including the Project Site, is part of the Mississippi embayment aquifer system that also includes parts of Missouri, Arkansas, Mississippi, Louisiana, Alabama, and extreme western Florida (USGS, 1995). The aquifers are part of the eastern side of the Mississippi Embayment section of the Coastal Plain Physiographic Province system.

There are five aquifers in the Mississippi embayment aquifer system (USGS, 1995). Only one of the five aquifers, the Lower Wilcox Aquifer, underlies the Project Site. The other four aquifers do not extend as far east as the Project Site. The aquifer is primarily fluvial sands similar to the sand seen along the shore of the Mississippi River. The sand is unconsolidated, an indication that it can store large quantities of water. An average of 54 inches of rain falls in the recharge area of the aquifers and is the source of water for recharging the five aquifers.

3.3.1.2 Surface Water

Surface waters are defined as open or flowing water features, typically consisting of streams, rivers, lakes, ponds, and wetlands. Surface water features are further segregated as having perennial, intermittent, and ephemeral flow. TDEC also designates certain surface water features as wet weather conveyances (WWCs). Perennial waters are permanent surface water features present throughout the year. Intermittent classification is generally restricted to streams with a well-defined channel but that only contain water part of the year, typically during winter and spring seasons when the stream bed is below the water table. Ephemeral streams (those channels that have an ordinary high-water mark and are potentially federally jurisdictional) or WWCs are features that only flow in direct response to precipitation events and typically exist as topographic swales and dry drainages with poor bed/bank development.

The Project Site is within the Puryear, Tennessee, topographic quadrangle, and is located within the East Fork Clarks River (060400060101) watershed. This watershed is in the Lower Tennessee River (06040006) watershed, which is within the Tennessee River Basin. Only the 23-square mile headwaters portion of the East Fork Clarks River Watershed is in Tennessee. Most of the watershed, 681 square miles, is in Kentucky. Water from this watershed drains into Clarks River which empties into the Tennessee River.

From September 20 through 22, 2022, biologists performed a field survey within the Project Site to determine the presence or absence of jurisdictional waters. Both USACE and TDEC methodologies were utilized to determine the jurisdiction of wetlands and non-wetland waters within the Project Site.

A total of 25 likely jurisdictional and 29 potentially non-jurisdictional features were identified within the Project Site, all of which were considered as streams, ephemeral channels, WWC, and wetlands (Figures 3.3-1 and 3.3-2a-2f). The features identified onsite are detailed in the Summary of Environmental Features for the Puryear Solar Project (Appendix B).

On January 27, 2023, SRC submitted the Hydrologic Determination Report for Puryear Solar Site, Puryear, Henry County, Tennessee, to TDEC. After reviewing the report, TDEC issued its hydrological determination letter on March 3, 2023. The report concluded that Streams 1-11 were jurisdictional (Table 3.3-1). Also on January 27, 2023, SCR submitted an approved jurisdictional request to the USACE. The USACE determination is pending. SRC will obtain the necessary permit(s) before construction begins and will follow the permit requirements to minimize impacts to wetlands and/or streams. Additionally, with the implementation of appropriate BMPs, impacts to wetlands and streams would be further minimized during construction.

3.3.1.3 Floodplains

A floodplain is the relatively level land area along a stream or river that is subject to periodic flooding. The area subject to a 1 percent chance of flooding in any given year is normally called the 100-year floodplain. The area subject to a 0.2 percent chance of flooding in any given year is normally called the 500-year floodplain. It is necessary to evaluate development in the 100-year floodplain to ensure that the project is consistent with the requirements of Executive Order (EO) 11988, Floodplain Management (EO 11988, 1977).

The Federal Emergency Management Agency (FEMA) produces maps which show the likelihood of an area flooding. These maps are used to determine both the special hazard areas and the risk premium zones applicable to communities participating in the National Flood Insurance Program. Based on Henry County, Tennessee, FEMA Flood Insurance Rate Map (FIRM) Panel number 47079C0200E, effective 9/28/2007, the majority of the Project Site is in Zone X, outside of Flood Zone A, meaning there is less than a 1.0 percent chance of flooding annually. The East Fork Clarks River is designated by FEMA as being in Zone A. Areas within Zone A have a 1 percent chance of flooding annually. Because detailed analyses are not performed for such areas, no depths or base flood elevations have been determined for these zones. Approximately 23 acres of the Project Site are located within the flood hazard zones of the East Fork Clarks River and one unnamed tributary (Figures 3.3-1 and 3.3-2c). The State of Tennessee also regulates the 100-year floodplains of perennial streams whose floodplains are not mapped on Flood Insurance Rate Maps. As described in Sections 3.3.1.2 (Surface Waters) and 3.3.1.4 (Wetlands) only two perennial streams were found within the Project Site: The East Fork Clarks River (STR-7) and an unnamed tributary of the East Fork Clarks River (STR-9), and the floodplains of these streams in the Project Site are mapped.

3.3.1.4 Wetlands

Wetlands are defined by the USACE as, “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (USACE, n.d.). Eight wetlands (WTL) were observed within the Project Site. All wetlands were observed as Palustrine Forested (PFO) and Palustrine Emergent (PEM) wetland features. Each wetland was verified with the positive identification of suitable hydrology, hydrophytic vegetation, and hydric soils according to the USACE Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region, Version 2.0. (USACE, 2010). The locations of the delineated wetlands are provided in Figures 3.3.2 and 3.3.2-a to 3.3.2-f. A total of 9.28 acres of wetlands were identified (Table 3.3-2). The Atlantic and Gulf Coastal Plain Regional Wetland Determination Data Forms were completed at wetland and upland sample points and are provided in the Summary of Environmental Features for the Puryear Solar Project (Appendix B).

Furthermore, 13 man-made ponds (P) were observed within the Project Site. These features were identified as Palustrine Unconsolidated-Bottom (PUB) features and are also described below. The details of the location and acreage are provided in the appendices of the Summary of Environmental Features for the Puryear Solar Project (Appendix B).

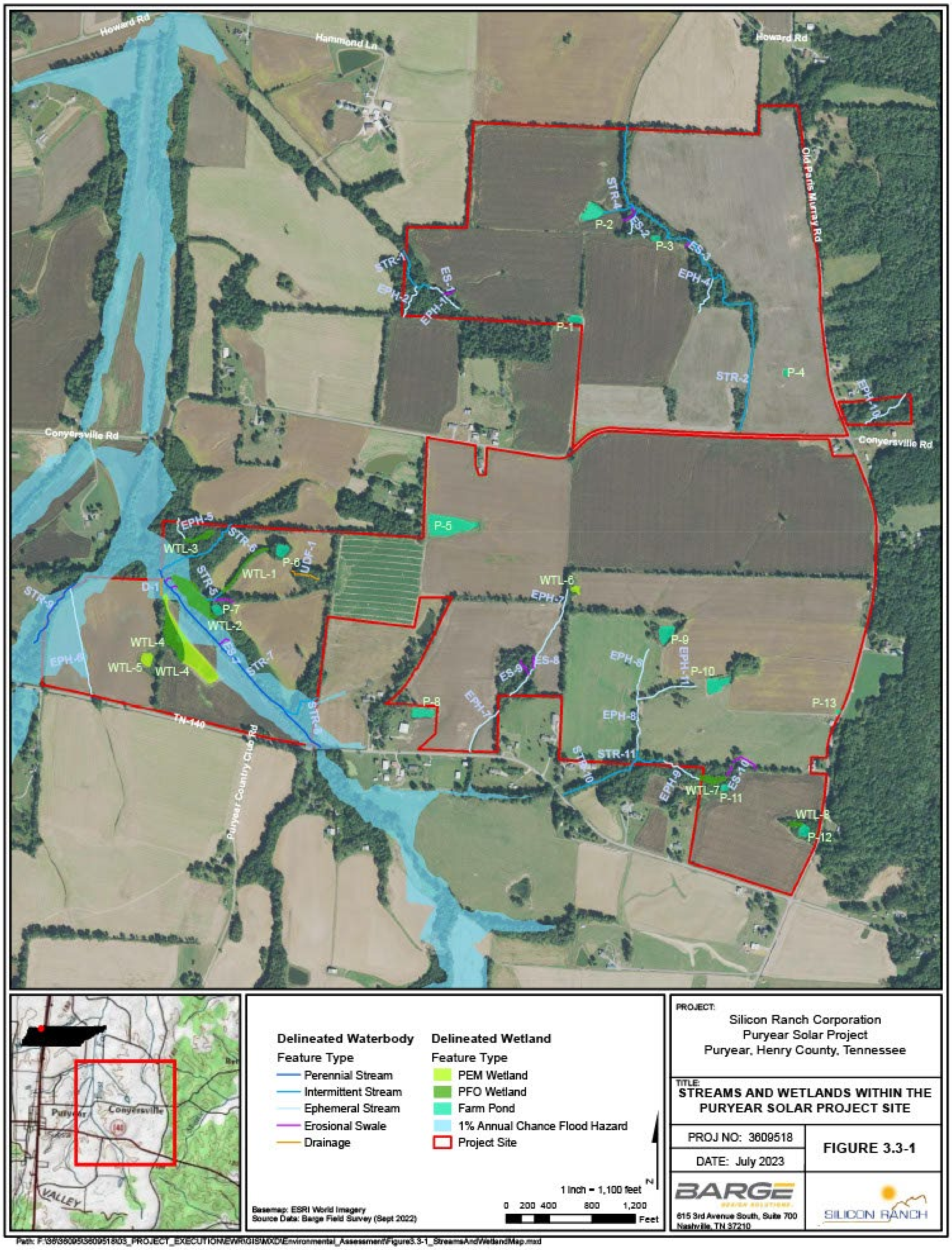


Figure 3.3-1. Drainages, Streams and Wetlands Within the Puryear Solar Project Site

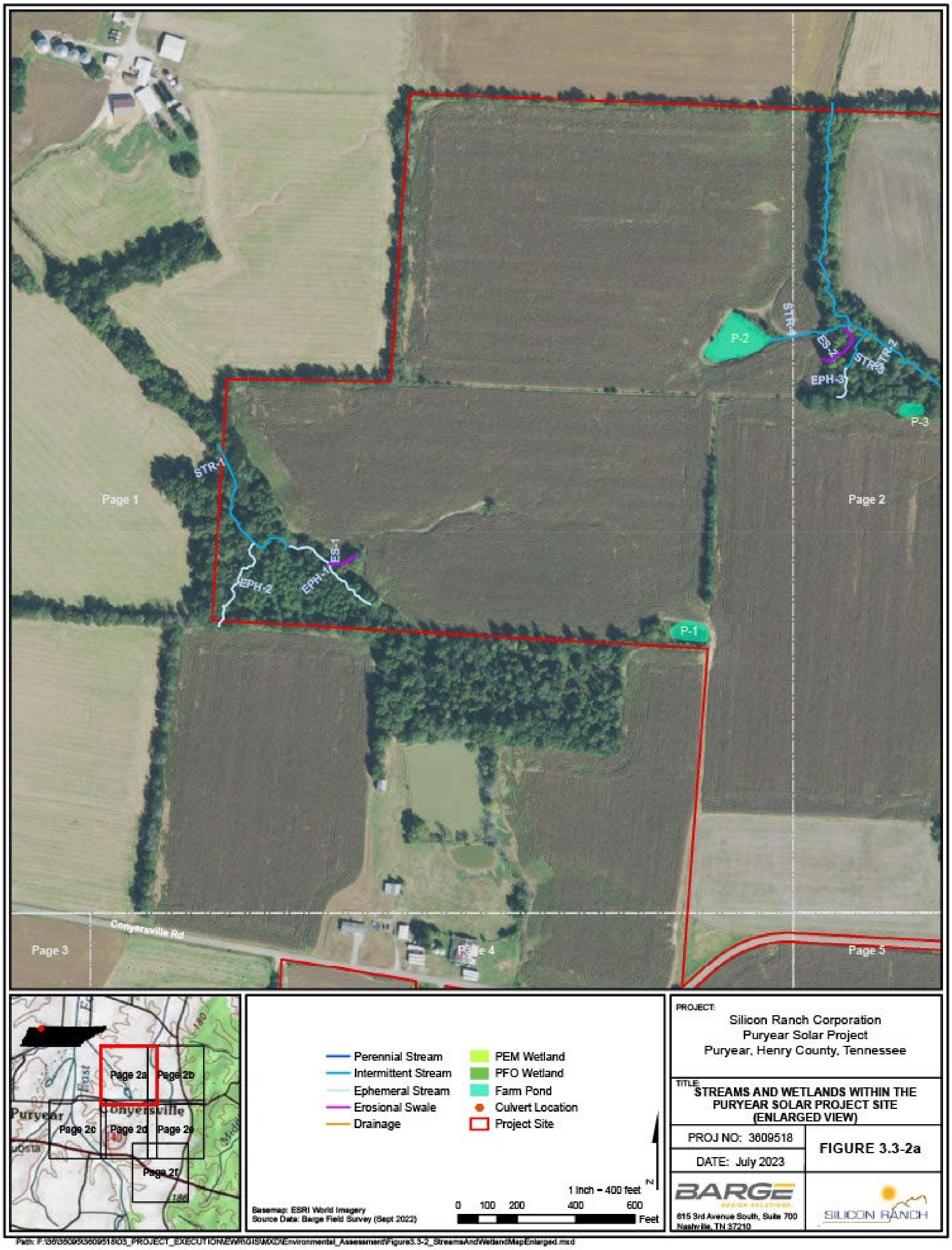


Figure 3.3-2a. Drainages, Streams and Wetlands Within the Puryear Solar Project Site Enlarged View

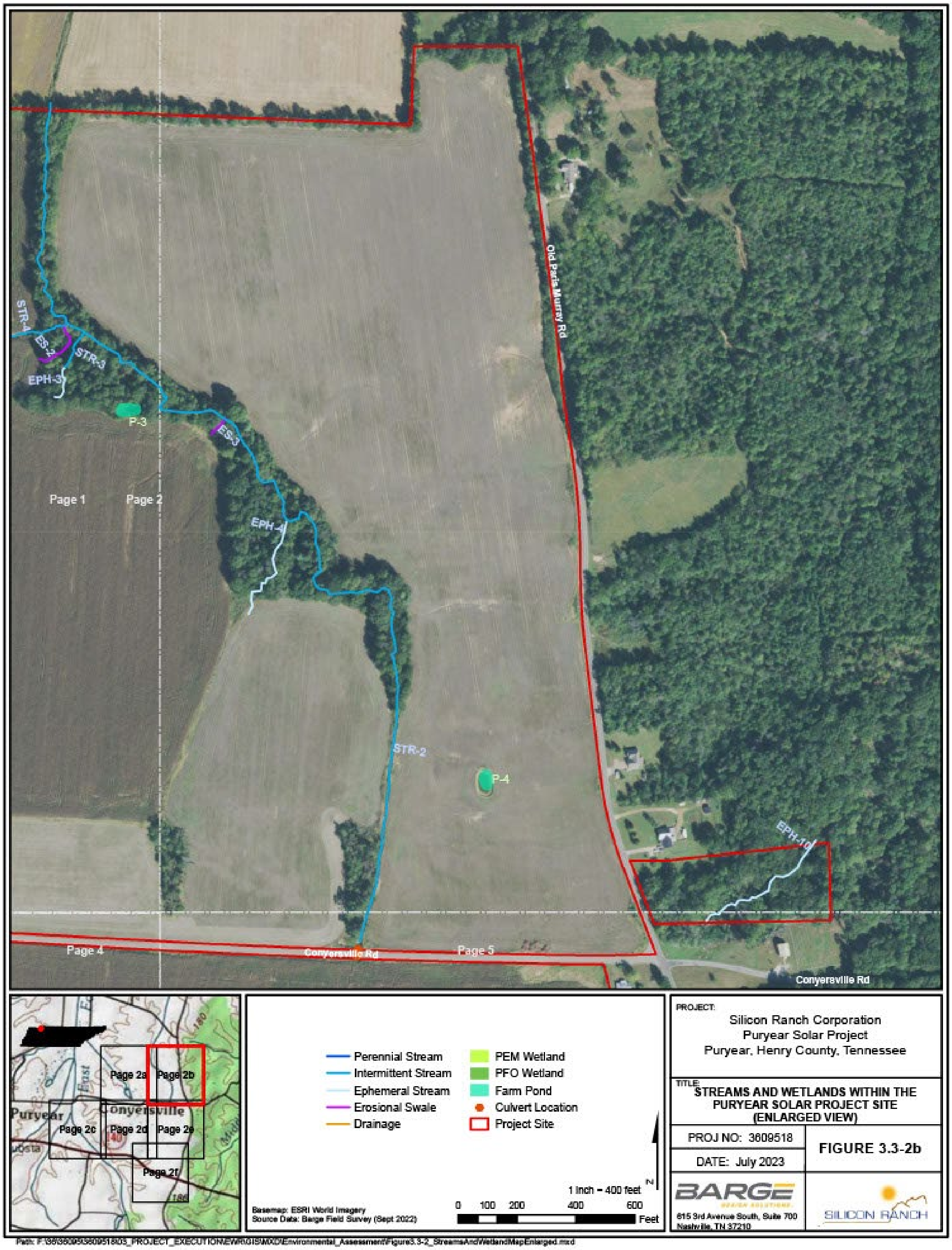


Figure 3.3-2b. Drainages, Streams and Wetlands Within the Puryear Solar Project Site

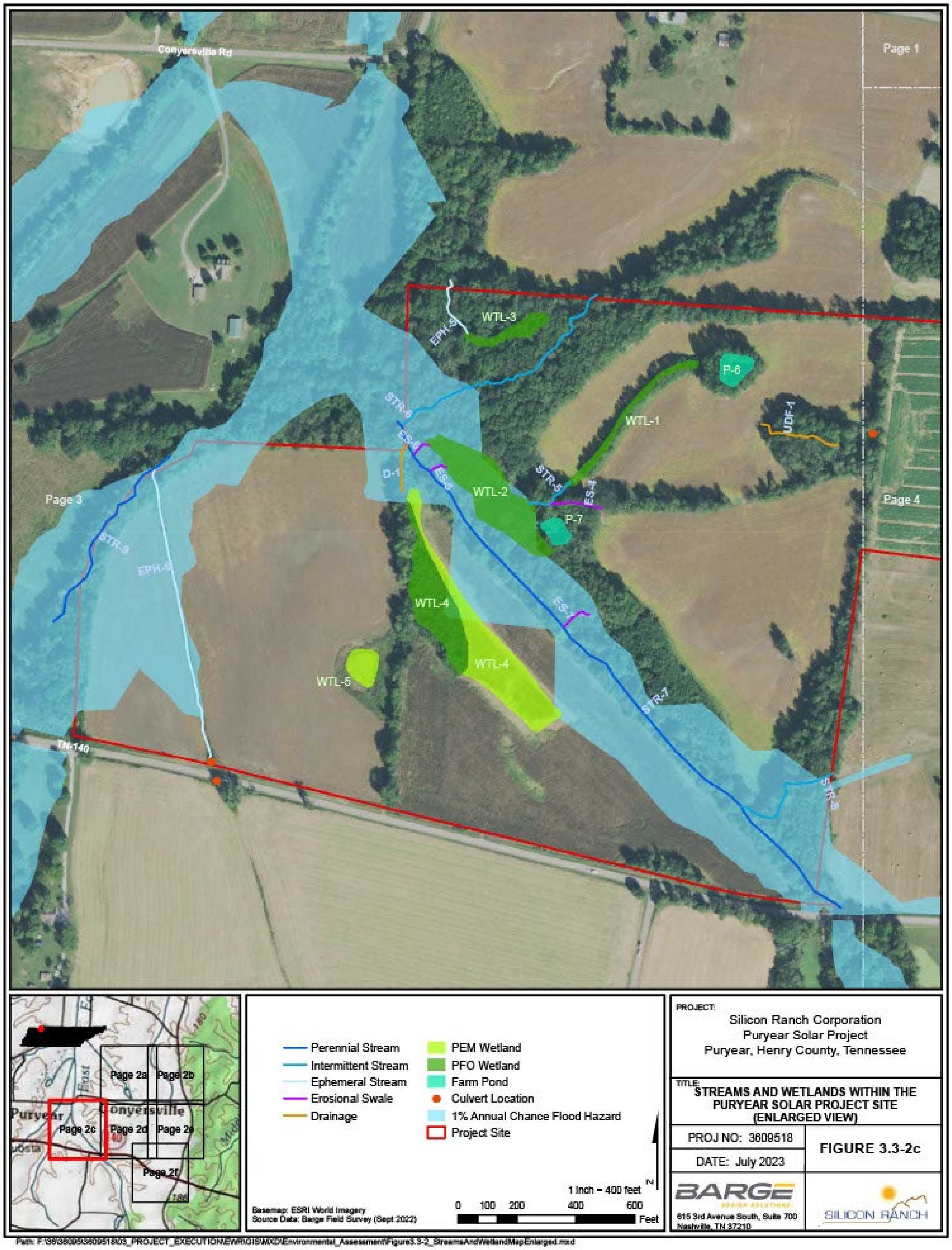


Figure 3.3-2c. Drainages, Streams and Wetlands Within the Puryear Solar Project Site

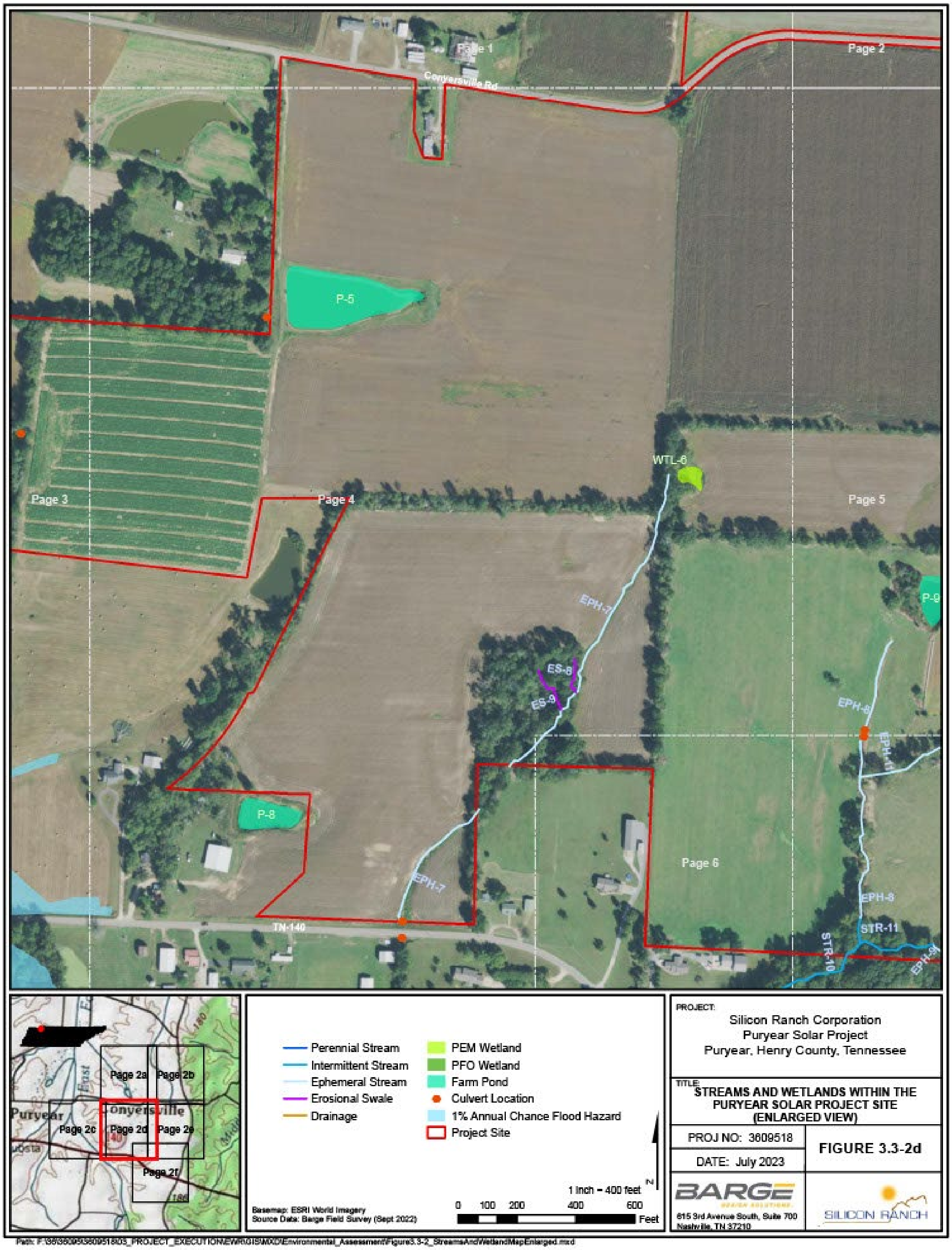


Figure 3.3-2d. Drainages, Streams and Wetlands Within the Puryear Solar Project Site

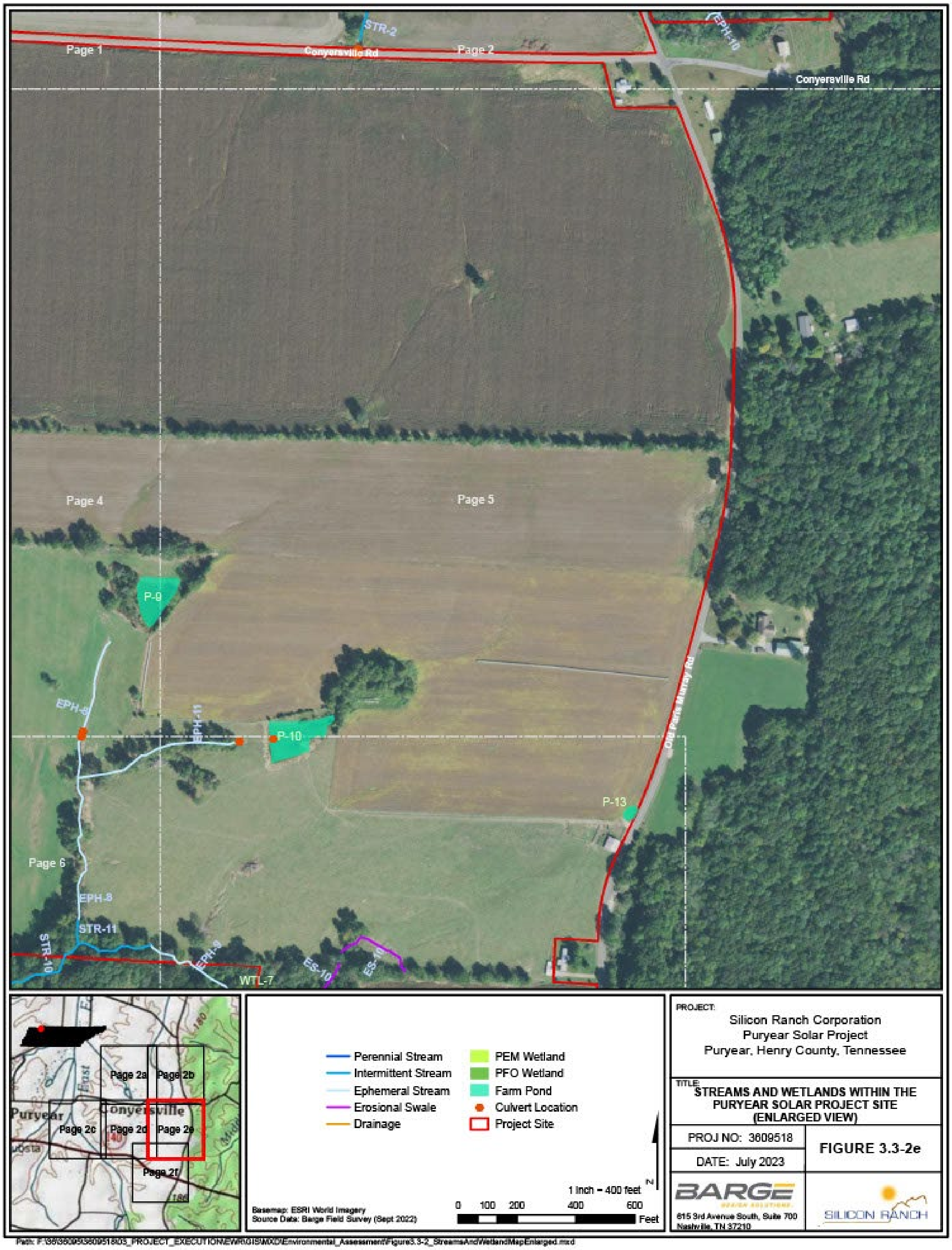


Figure 3.3-2e. Drainages, Streams and Wetlands Within the Puryear Solar Project Site

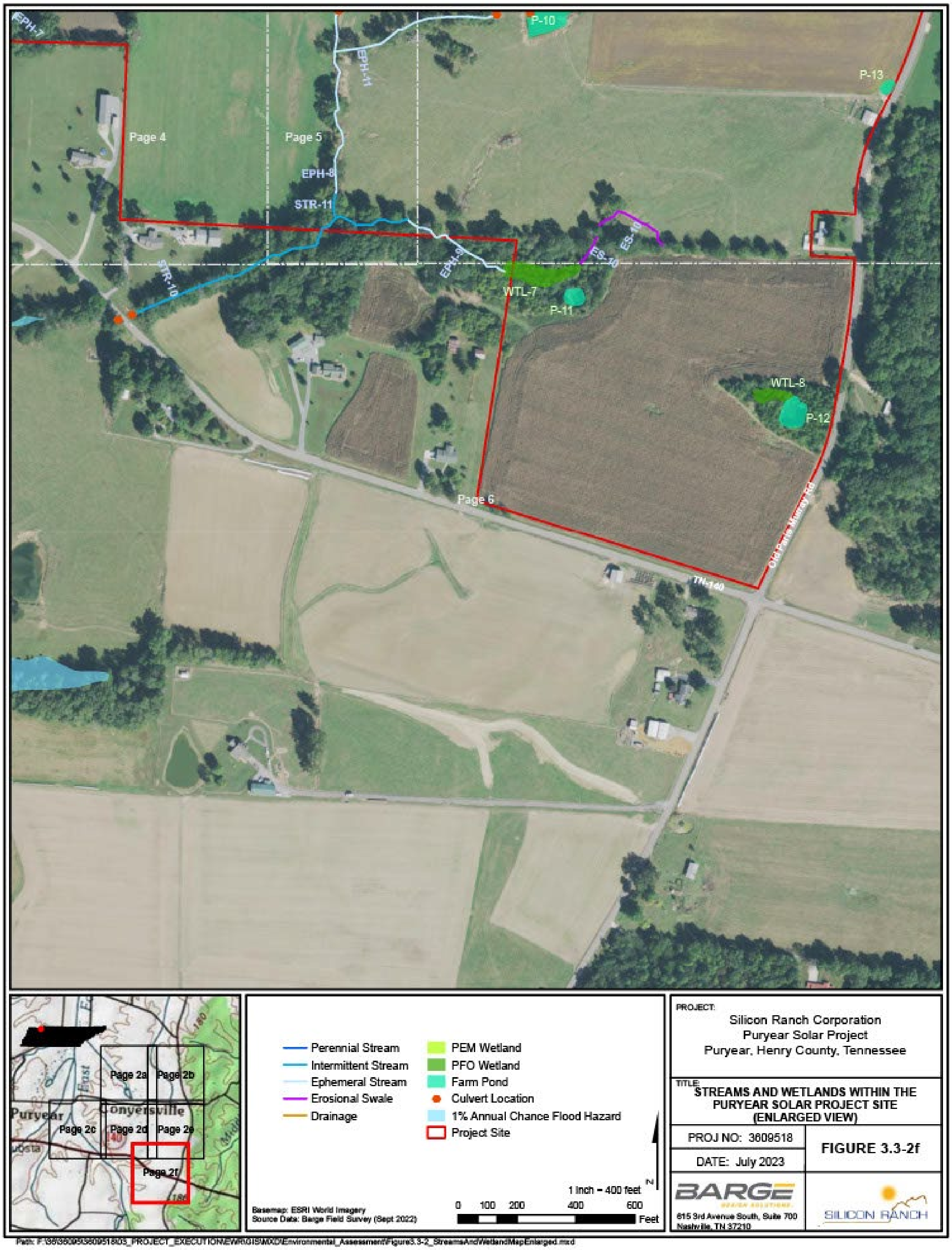


Figure 3.3-2f. Drainages, Streams and Wetlands Within the Puryear Solar Project Site

Table 3.3-1. Streams Identified Within the Project Site

Waterbody I.D.	Description	Location Within Project Boundaries	Linear Feet within Project	HD Score	Federal Jurisdictional Status*	State Jurisdictional Status
STR-1	Intermittent Stream	Start: 36.453450, -88.307866 End 36.454391, -88.308686	536	21.25	Yes	Yes
STR-2	Intermittent Stream	Start: 36.450017, -88.297948 End: 36.457746, -88.30176	3,854	24.00	Yes	Yes
STR-3	Intermittent Stream	Start: 36.455209, -88.301457 End: 36.455466, -88.301194	140	20.00	Yes	Yes
STR-4	Intermittent Stream	Start: 36.455539, -88.302408 End: 36.455704, -88.301509	297	19.25	Yes	Yes
STR-5	Intermittent Stream	Start: 36.445431, -88.314349 End: 36.445290, -88.314756	184	19.25	Yes	Yes
STR-6	Intermittent Stream	Start: 36.447332, -88.313994 End: 36.446062, -88.316202	895	19.50	Yes	Yes
STR-7	Perennial Stream	Start: 36.441680, -88.311011 End: 36.446099, -88.316257	2,267	Primary	Yes	Yes
STR-8	Intermittent Stream	Start: 36.442919, -88.311122 End: 36.442594, -88.312169	424	19.50	Yes	Yes
STR-9	Perennial Stream	Start: 36.444164, -88.320173 End: 36.445742, -88.318860	743	Primary	Yes	Yes
STR-10	Intermittent Stream	Start: 36.441546, -88.300116 End: 36.440614, -88.303253	1,059	26.00	Yes	Yes
STR-11	Intermittent Stream	Start: 36.441740, -88.300978 End: 36.441559, -88.300943	82	26.00	Yes	Yes
EPH-1	Ephemeral Stream	Start: 36.452814, -88.306826 End: 36.453450, -88.307866	374	16.75	Unlikely[1]	No[2] (WWC)
EPH-2	Ephemeral Stream	Start: 36.452726, -88.308706 End: 36.453587, -88.308454	374	16.75	Unlikely[1]	No[2] (WWC)
EPH-3	Ephemeral Stream	Start: 36.454977, -88.301705 End: 36.455209, -88.301457	132	13.00	Unlikely[1]	No[2] (WWC)
EPH-4	Ephemeral Stream	Start: 36.453034, -88.299334 End: 36.453922, -88.298913	398	13.50	Unlikely[1]	No[2] (WWC)
EPH-5	Ephemeral Stream	Start: 36.446939, -88.315479 End: 36.447438, -88.315688	223	13.75	Unlikely[1]	No[2] (WWC)
EPH-6	Ephemeral Stream	Start: 36.442922, -88.318325 End: 36.445613, -88.319042	1,025	10.25	Unlikely[1]	No[2] (WWC)
EPH-7	Ephemeral Stream	Start: 36.445870, -88.303291 End: 36.441677, -88.306268	1,686	11.00	Potential[1]	No[2] (WWC)
EPH-8	Ephemeral Stream	Start: 36.444358, -88.300671 End: 36.441801, -88.300959	322	14.75	Potential[1]	No[2] (WWC)
EPH-9	Ephemeral Stream	Start: 36.441077, -88.298986 End: 36.441546, -88.30011	401	13.75	Potential[1]	No[2] (WWC)
EPH-10	Ephemeral Stream	Start: 36.450275, -88.293970 End: 36.451068, -88.292723	513	12.75	Unlikely[1]	No[2] (WWC)
ES-1	Erosional Swale	Start: 36.453407, -88.307094 End: 36.453250, -88.307284	108	11.50	Unlikely[1]	No[2] (WWC)
ES-2	Erosional Swale	Start: 36.455370, -88.301801 End: 36.455670, -88.301532	188	12.50	Unlikely[1]	No[2] (WWC)

Waterbody I.D.	Description	Location Within Project Boundaries	Linear Feet within Project	HD Score	Federal Jurisdictional Status*	State Jurisdictional Status
ES-3	Erosional Swale	Start: 36.454714, -88.299795 End: 36.454856, -88.299657	70	12.50	Unlikely[1]	No[2] (WWC)
ES-4	Erosional Swale	Start: 36.445208, -88.313922 End: 36.445261, -88.31442	178	11.00	Unlikely[1]	No[2] (WWC)
ES-5	Erosional Swale	Start: 36.445685, -88.315683 End: 36.445649, -88.315868	63	11.50	Unlikely[1]	No[2] (WWC)
ES-6	Erosional Swale	Start: 36.445897, -88.315882 End: 36.445792, -88.316065	73	11.50	Unlikely[1]	No[2] (WWC)
ES-7	Erosional Swale	Start: 36.444362, -88.313983 End: 36.444234, -88.314285	112	11.50	Unlikely[1]	No[2] (WWC)
ES-8	Erosional Swale	Start: 36.444126, -88.304325 End: 36.443815, -88.304303	126	8.00	Unlikely[1]	No[2] (WWC)
ES-9	Erosional Swale	Start: 36.444014, -88.304738 End: 36.443644, -88.304466	175	8.00	Unlikely[1]	No[2] (WWC)
ES-10	Erosional Swale	Start: 36.441354, -88.297164 End: 36.441169, -88.298121	394	13.25	Unlikely[1]	No[2] (WWC)
UDF-1	Upland Drainage Feature	Start: 36.445988, -88.311172 End: 36.446164, -88.312054	294	--	No	No
D-1	Drainage Ditch	Start: 36.445455, -88.316176 End: 36.445886, -88.316120	166	--	No	No

** Determinations are anticipated decisions. Final determinations are pending issuance of by AJD from the USACE*
1: Federal jurisdiction status determined by observable connection to RPW and NonRPW WOTUS or significant nexus
2: State Status determined by HD score (<19 is a WWC)

Table 3.3-2. Wetlands Within the Project Site

Waterbody I.D.	Description	Location Within Project Boundaries	Acreage within Project	Federal Jurisdictional Status*	State Jurisdictional Status	TRAM Score
WTL-1	PFO	36.446141, -88.313703	0.28	Yes	Yes	23
WTL-2	PFO	36.445357, -88.315062	1.37	Yes	Yes	74
WTL-3	PFO	36.446975, -88.314885	0.26	Yes[1]	Yes	58
WTL-4	PEM	36.443901, -88.315137	1.52	Yes[1]	Yes	27
	PFO	36.444478, -88.315886	1.06			
WTL-5	PEM	36.443823, -88.316579	0.24	No[1]	Yes	14
WTL-6	PEM	36.445854, -88.303033	0.10	No[1]	Yes	14
WTL-7	PFO	36.441045, -88.298593	0.30	Yes[1]	Yes	52
WTL-8	PFO	36.439863, -88.295632	0.10	No[1]	Yes	38
P-1	PUB	36.452808, -88.303306	0.16	No[1]	Yes	-
P-2	PUB	36.455507, -88.302841	0.49	Yes	Yes	-
P-3	PUB	36.454917, -88.300769	0.07	No[1]	Yes	-

Waterbody I.D.	Description	Location Within Project Boundaries	Acreage within Project	Federal Jurisdictional Status*	State Jurisdictional Status	TRAM Score
P-4	PUB	36.451562, -88.296562	0.06	No[1]	Yes	-
P-5	PUB	36.447414, -88.306998	1.44	Yes[1]	Yes	-
P-6	PUB	36.446663, -88.312360	0.22	No[1]	Yes	-
P-7	PUB	36.445118, -88.314370	0.15	No[1]	Yes	-
P-8	PUB	36.442610, -88.307802	0.37	No[1]	Yes	-
P-9	PUB	36.444777, -88.300191	0.35	No[1]	Yes	-
P-10	PUB	36.443494, -88.298429	0.45	No[1]	Yes	-
P-11	PUB	36.440848, -88.298140	0.08	No[1]	Yes	-
P-12	PUB	36.439828, -88.295583	0.17	No[1]	Yes	-
P-13	PUB	36.442879, -88.294633	0.04	No[1]	Yes	-

** Determinations are anticipated decisions. Final determinations are pending issuance of by AJD from the USACE*
1: Federal jurisdiction status determined by observable connection to RPW and NonRPW WOTUS, significant nexus, or is an isolated water

PEM – Palustrine emergent wetland
PFO – Palustrine forested wetland
PUB – Freshwater pond

On January 27, 2023, SRC submitted the Hydrologic Determination Report for Puryear Solar Site, Puryear, Henry County, Tennessee, to TDEC. After reviewing the report, TDEC issued its hydrological determination letter on March 3, 2023 (Appendix C). The report concluded that Wetlands 1 to 8 and Ponds 1 to 13 were jurisdictional (Table 3.3-1). Also on January 27, 2023, SCR submitted an approved jurisdictional request to the USACE. The USACE determination is pending. Until the USACE issues its final jurisdictional determination, it is not known if a USACE permit pursuant to Section 404 of the CWA would be required. SRC will obtain the necessary permit(s) before construction begins and will follow the permit requirements to minimize impacts to wetlands. Additionally, with implementation of appropriate BMPs, impacts to wetlands would be further minimized during construction.

3.3.2 Environmental Consequences – Water Resources

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 solar facility would not be constructed. There would not be any Project-related impacts to water resources. Existing land use would remain primarily farmland, and water resources would not change. Indirect impacts to water resources could result due to the continuing use of the Project Site as agricultural land. Increases in erosion and sediment runoff could occur if farming practices were not maintained to prevent erosion and runoff. Erosion and sedimentation on the Project Site could alter runoff patterns and impact downstream surface water quality. In addition, if chemical fertilizers and pesticides are continually used, impacts to groundwater may occur if the local aquifers are recharged from surface water runoff.

3.3.2.2 Proposed Action

Under the Proposed Action, minor impacts from construction would be expected to groundwater, surface water, and wetlands as a result of the Proposed Action. To address these minor impacts, Puryear Solar would obtain appropriate permits from TDEC and USACE and, if required by the permits, mitigate the impacts.

Groundwater

Direct adverse impacts to the supply and availability of groundwater are not anticipated with implementing the Proposed Action. During construction, hazardous materials would be onsite that could potentially contaminate groundwater resources, including petroleum products for fuel and lubrication of construction equipment, hydraulic fluids, and various other chemicals commonly used for general construction. Appropriate BMPs would be followed, and a Spill Prevention, Countermeasure and Control (SPCC) Plan would be prepared to minimize the potential for leaks or spills to occur and provide countermeasures for spill response.

Overall, direct and indirect impacts on local aquifers and groundwater are not anticipated due to the limited ground disturbance required for initial construction, operation, maintenance, or decommissioning and closure. The presence of elevated PV panels would have relatively little effect on groundwater infiltration and surface water runoff. Rainwater would run off the panels to the adjacent ground where ground infiltration would occur, or it would run off and be collected within any onsite stormwater detention basins.

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

Surface Water Quality

Construction and operation of Puryear Solar would not impact surface waters based on the current project layout. No panels, other above-ground structures, or interior access roads are expected to impact any state of federal jurisdictional streams or ponds. This also includes the TDEC-required 30-foot buffer surroundings these features. These areas would be avoided during construction to the greatest extent feasible, although minor work would be expected to occur within the buffer zones.

During construction, runoff of sediment and pollutants could temporarily impact surface water quality on the Project Site. The use of BMPs for controlling soil erosion and runoff would minimize these potential impacts to surface water. Additionally, construction of onsite stormwater detention basins would allow sediments to settle out prior to release. With the BMPs in place, no indirect impacts to surface water are anticipated during construction.

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

In the operational phase there is a potential for beneficial impacts to streams and wetlands within the Project Site due to the reduction in annual agriculture activities and applications of pesticides and fertilizer within the Project Site. No indirect impacts to surface water are anticipated during the operational phase of the Project.

Floodplains

As a federal agency, TVA adheres to the requirements of EO 11988, Floodplain Management. The objective of EO 11988 is "…to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative" (EO 11988, 1977). The EO is not intended to prohibit floodplain development in all cases but rather to create a consistent government policy against such development under most circumstances (U.S. Water Resources Council, 1978). The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative.

As shown in Figure 2.2-2, of the proposed facilities, structures, and activities, only tree clearing and one stormwater basin adjacent to Area 4 would be located within the 100-year floodplain. Tree-clearing would be an agricultural use, which is considered a repetitive action in the 100-year floodplain, and therefore consistent with EO 11988 (TVA 1981). Stormwater basins are not considered repetitive actions in the 100-year floodplain (TVA 1981). TVA has determined that there is no practicable alternative to locating the stormwater basin within the floodplain because land outside the floodplain is planned for solar panels. As stated in Sections 1.0 and 2.2, the locations and quantity of solar panels have been designed to minimize harm to the environment and still allow the project to be economically viable. Other stormwater basins serving Area 4 would be located outside floodplains. To minimize adverse impacts, the stormwater basin would be designed to withstand flooding with minimum damage.

Although sited outside 100-year floodplain boundaries, individual solar panels that would be in low-lying, flat areas could be inundated during flood events. To minimize adverse impacts, solar panels in these low-lying areas would be elevated at least one foot above the 100-year flood elevation.

Demolition of existing structures on the Project Site could also occur if the project is not renewed at the end of the 20-year PPA. Demolition would be consistent with EO 11988 provided the demolition debris would be disposed of outside of floodways.

Wetlands

TVA is subject to EO 11990, Protection for Wetlands, which mandates federal agencies avoid new construction in wetlands wherever practicable and otherwise minimize wetland destruction or degradation (E.O. 11990, 1977). During all stages of the design process, efforts have been made to avoid and minimize impacts to jurisdictional wetlands and waterbodies to the greatest extent practicable. The proposed solar panel layout would impact up to 0.2 acres of forested wetland (tree removal leaving roots in place) in wetland 2 and wetland 4, which would be needed to reduce shading of the panels. However, the amount of impact in the future may be reduced or eliminated based on additional changes to the project layout.

Any wetland impacts would be subject to the terms and conditions of a general or individual ARAP from TDEC pursuant to Section 401 of the CWA Until the USACE issues its final jurisdictional determination, it is not known if a USACE permit pursuant to Section 404 of the CWA (33 U.S.C. § 1251 et seq.) would be required. SRC would obtain the necessary permit(s) and follow the permit and any mitigation requirements to minimize impacts to wetlands before construction begins. Additionally, SRC will follow CGP buffer requirements around all wetlands. With implementation of appropriate BMPs, and purchase of potentially required mitigation credits, impacts to wetlands would be insignificant during construction. The possible conversion of up to 0.2 acres of forested wetlands to emergent wetlands, while considered a permanent impact, will be considered insignificant on a watershed scale with the adherence to CWA 401/404 permitting and mitigation.

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

While operational, there is a potential for beneficial impacts on wetlands within the Project Site due to the reduction in annual agriculture activities and applications of pesticides and fertilizer within the Project Site. Additionally, using BMPs and implementing the SWPPP, indirect impacts to wetlands would be avoided.

State and Federal Concurrence

On March 3, 2023, TDEC released its official concurrence letter for the Project Site. The assigned TDEC agent for the project concurred with the findings of the Hydrologic Determination Report, with the exception that all the ponds are jurisdictional to the state due to potential connection to groundwater. The official TDEC Hydrologic Determination Concurrence Letter is provided in Appendix C. Currently, the USACE Approved Jurisdictional Determination for the Project Site is still under review. Until the USACE issues its final jurisdictional determination, it is not known if a USACE permit pursuant to Section 404 of the CWA (33 U.S.C. § 1251 et seq.) would be required. SRC will obtain the necessary permit(s) and follow the permit requirements and any required mitigation to minimize impacts to wetlands before construction begins. Additionally, with implementation of appropriate BMPs, impacts to wetlands would be further minimized during construction.

3.4 BIOLOGICAL RESOURCES

This section provides an overview of existing biological resources within the Puryear Solar Project Site and the potential impacts to biological resources that would be associated with the Proposed Action and No Action Alternatives. The biological resources that have been analyzed below are vegetation, wildlife, and rare, threatened, and endangered species. Unless cited separately, information has been summarized from the Summary of Environmental Features for the Puryear Solar Project report (Appendix B).

Biological resources are regulated by several federal laws. The laws relevant to biological resources in the vicinity of the Proposed Action include the following:

- 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)
- EO 13186 (January 10, 2001) Responsibilities of Federal Agencies to Protect Migratory Birds
- Bald and Golden Eagle Protection Act
- Rules of the Tennessee Wildlife Resources Agency, Chapter 1660-01-32 (based on authority provided in Tennessee Code Annotated §§ 70-1-206, 70-8-104, 70-8-106 and 70-8-107)

The USEPA defines ecoregions as “areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources; they are designed to serve as a spatial framework for the research, assessment, management, and monitoring of ecosystems and ecosystem components” (USEPA, n.d.-a). The Project Site lies within two ecoregions of Tennessee. The northwestern portion of the study area is within the Mississippi Valley Loess Plains (74) Tennessee ecoregion and is further categorized into the Mississippi Valley Loess Plains (74b) sub-ecoregion region. The southeastern portion of the study area is within the Southeastern Plains (65) Tennessee ecoregion and is further categorized into the Northern Hilly Gulf Coastal Plain (65e) sub-ecoregion region.

The Mississippi Valley Loess Plains ecoregion is typically comprised of gently rolling hillslopes and isolated plains with an average elevation ranging between 250 to 500 feet. Most streams are channelized and are low-gradient and murky with silt and sand bottoms. Native woodland within the Mississippi Valley Loess Plains ecoregion is commonly comprised of oak-hickory forests, southern floodplain forests, and bottomland cypress-gum swamps. The Northern Hilly Gulf Coastal Plains is comprised of sand and clay formations with rolling hillslopes, and elevations reach up to 650 feet. Streams in this ecoregion are typically low-gradient and are sandy-bottomed. Native woodland within the Northern Hilly Gulf Coastal Plains ecoregion is commonly comprised of oak-hickory and oak-hickory-pine forests.

Desktop investigations were conducted prior to field delineations of the proposed Project Site. Wildlife, vegetation, and threatened and endangered (T&E) species were researched during the desktop investigations and verified through the field delineations. From September 20 through 22, 2022, Barge biologists performed an onsite investigation for the Puryear Solar Project. The investigation included the delineation of wetlands and watercourses, as well as identification of vegetative communities and habitat types that may be suitable for protected species with the state and federal agencies. The findings of this technical report are detailed in the Summary of Environmental Features for the Puryear Solar Project report (Appendix B).

3.4.1 Affected Environment – Biological Resources

The existing biological resources at the Puryear Solar Project Site include vegetation, wildlife, and rare, threatened, or endangered species.

3.4.1.1 Vegetation

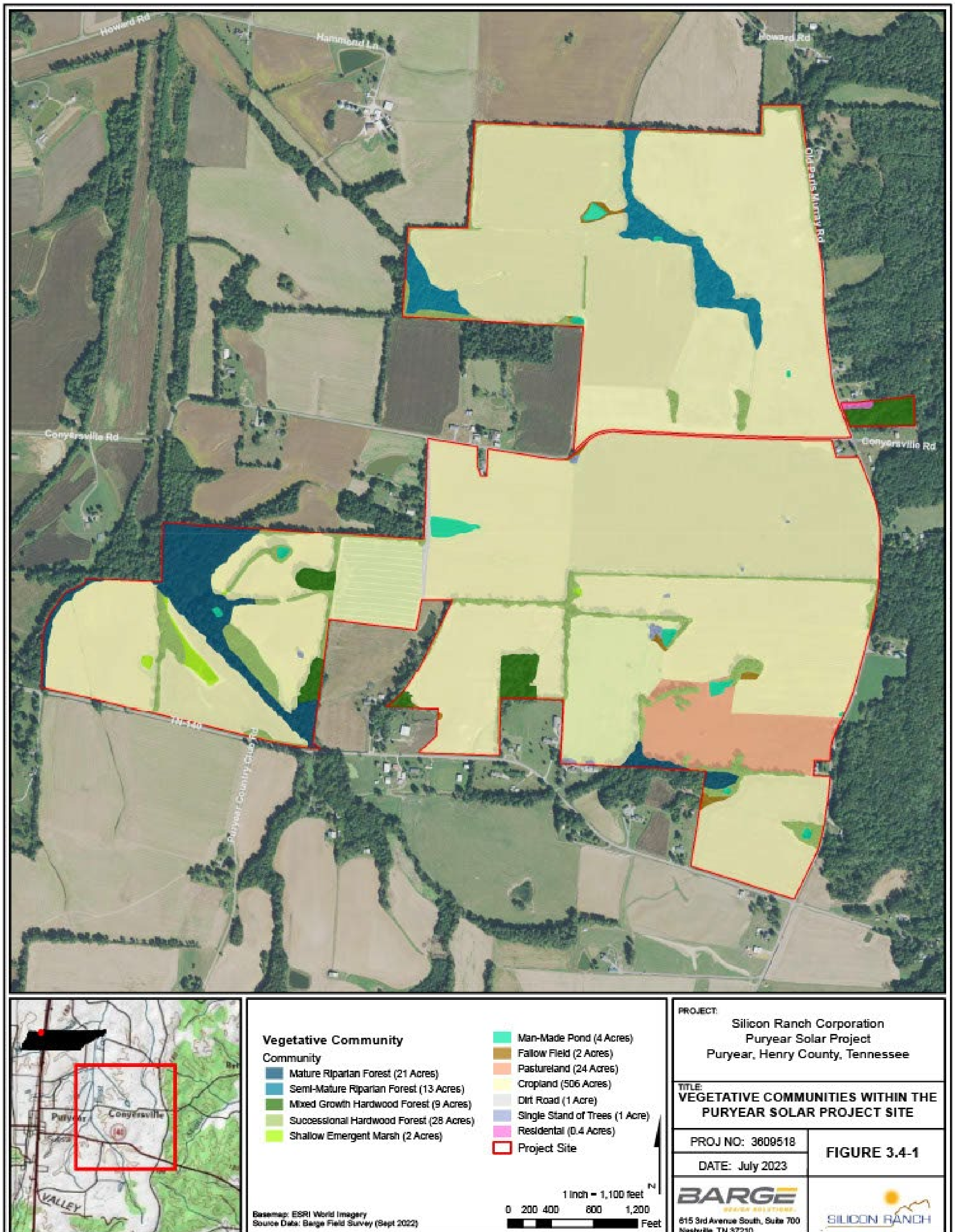
The Project Site is almost entirely utilized for agricultural purposes and is mostly comprised of cropland and cattle pasture. In the portions of the Project Site that remain forested, or have historically been disturbed, natural and successional vegetative communities have developed, which include oak-hickory forest, riparian forest, mixed-growth hardwood forest, successional hardwood forest, shallow emergent marsh, and fallow fields. A vegetative community map is provided in Figure 3.4-1.

Thirty-four acres of riparian forests were observed in three separate areas containing mature and semi-mature growth stages. Both the growth stages of the riparian forests are comprised of sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), sycamore (*Platanus occidentalis*), green ash (*Fraxinus pennsylvanica*), box elder (Acer negundo), slippery elm (*Ulmus rubra*), and an understory of jumpseed (*Polygonum virginianum*), Japanese stiltgrass (Microstegium vimineum), and greenbrier (Smilax glauca). The overstory size for this forested community averaged approximately 20 inches in diameter at breast height (DBH).

Nine acres of mixed-growth hardwood forests were observed in portions of the site that could have been historically impacted during the development of the agricultural farm fields and adjacent residential properties. The mixed-growth hardwood forests are comprised of northern and southern red oak (*Quercus falcata* and *Quercus. Rubra*), post oak (*Quercus stellata*), sweetgum, slippery elm, red maple, pignut hickory (*Carya glabra*), hackberry (*Celtis occidentalis*), red bud (*Cercis canadensis*), red cedar (*Juniperus virginiana*), basswood (*Tilia americana*), and an understory of white snakeroot (*Ageratina altissima*), jumpseed, and trumpet creeper (*Campsis radicans*). The overstory size for this forested community averaged approximately 12 inches in DBH and is common throughout the ecoregion.

Along the fence lines or property limits, and between agricultural fields, successional hardwoods were prevalent. The successional hardwood vegetative community encompasses approximately 28 acres of the Project Site. Successional hardwoods were established in areas that have naturally progressed to woody regions between actively maintained portions of the Project Site. While mostly comprised of tree species from the surrounding natural forested communities, the successional hardwoods were also observed with sassafras (*Sassafras albidum*) and honey locust (*Gleditsia triacanthos*) trees and an understory of American pokeweed (*Phytolacca americana*), Chinese privet (*Ligustrum sinense*), late goldenrod (*Solidago altissima*), and poison ivy (*Toxicodendron radicans*). The overstory size for this forested community averaged approximately 6 inches in DBH and is common throughout the ecoregion.

Shallow emergent marsh and fallow fields were encountered where vegetative maintenance is sporadic or has ceased. Both the shallow emergent marsh and fallow field encompass approximately 2 acres of the Project Site each. The fallow field vegetative community was observed with upland terrestrial plants, such as orchard grass (*Dactylus glomerata*), red fescue (*Festuca rubra*), Queen Ann’s lace (*Daucus carota*), and blackberry (*Rubus argutus*), whereas the shallow emergent marsh was comprised of hydrophytic plants such as woolgrass (*Scirpus cyperinus*), fox sedge (*Carex vulpinoidea*), monkeyflower (*Mimulus ringens*), seedbox (*Ludwigia alternifolia*), cattail (*Typha latifolia*), and boneset (*Eupatorium perfoliatum*).



Path: F:\36\3609\3609518\03_PROJECT_EXECUTION\ENV\GIS\MXD\Environmental_Assessment\Figure3.4-1_VegetationComunitiesMapV1.mxd

Figure 3.4-1. Vegetation Communities Within the Puryear Solar Project Site

Lastly, cropland was observed as the most predominant vegetative community within the Project Site, encompassing approximately 506 acres of the site, and cattle pasture was observed on an additional 24 acres. The observed cropland was cultivated with soy, corn, tobacco, hay, and squash, with corn and soy frequently throughout. A small portion of cattle pasture was observed in the southeastern portion of the Project Site. Man-made farm ponds were encountered within the agricultural fields, which could be potentially utilized for irrigation of the adjacent fields or drinking water for cattle.

3.4.1.2 Wildlife

Native wildlife was observed throughout the Project Site. Identified wildlife were observed utilizing the fragmented forested portions of the site and the surrounding residential and agricultural environments. A list of wildlife species observed during the field inspection of the Project Site is provided in Table 3.4-1. The largest group of wildlife species observed were birds. This may be due to the survey being conducted during the fall migration.

Table 3.4-1. Wildlife Observed Within the Project Site

Common Name	Scientific Name	Common Name	Scientific Name
Birds		**Birds cont'd**	
American robin	*Turdus migratorius*	Northern cardinal	*Cardinalis cardinalis*
American crow	*Corvus brachyrhynchos*	Northern bobwhite	*Colinus virginianus*
American goldfinch	*Spinus tristis*	Northern mockingbird	*Mimus polyglottos*
Barn swallow	*Hirundo rustica*	Northern parula	*Setophaga americana*
Blue jay	*Cyanocitta cristata*	Pileated woodpecker	*Dryocopus pileatus*
Blue-gray gnatcatcher	*Polioptila caerulea*	Prairie warbler	*Setophaga discolor*
Broad-winged hawk	*Buteo platypterus*	Red-bellied woodpecker	*Melanerpes carolinus*
Brown Thrasher	*Toxostoma rufum*	Red-eyed vireo	*Vireo olivaceus*
Carolina chickadee	*Poecile carolinensis*	Red-shouldered hawk	*Buteo lineatus*
Carolina wren	*Thryothorus ludovicianus*	Red tailed hawk	*Buteo jamaicensis*
Common grackle	*Quiscalus quiscula*	Red-winged black-bird	*Agelaius phoeniceus*
Cooper's hawk	*Accipiter cooperii*	Ruby-throated hummingbird	*Archilochus colubris*
Dark-eyed junco	*Junco hyemalis*	Summer tanager	*Piranga rubra*
Downy woodpecker	*Dryobates pubescens*	Tufted titmouse	*Baeolophus bicolor*
Eastern bluebird	*Sialia sialis*	White-eyed vireo	*Vireo griseus*
Eastern kingbird	*Tyrannus tyrannus*	Yellow-belied sapsucker	*Sphyrapicus varius*
Eastern towhee	*Pipilo erythrophthalmus*	Yellow-billed cuckoo	*Coccyzus americanus*
Eastern phoebe	*Sayornis phoebe*	**Mammals**	
European starling	*Sturnus vulgaris*	Eastern chipmunk	*Tamias striatus*
Field sparrow	*Spizella pusilla*	Eastern gray squirrel	*Sciurus carolinensis*
Gray catbird	*Dumetella carolinensis*	Fox squirrel	*Sciurus niger*

Common Name	Scientific Name		Common Name	Scientific Name
Great crested flycatcher	*Myiarchus crinitus*		Groundhog	*Marmota monax*
Green heron	*Butorides virescens*		White-tailed deer	*Odocoileus virginianus*
House finch	*Haemorhous mexicanus*		Racoon	*Procyonidae lotor*
Indigo bunting	*Passerina cyanea*		Red fox	*Vulpes vulpes fulvus*
Louisiana waterthrush	*Parkesia motacilla*		Nine banded armadillo	*Dasypus novemcinctus*
Mourning dove	*Zenaida macroura*		Coyote	*Canis latrans*
Northern cardinal	*Cardinalis cardinalis*		Virginia opossum	*Didelphis virginiana*
Northern bobwhite	*Colinus virginianus*			
Northern mockingbird	*Mimus polyglottos*			
Northern parula	*Setophaga americana*			
Pileated woodpecker	*Dryocopus pileatus*			

Table 3.4-1. Wildlife Observed Within the Project Site, Cont'd

Common Name	Scientific Name		Common Name	Scientific Name
Reptiles			**Fish**	
Black racer	*Coluber constrictor*		Blackspotted topminnow	*Fundulus olivaceus*
Common garter snake	*Thamnophis sirtalis*		**Invertebrates**	
DeKay's brown snake	*Storeria dekayi*		Common whitetail	*Plathemis lydia*
Eastern box turtle	*Terrapene carolina carolina*		Eastern black swallowtail	*Papilio polyxenes*
Five-lined skink	*Plestiodon fasciatus*		Eastern tiger swallowtail	*Papilio glaucus*
Ground skink	*Scincella lateralis*		Monarch butterfly	*Danaus plexippus*
Northern water snake	*Nerodia sipedon*		Silver-spotted skipper	*Epargyreus clarus*
Amphibians			Spicebush swallowtail	*Papilio troilus*
American toad	*Anaxyrus americanus*		Viceroy	*Limenitis archippus*
Bird-voiced treefrog	*Hyla avivoca*			
Gray treefrog	*Hyla versicolor*			
Green frog	*Lithobates clamitans*			
Southern leopard frog	*Lithobates sphenocephalus*			
Upland chorus frog	*Pseudacris feriarum*			

Many of these species listed in Table 3.4-1 are likely to be found in undisturbed areas of oak-hickory forests, riparian forests, and mixed-growth hardwood forests on the Project Site. However, the majority of the Project Site is actively farmed, so overall species diversity is expected to be relatively low, and most species present are widespread in their occurrence, adapted to open field habitats, and common in the region. During the winter, the agricultural fields are likely to be used by waterfowl and other birds feeding on crop residues. The ponds in the Project area also may be used by waterfowl in the winter and year-round by reptiles and amphibians.

No caves or other unique terrestrial animal habitats were observed during field reviews or are known within 3 miles of the Project area.

Migratory Birds

The USFWS Information for Planning and Conservation (IPaC) Trust Resource website was evaluated for migratory bird species potentially present within the Project Site. The results are included in Appendix G of the Summary of Environmental Features for the Puryear Solar Project report (Appendix B of the EA).

The USFWS IPaC report identified five species of migratory birds of conservation concern that have the potential to occur in the vicinity of the Project Site: the bald eagle (*Haliaeetus leucocephalus*), chimney swift (*Chaetura pelagica*), prairie warbler (*Dendroica discolor*), Prothonotary warbler (*Protonotaria citrea*), and red-headed woodpecker (Melanerpes erythrocephalus) (USFWS, n.d.-a). These are Birds of Conservation Concern, species not federally listed but that represent USFWS's highest conservation priorities. The IPaC report indicates the following: the bald eagle breeds September 1 to July 31 with the highest probability of occurrence in the Project Site in early to mid-January; the chimney swift breeds from March 15 to August 25 with the highest probability of occurrence in the Project Site in early to mid-May; the prairie warbler breeds from May 1 to July 31 with the highest probability of occurrence in the Project Site early to mid-June; the prothonotary warbler breeds April 1 to July 31 with the highest probability of occurrence in the Project Site in mid-April; and the red-headed woodpecker breeds May 10 to September 10 with the highest probability of occurrence in the Project Site in early May.

The prairie warbler was observed utilizing the cattle pastures and adjacent early successional woodlands within the Project Site. It is also anticipated that the prothonotary warbler, chimney swift, and red-headed woodpecker could also be present during the breeding season.

No very large raptor nests were observed within or immediately adjacent to the Project Site that can be utilized by bald eagles. Based on the USFWS's Bald Eagle Nests in Tennessee mapper, the nearest known bald eagle nest is on Kentucky Lake, approximately 12 miles from the eastern limit of the Project Site. Therefore, bald eagles are not anticipated to occur within the Project Site.

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

The USFWS IPaC online resource was reviewed for potential presence of federally listed animal and plant species within the Project Site (USFWS, n.d.-a). Five species were identified as being potentially present within the Project Site: NLEB (*Myotis septentrionalis*) (Endangered), TCB (*Perimyotis subflavus*) (Threatened, Proposed Endangered), alligator snapping turtle (Proposed Threatened), monarch butterfly (Candidate Species), and whooping crane (Essential Population, Non-Essential in TN) (Table 3.4-2).

Additionally, TVA provided a heritage database query for the Project Site. The search criteria included aquatics (within the HUC boundary for the project), botany (within a 5-mile radius), known caves (within a 3-mile radius), terrestrial zoology (within a 3-mile radius), and natural areas (within a 3-mile radius). These records indicated ten Tennessee state listed species that are either rare, deemed in need of management, special concern, threatened, endangered, or extant. Furthermore, TVA also provided a heritage database query for bats within a 10-mile radius of the Project Site, which also includes the gray bat (*Myotis grisescens*) potentially occurring in the area and within the State of Kentucky (gray bat). Additionally, the Indiana bat (*Myotis sodalis*) was reviewed due to suitable habitat being observed on the Project Site and the project falling within the range of this species (Table 3.4-2).

Of the 17 listed state and federal species that could occur on the Project Site, three are currently considered special concern or extant by the state of Tennessee: special concern chain pickerel (*Esox niger*), and blue sage (*Salvia azurea var. grandiflora*), extant from the region rosyside dace (*Clinostomus funduloides*). (Table 3.4-2). Of the remaining 14 state and federally protected species that could potentially occur within the Project Site, only the candidate monarch butterfly was observed on the Project Site. Both the preliminary USFWS IPaC Resource List and the TVA heritage database query summary are provided in Appendix G of the Summary of Environmental Features for the Puryear Solar Project (Appendix B).

Mammals

Suitable habitat for the state and federally endangered Indiana bat and threatened NLEB was noted during the field inspection. A total of 17 potential roost trees were observed and documented within the wooded portions of the Project Site (Figure 3.4-2).

The Indiana bat is an endangered, small migratory bat that feeds at night on insects. In the summer, it is found feeding and roosting in forests throughout the eastern half of the United States. In the winter, it hibernates in caves and mines.

The NLEB is federally endangered. It can occur throughout Tennessee and 36 other states from New England to the Midwest. This bat hibernates in caves and mines in the winter and feeds and roosts in forested areas in the summer. NLEBs eat a wide range of insects and some spiders.

Furthermore, state threatened and federally proposed endangered, TCB could potentially utilize the forested areas where there are live and dead leaf clusters of live or recently dead deciduous hardwood trees throughout the Project Site for summer roosting.

The TCB is federally threatened but is currently listed as proposed endangered. This species occurs in every state east of the Mississippi River and the midwestern states including Texas. An opportunistic feeder, it prefers small insects. The TCB hibernates in caves and mines in cooler states but may be found in culverts, tree cavities, and abandoned water wells in its southern range. During the summer it roosts in live and dead leaf clusters of live or recently dead deciduous hardwood trees.

Table 3.4-2 – Listed Species Potentially within the Project Site

Common Name	Species	State Status	Federal Status	Habitat Type	State Rank*	Habitat Present	Observed
	Mammal						
Northern long-eared bat	*Myotis septentrionalis*	Endangered	Endangered	Hibernates during winter in caves or occasionally in abandoned mines. Summer roosting season in late spring and summer months. Females would roost on trees with exfoliating bark and/or with cracks, crevices, and hollows. Will rarely roost in barns or other similar shed-like structures.	S1S2	Yes (Roosting)	No
Indiana bat	*Myotis sodalis*	Endangered	Endangered	Hibernates during winter in caves or occasionally in abandoned mines. Summer roosting season in late spring and summer months. Females would roost on trees with exfoliating bark and/or with cracks, crevices, and hollows.	S1	Yes (Roosting)	No
Tricolored bat	*Perimyotis subflavus*	Threatened	Proposed Endangered	Hibernates during winter in caves or occasionally in abandoned mines. Summer roosting season in late spring and summer months. Females would roost in leaf clusters in living or dead trees, as well as utilize cavities in living or dead trees and anthropogenic structures.	S2S3	Yes (Roosting)	No
Gray Bat	*Myotis grisescens*	Endangered	Endangered	Inhabits caves year-round. In the summer, the bats inhabit warm caves, dams, mines, quarries, concrete box culverts and undersides of bridges. In the winter hibernation sites are often deep vertical caves that trap cold air.	S2	Yes	No

Table 3.4-2 – Listed Species Potentially within the Project Site

Common Name	Species	State Status	Federal Status	Habitat Type	State Rank*	Habitat Present	Observed
				volumes of cold air; these caves are naturally very rare.			
Birds							
Whooping Crane	*Grus americana*	Not Listed	Experimental Population, Non-Essential**	Breeds in freshwater marshes and prairies. Uses grain fields, shallow lakes and lagoons, and saltwater marshes on migration and in winter.	-	Yes	No
Fish							
Rosyside darter	*Clinostomus funduloides*	Extant (KY)	Not Listed	Prefers pools and riffles of clear, cool, medium-sized upland streams flowing over gravel, cobble, or bedrock.	-	No	No
Chain pickerel	*Esox niger*	Special Concern (KY)	Not Listed	Prefers vegetated lakes, swamps, and backwaters and quiet pools of creeks and small to medium rivers.	S3	No	No
Goldstripe darter	*Etheostoma parvipinne*	Endangered (KY)	Not Listed	Inhabits small sluggish streams, spring seepage areas, and small woodland tributaries adjacent to larger streams. Patches of wood debris, leaf material, mud, silt, and sand appear to be favored microhabitats.	S1	No	No
Fish							
Cypress darter	*Etheostoma proeliare*	Threatened (KY)	Not Listed	Occurs around accumulations of woody debris, leaves, and aquatic vegetation in backwater pools of sluggish streams and swamps.	S2	No	No
Dollar sunfish	*Lepomis marginatus*	Endangered (KY)	Not Listed	Inhabits small to large streams, rivers, reservoirs, and swamps.	S1	No	No

Table 3.4-2 – Listed Species Potentially within the Project Site

Common Name	Species	State Status	Federal Status	Habitat Type	State Rank*	Habitat Present	Observed
Central mudminno w	*Umbra limi*	Threatened (KY)	Not Listed	Occurs in quiet areas of streams, sloughs, swamps, and other wetlands over mud and debris. Known to tolerate drought, low oxygen levels, and extreme water temperature.	S2S3	Yes (East Fork Clarks River)	No
Reptiles							
Alligator Snapping Turtle	*Macrochelys temminckii*	Threatened	Proposed Threatened	Occurs in deep water of rivers, sloughs, oxbows, swamps, and lakes	S2S3	Yes	No
	Insect						
Monarch butterfly	*Danaus plexippus*	Not Listed	Candidate	Occurs in fallow fields or prairies with a presence of milkweed (*Asclepias spp.*) host plants for larval development.	N/A	Yes	Yes
	Crayfish						
Blood River Crayfish	*Orconectes burri*	Threatened (KY)	Not Listed	Occurs in small to medium-sized streams with a channel substrate of sand and gravel.	N/A	No	No
Plants							
Water-milfoil	*Myriophyllum pinnatum*	Endangered	Not Listed	Occurs in moderately deep surface water in wetland and ponds.	S1	Yes	No
Compass plant	*Silphium laciniatum*	Threatened	Not Listed	Occurs in open prairies, fallow fields, roadsides, and glades.	S2	Yes	No
Blue Sage	*Salvia azurea var. grandiflora*	Extant	Not Listed	Occurs in dry prairies, limestone glades and edges of woods, bluffs, and open ground.	S3	Yes	No

*State Rank: S1 = Critically Imperiled; S2 = Very rare and imperiled; S3 = Rare and uncommon
** In Tennessee, the whooping crane is considered an Experimental Population, Non-Essential (USFWS, n.d.-b)

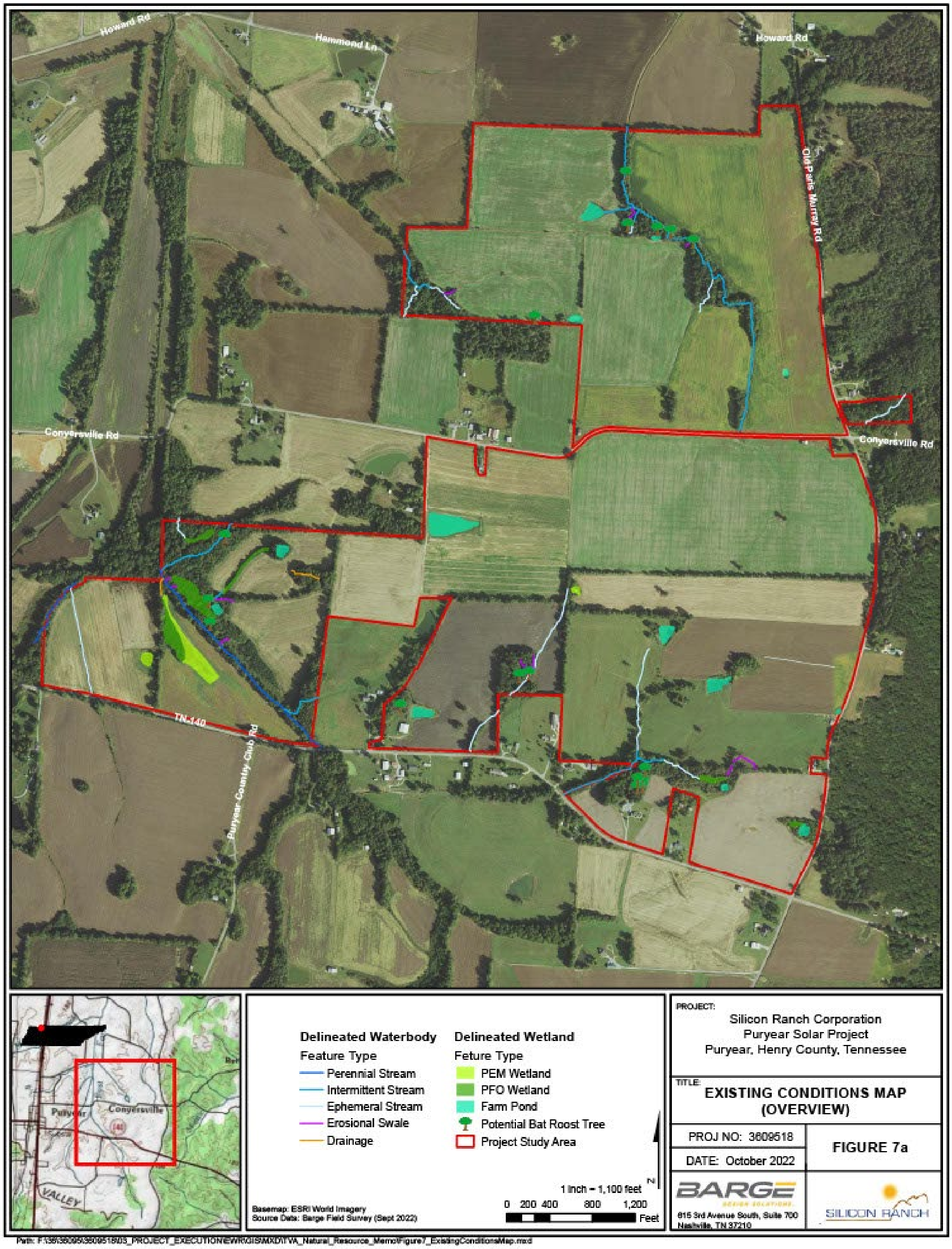


Figure 3.4-2 Potential Bat Roost Tree Sites

The federally endangered gray bat inhabits caves year-round. It is known to occur in portions of Tennessee, Kentucky, Missouri, Arkansas, northern Alabama, and eastern Oklahoma.

No suitable caves or potential hibernacula sites for any of the federally listed bat species were observed within the Project Site. Also, the TVA Natural Heritage Database does not list any caves located within a 3-mile radius of the Project Site. The USFWS IPaC Resource List states the Project Site does not overlap with the designated critical habitat for federally listed bats (USFWS, n.d.-a).

Field reviews to assess potential habitat for federally listed Indiana bat, NLEB, and proposed endangered TCB occurred from May 19-22, 2023, and followed the 2023 USFWS Range-wide Indiana bat and NLEB survey guidelines (USFWS, 2023). The quality of bat habitat within the Project Site was based on the presence of potential bat roost trees, solar exposure of those roost trees, density, and maturity of the woodland, as well as proximity to aquatic foraging habitat. Below are brief descriptions on the differences between Good, Marginal, and Poor habitat quality for the project:

Good – woodland areas that were rated as good were observed with a mature upper forest canopy, a presence of a semi-open mid canopy, and an open understory that allows for travel corridors and foraging opportunities between trees. Higher quality habitats have snags and suitable roosting trees with exfoliating bark, cracks, or crevices spread throughout the forest. The presence of streams and wetlands in or near these habitats also increases habitat quality. Typically, these portions of woods lacked dense understory vines, saplings, and shrubs.

Marginal – resembles that of the good quality habitat; however, marginal habitat was rated for observed semi-mature forest with younger trees and taller saplings and shrubs within the understory. Few snags and suitable roosting trees are present. These types of forest may have somewhat dense understories that make bat travel more challenging.

Poor – these areas of woodland were portions that were nearly absent of mature forest or suitable roost trees and are entirely dominated with dense tall saplings or shrubs. Due to the density of the forest, travel through the forest by bats is greatly impaired.

Potential roost trees within these forest categories were also rated on a similar scale. Each tree was rated on its sheltering habitat quality, proper solar exposure, obstructions for traveling in and out of the sheltered area, and its height above the forest floor. For example: a shagbark hickory, or dead tree, with many deep cracks and crevices, with little to no obstructing vines, and some solar exposure would be rated as good, whereas a poor potential roost tree could be a younger shagbark hickory, or dead tree, with shallow crevices, multiple obstructing vines, and little to no solar exposure.

Within the Project Site, there are approximately 73 acres of forested land. Within the 73 acres of forested land, multiple forested vegetative communities were categorized on quality to provide suitable bat roosting habitat. Ten of the 73 acres are mature riparian forest and rated as good habitat. Twenty-three acres of mature riparian forest habitat were rated as marginal. Of the 23 acres, 11 acres are mature riparian forest, six acres are semi-mature riparian forest, and six acres are mixed growth hardwood forest. There are 40 acres of poor habitat. Seven acres are semi-mature riparian forest, four acres mixed growth hardwood forest, 28 acres are successional, and one acre is single trees.

Seventeen potential bat roost trees were identified within and immediately adjacent to the Project Site. These potential bat roost trees were observed as exfoliating bark on shagbark hickory trees, dead snags or stands, or cracks and crevices in living trees. (Figure 3.4-2).

The riparian forest community was the most dominant forested community for the Project Site and was observed within the floodplain areas of East Fork Clarks River and STR-3, a large intermittent stream. Two variations of the riparian forest were also documented, mature with primary and secondary growth trees and semi-mature which was predominantly secondary growth. The mature riparian forest accounted for approximately 10 acres and was rated as “good” bat habitat, and eleven acres of mature riparian forest was rated as “marginal.”

The semi-mature stands accounted for approximately 13 acres. Six acres were rated as marginal for bat habitat due to the presence of younger growth trees that occupy the midstory. Additionally, seven acres were classified as “poor” habitat.

The successional area accounted for approximately 28 acres of the Project Site. The area was observed with a significant presence of midstory and understory growth and was rated as “poor” bat habitat.

The mixed growth hardwood forest was observed with tree species from both the riparian forest and oak-hickory forest communities, as well as some successional species, but was observed with variable growth stages of canopy and midstory development. Six acres of mixed growth hardwood forest was rated as marginal for bat habitat, due to the mixed growths of trees and an observable presence of climbing vines and intermittent dense stands of tall shrubs and saplings. Four acres of mixed growth hardwood forest was rated as poor habitat. There was one acre of single trees that were classified as poor habitat. The data forms for each forested vegetative community and its potential for bat habitat within the project are provided in Summary of Environmental Features for the Puryear Solar Project (Appendix B).

From May 19-22, 2023, certified biologists from The Jackson Group conducted a mist net survey according to the 2023 Range-Wide Indiana Bat and Northern Long-eared Survey Guidelines (USFWS, 2023). Survey plans were approved by USFWS on May 16, 2023, prior to surveys. Based on the approximately 65 acres of suitable forested habitat within the 611-acre project area, a total of 10 net-nights of survey effort was completed by The Jackson Group. Three bats were captured during the survey effort. Bat species captured included two eastern red bats (*Lasiurus borealis*) and one silver-haired bat (*Lasionycteris noctivagans*). No threatened or endangered bats were captured during survey efforts. The complete Bat Survey Report is provided in Appendix I of the Summary of Environmental Features for the Puryear Solar Project (Appendix B of the Draft EA).

Birds

The whooping crane (*Grus americana*) is a migratory bird currently classified by the USFWS as an Experimental Population, Non-Essential in Tennessee. It is one of five populations that exists in the wild. Whooping cranes that may occur on the Project site would be part of the Eastern Migratory Population that migrates from Wisconsin to Florida. Suitable habitat on the Project site is primarily agricultural fields, pastures, and ponds.

Aquatic Organisms

The Blood River crayfish (*Orconectes burri*) is listed as threatened by the State of Kentucky. This species of crayfish prefers small to medium sized streams with a channel substrate of sand and gravel. As the common name implies, this species of crayfish is known to occupy the Blood River and its unnamed tributaries. The Blood River watershed is located along the eastern limit of the Project Site. Only EPH-10 was delineated within the Blood River watershed, which lacks perennial or intermittent waters to provide potentially suitable habitat for the Blood River crayfish. The four fish species, goldstripe darter (Endangered), cypress darter (Threatened), dollar sunfish (Endangered) and central mudminnow (Threatened) are state-listed species in Kentucky. Of these four species the only potential habitat for the central mudminnow occurred in the East Fork Clarks River.

The alligator snapping turtle, a proposed threatened species occurs in deep water of rivers, sloughs, oxbows, swamps, and lakes. It is present in western Tennessee and all or portions of Alabama, Arkansas, Florida, Georgia, Illinois, Kansas, Kentucky, Louisiana, Mississippi, Missouri, Oklahoma, and Texas.

TVA biologists conducted an aquatic survey of the perennial streams on the Project Site. Most streams were already in a degraded condition within the Project Site due to poor agricultural management practices. The field survey yielded no aquatic habitat worth surveying. Therefore, no aquatic species were observed.

Insects

The monarch butterfly (*Danaus plexippus*), a candidate species for listing by USFWS, was observed throughout the Project site. Additionally, milkweed (*Asclepias spp.*), where this species lays its eggs, was observed sporadically along agricultural field and farm pond margins. While no eggs or larvae were observed, it is possible that this species reproduces within the Project Site.

Plants

Tennessee state endangered water-milfoil (*Myriophyllum pinnatum*) and state threatened compass-plant (*Silphium laciniatum*) are listed within a 3-mile radius of the Project Site. The water-milfoil prefers moderately deep surface water in wetlands and ponds, while the compass-plant prefers open prairies, fallow fields, roadsides, and glades. Habitat for these two state-listed species is present within the Project Site. However, based on the September 2022 site inspection, all the 13 delineated ponds were observed with a lack of aquatic vegetation, including water-milfoil. The 13 delineated ponds were observed with a silty-mud bottom, a presence of suspended algal blooms, and fringe vegetation comprised of soft rush, woolgrass, black willow saplings, and cattail.

Furthermore, habitat for the compass-plant was present along the gravel access paths for the farms and occasional fallow field areas of the Project Site. However, based on the September 2022 site inspection, no compass-plants were observed within the Project Site, which should have been in flower for the season. Therefore, both the water-milfoil and compass-plant are not anticipated to be within the Project Site.

3.4.2 Environmental Consequences – Biological Resources

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

3.4.2.1 No Action Alternative

Vegetation

Under the No Action Alternative, the project would not be constructed and there would be no impacts to the existing vegetation in what would have been the Project Site. It is assumed that active farming, the predominant land use on the Project Site, would continue. Any agricultural or pastureland that became fallow would transition gradually from open grassland, shrubs, and young trees to a successional hardwood forest, and eventually to an oak-hickory or mixed-growth hardwood forest as described in Section 3.4.1.1. No indirect impacts to vegetation are anticipated.

Wildlife

Because agricultural activity is likely to continue if the project is not constructed, the status of wildlife would not noticeably change. Farming activities would continue thus limiting new wildlife habitat from developing. The existing forested communities would continue to provide habitat for wildlife known to utilize these habitats as described in Section 3.4.1.2. If the land ceases to be used for agriculture, wildlife appropriate to the successional communities would move into the area. No indirect impacts to wildlife are anticipated.

T&E and Other Rare Species

Under the No Action Alternative, existing land uses would continue, and there should be no direct or indirect impacts to T&E or other rare species. Ongoing farming activity is not conducive to supporting T&E and other rare species. Any agricultural or pastureland that became fallow would undergo a series of successional changes. During these changes, some habitat favorable to T&E and other rare species may develop. No indirect impacts to T&E species are anticipated.

3.4.2.2 Proposed Action

Vegetation

Under the proposed action, approximately 341 acres of agricultural land and up to 20 acres of forested land of the 611-acre project site would be required for the site's development. Most of the impacted land in the Project Site is agricultural land. Due to ongoing agricultural practices, species diversity is low with the highest areas of diversity being the forested areas. Following construction of the solar facility, the remaining Project Site would be maintained to prevent vegetation from growing above panel height.

Considering the large amount of similar vegetation types in the area, both regionally and locally, clearing the existing vegetation would be regarded as minimal and insignificant impacts. The surrounding area consists of similar vegetation communities, and the effects of the conversion of open land with areas maintained for hunting would be relatively small. Direct impacts to forested land would be minimal as most of the tree species on the project site are located adjacent to the site locally and regionally. Following construction, the solar facility would be maintained to prevent vegetation from growing above the panel height, converting some woody-dominated vegetation communities to herbaceous species, and maintaining some open, cleared areas.

No adverse impact to unique vegetation communities is anticipated. Vegetation impacts would be further reduced as revegetation of the site would be accomplished using native and/or noninvasive species. Disturbed areas would be seeded post-construction utilizing a mixture of certified weed-free, low-growing native or non-native grass seed obtained from a reputable seed dealer and in compliance with the requirements established by the local office of the NRCS. The Proposed Action would not significantly contribute to the spread of exotic or invasive species.

BMPs and appropriate erosion controls would be used as needed to minimize exposure of soil and limit erosion of soil from the Project Site. Disturbed areas would be seeded and stabilized post-construction. Erosion control measures would be inspected and maintained until vegetation in the disturbed areas has become well-established and soil stabilized.

No indirect impacts to vegetation are anticipated. Most of the land to be disturbed for this Project is agricultural land that does not have any unique vegetation or genetic qualities. Thus, no indirect impacts to the native vegetation in the region are anticipated. Creation of a grassland community maintained at a level below the panel height surrounding the solar panels is viewed as a beneficial impact from agricultural land for wildlife.

Wildlife

Overall, direct impacts on wildlife would be minor and insignificant. Wildlife present at the time of construction would be impacted, particularly when heavy machinery is used for vegetation clearing and driving piles. This machinery would result in the displacement of any wildlife (primarily common, habituated species) currently using the area. Direct effects to some individuals may occur if those individuals are immobile during the time of habitat removal. These effects would be more likely to occur if activities took place during breeding/nesting seasons or winter hibernation periods when animals are immobile in shallow burrows.

Habitat removal would likely disperse mobile wildlife into surrounding areas to find new food sources and shelter sources and reestablish territories. Those animals able to use early successional habitats could return to the site upon completion of the Project if they are able to access the new habitats. Approximately 235 acres of habitat is not proposed for development and would be available for wildlife use. Due to the amount of similarly suitable habitat in areas immediately adjacent to the Project Site, populations of common wildlife species likely would not be directly impacted by the Proposed Action.

Wildlife able to use herbaceous habitat is expected to return to the site upon completion of the Proposed Action. Upon completion of the Project, the site would be revegetated using a mixture of certified weed-free, low-growing native or non-native grass seed obtained from a reputable seed dealer and in compliance with the requirements established by the local office of the NRCS. Wildlife able to use this type of habitat is expected to return to the site upon completion of Proposed Action.

Of the five migratory bird species of conservation concern, only the prairie warbler was observed in the Project Site. It is also anticipated that the prothonotary warbler, chimney swift, and red-headed woodpecker could be present during the breeding season. To confirm this, a presence/absence survey would be required during the breeding season for each species, preferably during May or June. Tree clearing would be conducted only during the winter window (October 15 – March 31) thus, implementing the Proposed Action would avoid impacts to nesting birds.

No large raptor nests were observed within or immediately adjacent to the project study area that can be utilized by bald eagle. Based on the USFWS’s Bald Eagle Nests in Tennessee mapper, the nearest known bald eagle nest is on Kentucky Lake, approximately 12-miles from the eastern limit of the project study area. Therefore, bald eagle is not anticipated to occur within the project study area and would not be directly or indirectly impacted by the Project.

Minor indirect impacts to wildlife would occur due to habitat removal. Once removed this habitat would not be available to species returning to the Project Site. Any impacts would be minor because displaced wildlife would colonize similar habitats that are abundant in adjacent areas.

T&E and Other Rare Species

Under the Proposed Action, federally listed T&E species are unlikely to be significantly affected. No currently federally listed species or proposed listed species were observed during field surveys on or in the immediate vicinity of the Project Area. One insect, the monarch butterfly, is federally listed as a candidate species and was observed within the Project Site. Currently, there are no Section 7 requirements for this species as a candidate species thus consultation is not required. Because more open field type habitat will result from the Project, there is potential that habitat for the monarch butterfly will increase.

Roosting habitat for three federally protected mammals, the Indiana bat, NLEB, and the candidate TCB are present within the Project Site; however, no individuals of the three species or gray bats were collected during the mist-net survey that followed federal survey guidelines. Less than 20 acres of potentially suitable summer roosting habitat for Indiana bat and NLEB would be removed. Wetlands, streams, and forested areas offer suitable foraging habitat for these species and, except for a possible 0.2 acres of wetland impact, would not be impacted by constructing the Project. The current design estimates up to 0.2 acres of wetland impact; however, SRC is working to reduce this to no wetland impacts. Tree clearing would be conducted only during the winter window (October 15 – March 31) when federally protected bats are not present. Thus, implementing the Proposed Action would not adversely impact these species.

Consultation with USFWS under Section 7 of the Endangered Species Act has been completed and concurrence was received on December 19, 2023 (Appendix D). Due to the probable absence of the Indiana bat, NLEB, and TCB as determined by mist net survey efforts, TVA has determined that the proposed actions may affect, but are not likely to adversely affect these species. Due to the lack of impacts to potential roosting habitat and lack of captures during mist-net surveys, TVA has also determined that the proposed actions may affect but are not likely to adversely affect the gray bat.

The whooping crane was not observed on site; however, suitable habitat is present. Direct and indirect impacts to whooping crane habitat would result from construction of the project. Most of the agricultural fields and pasture, potential whooping crane habitat, would be converted to solar arrays. This loss may impact current and future migrating whooping cranes. However, the small loss of suitable habitat would not be likely to adversely affect the experimental population of whooping cranes as there is an abundance of agricultural land along the whooping crane's migration route.

The aquatic survey found the aquatic habitats had degraded due to agricultural activity and that there was no suitable habitat to survey. Thus, the Proposed Action would not adversely impact the four Kentucky state-listed fish species and the Blood River crayfish that had the potential to be present in the streams on the Project Site.

Constructing the Project may eliminate some suitable habitat, including milkweed plants, for the monarch butterfly. These direct and indirect impacts would be minor due to the abundance of habitat surrounding the Project site.

The alligator snapping turtle was not observed on site. The turtle's preferred habitats are in deep water of rivers, sloughs, oxbows, swamps, and lakes. The Project Site lacks these features; however, it may be possible for the turtle to be present in a wetland or pond. With the exception of the 0.2 acres of wetlands that may be impacted by the cutting of trees, potential habitat for the alligator snapping turtle would not be directly impacted by the Project. Indirect impacts to ponds and wetlands are not anticipated as BMPs will be followed to protect these features during construction.

No state listed species in Table 3.4-2 were observed within the Project Site.

3.5 VISUAL RESOURCES

This section provides an overview of existing visual resources within and surrounding the Puryear Project Site and potential impacts to visual resources that would be associated with the Proposed Action and No Action Alternatives and how visual impacts would be addressed.

Visual resources are the characteristics of a place, both natural and man-made, that give a particular landscape its character and aesthetic quality. An observer's experience within or near a specific location can be determined by the visual resources surrounding that location. For example, an observer would likely have a much different reaction to viewing a forest than a commercial building complex. What a person sees of the visible environment from a particular vantage point is known as a viewshed. Visual resources are very important to people living in and travelling through an area. For this project, seeing solar panels replace agricultural land can trigger feelings that can be positive or negative depending on the individual's perspective.

3.5.1 Affected Environment – Visual Resources

The Project Site, located in Henry County, is less than one mile east of the City of Puryear. The land is mostly flat with a few small gently rolling hills. The Project Site and the surrounding land to the north, west, and east is mostly agricultural land with scattered rural residences. Approximately 12 residences appear to be within 500 feet of the Project Site boundary. To the west is a large north-south oriented forested area.

The Project Site is mostly agricultural land with small, forested areas and tree lines present. The viewsheds constitute an almost completely agricultural setting, with very few man-made attributes. Man-made items include homes, barns, and sheds on adjoining properties. There are no retail businesses, commercial buildings, or industrial sites adjacent to the Project Site.

Figure 3.5-1 shows the locations where photos were taken along SR 140 and Old Paris Murray Road. Photos 3.5-1 to 3.5-5 are ground-level views as seen from SR 140 and Old Paris Murray Road. The images show the near-total agricultural features of the Project Site. Although the uniformity of the crop and pasturelands is a man-made visual disturbance, it may be appealing to some people due to the colors and topography. The more open areas adjacent to the forested areas present contrasting colors and shapes to the crop and pastureland. These views would have different appearances during the year due to the planting and harvesting of crops over the year.

3.5.2 Environmental Consequences – Visual Resources

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

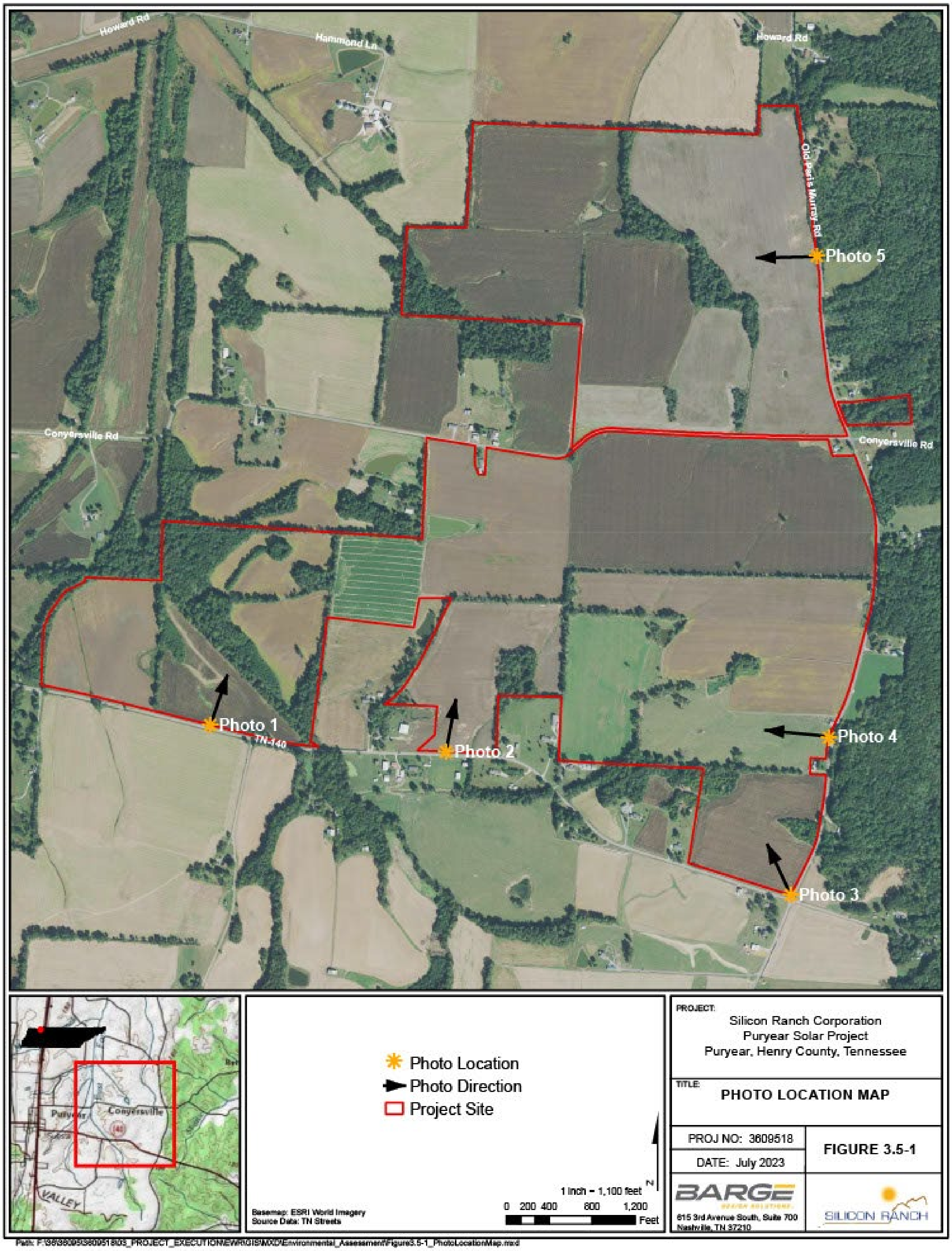


Figure 3.5-1. Photo Locations

Photo 3.5-1. Agricultural field and tree line near East Fork Clarks River

Photo 3.5-2 Agricultural field

Photo 3.5-3. Project Site illustrating the relatively flat terrain.

Photo 3.5-4. Pastureland with tree line in the distance

Photo 3.5-5. Agricultural field with a tree line in the distance

3.5.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be built, and there would be no Project-related changes to the area's visual character. Existing views and land use would be expected to remain unchanged except for any naturally occurring changes in the viewshed.

3.5.2.2 Proposed Action

Construction of the Project would convert farmland to commercial/industrial land use and alter the visual character of the Project Site. Heavy machinery used during construction would be visible and temporarily change the visual characteristics from vantage points surrounding the project site. When operational, the panels would be visible from the roads that border the Project and from two residences. On July 5, 2023, SRC sent letters to neighboring residents notifying them of the Project. On July 18 SRC had a community meeting with nearby residents. Residents did not express concern about adverse visual impacts. Additionally, the topic was not mentioned by anyone submitting comments during the public comment period.

In areas where grading would be necessary, minor changes to the ground surface's contour, color, and texture would be visible. Erosion control devices (ECDs) such as silt fences would likely be visible from the properties adjacent to the Project Site. Visual impacts from construction would be minimal at night since most construction is anticipated to occur during the day. Erosion control silt fences and sediment traps would be removed once construction is complete, and the site has been stabilized.

During construction, additional traffic would be seen on SR 140, Old Paris Murray Road, and Conyersville Road. SR 140, the most heavily traveled road near the Project Site, runs east-west along the southern boundary of the Project Site.

Once operational, panels and the chain link fence surrounding the panels would be visible along the western half of the Project Site from SR 140, along both sides of Conyersville Road where it passes through the Project Site, and along most of the Project Site that borders Old Paris Murray Road. The only place where the panels would not be visible from any roads is along the eastern half of the Project Site along SR 140. Visibility is blocked by existing tree lines. The substation and switchyard would be visible from SR 140. Additionally, panels would be visible to two existing residences from their properties, and the residents would experience noticeable visual impacts. To mitigate this, SRC may explore adding new vegetated buffers where useful to reduce the visual impact.

Visually, the PV panels would be dramatically different from the current scenery on the site. Photo 3.5-6 shows typical solar panel arrays. Photos 3.5-7 to 3.5-14 show the viewshed at four sites before and with a rendering added to approximate what the panels would look like once they are installed.

Photos 3.5-7 to 3.5-9 show the appearance of the Project Site from three publicly accessible viewsheds (Figure 3.5-2). The images show the site as it currently looks and a rendering of the site after construction. The view would change from an agricultural view to a more industrial view. Because vegetation would be planted beneath and around the panels and grow to a height of 2 feet, this would reduce the view of seeing the panels. Since there are very few residences in this location, changes to the visual nature of this space would mostly be seen only by those traveling along SR 140 and Old Paris Murray Road. Additionally, SRC may elect to install vegetative barriers in some areas to further reduce the visual impacts of the panels.

Overall, there would be minor temporary direct and indirect impacts to visual resources during the construction and operation phases of the Proposed Action. Vegetation removal will be minimized to limit visual impacts of the panels. 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.

Photo 3.5-6. Single-axis, tracking photovoltaic system with panels close to maximum tilt

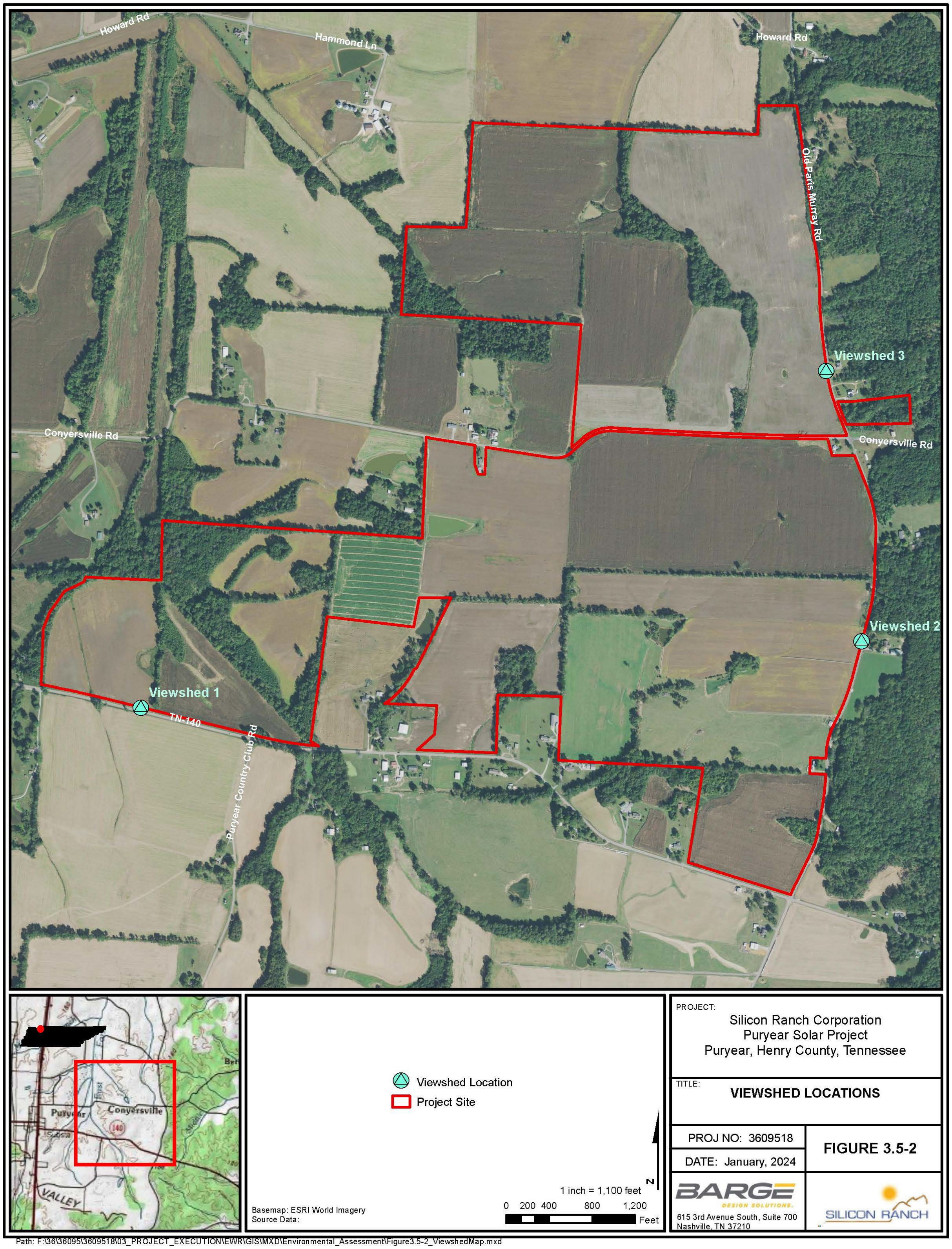


Figure 3.5-2 Viewshed Locations

Photo 3.5-7. Viewshed 1 pre- and post-construction

Photo 3.5-8. Viewshed 2 pre- and post-construction

Photo 3.5-9. Viewshed 3 pre- and post-construction

3.6 NOISE

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

3.6.1 Affected Environment – Noise

Noise is generally described as unwanted sound, based on objective effects (hearing loss, damage to structures, etc.) or subjective judgments (such as community annoyance). Sound is typically measured by decibels (dB), which expresses the ratio of one value of a physical property to another on a logarithmic scale. The weighted decibel, dBA, expresses loudness perceived by the human ear. A day-night average sound level of 55 dBA is commonly used as a threshold level for noise which could result in adverse impacts, and prolonged exposure to levels above 65 dBA is considered unsuitable for residential areas (USEPA, 1974). The threshold of human hearing is approximately 0 dBA, and the threshold of discomfort or pain is around 120 dBA.

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

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

The magnitude and frequency of environmental noise may vary considerably over the day, throughout the week, and across seasons, in part due to changing weather conditions and the effects of seasonal vegetation cover. Noise levels occurring at night generally produce a greater annoyance than do the same levels occurring during the day. It is generally agreed that people perceive intrusive noise at night as being 10 dBA louder than the same level of noise during the day. This perception is largely because background environmental sound levels at night in most areas are about 10 dBA lower than those during the day.

3.6.1.1 Noise Regulations

The Noise Control Act of 1972 and its subsequent amendments delegate authority to the states to regulate environmental noise. It also directs government agencies to comply with local community noise statutes and regulations. Henry County has no federal, state, or local regulations for community noise. Further, because Henry County does not enforce zoning, there are no local noise ordinances that apply to the county.

EPA guidelines recommend that the day-night average sound level (DNL) not exceed 55 dBA for outdoor residential areas (EPA, 1974). This guidance is not a regulatory requirement. It is a recommendation considered sufficient to protect the public from adverse noise in typical outdoor and residential areas.

3.6.1.2 Background Noise Levels

Noise levels are variable depending on location and time of day. As sound is generated at a source and spreads out, the level of sound diminishes. Additional factors such as wind, climatic conditions, and vegetation can influence sound levels. An individual's sound exposure is determined by measurement of the noise that the individual experiences over a specified time interval.

Typical background day/night noise levels for rural/agricultural areas range between 35 and 50 dBA. Noise levels are locally higher when farm equipment is in operation. Higher-density residential and urban areas' background noise levels range from 43 dBA to 72 dBA (EPA 1974). Background noise levels greater than 65 dBA can interfere with normal conversation, watching television, using a telephone, listening to the radio, and sleeping.

The Project Site is predominately agricultural, with a few residences. There are no businesses or commercial noise-generating facilities near the Project Site. Ambient noise at the Project Site consists mainly of agricultural, transportation, rural, and natural sounds (e.g., farming equipment, moderate traffic, moderate voice, wind, wildlife, and similar sounds). Generally, noise levels in these types of areas range from 45 to 55 dBA. Noise from businesses in the Town of Puryear is not detectable at the Project Site.

Approximately 50 structures (residences, barns, and other structures) are within a half-mile of the Project Site boundary. One residence would be approximately 160 feet from the fence line enclosing the panels, and two other residences are approximately 225 feet from the fence line.

3.6.2 Environmental Consequences – Noise

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, no noise impacts would occur from the construction or operation of the proposed solar facility. Existing land use would remain primarily agricultural land and the Project would not result in related changes to noise level. No noise would be generated by the operation of the proposed solar facility. However, an increase in noise levels in the vicinity of the Project Site is possible if the area becomes developed for residential or commercial purposes.

3.6.2.2 Proposed Action

Construction noise would cause temporary and short-term adverse impacts to the ambient sound environment near the Project Site. Nearby residents could experience elevated noise levels caused by construction equipment. Construction equipment typically results in a maximum noise level of 80-90 dBA, dropping to 71-81 dBA at 300 feet, and 50-60 dBA at 1,000 feet. However, most construction-related noise such as delivery trucks, dump trucks, water trucks, service trucks, bulldozers, chain saws, bush hogs, and other large mowers for tree clearing would remain under 65 dBA for nearby residences due to their distance from the sound source. Most of the proposed equipment would not be operating on the site for the entire construction period or at one time but would be phased in and out based on project progress. Typical noise levels of construction equipment used for construction of Puryear Solar are provided in Table 3.6-1 (USDOT, 2006).

The construction work associated with pile driving would be the loudest and occur intermittently during daylight hours. However, except for short periods for three residences, most pile driving would occur at distances greater than 500 feet. Therefore, impacts to noise due to pile driving would be minimal. Construction of the substation and switchyard in the southwest portion of the Project Site would have similar impacts on noise levels.

Work would occur Monday through Saturday from 7 am to 5 pm. Construction workers would wear appropriate hearing protection in accordance with the Occupational Safety and Health Administration (OSHA) regulations.

Following completion of the solar facility, the ambient sound environment is anticipated to return to existing noise levels or below by eliminating some of the seasonal use of agricultural equipment. The proposed inverters would produce minimal noise for residences more than 1,000 feet from the proposed inverters. A typical inverter, such as a Power Electronics 3510kVA model, has noise levels of less than 79 dB measured at 1 meter from the back of the unit. Maintenance activities, primarily mowing, would result in noise periodically; however, this noise would be similar to existing noises near the Project Site.

Overall adverse noise impacts resulting from the Proposed Action would be temporary and minimal for residents living in proximity to the Project Site during construction, operation, and maintenance of the solar facility. No indirect impacts from noise are anticipated.

Table 3.6-1 Construction Equipment Noise Levels

Equipment Description	Impact Device?	Acoustical Usage Factor (%)	Spec. 721.560 L_{max} @ 50 feet (dBA, slow)	Actual Measured L_{max} @ 50 feet (dBA, slow) (Samples Averaged)	Number of Actual Data Samples (Count)
All Other Equipment > 5 HP	No	50	85	N/A	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	N/A	0
Blasting	Yes	N/A	94	N/A	0
Boring Jack Power Unit	No	50	80	83	1
Chain Saw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Batch Plant	No	15	83	N/A	0

Equipment Description	Impact Device?	Acoustical Usage Factor (%)	Spec. 721.560 Lmax @ 50 feet (dBA, slow)	Actual Measured Lmax @ 50 feet (dBA, slow) (Samples Averaged)	Number of Actual Data Samples (Count)
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (<25KVA, VMS Signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader	No	40	85	N/A	0
Grapple (on backhoe)	No	40	85	87	1
Horizontal Boring Hydraulic Jack	No	25	80	82	6
Hydra Break Ram	Yes	10	90	N/A	0
Impact Pile Driver	Yes	20	95	101	11
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	75	23
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	212
Paver	No	50	85	77	9
Pickup Truck	No	40	55	75	1
Pneumatic Tools	No	50	85	85	90
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3

Equipment Description	Impact Device?	Acoustical Usage Factor (%)	Spec. 721.560 Lmax @ 50 feet (dBA, slow)	Actual Measured Lmax @ 50 feet (dBA, slow) (Samples Averaged)	Number of Actual Data Samples (Count)
Rivit Buster/Chipping Gun	Yes	20	85	79	19
Rock Drill	No	20	85	81	3
Scraper	No	40	85	84	12
Sheers (on backhoe)	No	40	85	96	5
Slurry Trenching Machine	No	50	82	80	75
Tractor	No	40	84	N/A	0
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder/Torch	No	40	73	74	5

Source: https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm

3.7 AIR QUALITY AND CLIMATE CHANGE

This section describes an overview of existing air quality and GHG emissions within the Project Site and the potential impacts on air quality and GHG emissions that would be associated with the Proposed Action and No Action Alternatives.

3.7.1 Affected Environment – Air Quality and Climate Change

Air Quality Standards

The Clean Air Act (CAA), first enacted in 1963, and amended several times, regulates air emissions from stationery and mobile sources (USEPA, n.d.-b). The Act also required EPA to set National Ambient Air Quality Standards (NAAQS) for six principal pollutants known as "criteria" air pollutants: sulfur dioxide (SO_2), ozone (O_3), nitrogen dioxide (NO_2), particulate matter whose particles are less than or equal to 10 micrometers (PM10), particulate matter whose particles are less than or equal to 2.5 micrometers (PM2.5), carbon monoxide (CO), and lead (Pb) (Table 3.7-1). These pollutants may be harmful to public health and the environment. Further, the CAA established two types of national ambient air quality standards. Primary standards are designed to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. The secondary standards protect public welfare and decreased visibility and damage to animals, crops, vegetation, and buildings (USEPA, n.d.-c). Pollutants are measured in three ways: parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air (μg/m^3).

An area can either be in “attainment” meaning the area complies with the NAAQS or “nonattainment” meaning the area exceeds one or more of the six NAAQS. New sources located in or near “nonattainment” areas may be subject to more stringent air permitting requirements. Typically, a state agency must prepare and submit to EPA a plan for implementation, maintenance, and enforcement for an area that does not meet the NAAQS. EPA Region IV office granted TDEC the authority to implement federal air pollution control regulations promulgated under the CAA.

Table 3.7-1. National Ambient Air Quality Standards

Pollutant [links to historical tables of NAAQS reviews]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3-month average	0.15 µg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	One year	53 ppb (2)	Annual mean
Ozone (O_3)		primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration averaged over three years.
Particle Pollution (PM)	$PM_{2.5}$	primary	1year	12.0 µg/m^3	Annual mean averaged over three years
		secondary	One year	15.0 µg/m^3	Annual mean averaged over three years
		primary and secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

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

(2) The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards are not revoked and remain in effect for designated areas. Additionally, some areas may have certain continuing implementation obligations under the prior revoked 1-hour (1979) and 8-hour (1997) O_3 standards.

(4) The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (a) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (b) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO_2 standards or is not meeting the requirements of a SIP call under the previous SO_2 standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

3.7.1.1 Regional Air Quality

The Project Site is in Henry County, Tennessee. It is part of the Paris Micropolitan Statistical Area. There are no air quality monitoring sites in Henry County. The closest active air quality monitoring station is near Cadiz, Kentucky, approximately 40 miles northeast of the Project Site. It only collects local data for ozone.

Per the EPA Tennessee Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants website (https://www3.epa.gov/airquality/greenbook/anayo_tn.html), Henry County, Tennessee, is not listed as having been in nonattainment for any of the NAAQS pollutants since 1992. Thus, the CAA regulations would not require any further analysis of air quality.

3.7.1.2 Regional Climate

Weather conditions determine the potential for the atmosphere to disperse emissions of air pollutants. Henry County's climate is characterized by hot and muggy summers and cold and wet winters. Spring temperatures range from 36°F to 81°F. Summer temperatures range from 60°F to 90°F, with an average temperature of 81°F. Fall temperatures range from 38°F to 81°F, and winter temperatures range from 30°F to 54°F. Precipitation is highest from mid-March through the end of July (Weather Spark, n.d.). Precipitation averages 54 inches per year, including an average of 5 inches of snow (U.S. Climate Data, n.d.). Henry County averages 202 sunny days (Best Places, Henry County, n.d.) In the past ten years, three tornados have been in Henry County (Storm Events Database).

3.7.1.3 Greenhouse Gas Emissions

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

Carbon dioxide ($C0_2$) is the main GHG accounting for 79 percent of the GHG emissions in the U.S. in 2020 (EPA, n.d.). Methane (11%), nitrous oxide (7%), and fluorinated gases (3%) comprise the other GHGs. CO_2 is naturally present in the atmosphere, but many scientists believe that the excess CO_2 released by combustion of fossil fuels is dramatically accelerating the release of CO_2 into the atmosphere. Excess CO_2 trapped in the atmosphere absorbs energy from the sun acting as insulation in the stratosphere thereby warming the atmospheric temperature (global warming). Many scientists believe that climate change associated with global warming will produce negative economic and social consequences across the globe through changes in weather (e.g., more intense hurricanes, greater risk of forest fires, flooding).

The impact of global warming is a planet-wide issue. A potential measure for reducing CO_2 in the atmosphere is carbon sequestration. The effectiveness of this varies from country to country. The U.S. has reduced CO_2 emissions by approximately 8 percent between 1990 and 2020, methane emissions by 17 percent, and nitrous oxide emissions by 5 percent. Fluorinated gas emissions have increased by 90 percent primarily due to a 28 percent increase in hydrofluorocarbons which are used as a substitute for ozone-depleting substances (EPA, n.d.-b).

3.7.2 Environmental Consequences – Air Quality and Climate Change

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

3.7.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed. No Project-related impacts to air quality or climate change would occur as the proposed solar facility would not be built. No air pollutants or GHG emissions would be generated by equipment or vehicles from the construction or operation of the solar facility. Existing land use would remain an agricultural, forested, and rural residential mix with little effect on climate and air quality.

3.7.2.2 Proposed Action

Construction

Under the Proposed Action, minor impacts on air quality would occur during the facility's construction. Only minimal air impacts would be expected, as construction might result in localized dust and fumes from equipment. The construction would likely involve using diesel-powered machinery that would create small amounts of airborne dust and debris. Internal combustion engines' emissions associated with diesel fuels would generate local emissions, including carbon monoxide, nitrogen oxides, and sulfur dioxide during construction (an increase of GHG during construction). Also, during clearing, trees would be burned and result in a minor increase in GHG emissions. The impacts on air quality would be expected to be minimal and short-lived and would remain well below the applicable ambient air quality standard.

Vehicle traffic on internal unpaved haul roads and soil disturbance may create short-term fugitive dust issues during construction. BMP control and suppression measures, including covered loads and wet suppression, would minimize fugitive dust emissions. In addition, standard erosion control measures, such as redistribution of removed topsoil and reseeding, would minimize the potential for wind erosion.

Trees and other tall vegetation removed during construction to accommodate the panel layout would represent a minor loss of sequestered carbon, as well as potential future carbon sequestration. Emissions from construction would have at most a minor transient impact on air quality, which would remain well below the applicable ambient air quality standards.

Overall, by implementing BMPs, there would be minor and temporary impacts to air quality. Further, CO_2 emissions produced during construction would not have a measurable impact on GHGs emissions atmosphere. No indirect impacts to air quality or GHGs are anticipated from construction activities.

Operations

The operation of the solar facility would result in minimal impacts due to operation activities such as facility inspections, repairs to panels, periodic mowing, and possible animal grazing. However, a minor reduction in new GHG emissions is expected as the emissions-free power generated by the solar facility would reduce the need for power that would otherwise be generated in part by fossil fuels. This reduction would result in minor beneficial impacts to air quality (TVA 2019). The solar facility would be part of the cleaner, lower-emitting generating portfolio described in the 2019 IRP

(TVA 2019) and would contribute to the approximately 44 percent reduction in CO_2 emissions projected between 2014 and 2033. While the reductions in air pollutants and CO_2 emissions attributable to the solar facility would be relatively minor, they would be a component of TVA's projected significant overall reductions, the associated beneficial impacts to air quality, and the reduced impacts from climate change.

No indirect impacts to regional climate are expected during the operational phase. The ground below the modules is shaded, reducing the ground temperature proportionally, and lowering the ambient air temperature below the array. On a hot sunny summer day, the top side of the panels would be hot to the touch. The heat from the panels may radiate just above the panels (inches) where it cools to ambient temperature. Further, there is no research that suggests the shading below the array or the atmosphere above the array is negatively impacting the community or surrounding environments.

The Proposed Action would change the surface characteristics somewhat, but it would have little effect on soil permeability and hydrologic characteristics of the developed area. Vegetation would still grow under and around the solar panels, tending to maintain a landscape with significant evapotranspiration of precipitation instead of creating significant rainfall runoff, which happens with urban and industrial development. Agricultural practices, which currently raise dust and combustion byproducts, would be discontinued at the Project Site. Therefore, operations could ultimately result in a minor beneficial impact to local air quality.

3.8 CULTURAL RESOURCES

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

3.8.1 Affected Environment – Cultural Resources

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

The NRHP lists buildings, districts, sites, structures, and objects significant to local, state, or national history and prehistory. Additionally, cultural resources may be eligible for listing on the NRHP if the cultural resource meets one of the following criteria:

> *Criterion A:* made a significant contribution to American history; for example, literature, ethnic heritage, health/medicine, and transportation
>
> *Criterion B:* related to the life of significant persons; examples of National Register properties nominated under *Criterion B* include George Washington's Mt. Vernon estate

Criterion C: embodied distinctive characteristics of a type, period, or method of construction including works of a master or buildings that possess high artistic value

Criterion D: yielded important information about history or prehistory; This category is typically the most relevant criterion for archaeological resources.

TVA is required by the NHPA and by NEPA to consider the possible effects on historic properties for proposed solar facilities. This is accomplished through a four-step review process outlined in section 106 of the NHPA (36 CFR Part 800). These steps are:

1. Initiation (defining the undertaking and the area of potential effect [APE] and identifying the parties to be consulted in the process)

2. Identification (studies to determine whether cultural resources are present in the APE and whether they qualify as historic properties)

3. Assessment of adverse effects, if any (determining whether the undertaking would damage the qualities that make the property eligible for the NRHP)

4. Resolution of adverse effects (by avoidance, minimization, or mitigation)

As the lead NEPA agency, TVA must consult with the appropriate State Historic Preservation Office (SHPO), federally-recognized American Indian tribes that have an interest in the Project, and any other party with a vested interest in the Project. As part of the evaluation process for this Project, an archaeological survey and architectural survey were conducted by Tennessee Valley Archaeological Research (TVAR) to determine the presence of precontact and historic cultural resources that are listed on or potentially eligible for the NRHP. The archaeological survey area consists of the 611-acre tract of land where the solar array is to be constructed. The architectural APE consisted of a 0.5-mile radius surrounding the solar array's footprint. Areas within the survey radius that were determined not to be within view of the solar array due to terrain, vegetation, and/or modern built environments were not considered part of the APE.

3.8.1.1 Previous Surveys

TVAR's background and literature search found no previously recorded architectural resources, NRHP properties, or currently listed national monuments located within the survey radius. Reviews of local topographic maps indicated the locations of three undocumented cemeteries within the larger 0.5- mile survey radius, Cooper Cemetery, Potts Cemetery, and the Old Conyersville Cemetery. However, these cemeteries lie out of view of the solar array due to dense vegetation and/or terrain and were thus not considered part of the architectural APE. In addition, TVAR consulted the Henry County tax records to confirm known construction dates and parcel boundaries.

3.8.1.2 Survey Results

TVAR conducted architectural field investigations between February 8-9, 2023. The archaeological survey was conducted between October 13, 2022, and February 9, 2023. Locations within the archaeological survey area that were accessible by foot and had surface visibility equal to or greater than 50 percent were examined along transects placed at intervals no greater than 15 meters. Systematic shovel testing was conducted at 30-meter intervals in all areas characterized by surface visibility of less than 50 percent or that demonstrated the potential for containing archaeological deposits. Shovel tests were 30-centimeter x 30-centimter square holes excavated to a depth of 70 centimeters below surface or until impenetrable substrate, subsoil, or the water table was encountered.

Archaeological Survey Results

The archaeological survey resulted in the identification and evaluation of 46 cultural resources, including 9 archaeological sites (Table 3.8-1) and 37 non-site cultural resources (NSCR) (Table 3.8-2). Due to a low density of artifacts and disturbance from historic construction and modern agricultural practices, TVAR recommends that the nine sites identified during the survey lack integrity and significant research potential beyond the findings of the Phase I survey, and these sites are recommended as ineligible for NRHP listing. Additionally, none of the non-cultural sites are recommended as eligible for NRHP listing. TVA consulted the SHPO and federally-recognized Indian tribes with respect to the findings of the archaeological survey. In a letter dated September 7, 2023, the SHPO concurred with TVA's eligibility recommendations and that the project would have no effect to historic properties (Appendix E). TVA received no concerns from consulting federally-recognized Indian tribes regarding the proposed project.

Table 3.8-1. Summary of Archaeological Sites Identified during the Survey

Survey Number	Architectural Style/Property Type	Recommended NRHP Status
JPV005	Early to mid-twentieth century house site	Not Eligible
JPV006	Early to mid-twentieth century house site	Not Eligible
JPV007	Early to mid-twentieth century artifact scatter	Not Eligible
JPV008	Early to mid-twentieth century house site	Not Eligible
JPV009	Early nineteenth to early twentieth century house site	Not Eligible
JPV011	Lithic surface scatter	Not Eligible
EMM005	Lithic scatter	Not Eligible
ASM001	Lithic scatter	Not Eligible
EMM001	Early to mid-twentieth century house site	Not Eligible

Table 3.8-2. Summary of Non-Site Cultural Resources Identified during the Survey

NSCR 1	Historic	Not Eligible	NSCR 20	Early Nineteenth to Mid-Twentieth Century	Not Eligible
NSCR 2	Native American	Not Eligible			
NSCR 3	Historic	Not Eligible	NSCR 21	Historic	Not Eligible
NSCR 4	Historic	Not Eligible	NSCR 22	Historic	Not Eligible
NSCR 5	Native American; Historic	Not Eligible	NSCR 23	Historic	Not Eligible
NSCR 6	Native American	Not Eligible	NSCR 24	Native American	Not Eligible
NSCR 7	Native American	Not Eligible	NSCR 25	Historic	Not Eligible
NSCR 8	Historic	Not Eligible	NSCR 26	Native American	Not Eligible
NSCR 9	Historic	Not Eligible	NSCR 27	Native American	Not Eligible
NSCR 10	Native American	Not Eligible	NSCR 28	Native American	Not Eligible
NSCR 11	Native American	Not Eligible	NSCR 29	Native American	Not Eligible
NSCR 12	Native American	Not Eligible	NSCR 30	Native American	Not Eligible
NSCR 13	Native American	Not Eligible	NSCR 31	Native American	Not Eligible
NSCR 14	Historic	Not Eligible	NSCR 32	Native American	Not Eligible
NSCR 15	Native American	Not Eligible	NSCR 33	Historic	Not Eligible
NSCR 16	Historic	Not Eligible	NSCR 34	Native American	Not Eligible
NSCR 17	Historic	Not Eligible	NSCR 35	Native American	Not Eligible
NSCR 18	Historic	Not Eligible	NSCR 36	Native American	Not Eligible
NSCR 19	Historic	Not Eligible	NSCR 37	Native American	Not Eligible

Architectural Survey Results

TVAR recorded 16 historic architectural resources (Table 3.8-3). These recordings included parcels with single homes or barns, as well as large parcels containing anchoring homes and surrounding agricultural outbuildings. While 14 of these recordings were typical, 2 warranted further research and discussion. The farm represented by HY0002 contained a suspected slave cemetery; however, TVAR's research and investigation found no evidence of such a resource. Consequently, TVAR recommends that the location of the purported slave cemetery be considered a sensitive area, should future ground disturbing endeavors be required at this location. However, with the lack of sufficient information, TVAR recommends that HY0002 be considered ineligible for NRHP listing. Despite the presence of multiple fire-cured tobacco barns within the APE, only HY0010 was built during the period of significance recommended by TVAR within this report, as well as met the design and contextual criteria found in published contexts. While the barn's design is significant within the regional context, it has suffered severe neglect and damage that has compromised its integrity. Thus, TVAR recommends HY0010 as ineligible for NRHP listing under Criteria A, B, and C. As TVAR found all 16 recorded architectural resources to be ineligible for NRHP listing under the 3 applicable criteria, a finding of no historic properties affected is recommended.

TVAR found no basis to recommend further above-ground investigations in relation to the undertaking as currently planned. TVA consulted with the SHPO with respect to the findings of the architectural survey. The SHPO concurred with TVA's findings.

Table 3.8-3. List of Recorded Architectural Resources within the APE

Survey Number	Architectural Style/Property Type	Recommended NRHP Status
HY0001	ca. 1961 Compact Ranch house/farm	Not Eligible
HY0002	ca. 1972 Ranch house/farm with potential cemetery	Not Eligible
HY0003	ca. 1952 Compact Ranch house/farm	Not Eligible
HY0004	ca. 1973 Linear Ranch house/farm	Not Eligible
HY0005	ca. 1940 center hall folk house	Not Eligible
HY0006	ca. 1935 pyramidal cottage	Not Eligible
HY0007	ca. 1951 vernacular church (Conyersville Community Center)	Not Eligible
HY0008	ca. 1862 Conyersville Community Cemetery	Not Eligible
HY0009	ca. 1956-1981 transverse crib barn	Not Eligible
HY00010	ca. 1950 fire-cure tobacco barn	Not Eligible
HY00011	ca. 1965 Linear Ranch house	Not Eligible
HY00012	ca. 1950 Compact Ranch house	Not Eligible
HY00013	ca. 1955 massed-plan house	Not Eligible
HY00014	ca. 1955 massed-plan bungalow house/farm	Not Eligible
HY00015	ca. 1900 Queen Anne Cottage	Not Eligible
HY00016	ca. 1918 pyramidal cottage/farm	Not Eligible

3.8.2 Environmental Consequences – Cultural Resources

3.8.2.1 No Action Alternative

Under the No Action Alternative, the existing land use would be expected to remain unchanged. Ground disturbing agricultural practices at the Project Site would continue to potentially impact intact cultural resources at the surface or within the first 8 to 10 inches of soil. Therefore, no significant impacts to cultural resources would be anticipated as the site would not be developed as a solar facility.

3.8.2.2 Proposed Action

The Proposed Action would not impact any listed or eligible NRHP archaeological sites. Unless plans change or new concerns are brought to light, no further archaeological or architectural investigations are recommended for the proposed project. TVA consulted with the SHPO and federally-recognized Indian tribes with an interest in the area with respect to these findings of both the archaeological and architectural surveys. TVA received concurrence from the SHPO in a letter dated September 7, 2023. Should previously undiscovered cultural resources be identified during Project Site construction or operations, a Secretary of the Interior qualified archaeologist and the SHPO would be consulted before any further action is taken.

3.9 NATURAL AREAS AND RECREATION

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

3.9.1 Affected Environment – Natural Areas and Recreation

Natural areas are managed areas such as National Wildlife Refuges, Natural Areas listed by TDEC, Wildlife Management Areas (WMA) listed by the Tennessee Wildlife Resource Agency, ecologically significant sites, and river segments listed in the Nationwide Rivers Inventory. The level of public use is variable but tends to be less intensive than recreational areas. Recreation areas, including federal, state, or local areas, are designed to offer a higher level of public use. Within a 5-mile radius of the Project Site, there are no natural or recreation areas (Figure 3.9-1).

3.9.2 Environmental Consequences – Natural Areas and Recreation

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

3.9.2.1 No Action Alternative

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

3.9.2.2 Proposed Action

Because there are no natural areas within a 5-mile radius of the Project Site, implementing the proposed action would not affect natural areas.

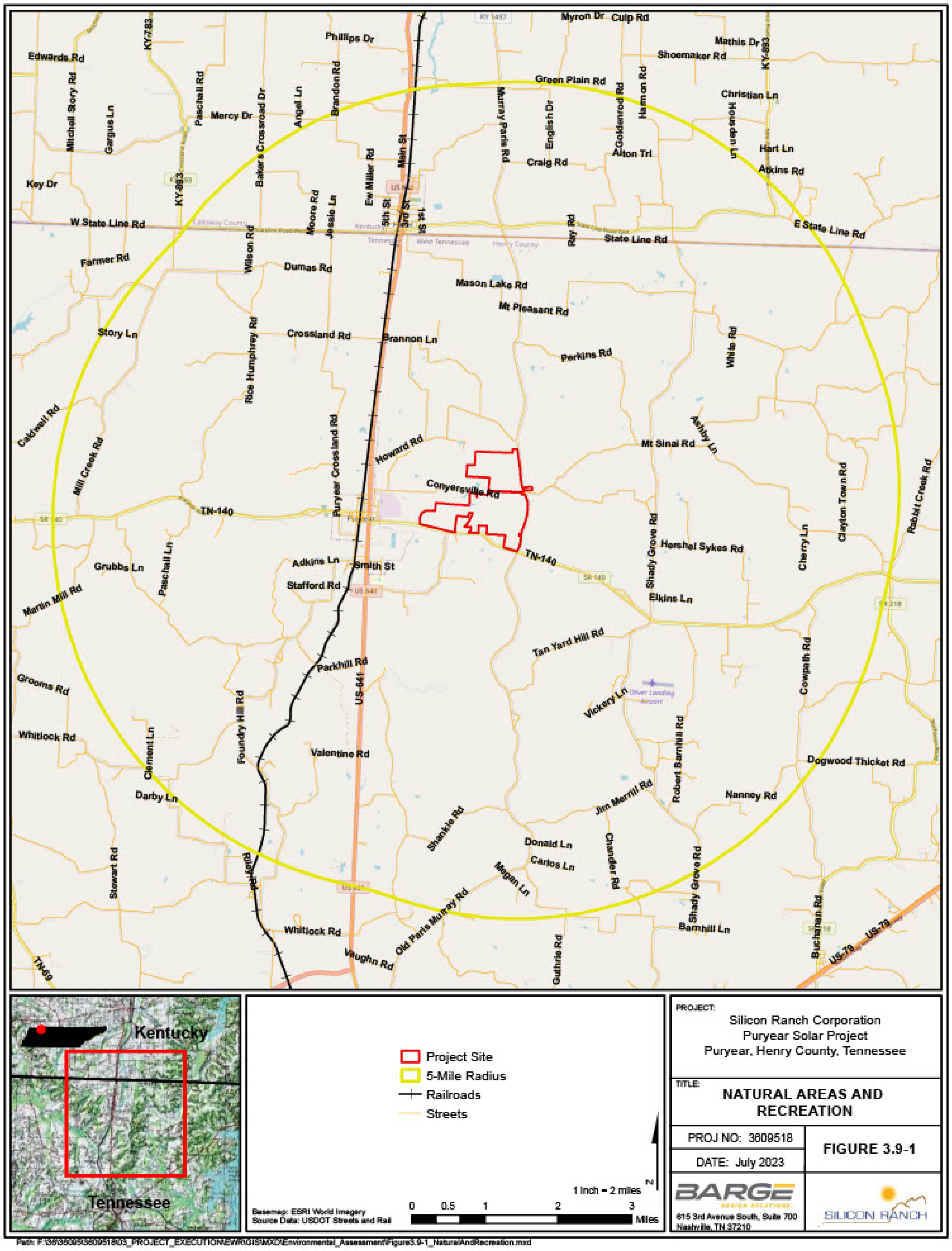


Figure 3.9-1. Natural Areas and Recreation

3.10 UTILITIES

This section describes an overview of existing utilities within and near the Project Site and the potential impacts on these utilities that would be associated with the No Action and Proposed Action

Alternatives. Specific utility components analyzed below include electrical service, natural gas, water supply, and communications.

3.10.1 Affected Environment – Utilities

3.10.1.1 Electrical Service

The PBPU provides electrical service to the county including the Project Site.

3.10.1.2 Natural Gas

The Paris Henry County Public Utility District provides natural gas service to the county including the Project Site.

3.10.1.3 Water Supply

The PBPU Water Department produces 2.5 million gallons of potable (drinkable) water per day during the summer and 2 million gallons per day the rest of the year. With the completion of the new water treatment plant in 2020, the capacity has grown to 4 million gallons per day and could add an additional 2 million in capacity as the community continues to grow. The PBPU Department is the sole source of water for the City of Paris, Tennessee, and is a wholesale water provider for several surrounding water utilities.

3.10.1.4 Communication Resources

Henry County has full digital telecommunications capabilities. AT&T and Charter Communications are the two franchised local telephone companies.

3.10.2 Environmental Consequences – Utilities

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

3.10.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed. Consequently, there would be no related impacts to utilities. Existing land use would be expected to remain primarily agricultural land and existing onsite utilities would likely remain unchanged, except for potential upgrades and maintenance.

3.10.2.2 Proposed Action

Under the Proposed Action, TVA would connect the solar facility to the future Eagle Creek Feeder 734 TL which would link the Project to the existing Eagle Creek Substation. An onsite substation and switchyard would also be constructed along the Project Site’s southern boundary along SR 140 (Figure 2.2-2). Electrical service to the Project Site is available from the PBPU. A service drop would be installed during construction to provide construction power. Once the Project enters the operation phase, the PBPU would provide the required back-up power for controls. Given the low-level of electric demand during construction and operation, no changes to the PBPU distribution system would be expected, and there would be no impact to the local utility or its customers. Implementation of the Proposed Action would result in additional renewable energy resources in the region which would constitute a beneficial impact to electrical services in the region.

Water would be needed for soil compaction and dust control during construction and to a lesser extent for domestic use during operations (i.e., washing solar panels). There would be no habitable buildings onsite and no need for potable water. Portable toilets would be available onsite for the duration of the construction period. Water for fugitive dust control and other needs would be provided via water trucks or by wells if there are any usable wells site during construction and, if needed, during decommissioning.

Natural gas service would not be required during the construction or operation of the Project. No communication resources are anticipated to be acquired through the local providers. Puryear Solar would have a dedicated communications system to remotely monitor the Project facility and operations.

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

3.11 WASTE MANAGEMENT

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

3.11.1 Affected Environment – Waste Management

Virtually all human activity generates some type of waste. Once created, waste must be managed. Management includes disposal, recycling, reuse, storage, and release into the environment. Waste is regulated by the Resource Conservation and Recovery Act (RCRA) of 1976 and its amendments. The Act delegates EPA to regulate hazardous waste. The regulations for this are found in Title 40, Part 261 of the Code of Federal Regulations (CFR). USEPA can also delegate authority to control waste to the states.

RCRA defines solid waste as “any garbage or refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, resulting from industrial, commercial, mining, and agricultural operations, and from community activities” (USEPA, n.d.-d). For regulatory purposes, RCRA considers all solid waste as either non-hazardous waste or hazardous waste. RCRA defines hazardous waste as “a waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment” (USEPA, n.d.-d). Non-hazardous waste is all waste that is not classified as hazardous waste. The Puryear Solar Project would generate non-hazardous and hazardous waste. It would comply with the requirements of RCRA, the Solid and Hazardous Wastes Rules and Regulations of the State of Tennessee (TDEC DSWM Rule 0400 Chapters 11 and 12, respectively), and local regulations related to the disposal of the non-hazardous and hazardous waste resulting from the construction, maintenance, and decommissioning of the Project.

To determine if any hazardous wastes were present on the Project Site, a Phase I Environmental Site Assessment (ESA) was conducted on the Project Site in November 2022. A Phase I ESA is conducted to look for the Recognized Environmental Conditions (RECs). A REC is defined as “the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property” (Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, 2021). Based on an environmental database search; review of available subsurface and geological information, aerial photographs, and topographic maps; review of reasonably ascertainable data from state and federal regulatory agencies and utility companies, file searches, and permit reviews; and an onsite visit, the investigation concluded there were no RECs identified at the Project Site.

The Project Site is primarily agricultural land. Once SRC takes possession of the property and is ready to begin construction, any non-hazardous waste found onsite would be collected and disposed of at the proper landfill in accordance with local, state, and federal laws and regulations.

Landfills

Solid waste collection in Henry County is under the authority of Henry County government. The County contracts with Republic Services of Union City for weekly curbside garbage pickup of non-hazardous solid waste. Recycling pickup is only for businesses and industrial customers. There is a recycling center in Paris, Tennessee, and several other locations throughout the county that accept recyclable materials from residents.

The Paris Henry County Landfill, operated by Henry County, is located at 1140 Jones Bend Road, Paris, Tennessee. The Class III/IV landfill accepts landscaping, land clearing and farming waste, and construction debris for local disposal. Household garbage is accepted at a landfill transfer station and sent outside of the County.

Any hazardous waste generated during construction and operation would be sent to an approved landfill in accordance with local, state, and federal laws and regulations. The landfill to be used would be determined later.

Construction and decommissioning would generate small amounts of hazardous waste. During the operation phase, there should be very little to no hazardous waste generated. All federal, state, and local regulations would be followed for handling, storing, and disposing of hazardous materials.

3.11.2 Environmental Consequences – Waste Management

3.11.2.1 No Action Alternative

Under the No Action Alternative, the Project would not be constructed and there would not be any new impacts to non-hazardous and hazardous waste generated. Existing land use would be expected to remain primarily agricultural, and existing waste management conditions would be expected to stay as they are at present.

3.11.2.2 Proposed Action

Construction and operation of the Proposed Action would result in the generation of hazardous and nonhazardous solid and liquid waste. All materials determined to be waste would be evaluated and managed per the Solid and Hazardous Wastes Rules and Regulations of the State of Tennessee (TDEC DSWM Rule 0400 Chapters 11 and 12, respectively). Constructing the project would not result in a significant increase in waste that would create concerns at the landfills used for this project.

Hazardous Waste

During construction, operation, maintenance, and decommissioning small amounts of hazardous waste would be generated. Hazardous waste that may be generated during construction and decommissioning includes hydraulic fluids, used oil, paint and paint thinner, other petroleum-based fluids, and any materials saturated with these fluids. Very little hazardous waste would be generated during operation. Hazardous waste generated during decommissioning would include substances such as diesel fuel, hydraulic fuel, and lube oil.

BMPs would be implemented to minimize the potential of a spill and to instruct onsite workers on how to contain and clean up spills. Details regarding the handling of fuel spills would be included in the SWPPP. Each spill, regardless of amount, would be cleaned up within 48 hours and a spill report completed. Copies of spill and cleanup reports would be kept onsite. To prevent public access to hazardous materials, the Project Site would be surrounded by security fencing during both construction and operational phases and access gates would normally remain locked.

To the extent possible, hazardous waste would be recycled. Collection and disposal of these wastes would be conducted in accordance with applicable regulatory requirements to minimize health and safety effects. All hazardous waste would be transferred to an approved landfill or processing center. Details concerning hazardous materials that could be present during construction and decommissioning and their handling are included in Tables 3.11-1, 3.11-2, and 3.11-3.

During construction of the proposed solar facility, hazardous materials would be stored onsite in storage tanks, vessels, or other appropriate containers specifically designed for the characteristics of these materials. Fuel for construction vehicles may be stored onsite during construction. Fueling of construction vehicles would occur within the construction area. Appropriate safety protocols would be followed during fueling.

During operation, solar panels do not pose a threat to contaminate the soil. Upon expiration of the 20-year PPA or an amended or alternative PPA for the sale of power after the 20-year period, Puryear Solar would develop a decommissioning plan to document the recycling and/or disposal of solar facility components following applicable local, state, and federal laws and regulations. Impacts from hazardous waste stored at the Project Site during the construction and operation of the proposed facility would be insignificant.

Overall, by following guidance in the SWPPP and implementing BMPs, minimal direct impacts from hazardous waste storage and spills are anticipated. Additionally, no indirect impacts from hazardous waste storage or spills are anticipated.

Solid (Non-Hazardous Waste)

Under the Proposed Action, construction activities and facility operation would generate non-hazardous solid waste. Worn or broken metal and machine parts, defective or broken electrical materials, other scrap metal and plastic, broken down module boxes, empty containers, paper, glass, and other miscellaneous solid waste would be generated throughout all phases of the proposed project. Waste would be disposed of utilizing contracted refuse collection and recycling services. The waste would be placed in construction debris containers and would likely be taken to the Paris-Henry Landfill, an approved Class III/IV landfill that accepts land clearing and farming waste and construction debris. Bulk chemicals would be stored in storage tanks or returnable delivery containers. Decommissioned equipment and materials, including PV panels, racks, and transformers, would be recycled. Management methods for handling non-hazardous waste are provided in Table 3.11-4. All applicable federal and state regulatory requirements would be followed.

Overall, by implementing BMPs, minimal direct impacts from non-hazardous waste are anticipated. Additionally, no indirect impacts from non-hazardous waste are anticipated.

Table 3.11-1. Summary of Special Handling Precautions for Large Quantity Hazardous Material

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

PEL – permissible exposure limit
TLV – threshold limit value
TWA – time-weighted average
STEL – short-term exposure limit
[1] Low toxicity is used to describe materials with a National Fire Protection Association (NFPA) Health rating of 0 or 1. Moderate toxicity is used to describe materials with an NFPA rating of 2. High toxicity is used to describe materials with an NFPA rating of 3. Extreme
Toxicity is used to describe materials with an NFPA rating of 4.
[2] NA denotes materials that do not meet the criteria for any hazard class defined in the 1997 Uniform Fire Code.

Table 3.11-2. Summary of Hazardous Construction Waste Streams and Management Methods

Waste Stream and Classification	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Onsite Treatment	Waste Management Method/Offsite Treatment
Construction waste - Hazardous	Empty hazardous material containers	TBD	Intermittent	None	Return to vendor or dispose at permitted hazardous waste disposal facility
Construction waste – Hazardous	Solvents, used oil, paint, oily rags	TBD	Intermittent	None	Send to an approved facility for recycle, energy recovery, or disposal

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

Waste Stream and Classification	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Waste Management Method	
				On-site	Off-site
Used Hydraulic Fluid, Oils and Grease – Non-RCRA Hazardous	Tracker drives, hydraulic equipment	<500 gallons/year	Intermittent	Accumulated for <90 days	Recycle
Oily rags, oil absorbent, and oil filters – Non-RCRA Hazardous	Various	One 55-gallon drum every 3 months	Intermittent	Accumulated for <90 days	Sent offsite for recovery or disposed at Class I landfill
Spent batteries – Universal Waste	Rechargeable and household	<400	Continuous	Accumulate for <1 year	Recycle
Spent batteries – Hazardous	Lead acid		Intermittent	Accumulated for <90 days	Recycle
Spent fluorescent bulbs – Universal Waste	Facility lighting	TBD, likely minimal to none	Intermittent	Accumulate for <1 year	Recycle

Table 3.11-4. Summary of Non-hazardous Construction Waste Streams and Management Methods

Waste Stream and Classification	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Onsite Treatment	Waste Management Method/Offsite Treatment
Construction waste – Non-hazardous	Scrap wood, concrete, steel, glass, plastic, cardboard, paper	TBD, assumed ~20,000 cubic yards	Intermittent	None	Recycle wherever possible, otherwise dispose to Class III landfill
Sanitary waste – Non-hazardous	Portable chemical toilets - sanitary waste		Periodically pumped to tanker truck by licensed contractors	None	Ship to sanitary wastewater treatment plant
Office waste – Non-hazardous	Paper, aluminum, food		Intermittent	None	Recycle or dispose to Class III landfill

Wastewater

Wastewater generated from portable toilets would be removed by a licensed contractor and disposed of in an approved facility. No direct or indirect impacts from wastewater generated at the Project Site are expected.

3.12 PUBLIC AND OCCUPATIONAL HEALTH AND SAFETY

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

3.12.1 Affected Environment – Public and Occupational Health and Safety

The Project Site is currently private property used primarily for agriculture. There are no residences on the property. Public emergency services in the area include urgent care clinics, hospitals, law enforcement services, and fire protection services. A brief description of the public emergency services relative to the Project Site is provided below:

- Law enforcement is provided by the Henry County Sheriff's Office headquartered in Paris, TN, approximately 10 miles south of the Project Site
- There are three urgent care facilities in Paris approximately 10 miles south of the Project Site: East Wood Clinic, Reelfoot Family Walk-In Clinic, and Fast Pace Health Urgent Care.
- The closest hospital is the Henry County Medical Center located in Paris, TN, approximately 10 miles south of the Project Site.
- The Puryear Fire Department is located approximately 1 mile west of the project Site.
- The Henry County Emergency Management Department responds to disasters within the county and would coordinate with state and federal agencies as needed.

3.12.2 Environmental Consequences – Public and Occupational Health and Safety

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

3.12.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed; therefore, no Project-related impacts on public health and safety would result. Existing land use would remain primarily agriculture. No changes to existing public health and safety would occur.

3.12.2.2 Proposed Action

Under the Proposed Action, during construction, workers on the project site would have an increased safety risk. Standard construction site practices such as establishing and maintaining health and safety plans to comply with OSHA regulations would be developed to reduce risk. Health and safety plans emphasize BMPs for site safety to minimize risk to construction staff. These plans may include the use of personal protective equipment, regular safety inspections, use of equipment guards, and establishment of emergency shutdown procedures.

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

The solar project is not anticipated to cause electromagnetic interference levels such that there would be impacts on nearby residents. Puryear Solar intends to design, construct, and operate the electrical systems of the proposed solar project using standard industry practices with sufficient setbacks to reduce or eliminate electromagnetic frequency and interference exposure to adjacent property owners.

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

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

3.13 TRANSPORTATION

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

3.13.1 Affected Environment – Transportation

3.13.1.1 Roads

The southern Project Site boundary is SR 140, and the eastern border is Old Paris Murray Road. US Highway 641 and SR 140 are the main arteries within a 5-mile radius of the Project Site (Figure 3.13-1). US Highway 641 is a north-south road that traverses the state and continues into Kentucky connecting numerous small cities and towns. SR 140 is an east-west rural road connecting Puryear to several communities along the shoreline of Kentucky Lake. The intersection of US Highway 641 and SR 140 is in the center of Puryear, Tennessee. Most businesses are along US 641.

Other secondary roads access the rural residences and the agricultural areas that predominate the region. All primary and secondary roads are 2-lane. No public roads are present within the Project Site boundary although there are several unpaved farm roads that provide vehicular access to the agricultural fields. There are no rail lines or airports within the 5-mile radius of the Project Site.

3.13.1.2 Traffic

There is one existing 2-way Tennessee Department of Transportation (TDOT) station (Location ID 40000017) on SR 140 0.2 miles west of the Project Site's western boundary. The annual average daily traffic (AADT) count in 2021 was 1005 vehicles. The 2020 count was 1037. The values provided are AADT volumes based on a 24-hour, 2-directional count at a given location. The raw traffic data is mathematically adjusted for vehicle type, determined by an axle correction factor. The data are then statistically corrected by a seasonal variation factor that considers the time of year and day of the week. These data were obtained from the TDOT Transportation Data Management system (TDOT, n.d.).

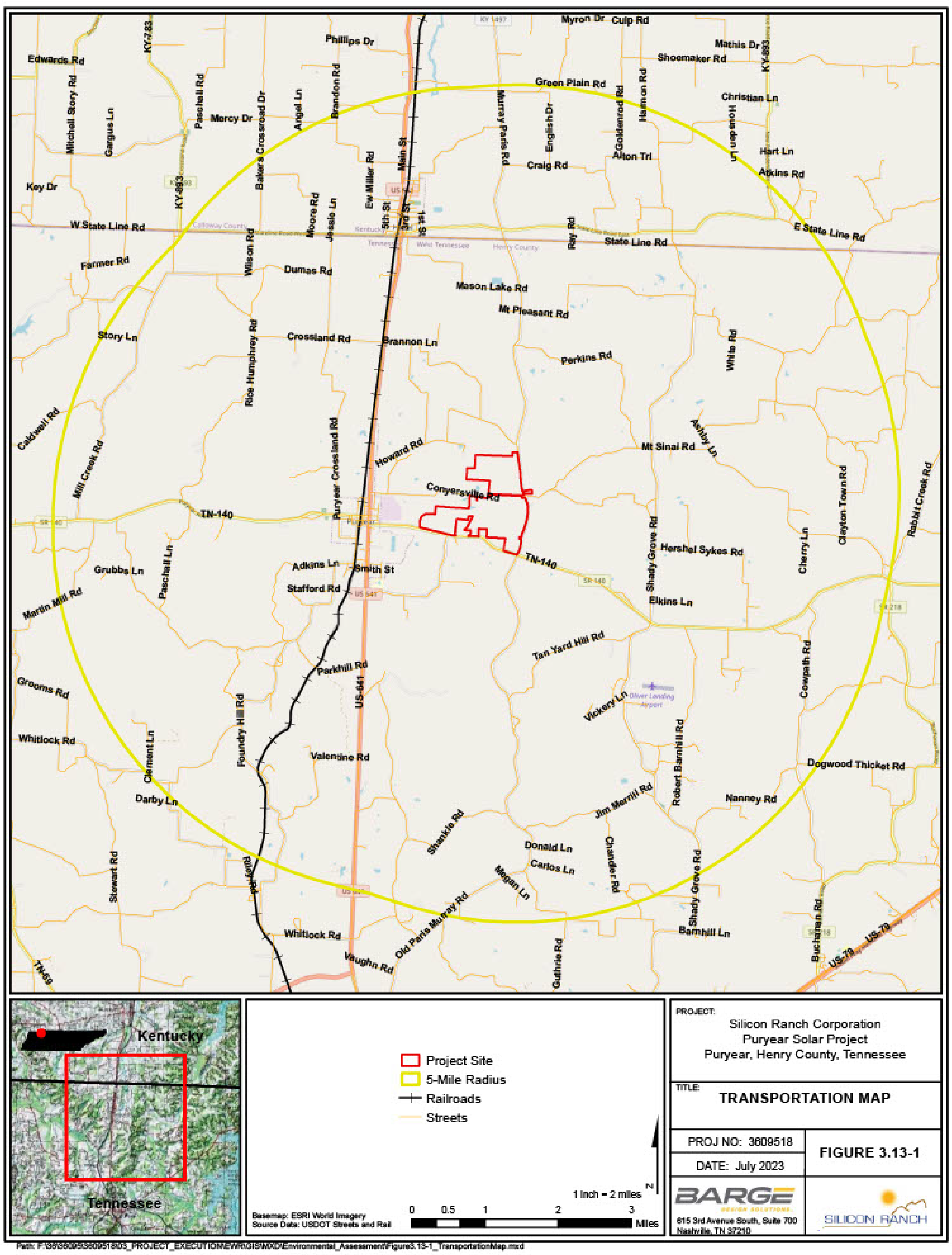


Figure 3.13-1. Transportation Map

3.13.2 Environmental Consequences – Transportation

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

3.13.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed. Therefore, no Project-related impacts on transportation resources would result. Existing land use would be expected to remain primarily agricultural and rural residential. The existing transportation network and traffic conditions would be expected to remain as they are at present.

3.13.2.2 Proposed Action Alternative

During construction of the solar facility, approximately 100 to 150 workers would be present at the site from 7 am to 5 pm, up to six days a week (Monday through Saturday) for approximately 12 months. More than half of the workers would likely come from the local or regional area; 25 to 50 percent of the workforce would likely come from out-of-state. If necessary, workers from outside the area would stay in hotels in Paris, Tennessee, 10 miles south of the Project Site or in Murray, Kentucky, 11 miles to the north. Workers would either drive their vehicles or carpool to the Project Site. Parking would be on the site during the day. Some work teams may visit local restaurants and businesses during work hours. Additional traffic due to deliveries and waste removal would consist of approximately 15 vehicles per day during construction.

During construction, increased traffic would impact roads in the immediate vicinity of the Project Site, primarily US 641 and SR 140. Traffic flow around the worksite would be heaviest at the beginning of the workday, at lunch, and the end of the workday. During the day traffic counts on SR 140 would increase during construction due to the delivery of construction equipment and supplies. Deliveries and most workers would access the Project Site by turning off US 641 onto SR 140. Should traffic flow be a problem for local residences or businesses, Puryear Solar would consider staggering work shifts to space out traffic flow to and from the Project Site. The use of such measures would minimize potential adverse impacts to traffic and transportation to less than significant levels.

Several onsite 16- to 20-foot-wide maintenance roads would be constructed and maintained on the Project Site. These roadways would serve as periodic access for site inspection and maintenance but would be closed to through traffic.

The proposed solar facility would not be staffed during operation but would be inspected weekly. Maintenance would be required quarterly for equipment failures and would require minimal personnel. Therefore, the operation of the solar facility would not have a noticeable adverse impact on local roadways.

Overall, the Proposed Action would not result in any noticeable direct or indirect adverse impacts to transportation.

3.14 SOCIOECONOMICS

This section describes an overview of existing socioeconomic conditions within the Project Site and the potential impacts that would be associated with the Proposed Action and No Action Alternatives.

Components of socioeconomic resources that are analyzed include population, employment, and income.

3.14.1 Affected Environment – Socioeconomics

The proposed Project Site is in the northern part of Henry County, Tennessee. Henry County is the impact area for socioeconomic resources. Most of the Project Site is in the U.S. Census Bureau's (USCB's) Census Tract (CT) 9691, Block Group (BG) 1. A small portion of the Project Site containing the new substation and switchyard and some panels is in CT 9691, BG 2.

3.14.1.1 Population

Population trends and projections are presented in Table 3.14-1. The County's population was nearly stagnant from 2013 to 2021. The population of CT 9691, BGs 1 and 2 decreased approximately 20 percent from 2013 to 2021. Conversely, population of the United States and Tennessee grew during the same 2013-2021 period (USCB 2017). According to the University of Tennessee's Center for Business and Economic Research (CBER), by 2030, the County's population is projected to have less than 5 percent growth by 2030. Tennessee and the U.S. are projected to increase population by 15.5 percent and 14 percent, respectively, by 2030 (CBER 2009).

Table 3.14-1. 2013 – 2030 Population Data

Area	2013	2021	Projection 2030	Percent Increase 2013 - 2021	Percent Increase 2013 - 2030
Henry County	32,293	32,298	33,638	+0.015%	+4.16
Census Tract 9691, Block Group 1	1272	1041	NA	-18.16%	NA
Census Tract 9691Block Group 2	1060	830	N/A	-21.70%	N/A
Tennessee	6,402,387	6,859,497	7,397,302	+7.14%	+15.54%
United States	311,536,594	329,725,481	355,100,730	+5.84%	+13.98

Source: USCB Tables B03002 and B17021, ACS 5-yr Estimates

Employment and Income

There is limited data on employment and income for Henry County. In 2021, the total number of people employed was 14,972 which is 46.5 percent of the County's population (USCB, n.d.-a). The 2022 unemployment rate for Henry County was in the 3.5 to 4.4 percent range (Bureau of Labor Statistics [BLS], n.d.). Specific rates by County in 2022 are not available from BLS. The unemployment rate in Henry County is the same to possibly slightly higher than the state unemployment rate of 3.5 percent and national rate of 3.6 percent in December 2022 (BLS, n.d.). The per capita personal income in Henry County in 2021 was $49,852 which is 11.9 percent less than the state average per capita income of $56,560 and 22.3 percent less than the national average per capita income of $64,143 (Bureau of Economic Analysis [BEA], n.d.).

3.14.2 Environmental Consequences – Socioeconomics

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

3.14.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed. Therefore, no Project-related socioeconomic impacts would occur within Henry County. Significant changes to the unemployment rate and per capita income would be unlikely. Therefore, no beneficial socioeconomic impacts from a change in population, employment, or expenditures would occur under the No Action Alternative.

3.14.2.2 Proposed Action

Under the Proposed Action, the proposed solar facility would be constructed. Approximately 100-150 workers would be employed during construction, lasting approximately 12 months. Construction of the proposed facility could have short-term beneficial economic impacts due to the purchase of materials, equipment, and services and a temporary increase in employment, income, and population. The beneficial economic impacts 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 Henry County area, as well as in adjacent counties and cities.

Operation of the facility would not increase local employment as no workers would be needed for day-to-day operation of the solar facility. One or two employees would visit the Project Site as needed for scheduled/preventative maintenance and for unscheduled maintenances or outages. While periodic maintenance activities, primarily mowing, would be done by local workers, this would not increase employment.

Overall, socioeconomic impacts for the operation of the Project are anticipated to be positive and long-term, although small relative to the total economy of the region. Although it is too early to quantify, the Project would benefit the local tax base through the increased property taxes due to site improvements.

3.15 ENVIRONMENTAL JUSTICE

This section describes an overview of EJ considerations within the Project Site and the potential EJ impacts that would be associated with the Proposed Action and No Action Alternatives. Components of EJ that are analyzed include minority and low-income populations.

3.15.1 Affected Environment – Environmental Justice

The 1994 Presidential Executive Order (EO) 12898, Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations, directs federal agencies to make "achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the

Commonwealth of the Mariana Islands" (EO 12898, 1994). While the directive's intent is clear, the methods to determine if minority or low-income populations are present are variable.

Two reports provide guidance on how to determine if a minority or low-income population is present in a defined area. The 1997 Environmental Justice Guidance Under the National Environmental Policy Act (EJ Guidance) report from the CEQ describes procedures for assessing if a minority or low-income population is present (CEQ, 1997). The 2016 report, Promising Practices for EJ Methodologies in NEPA Reviews (Promising Practices) prepared by the Federal Interagency Working Group on Environmental Justice & NEPA Committee (Working Group), recommends using multiple methods to determine if minority or low-income populations are present in the area being studied (Working Group, 2016). The report also provides specific guidance on how to conduct the analyses.

Identifying and Assessing Minority Populations

EO 12898 defines minority as "individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic." The EJ Guidance report states that a minority population should be identified when either "(a) the minority population of the affected area exceeds 50 percent or (b) 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." A minority population exists "if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds."

For minority populations Promising Practices recommends using the No Threshold Analysis and, in concert, the Fifty Percent and Meaningfully Greater Analyses. A minority population is present using the No Threshold Analysis if the percentage of minorities in the CT and BG is greater than or equal to the percentage of minorities in the reference population which, for these analyses, is the county. The USCB defines a Census Tract as "small, relatively permanent statistical subdivisions of a county or statistically equivalent entity that can be updated by local participants prior to each decennial census as part of the Census Bureau's Participant Statistical Areas Program" (USCB, n.d.-b). Each CT is further subdivided into one or more BGs. A BG represents the smallest geographic unit of analysis used by the USCB.

A minority population exists in the Fifty Percent Analysis when the minority population exceeds 50 percent of the total population within a defined area. A minority population exists in the Meaningfully Greater Analysis if the percentage of minorities within a CT and BG is 10 percent greater than the percentage of minorities in a reference community. For these analyses, the defined area is the CT and BG, and the reference community is the county. A minority community is present if the percentage of minorities in the CT and BG exceeds the percentage of minorities in the county by either 10 or 20 percent. TVA uses the 10 percent value to identify a minority population.

Identifying and Assessing Low-income Populations

Guidance in the 1997 Environmental Justice report (CEQ, 1997) specifies that low-income populations are to be identified using the annual statistical poverty threshold from USCB Current Population Reports Series P-60 on Income and Poverty. The most recent report, Poverty in the United States: 2021 (USCB, 2022), defines poverty "by comparing pretax money income to a poverty threshold that is adjusted by family composition." The 2021 poverty threshold for individuals under age 65 was $14,097 (USCB, 2022). TVA considers low-income individuals to be those who earn less the twice the poverty threshold. The poverty and low-income thresholds were compared to the per capita income for the CT and BGs and county. If the per capita income is lower than the threshold values, a poverty or low-income population was recorded.

Promising Practices recommends two methods of analysis for determining if a low-income population is present: Alternative Criteria Analysis and Low-Income Threshold Criteria Analysis. Both use quantitative measures to determine if a minority population is present. A low-income population exists in the Alternative Criteria Analysis when the percentage of low-income population exceeds 50 percent of the total population within a defined area. A low-income population exists in the Low-Income Threshold Analysis if the percentage in the CT & BG is equal to or greater than that of the reference community (county).

Environmental Justice Analysis Procedures

EPA's EJ Screening and Mapping Tool (EJScreen) provides an initial assessment of the presence of minority or low-income populations in the project area (USEPA, n.d-e). EJScreen also allows users to specify a buffer around a project site and provide the percentage of minority and low-income individuals within the buffer. For these projects, a 1-mile buffer is used.

Data from the USCB website data.census.gov are used to conduct the analyses described in Promising Practices. These analyses assess the presence or absence of minority and low-income populations at the BG and county level.

Criteria for Determining Disproportionately High and Adverse Human Health Effects to EJ Populations

When a minority or low-income population is present within or adjacent to a project site, an EJ analysis is needed to determine if the proposed action will have disproportionately high and adverse impacts on the minority and/or low-income populations. The analysis considers project impacts to human health and the environment on EJ populations. When determining if a minority of low-income population is experiencing disproportionately high and adverse human health effects CEQ recommends considering three factors (CEQ, 1997):

- "Whether the health effects, which may be measured in risks and rates, are significant (as employed by NEPA), or above generally accepted norms. Adverse health effects may include bodily impairment, infirmity, illness, or death
- Whether the risk or rate of hazard exposure by a minority population, low-income population, or Indian tribe to an environmental hazard is significant (as employed by NEPA) and appreciably exceeds or is likely to appreciably exceed the risk or rate to the general population or other appropriate comparison group
- Whether health effects occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards."

When determining if environmental effects are disproportionately high and adverse, CEQ recommends considering three factors (CEQ, 1997):

- "Whether there is or will be an impact on the natural or physical environment that significantly (as employed by NEPA) and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment

- Whether environmental effects are significant (as employed by NEPA) and are or may be having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group
- Whether the environmental effects occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards."

3.15.1.1 Environmental Justice Analysis Results

The Proposed Site is within CT 9691, BGs 1 and 2 (Figure 13.15-2). There are no adjacent CTs within 1 mile of the Project Site, so there is no need to include any adjacent CT and BG as people living in adjacent CTs are more than a mile away and would not be impacted by Puryear Solar.

Puryear Solar Minority Population EJ Analysis

Results of the EJScreen pre-decisional tool are presented in Table 3.15-1. The data suggest no predominately minority populations exist within a 1-mile buffer of the Project Site, CT 9691, BGs 1 and 2, or Henry County. An aerial photo showing the project boundary and the 1-mile buffer is provided in Figure 3.15-2.

Table 3.15-1. EJScreen Report

Geographic Unit	Geographic Unit Population	Percent Minority Population	Percent Low-Income Population
One-mile Buffer*	741	13	51
CT 9691, BG 1*	1041	5.3	22.1
CT 9691, BG 2	830	17.8	50.9
Henry County**	32298	13.4	41.1

* Data from EJScreen

** Data from the USCB website, Table B03002, Hispanic or Latino Origin by Race and Table C17002, Ratio of Income to Poverty Level in the Past 12 Months using the 2021 5-year American Community Survey (ACS) database.

A minority or low-income population may be present if the percentage exceeds 50%

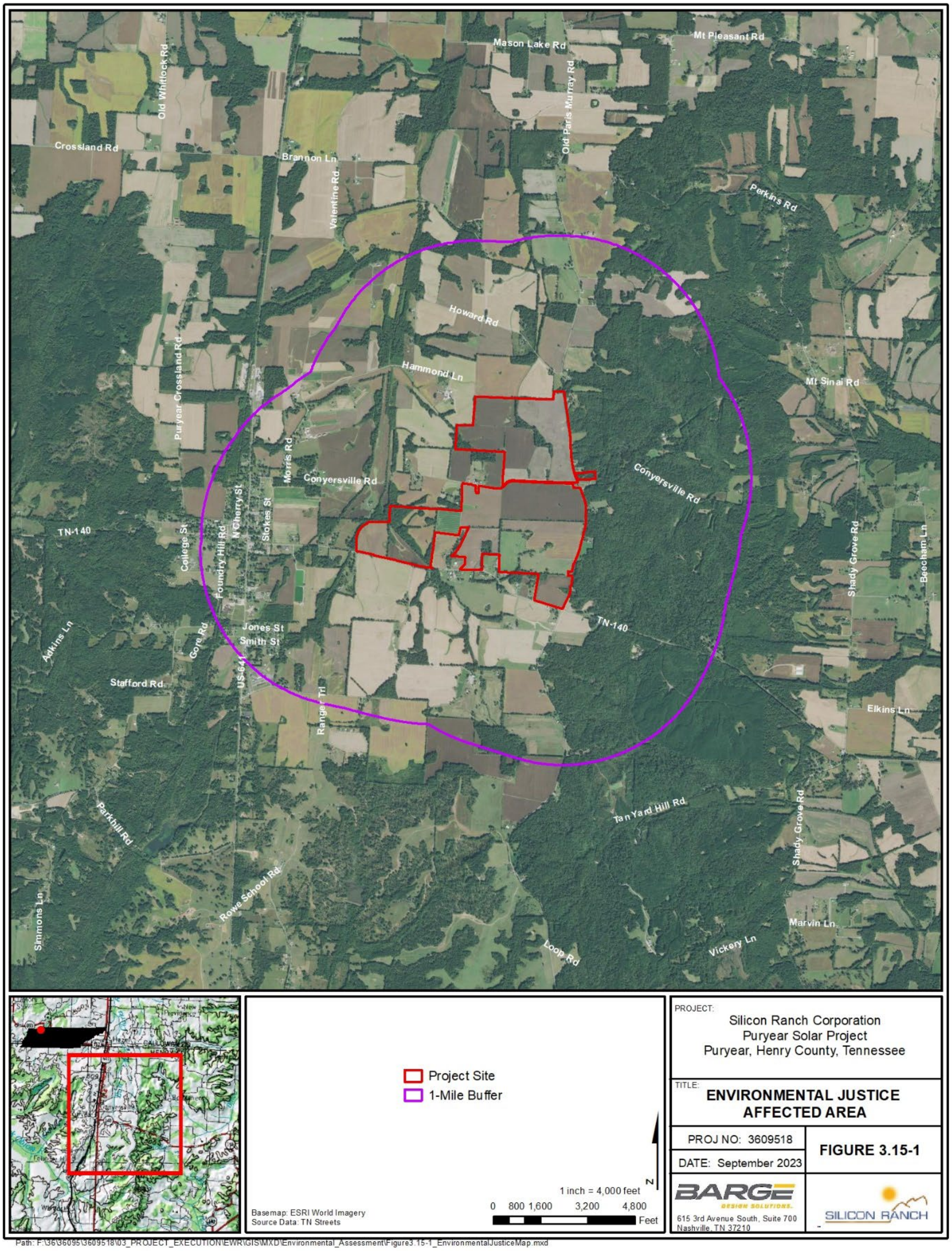


Figure 3.15-1. Environmental Justice Affected Area (One-mile Buffer)

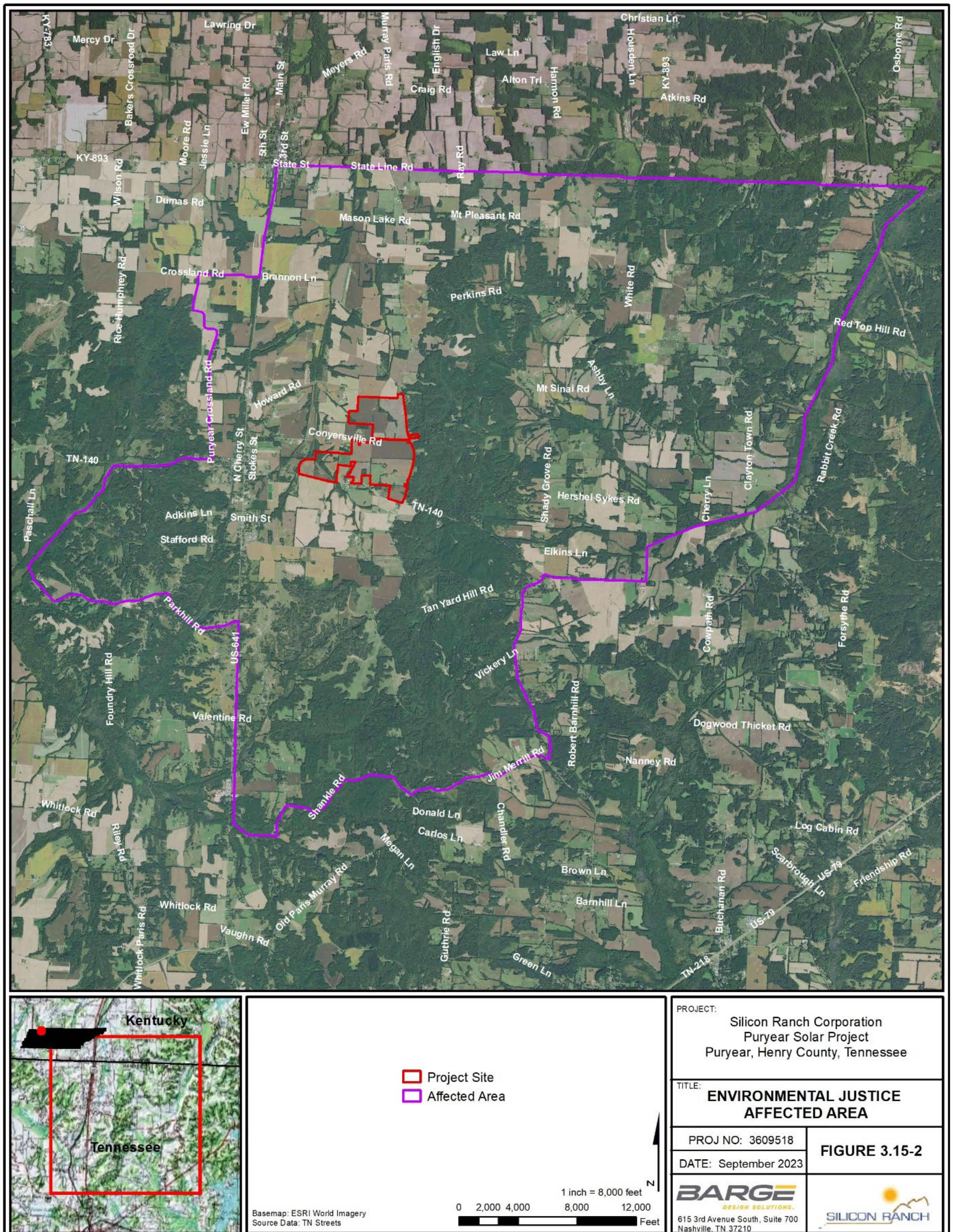


Figure 3.15-2. Census Tract 9691, Block Groups 1 and 2.

Results of the No Threshold Analysis indicate the percent minority population in CT 9691, BG 2 is greater than the minority percentage in Henry County (reference community) indicating there is a minority population in CT 9691, BG 2 (Table 3.15-2). The percentage minority population in CT 9691, BG 1 is less than the minority percentage in Henry County indicating there is not a minority population in CT 9691, BG 1. (Table 3.15-2).

Table 3.15-2. No Threshold Analysis for Minority Population

Geographic Unit	Total Population	Total Minority Population	Percent Minority Population	Minority Population Present
CT 9691, BG 1	1041	55	5.3	No
CT 9691, BG 2	830	148	17.8	Yes
Henry County	32298	4336	13.4	N/A

Data from USCB Table P1, Race using the 2020 DEC Redistricting Data (PL-94-171)
Minority population present if percentage > 50% in any geographic unit or CT, BG percentage ≥ County percentage

Results of the Fifty Percent Analysis indicate there are no minority populations in CT 9691, BG 1 and 2 or Henry County because the minority percentage for CT 9691, BGs 1 and 2 and the county are less than 50 percent. (Table 3.15-3).

Table 3.15-3. Minority Population Using the Fifty Percent Analysis

Geographic Unit	Total Population	Total Minority Population	Percent Minority Population	Exceeds 50 % of Geographic Unit	Minority Population Present
CT 9691, BG 1	1041	55	5.3	No	No
CT 9691, BG 2	830	148	17.8	No	No
Henry County	32298	4336	13.4	No	No

Data from the USCB website, Table B03002, Hispanic or Latino Origin by Race using the 2021 5-year ACS database.
Minority population present if the percentage of minorities residing within the geographic unit of analysis meets or exceeds 50%,

Results of the Meaningfully Greater Analysis in Table 3.15-4 show the percentage of minorities in CT 9691, BG 2 (17.8%) is meaningfully greater than the percentage of minorities in Henry County using the 10 percent value (13.4% + 10% of 13.4% = 14.74%). The percentage of minorities in CT 9691, BG 1 (5.3%) is not meaningfully greater than the percentage of minorities in Henry County using the 10 percent value (13.4% = 10% = 14.74%).

Table 3.15-4. Minority Population Using the Meaningfully Greater Analysis

Geographic Unit	Percent Minority Population	Meaningfully Greater at 10%
CT 9691, BG 1	5.3	No
CT 9691, BG 2	17.8	Yes
Henry County	13.4 (14.74%)*	N/A

Data from the USCB website, Table B03002, Hispanic or Latino Origin by Race using the 2021 5-year ACS database.

* Minority population present if the CT, BG percent minority population is ten percent greater than the County minority percentage indicated in parentheses.

Puryear Solar Low-income Environmental Justice Analysis

Results of the EJScreen pre-decisional tool are presented in Table 3.15-1. The data indicate that there is a predominately low-income population in CT 9691, BG 2 but not within a 1-mile buffer of the Project Site, CT 9691, BG 1, or in the reference community, Henry County.

Comparing the per capita income of residents in CT 9691, BGs 1 and 2 and Henry County to the poverty and low-income thresholds indicates there is no geographic unit in poverty, but all units do have low-income populations (Table 3.15-5).

Table 3.15-5. Poverty and Low-income threshold analysis

Geographic Unit (GU)	Per capita Income (PCI)	Poverty Population if GU PCI < Poverty Threshold ($14,097)	Low-income Population if GU PCI < 2X Poverty Threshold ($28,194)
CT 9691, BG 1	$23,724	No	Yes
CT 9691, BG 2	$19,982	No	Yes
Henry County	$24,949	No	Yes

Per capita income from 2021 ACS 5-Year Estimates

Results of the Alternative Criteria Analysis obtained from the USCB Map website and Table C17002 Ratio of Income to Poverty Level in the Past 12 Months indicate there is a low-income population within CT 9691, BG 2 but not in CT 9691, BG 1 or Henry County (Table 3.15-6).

Table 3.15-6. Low-Income Population Using Alternative Criteria Analysis

Geographic Unit	Total Number of Individuals	Number of Low-income Individuals	Percent Low Income	Exceeds 50 % of Geographic Unit	Low- Income Population Present
CT 9691, BG 1	1041	230	22.1	No	No
CT 9691, BG 2	800	407	50.9	Yes	Yes
Henry County	31174	13040	41.1	No	No

Data from the USCB website, Table C17002, Ratio of Income to Poverty Level in the Past 12 Months using the 2021 5-year ACS database.

Results of the Low-Income Threshold Analysis obtained from the USCB Map website and Table C17002 Ratio of Income to Poverty Level in the Past 12 Months indicate a low-income population is present in CT 9691, BG 2 but not in CT 9691, BG 1 (Table 3.15-7).

Table 3.15-7. Low Income Threshold Analysis

Geographic Unit	Total Number of Individuals	Number of Low-income Individuals	Percent Low Income Population	Is the CT and BG ≥ County	Minority Population Present
CT 9691, BG 1	1041	230	22.1	No	No
CT 9691, BG 2	800	407	50.9	Yes	Yes
Henry County	31174	13040	41.1	N/A	N/A

Data from EJScreen

Data from the USCB website, Table C17002, Ratio of Income to Poverty Level in the Past 12 Months using the 2021 5-year ACS database

Table 3.15-8 summarizes the results of the analyses conducted to determine if minority or low-income population are present in the CT and BG or County in which Puryear Solar is located.

Table 3.15-8. Puryear EJ Analysis Summary

PURYEAR EJ ANALYSIS SUMMARY											
Minority				**Minority**				**Minority**			
CT 9691, BG 1				***CT 9691, BG 2***				***Henry County***			
Analysis	**Yes**	**No**	**N/A**	**Analysis**	**Yes**	**No**	**N/A**	**Analysis**	**Yes**	**No**	**N/A**
EJScreen		X		EJScreen		X		EJScreen		X	
No Threshold		X		No Threshold	X			No Threshold			N/A
Fifty Percent		X		Fifty Percent		X		Fifty Percent		X	
Meaningfully Greater		X		Meaningfully Greater	X			Meaningfully Greater			N/A
Result	*No*			*Result*	*Possible*			*Result*	*No*		
Low-income				**Low-income**				**Low-income**			
EJScreen		X		EJScreen	X			EJScreen		X	
Poverty/Low-income	X			Poverty/Low-income	X			Poverty/Low-income	X		
Alternative Criteria		X		Alternative Criteria	X			Alternative Criteria		X	
Low-income Threshold		X		Low-income Threshold	X			Low-income Threshold			X
Result	*Possible*			*Result*	*Yes*			*Result*	*Possible*		

3.15.2 Environmental Consequences – Environmental Justice

This section describes potential EJ populations near the Project Site and describes the level of impacts that may occur by implementing the No Acton and Proposed Acton alternatives.

3.15.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar facility would not be constructed. Therefore, no project-related EJ impacts within Henry County would occur. Further, no disproportionately high and adverse impact on minority and low-income populations in the vicinity of the Project Site would occur.

3.15.2.2 Proposed Action

The results of the analyses indicate there is no minority population in CT 9691, BG 1, or Henry County but there may be one in CT 9691, BG 2. Additionally, there is a low-income population in CT 9691 BG 2 and possibly one in CT9691 BG 1 and/or Henry County. (Tables 3.15-5, 3.25-6, and 3.15-7).

EJ Analysis

This EJ Analysis examined the potential for the Project to have disproportionately high and adverse human health and environmental effects on one or more minority and/or low-income populations that are within the two CTs and BGs containing the Project Site.

Conversion of the land from agricultural to industrial and the potential change to the visual effects are the most notable changes that will occur. Any adverse visual impacts would be offset by using existing vegetation to reduce or eliminate the visibility of the panels from public and private access points and would be supplemented with fencing and planting new vegetation if necessary. Constructing the project does not result in a long-term increase to air pollution, the release of GHGs, noise, hazardous materials, or traffic. The Project will not result in a permanent change to the socioeconomics of the area or create undo impacts on solid waste and utilities. No recognized natural areas or recreational facilities will be impacted. The Project would result in minor impacts to surface and groundwater, biological, and cultural resources; and these minor impacts would be offset by buffers protecting the resources and would not have an adverse impact on minority or low-income populations.

All persons living adjacent to the Project site, including any minority and/or low-income populations, may experience short-term minor impacts from an increase in traffic and noise during construction along with minor short-term direct and indirect air quality impacts resulting from localized dust and exhaust fumes from equipment during construction, but these impacts will end once construction is completed. Some minor long-term beneficial impact may result from the decreased use of pesticides and fertilizers on farmland that is converted to solar panels.

None of the impacts mentioned above rises to a level where they create a disproportionately high and adverse human health or environmental effect to anyone, including EJ populations living near the Project Site.

3.16 CUMULATIVE EFFECTS

The 2022 CEQ NEPA regulations, Title 40, Chapter V, Subchapter A, defines cumulative effects as "effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (CEQ, 2022).

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

- Aerial imagery from 2019 to 2023 within a 5-mile radius of the Project Site was examined. No major land use changes were observed.
- Minutes from the Henry County Commission were reviewed for 2021 and 2022. No actions were taken by the Commission related to rezoning of the land within the County or approval of new commercial or industrial development within a 5-mile radius of the Project Site. The County did approve a measure to develop a 400-acre industrial park approximately 11 miles south of the Project Site.
- TDOT's FY2023-2025 Comprehensive Multimodal Program (Program) has a non-construction right-of-way project scheduled for 2023 on SR 54 (US 641) from the north side of Puryear (Howard Road) to the Kentucky state line that is within the 5-mile radius of the Project Site. There were no state-funded Henry County projects in the FY2020-2022 Program within the 5-mile radius and one preliminary engineering project between Paris and Puryear in the FY2019-2021 Program.
- A review of the Paris-Henry Chamber of Commerce website did not find any new business-related projects other than the future industrial park.
- Local news articles were reviewed.

The desktop research did not identify any past, present, or foreseeable future local projects that could combine with the Proposed Action to cause cumulative impacts that may significantly affect the environment.

CHAPTER 4 – LIST OF PREPARERS

4.0 LIST OF PREPARERS

Table 4-1 summarizes the expertise and contribution made to the EA by the Project Team.

Table 4-1. Environmental Assessment Project Team

Name/Education	Experience	Project Role
TVA		
Neil Schock *M.S., Ecology* *B.S., Biology*	14 years of experience in water quality monitoring, permit writing and NEPA compliance.	NEPA Coordinator, NEPA Compliance, Document Preparation
Elizabeth Smith *B.A., Environmental Studies and Geography*	16 years of experience in water quality monitoring and compliance; 14 years in NEPA planning and environmental services	TVA Project Manager, TVA NEPA Coordinator, NEPA Compliance, Document Preparation, and Technical Editor
Michaelyn Harle *Ph.D., Anthropology*	22 years in archaeology and cultural resources management	Supervisor/ Archaeologist
Ashley Pilakowski *B.S., Environmental Management*	10 years in environmental planning and policy and NEPA compliance, 1 year in solar coordination within CES	TVA Project Manager, Solar Coordination and Integration
Carrie Williamson *B.S. and M.S., Civil Engineering*	10 years in Floodplains and Flood Risk; 3 years in River Forecasting; 11 years in Compliance Monitoring	Floodplains and Flood Risk
Elizabeth Hamrick *M.S. Wildlife and Fisheries Science,* *B.A. Biology,* *B.A. Anthropology*	19 years working in wildlife biology, threatened and endangered species surveys, research, and habitat restoration, 14 years technical writing, 10 years compliance with NEPA and ESA	Terrestrial Zoology

Todd Amacker *M.S. Wildlife and Fisheries Science* *B.S. Environmental Science*	12 years working with threatened and endangered aquatic fauna in the American Southeast; 7-year NEPA and ESA Compliance	Aquatic Ecology, Aquatic T&E Species
Fallon Parker Hutcheon *M.S., Environmental Studies* *B.S., Biology*	4 years in wetland delineation, wetland impact analysis, and NEPA and CWA compliance	Wetland Biologist
David Mitchell *M.S Soil and Water Science,* *B.S. Hortuculture*	18 years of experience with botany, ecosystem restoration, land management; 6 years of project/program management in environmental research	Vegetation, Threatened and Endangered Plants
Chloe Sweda *B.S. Earth and Environmental Sciences*	5.5 years in Natural Resource Management	Natural Areas
Sara Bayles *M.S. Sport and Recreation Management*	3 years of experience in outdoor recreation management.	Site Review and Document Preparation
Emily Kathryn McCann *B.S. Professional Biology* *M.S. Biological Sciences, Wetland Ecology*	8 years' experience in field biology, environmental reviews, NEPA and ESA compliance, and consulting with Federal agencies.	Biological Compliance
Jesse Troxler *M.S. and B.S. Wildlife and Fisheries Science*	19 years working in wildlife research, surveying, and monitoring; 6 years in NEPA and Endangered Species Act compliance	Terrestrial Zoology
Russ Brasfield, P.E., LEED AP *B.S. Civil Engineering* *M.B.A.*	23 years' experience in civil engineering and project management	Project Manager

Kris Thoemke, Ph.D., CEP *B.S. Zoology* *Ph.D. Biology*	12 years NEPA experience; 30+ years' experience in environmental science	NEPA Project Coordinator Document Preparation
Nick Carmean, PWS, TN-QHP *B.S. Biology and Environmental Studies* *M.S. Fisheries and Wildlife Management*	11 years in regulatory compliance, preparation of NEPA/environmental review documents, protected species surveys, stream and wetland delineation, and permitting	Field Work Document Preparation Document Review
Frank Amatucci, TN-QHP *B.A Biology* *B.S. Environmental Science*	11 years in regulatory compliance, protected species surveys, stream and wetland delineation, permitting, and preparation of NEPA/environmental review documents	Field Work Document Preparation
Cameron Brueck, TN-QH—IT *B.S. Environmental Science* *B.S., Biology (Neurobiology)*	2 years conducting stream and wetland delineation, and habitat and vegetation assessments	Field Work Document Preparation
Chelsea Sachs, P.G. *B.S. Geology*	Nine years in environmental geology, field work, and regulatory compliance	Field Work Document preparation

CHAPTER 5 – LITERATURE CITED

5.0 LITERATURE CITED

Best Places, Henry County, TN. (n.d.) https://www.bestplaces.net/county/tennessee/henry

Center for Business and Economic Research. (2009). Population Projections for the State of Tennessee, 2010-2030. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.tn.gov/content/dam/tn/tacir/documents/Population2010.pdf

Council on Environmental Quality (CEQ). (1997). Environmental Justice. Guidance Under the National Environmental Policy Act. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.epa.gov/sites/default/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf

CEQ. (2022). CEQ Regulations 40 CFR Parts 1502, 1507, and 1508. https://www.federalregister.gov/documents/2022/04/20/2022-08288/national-environmental-policy-act-implementing-regulations-revisions

Dockery, David T., and David E. Thompson (2016) *The Geology of Mississippi*. University Press of Mississippi, Jackson.

Executive Order (E.O.) 11988, Floodplain Management, 3 C.F.R. (1977). Federal Emergency Management Agency (FEMA). (n.d.). Flood Map Service Center. https://msc.fema.gov/portal/home

EO 11990. (1977). Protection of Wetlands. https://www.epa.gov/cwa-404/protection-wetlands-executive-order-11990

EO 12898. (1994). Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.archives.gov/files/federal-register/executive-orders/pdf/12898.pdf

Federal Interagency Working Group on Environmental Justice & NEPA Committee. (Working Group). (2016). Promising Practices for EJ Methodologies in NEPA reviews. Chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.epa.gov/sites/default/files/2016-08/documents/nepa_promising_practices_document_2016.pdf

Middleton, E. J., and M.N. Murray. (2009). Population for the State of Tennessee, 2010-2030. University of Tennessee Center for Business and Economic Research. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.tn.gov/content/dam/tn/tacir/documents/Population2010.pdf

Tennessee Department of Environment and Conservation (TDEC). (n.d.). NPDES Stormwater Construction Permit. https://www.tn.gov/environment/permit-permits/water-permits1/npdes-permits1/npdes-stormwater-permitting-program/npdes-stormwater-construction-permit.html

Tennessee Department of Transportation (TDOT). (2023). Fiscal Year 2024 Comprehensive Three-Year Multimodal Improvement Program Chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.tn.gov/content/dam/tn/tdot/three-year-program/TDOT%20FY%2024-26%20Multimodal%20Program%20Final.pdf

TDOT. (n.d.). Annual Average Daily Traffic (AADT). https://www.arcgis.com/apps/webappviewer/index.html?id=075987cdae37474b88 fa400d65681354

Tennessee Valley Authority (TVA). (1981). Class Review of Repetitive Actions in the 100-Year Floodplain, Federal Register Vol. 46, No. 76, April 21, 1981. pp. 22845-22846. https://www.govinfo.gov/content/pkg/FR-1981-04-21/pdf/FR-1981-04-21.pdf

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

TVA. (2019). 2019 Integrated Resource Plan Final Supplemental Environmental Impact Statement. https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/default-document-library/site-content/environment/environmental-stewardship/irp/2019-documents/tva-2019-integrated-resource-plan-volume-i-final-resource-plan.pdf?sfvrsn=44251e0a_4

TVA. (2022). A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, Revision 4.

TVA. (n.d.). TVA Environmental Quality Protection Specifications for Transmission Substation or Communications Construction. chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://tva-azr-eastus-cdn-ep-tvawcm-prd.azureedge.net/cdn-tvawcma/docs/default-source/energy/transmission/tva-environmental-quality-protection-specifications-for-transmission-substation-or-communications-construction_august2022cbc19574-281f-4688-8a5d-563213536404.pdf?sfvrsn=4389a34a_3

U.S. Army Corps of Engineers (USACE). (2010). Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0). https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046490.pdf

U.S. Bureau of Labor Statistics (USBLS). (n.d.) Occupational Employment and Wage Statistics. https://www.bls.gov/news.release/laus.toc.htm

U.S. Census Bureau (USCB). (2017). Total population. U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates https://factfinder.census.gov/bkmk/table/1.0/en/ACS/17_5YR/B01003/0100000US|0400000US01|0500000US01033|1500000US010330210002

USCB. (2022). Poverty in the United States: 2021. https://www.census.gov/library/publications/2022/demo/p60-277.html

USCB. (n.d.-a). Profile: Henry County, Tennessee. https://data.census.gov/profile/Henry_County,_Tennessee?g=050XX00US47079

USCB. (n.d.-b). Glossary. https://www.census.gov/programs-surveys/geography/about/glossary.html

U.S. Climate Data. (n.d.). U.S. Climate Data Savannah, TN. https://www.usclimatedata.com/climate/savannah/tennessee/united-states/ustn0450

U.S. Department of Agriculture, Natural Resources Conservation Service (USDA NRCS). (n.d.-a). National Soil Survey Handbook. https://www.nrcs.usda.gov/resources/guides-and-instructions/national-soil-survey-handbook

USDA NRCS. (n.d.-b). Farmland Protection Policy Act (FPPA). https://www.nrcs.usda.gov/wps/portal/nrcs/detail/?ss=16&navtype=SUBNAVIGATIO%20N&cid=nrcs143_008275&navid=100170180000000&position=Welcome.Html&ttype=%20detail

USDA (n.d.-c). Soil Data Access (SDA) Prime and Other Important Farmland. https://efotg.sc.egov.usda.gov/references/public/LA/Prime_and_other_Important_Farmland.html

U.S. Department of Commerce, National Oceanographic and Atmospheric Administration. (n.d.). Storm Events Database. https://www.ncdc.noaa.gov/stormevents/

US Department of Transportation (USDOT). (2006). U.S. Department of Transportation Federal Highway Administration. Roadway Construction Noise Model User's Guide, January 2006. FHWA-HEP-05-054, DOT-VNTSC-FHWA-05-01. Accessed 3/28/19 at https://www.fhwa.dot.gov/Environment/noise/construction_noise/rcnm/rcnm.pdf

U.S. Environmental Protection Agency (USEPA). 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. https://nepis.epa.gov/Exe/ZyPDF.cgi/2000L3LN.PDF?Dockey=2000L3LN.PDF

USEPA. (n.d.-a). Ecoregion Download Files by State - Region 4. https://www.epa.gov/eco-research/ecoregion-download-files-state-region-4

USEPA. (n.d.-b). Clean Air Act Requirements and History. https://www.epa.gov/clean-air-act-overview/clean-air-act-requirements-and-history

USEPA. (n.d.-c). NAAQS Table. https://www.epa.gov/criteria-air-pollutants/naaqs-table

USEPA. (n.d.-c). Overview of Greenhouse Gases. https://www.epa.gov/ghgemissions/overview-greenhouse-gases

USEPA. (n.d.-d). Resource Conservation and Recovery Act (RCRA) Overview. https://www.epa.gov/rcra/resource-conservation-and-recovery-act-rcra-overview#whatisrcra

USEPA. (n.d.-e). EJScreen. https://ejscreen.epa.gov/mapper/

U.S. Fish and Wildlife Service (USFWS). (2023). Range-Wide Indiana Bat Survey Guidelines. https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines

USFWS. (n.d.-a). Information for Planning and Consultation (IPaC). https://ipac.ecosphere.fws.gov/

USFWS. (n.d.-b). Whooping Crane. https://ecos.fws.gov/ecp/species/758

U.S. Geological Service. (1995). Ground Water Atlas of the United States: Segment 10. https://pubs.er.usgs.gov/publication/ha730K

US Geological Service. Seismic Hazard Maps and Site-Specific Data. (n.d.). https://www.usgs.gov/programs/earthquake-hazards/seismic-hazard-maps-and-site-specific-data

U.S. Water Resources Council. (1978). Guidelines for Implementing Executive Order 11988, Floodplain Management. Federal Register Vol. 43, No. 29, February 10, 1978. pp. 6030-6054. https://www.energy.gov/sites/prod/files/2015/09/f26/Floodplain%20Management%20Guidelines_1978.pdf

Weather Spark. (n.d.). Average Weather in Adamsville, Tennessee, Untied States. https://weatherspark.com/y/13179/Average-Weather-in-Adamsville-Tennessee-United-States-Year-Round

Appendix A

Puryear Solar Public Comments and Responses

Topic	Comment	Commentor(s)	Response
Alternatives	No Action Alternative	Charles Allen	Prior to execution of any Power Purchase Agreement, TVA evaluates each developer's safety and environmental performance including the performance of developer's contractors performing the work, over the previous five years. Additionally, TVA is a corporate agency and instrumentality of the federal government and accordingly must conduct or approve an environmental review under the National Environmental Policy Act (NEPA) for any federal action, which includes the purchase of power from the proposed Project. The environmental impact of the proposed Puryear renewable facility and any connected actions (e.g., transmission system upgrades) were thoroughly evaluated and disclosed in this NEPA review. Please see Sections 3.2, 3.3, and 3.4 of the EA for information regarding groundwater, wildlife, soil contamination and water runoff impacts associated with the Project. Per TVA's PPA requirements SR Puryear LLC must comply with all applicable federal and state laws, both during construction and during operation of the Project for the life of the PPA. TVA has concluded the proposed Project would produce renewable energy with only minor direct and indirect environmental impacts, would help meet TVA's renewable energy goals, and would help TVA meet customer-driven energy demands on the TVA system. As discussed in Section 2.0 of the EA, PPAs are needed to help TVA meet immediate needs for additional renewable generating capacity in response to customer demands and TVA's own renewable energy goals established in the 2019 Integrated Resource Plan (IRP). Please see TVA's 2019 IRP at www.tva.gov/irp for information regarding TVA's least-cost planning, grid stability/reliability, and TVA's generation mix.

Topic	Comment	Commentor(s)	Response
Climate	Comment about the amount of heat produced by solar panels	Clint Diggs	The solar panels to be used for this project absorb solar energy rather than reflecting it, and therefore do not create significant heat. The heating effect that may be generated at large-scale solar developments is similar to any other types of development that have heat absorbing structures and surfaces but is much smaller and more localized. Research shows that any additional heating is minimal, dissipates quickly, and cannot be measured 100 feet away from solar developments.
Decommissioning	Comment about disposal of solar cells at end of project and cost of disposal	Clint Diggs	Please refer to Section 2.2.5 of the Draft EA. This details the decommissioning process and recycling of materials. In brief, when the decision is made to cease operating the solar facility, Puryear Solar would dismantle the facility. Removed materials would be recycled to the extent possible and remaining materials disposed of at approved facilities in accordance with local, state, and federal laws and regulations. Puryear Solar is responsible for the cost of decommissioning.
General	Project Support	Paul Willis Bob & Carol Peppler Cecilia Koenig Danny Curtis Marc Wiggins Charles Perry	Thanks for your comments
General	Comment about benefit of solar facilities	Drake Gamlin	Thanks for your comment
General	Comment - No action	Jon Trosper	Thanks for your comment

Topic	Comment	Commentor(s)	Response
Groundwater/Soils	Comment about long-term effects on groundwater and soils	Charles Allen	Solar panels are constructed to be nontoxic. Rain falling on the panels that percolates into the ground will not contaminate the soil or groundwater. Some minor long-term beneficial impact may result from the decreased use of pesticides and fertilizers on farmland that is converted to solar panels.
Health Risks	Comment about long-term health risks	Sandy McGuire	There is no credible evidence that living near a solar facility causes health risks. No direct or indirect public health or safety hazards are anticipated as a result of operations. Overall, impacts to public health and safety in association with implementation of the Proposed Action would be considered temporary and minor.
Health Risks	Comment about herbicides poisoning water supply	Chris Casey	Once construction is complete, the site will be revegetated with low-growing native grasses. Vegetation management would be by mechanical means and/or use of grazing animals. Some minor long-term beneficial impact may result from the decreased use of pesticides and fertilizers on farmland that is converted to solar panels.
Land Use	Comment about loss of farmland and forests	Chris Casey	Solar projects do not result in the permanent or irreversible conversion of farmland. During operations, soils would have an opportunity to develop in place with minimal ground disturbance and possibly regenerate while not in active agricultural production. When the solar and supporting materials are removed, the site could be readily returned to agricultural production. Up to 116 acres of forested land would be cleared for this project. Considering the amount of forested land in the area, both regionally and locally, clearing approximately 116 acres of trees would be regarded as minimal and have insignificant impacts.

Topic	Comment	Commentor(s)	Response
Land Use	Comment about loss of farmland.	Charles Allen	Solar projects do not result in the permanent or irreversible conversion of farmland. During operations, soils would have an opportunity to develop in place with minimal ground disturbance and possibly regenerate while not in active agricultural production. When the solar and supporting materials are removed, the site could be readily returned to agricultural production.
Wildlife	Comment about wildlife disruption	Sandy McGuire	Please refer to Section 3.4, Biological Resources for a detailed discussion of the wildlife and the impacts of the project additional details. In brief, the impacts of the project will result in minor impacts to wildlife. Current agricultural use of the land limits habitat available for wildlife. Once construction is complete, the site will be revegetated with low-growing native grasses. Wildlife that can access the facility will be able to use this type of habitat upon completion of construction.
Wildlife	Comment about long-term effects on wildlife	Charles Allen	See response to comment on wildlife from Sandy McGuire
Wildlife	Comment about loss of wildlife	Chris Casey	See response to comment on wildlife from Sandy McGuire

Appendix B

Summary of the Environmental Features for the Puryear Solar Project

SUMMARY OF ENVIRONMENTAL FEATURES FOR THE

PURYEAR SOLAR PROJECT

PURYEAR, HENRY COUNTY, TENNESSEE

Prepared For: Silicon Ranch Corporation

Sent To: Tennessee Valley Authority

36095-18
TVA #41214
August 2023

CONTENTS

APPENDICES

1.0 INTRODUCTION

Barge Design Solutions, Inc. (Barge) has been retained by Silicon Ranch Corporation (Silicon Ranch) to perform a natural resource analysis on the approximately 611-acre proposed Puryear Solar Project (Project Study Area), located in Puryear, Henry County, Tennessee. The project study area is located between Highway 140 East, Conyersville Road, and Old Paris-Murray Road, approximately 0.7 miles east of the city square of Puryear and Highway 641 North. The project study area encompasses multiple properties of various property owners, which include parcel Nos. 029 12.00, 029 13.04, 029 13.05, 029 13.07, 029 14.00, 029 15.00, 029 36.00, 029 37.00, 029 38.00, 029 38.01, 029 40.00, 029 42.00, 029 44.00, and 029 48.00.

Prior to visiting the project study area, a resource review of available background site information was conducted using the U.S. Fish and Wildlife Service's (USFWS's) National Wetland Inventory (NWI) database to determine if wetlands could be found within the area, as well as review with the Information for Planning and Consultation (IPaC) system for federally listed species. Topographic maps and the United States Geological Survey (USGS) National Hydrography Dataset (NHD) were also evaluated for potential jurisdictional waters. Additionally, major landscapes and vegetation units were identified using aerial imagery prior to surveying the study area. The United States Department of Agriculture (USDA) Natural Resources Conservation Service's (NRCS's) Web Soil Survey and the Federal Emergency Management Agency (FEMA) flood mapping were also reviewed for solar farm feasibility within the project study area.

From September 20 through 22, 2022, Barge biologists Frank Amatucci (TN-QHP #1203-TN21) and Cameron Brueck performed an onsite investigation for the Puryear Solar Project. The investigation included the delineation of wetlands and watercourses, as well as identification of vegetative communities and habitat types that may be suitable for protected species with the state and federal agencies. The findings of this technical report are detailed below, and the following appendices are included subsequent to this report.

- Appendix A – Figures
- Appendix B – NRCS Custom Soil Report
- Appendix C – Supplemental Tables
- Appendix D – Waterbody and Wetland Data Forms
- Appendix E – Photographic Summary
- Appendix F – State and Federal Concurrence Documents
- Appendix G – Rare, Threatened and Endangered Species Lists
- Appendix H – USFWS Bat Habitat Data Forms
- Appendix I – Bat Survey Report

2.0 SITE DESCRIPTION

The project study area is primarily utilized for agricultural purposes and was observed with cropland of corn, soy, tobacco, and squash and a small pasture area for cattle. Forested and wooded hedgerows were also present along property lines and drainage valleys within the project study area. A Project Location Map depicting the area can be found in Appendix A, Figure 1. The adjoining properties to the west, north, and south are comprised of agricultural fields and residential homes, and to the east is mostly forested with sporadic residential homes.

The project study area is located between Highway 140 East, Conyersville Road, and Old Paris-Murray Road, approximately 0.7 miles east of the city square of Puryear and Highway 641 North in Puryear, Henry County, Tennessee (Appendix A, Figure 1). The project study area is within the Puryear, Tennessee, topographic quadrangle (Appendix A, Figure 2), and the project survey area is located within the East Fork Clarks River (060400060101) and the Headwaters of Blood River (060400050801) HUC-12 watersheds. These watersheds are ultimately located, respectively, within the Lower Tennessee River (06040006) and the Kentucky Lake (06040005) HUC-8 watersheds, which are within the Tennessee River Basin (Appendix A, Figure 3).

The project study area also lies within two ecoregions of Tennessee. The northwestern portion of the study area is within the Mississippi Valley Loess Plains (74) Tennessee ecoregion and is further categorized into the Mississippi Valley Loess Plains (74b) sub-ecoregion region. The southeastern portion of the study area is within the Southeastern Plains (65) Tennessee ecoregion and is further categorized into the Northern Hilly Gulf Coastal Plain (65e) sub-ecoregion region.

The Mississippi Valley Loess Plains ecoregion is typically comprised of gently rolling hillslopes and isolated plains with an average elevation ranging between 250 to 500 feet. Most streams are channelized and are low-gradient and murky with silt and sand bottoms. Native woodland within the Mississippi Valley Loess Plains ecoregion is commonly comprised of oak-hickory forests, southern floodplain forests, and bottomland cypress-gum swamps. The Northern Hilly Gulf Coastal Plains is comprised of sand and clay formations with rolling hillslopes, and elevations reach up to 650 feet. Streams in this ecoregion are typically low-gradient and are sandy-bottomed. Native woodland within the Northern Hilly Gulf Coastal Plains ecoregion is commonly comprised of oak-hickory and oak-hickory-pine forests.

3.0 SOILS

A total of 22 soil units consisting of loams, silt loams, silty clay loams, and complexes were identified onsite. None of the 22 soil units are listed as potentially hydric for Henry County. However, the Chenneby silt loam, 0 to 2 percent slopes, occasionally flooded (Cn), Enville silt loam, 0 to 2 percent slopes, occasionally flooded (Ea), and Iuka loam, 0 to 2 percent slopes, occasionally flooded (Ik) are known to flood. Grenada silt loam, 2 to 5 percent slopes, eroded (GrB2) is the dominant soil unit for the project, which accounts for 37.5 percent of the project study area. Providence silt loam, 5 to 8 percent slopes, moderately eroded (PoC2) is the second most dominant soil unit, which accounts for 9.5 percent of the project study area. A Soil Map can be found within Appendix A, Figure 4, and a Custom Soil Resource Report from the NRCS can be found in Appendix B.

4.0 VEGETATION

The project study area is almost entirely utilized for agricultural purposes and is mostly comprised of cropland and cattle pasture. In the portions of the project study area that remain forested, or have historically been disturbed, natural and successional vegetative communities have developed, which include oak-hickory forest, riparian forest, mixed-growth hardwood forest, successional hardwood forest, shallow emergent marsh, and fallow fields. A vegetative community map depicting all of the vegetative communities within the project study area is provided in Appendix A, Figure 6. Below are brief descriptions of each observed vegetative community and characteristics observed during the onsite evaluation.

In natural areas of the project study area, the riparian forests and mixed-growth hardwood forests were encountered. These forested communities encompass approximately 34 and 9 acres within the project study area, respectively. The riparian forests were observed in three separate areas within the project study area and were observed with mature and semi-mature growth stages. Both the growth stages of the riparian forests were comprised of sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), sycamore (*Platanus occidentalis*), green ash (*Fraxinus pennsylvanica*), box elder (*Acer negundo*), slippery elm (*Ulmus rubra*), and an undergrowth of jumpseed (*Polygonum virginianum*). The overstory size for this forested community averaged approximately 20-inches in DBH and is common throughout the ecoregion. Whereas, the mixed-growth hardwood forests were observed in portions of the site that could have been historically impacted during the development of the agricultural farm fields and adjacent residential properties. The mixed-growth hardwood forests were comprised of northern and southern red oak (*Q. falcata* and *Q. rubra*), post oak (*Q. stellata*), sweetgum, slippery elm, red maple, pignut hickory (*Carya. glabra*), hackberry (*Celtis occidentalis*), red bud (*Cercis canadensis*), red cedar (*Juniperus virginiana*), basswood (*Tilia americana*), and an undergrowth of white snakeroot (*Ageratina altissima*), jumpseed, and trumpet creeper (*Campsis radicans*). The overstory size for this forested community averaged approximately 12-inches in DBH and is common throughout the ecoregion.

Along the fence lines, or property limits, between agricultural fields, successional hardwoods were prevalent. The successional hardwood vegetative community encompasses approximately 28 acres of the project study area. Successional hardwoods were established in areas that have naturally progressed to woody regions between actively maintained portions of the project study area. While mostly comprised of tree species from the surrounding natural forested communities, the successional hardwoods were also observed with sassafras (*Sassafras albidum*) and honey locust (*Gleditsia triacanthos*) trees and an understory of American pokeweed (*Phytolacca americana*), Chinese privet (*Ligustrum sinense*), late goldenrod (*Solidago altissima*), and poison ivy (*Toxicodendron radicans*). The overstory size for this forested community averaged approximately 6-inches in DBH and is common throughout the ecoregion.

Shallow emergent marsh and fallow fields were encountered where vegetative maintenance is sporadic or has ceased. Both the shallow emergent marsh and fallow field encompass approximately two acres of the project study area each. The fallow field vegetative community was observed with upland terrestrial plants, such as orchard grass (*Dactylus glomerata*), red fescue (*Festuca rubra*), Queen Ann's lace (*Daucus carota*), and blackberry (*Rubus argutus*), whereas the shallow emergent marsh was comprised of hydrophytic plants such as woolgrass (*Scirpus cyperinus*), fox sedge (*Carex vulpinoidea*), monkeyflower (*Mimulus ringens*), seedbox (*Ludwigia alternifolia*), cattail (*Typha latifolia*), and boneset (*Eupatorium perfoliatum).*

Lastly, cropland was observed as the most predominant vegetative community within the project study area, encompassing approximately 506 acres of the site, and cattle pasture was observed on an additional 24 acres. The observed cropland was cultivated with soy, corn, tobacco, hay, and squash, with corn and soy frequently throughout. A small portion of cattle pasture was observed in the southeastern portion of the project study area. Man-made farm ponds were encountered within the agricultural fields, which could be potentially utilized for irrigation of the adjacent fields or drinking water for cattle.

5.0 WATER RESOURCES

From September 20 through 22, 2022, Barge biologists performed a field survey within the project study area to determine the presence or absence of jurisdictional waters. Both the U.S. Army Corps of Engineers (USACE) and Tennessee Department of Environment and Conservation (TDEC) methodologies were utilized to determine the jurisdiction of wetlands and non-wetland waters within the project study area.

A total of 25 likely jurisdictional and 29 potentially non-jurisdictional features were identified within the project study area, all of which were considered as streams, ephemeral channels, wet weather conveyances, and wetlands. The sections below detail the features that were delineated within the project study area. The features identified onsite are listed in Table 1 and Table 2 (Appendix B) and are displayed in Figure 6 (Appendix A).

5.1 Non-Wetland Waters

Lead Scientist Frank Amatucci (TN-QHP #1203-TN21) and Cameron Brueck conducted the hydrologic determination (HD) site investigation in accordance with TDEC Rule 0400-40-17-.04. In addition, water features were considered regarding the Regulatory Guidance Letter No. 05-05. The site visit was conducted more than 48 hours following a significant rain event of greater than 1.0 inch in a 24-hour period. Upon commencement of the study, no rain (CoCoRaHs #TN-HY-8) was observed in the seven days preceding September 20, 2022, and no precipitation was recordable during the consecutive surveys. In the preceding 30 days, 2.77 inches of rain was observed. The precipitation for the preceding three months is considered “normal” based on the Antecedent Precipitation Tool (Table 3, Appendix C). However, observed onsite conditions during the field evaluation indicate potential drought circumstances.

Two perennial streams (STR), nine intermittent streams (STR), ten ephemeral streams (EPH), ten erosional swales (ES), one upland drainage feature (UDF), and one drainage ditch (D) were delineated within the project study area. These waterbody features were based primarily on secondary indicators while conducting the HD. Below are brief descriptions of the delineated waterbody features within the project study area. Figure 7 – Existing Conditions Map (Appendix A) illustrates their locations within the project study area, and Table 1 (Appendix C) details the locations and lengths of each feature. Photographs of each feature area are provided in Appendix E, and the HD data forms area provided in Appendix D.

5.1.1 Non-Wetland Waters Descriptions

STR-1 was observed as an intermittent stream that starts at a large headcut below EPH-1 within the northern portion of the project study area. While no perceivable flow was observed throughout the evaluated reach, continuous bed and bank was moderately strong, as well as a presence of hydric soils on the channel bottom, indicating a potential intermittent stream. The stream channel bottom was composed of clay with recent deposits of sand, cobble, and gravel. There was no aquatic life observed within the feature at the time of the site visit. STR-1 is assumed to be jurisdictional to TDEC and the USACE.

STR-2 was observed as an intermittent stream that starts at a large headcut below the culverted outfall adjacent to Conyersville Road in the northern portion of the project study area. While no perceivable flow was observed throughout the evaluated reach, continuous bed and bank was moderately strong, as well as a presence of hydric soils on the channel bottom, indicating a potential intermittent stream. The stream channel bottom was composed of clay with a significant deposition of sand as bars and benches. There was no aquatic life observed within the feature at the time of the site visit. STR-2 is assumed to be jurisdictional to TDEC and the USACE.

STR-3 was observed as an intermittent stream that starts at a moderate headcut below EPH-3 in the northern portion of the project study area. While no perceivable flow was observed throughout the evaluated reach, a pool below the headcut was observed with a presence of red tubificid worms and *Physidae* snails. STR-3 was also observed with a moderate presence of a bed and bank, and channel bottom was composed of clay, silt, and sand. STR-3 is assumed to be jurisdictional to TDEC and the USACE.

STR-4 was observed as an intermittent stream that starts at a surface water connection with Pond (P) P-2 within the northern portion of the project study area and conveys excess surface water to STR-3. While no perceivable flow was observed throughout the evaluated reach, continuous bed and bank was moderately present, as well as a presence of hydric soils on the channel bottom, indicating a potential intermittent stream. The stream channel bottom was composed of clay with recent deposits of sand and gravel. There was no aquatic life observed within the feature at the time of the site visit. STR-4 is assumed to be jurisdictional to TDEC and the USACE.

STR-5 was observed as an intermittent stream that presumably drains wetland (WTL) WTL-1 into WTL-2 within the southwestern portion of the project study area. While no perceivable flow was observed throughout the evaluated reach, continuous bed and bank was moderately present, as well as a presence of hydric soils on the channel bottom, indicating a potential intermittent stream. The stream channel bottom was composed of clay with recent deposits of sand and gravel. There was no aquatic life observed within the feature at the time of the site visit. STR-5 is assumed to be jurisdictional to TDEC and the USACE.

STR-6 was observed as an intermittent stream that likely conveys excess surface water from the surrounding upland area and floodplain forest into the East Fork Clarks River (STR-7). While no perceivable flow was observed throughout the evaluated reach, continuous bed and bank was moderately present, as well as a presence of hydric soils on the channel bottom, indicating a potential intermittent stream. The stream channel bottom was composed of clay with recent deposits of sand and gravel. There was no aquatic life observed within the feature at the time of the site visit. STR-6 is assumed to be jurisdictional to TDEC and the USACE.

STR-7 was observed in the mapped location of the East Fork Clarks River and was observed as a perennial stream within the southwestern portion of the project study area. STR-7 was determined to be a stream based on the presence of blackspotted topminnow (*Fundulus olivaceus*), a primary indicator, within the slow flowing waters of the investigated reach. The stream channel bottom was composed of highly compacted clay with recent deposits of gravel. STR-7 is assumed to be jurisdictional to TDEC and the USACE.

STR-8 was observed as an intermittent stream in the southeastern portion of the project study area. STR-8 likely originates offsite to the east from a man-made farm pond. While no perceivable flow was observed throughout the evaluated reach, continuous bed and bank was moderately present, as well as a presence of hydric soils on the channel bottom, indicating a potential intermittent stream. The stream channel bottom was composed of clay, silt, and sand. There was no aquatic life observed within the feature at the time of the site visit. STR-8 is assumed to be jurisdictional to TDEC and the USACE.

STR-9 was observed as a potential perennial stream in the southeastern portion of the project study area. While no perceivable flow was observed throughout the evaluated reach, pools with a presence of blackspotted topminnow were documented. The presumably perennial stream is likely subjected to drought-like conditions. The stream channel bottom was composed of moderately sorted sand and cobble underlain by highly compacted clay. STR-9 is assumed to be jurisdictional to TDEC and the USACE.

Both STR-10 and STR-11 were observed as intermittent streams within the southeastern portion of the project study area. Both streams were observed to be originating at the bottom of moderately sized headcuts at comparable topographic elevations, which could indicate a probable groundwater connection. STR-11 flows directly into STR-10 within the project study area. STR-10 and STR-11 were observed with continuous bed and bank, as well as a presence of hydric soils on the channel bottom. The stream channel bottoms for the two streams were observed with sand and gravel underlain by highly compacted clay. Both STR-10 and STR-11 are assumed to be jurisdictional to TDEC and the USACE.

EPH-1 was observed as an ephemeral stream to the USACE and as a wet weather conveyance (WWC) to TDEC in the northern portion of the project study area. The feature displayed a moderate bed and bank throughout most of the reach, as well as a slight presence of riffle-pool sequences. No surface water or saturation was present within the reach during the site visit, and no hydric soils were observed within the channel. A slight presence of smartweed (*Persicaria hydropiper*) and clearweed (*Pilea pumilia*) was observed within the channel. EPH-1 was observed with a channel bottom of sand and clay. EPH-1 is potentially non-jurisdictional to the USACE and is assumed to be non-jurisdictional to TDEC, being a WWC.

EPH-2 was observed as an ephemeral stream to the USACE and as a WWC to TDEC in the northern portion of the project study area. The feature displayed a moderate bed and bank and sinuosity throughout most of the reach. No surface water or saturation was present within the reach during the site visit, and no hydric soils were observed within the channel. A slight presence of fibrous roots was detected within the channel. EPH-2 was observed with a channel bottom of sand and clay. EPH-2 is potentially non-jurisdictional to the USACE and is assumed to be non-jurisdictional to TDEC, being a WWC.

EPH-3 was observed as a relatively short reach of ephemeral stream to the USACE and as a WWC to TDEC in the northern portion of the project study area. The feature displayed a semi-moderate bed and bank, as well as two or more ordinary high-water mark (OHWM) indicators such as vegetative cut lines and wrack lines. No surface water or saturation was present within the reach during the site visit, and no hydric soils were observed within the channel. A slight presence of jumpseed was detected within the channel. EPH-3 was observed with a channel bottom of sand and clay. EPH-3 is potentially non-jurisdictional to the USACE and is assumed to be non-jurisdictional to TDEC, being a WWC.

EPH-4 was observed as an ephemeral stream to the USACE and as a WWC to TDEC in the northern portion of the project study area, which drains an adjacent agricultural field into STR-2. The feature displayed a semi-moderate bed and bank that was frequently lost throughout the reach but was observed with two or more OHWM indicators, such as vegetative cut lines and sorting. No surface water or saturation was present within the reach during the site visit, and no hydric soils were observed within the channel. EPH-4 was observed with a channel bottom of sand and clay. EPH-4 is potentially non-jurisdictional to the USACE and is assumed to be non-jurisdictional to TDEC, being a WWC.

EPH-5 was observed as an ephemeral stream to the USACE and as a WWC to TDEC in the southwestern portion of the project study area, which connects WTL-3 to an offsite wetland north of the project study area. The feature displayed a semi-moderate bed and bank that was irregularly lost throughout the reach but was observed with two or more OHWM indicators, such as vegetative cut lines and wrack lines. No surface water or saturation was present within the reach during the site visit, and no hydric soils were observed within the channel. EPH-5 was observed with a channel bottom of silt and clay. EPH-5 is potentially non-jurisdictional to the USACE and is assumed to be non-jurisdictional to TDEC, being a WWC.

EPH-6 was observed as an ephemeral stream/agricultural drainage ditch to the USACE and as a WWC to TDEC in the southwestern portion of the project study area, which drains into the East Fork Clarks River. The feature displayed a moderately-strong bed and bank within the man-made drainageway and was observed with two or more OHWM indicators, such as vegetative cut lines and sorting. No surface water or saturation was present within the reach during the site visit, and no hydric soils were observed within the channel. EPH-6 was observed with a channel bottom of sand. EPH-6 is potentially non-jurisdictional to the USACE and is assumed to be non-jurisdictional to TDEC, being a WWC.

EPH-7 was observed as an ephemeral stream to the USACE and as a WWC to TDEC in the southern portion of the project study area, adjacent to Highway 140 East. The feature displayed a semi-moderate bed and bank that was irregularly lost throughout the reach but was observed with two or more OHWM indicators, such as vegetative cut lines and sorting. No surface water or saturation was present within the reach during the site visit, and no hydric soils were observed within the channel. EPH-7 was observed with a channel bottom of silt and clay. EPH-7 could potentially be jurisdictional to the USACE due to its relatively large drainage area but is assumed to be non-jurisdictional to TDEC, being a WWC.

EPH-8 was observed as an ephemeral stream to the USACE within a cattle pasture and hay field, as well as a WWC to TDEC, in the southern portion of the project study area. The feature displayed a semi-moderate bed and bank that appeared to be frequently lost by the disturbance of farm equipment and cattle but was observed with two or more OHWM indicators, such as vegetative cut lines and wrack lines. No surface water or saturation was present within the reach during the site visit, and no hydric soils were observed within the channel. EPH-8 was observed with a channel bottom of silt and clay. EPH-8 could potentially be jurisdictional to the USACE due to its relatively large drainage area but is assumed to be non-jurisdictional to TDEC, being a WWC.

EPH-9 was observed as an ephemeral stream to the USACE and as a WWC to TDEC in the southern portion of the project study area, which drains excess surface water from WTL-7 into STR-10. The bed and bank of the ephemeral feature was fairly irregular but was observed with a significant presence of two or more OHWM indicators, such as vegetative cut lines and wrack lines. No surface water or saturation was present within the reach during the site visit, and no hydric soils were observed within the channel. EPH-9 was observed with a channel bottom of silt and clay, as well as a moderate presence of fibrous roots. EPH-9 could potentially be jurisdictional to the USACE due to its location within an NWI mapped resource but is assumed to be non-jurisdictional to TDEC, being a WWC.

EPH-10 was observed as an ephemeral stream to the USACE and as a WWC to TDEC in the easternmost property of the project study area, northeast of the Conyersville Road and Old Paris-Murray Road intersection. The feature displayed a semi-moderate bed and bank that was irregularly lost within a steep natural valley and was observed with two or more OHWM indicators, such as vegetative cut lines and sorting. No surface water or saturation was present within the reach during the site visit, and no hydric soils were observed within the channel. EPH-10 was observed with a channel bottom of sand. EPH-10 is potentially non-jurisdictional to the USACE and is assumed to be non-jurisdictional to TDEC, being a WWC.

ES-1 was observed as an erosional swale that originates from agricultural field runoff directed towards EPH-1 and STR-1 in the northern portion of the project study area. Bed and bank was present and at least one OHWM indicator was detected, such as a defined channel. No surface water or saturation was present within the reach during the site visit, and no hydric soils were observed within the channel. Very little substrate sorting was observed within the channel, which was composed of silt and clay, as well as a moderate presence of fibrous roots. ES-1 is assumed to be non-jurisdictional to the USACE and TDEC as a WWC.

Both ES-2 and ES-3 were observed as erosional swales that originate from agricultural field runoff directed towards STR-4 in the northern portion of the project study area. Bed and bank was slightly present and at least one OHWM indicator was detected, such as a defined channel. No surface water or saturation was present within either reach during the site visit, and no hydric soils were observed within the channel. Very little substrate sorting was observed within ES-2 and ES-

3, which were composed of silt and clay, as well as a moderate presence of fibrous roots. Both ES-2 and ES-3 are assumed to be non-jurisdictional to the USACE and TDEC as WWCs.

ES-4 was observed as an erosional swale that originates from agricultural field runoff directed towards STR-5 and WTL-2 in the southwestern portion of the project study area. Bed and bank was present and at least one OHWM indicator was detected, such as a wrack lines. No surface water or saturation was present within the reach during the site visit, and no hydric soils were observed within the channel. Very little substrate sorting was observed within the channel, which was composed of silt and clay, as well as a moderate presence of fibrous roots. ES-4 is assumed to be non-jurisdictional to the USACE and TDEC as a WWC.

Both ES-5 and ES-6 were observed as erosional swales that drain excess surface water from WTL-2 into the East Fork Clarks River in the southwestern portion of the project study area. Bed and bank was slightly present and at least one OHWM indicator was detected, such as a vegetative cut lines. No surface water or saturation was present within either reach during the site visit, and no hydric soils were observed within the channel. Very little channel substrate sorting was observed within ES-5 and ES-6, which was composed of silt and clay, as well as a moderate presence of fibrous roots. Both ES-5 and ES-6 are assumed to be non-jurisdictional to the USACE and TDEC as WWCs.

ES-7 was observed as an erosional swale that originates within an upland wooded terrace, adjacent to an agricultural field, which presumably directs overland sheet flow into the East Fork Clarks River in the southwestern portion of the project study area. Bed and bank was present and at least one OHWM indicator was detected, such as vegetative cut lines. No surface water or saturation was present within the reach during the site visit, and no hydric soils were observed within the channel. Very little substrate sorting was observed within the channel, which was composed of silt and clay, as well as a moderate presence of fibrous roots. ES-7 is assumed to be non-jurisdictional to the USACE and TDEC as a WWC.

Both ES-8 and ES-9 were observed as erosional swales that originate within an upland wooded area and presumably direct overland sheet flow into EPH-8 in the southcentral portion of the project study area. Bed and bank was slightly present and at least one OHWM indicator was detected, such as wrack lines. No surface water or saturation was present within either reach during the site visit, and no hydric soils were observed within the channel. Very little channel substrate sorting was observed, which was composed of silt, clay, dense fibrous roots, and surrounding terrestrial vegetation. Both ES-8 and ES-9 area assumed to be non-jurisdictional to the USACE and TDEC as WWCs.

ES-10 was observed as an erosional swale within an active cattle pasture, which presumably directs excess surface water from a nearby agricultural field and the cattle pasture in the southeastern portion of the project study area. Bed and bank was infrequently present due to cattle disturbance and at least one OHWM indicator was detected, such as vegetative cut lines. No surface water or saturation was present within the reach during the site visit, and no hydric soils were observed within the channel. Very little substrate sorting was observed within the channel, which was composed of silt and clay. ES-10 is assumed to be non-jurisdictional to the USACE and TDEC as a WWC.

Both UDF-1 and D-1 were observed as relic man-made drainages within the project study area. These man-made drainages were observed with a lack of a defined bed and bank and no detectable OHWM indicators. UDF-1 presumably drains overland sheet flow from the surrounding upland woods into an adjacent agricultural field, whereas D-1 is assumed to irregularly drain excess surface water from WTL-4 into the East Fork Clarks River. Both UDF-1 and D-1 are assumed to be non-jurisdictional to the USACE and TDEC.

5.2 Wetlands

Eight wetlands (WTL) were observed within the project study area. All wetlands were observed as Palustrine Forested (PFO) and Palustrine Emergent (PEM) wetland features. Each wetland was verified with the positive identification of suitable hydrology, hydrophytic vegetation, and hydric soils according to the USACE *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region, Version 2.0*. Below are brief descriptions of the delineated wetland features within the project study area. The locations of the delineated wetlands are provided in Figure 7 – Existing Conditions Map (Appendix A), and Table 2 (Appendix C) details the location and acreage of each wetland. The Atlantic and Gulf Coastal Plain Regional Wetland Determination Data Forms were completed at wetland and upland sample points and area provided in Appendix D, and photographs of each wetland feature are provided in Appendix E.

Furthermore, 13 man-made ponds (P) were observed within the project study area. These features were identified as a Palustrine Unconsolidated-Bottom (PUB) features and are also described below. The details of the location and acreage are provided in Appendix A and Appendix C, respectively. A photograph of the relic farm pond is provided in Appendix E.

5.2.1 Wetland Descriptions

WTL-1 was observed as a depressional PFO wetland along a slight hillslope below P-6 in the southwestern portion of the project study area. The depressional wetland likely collects surface water runoff from the surrounding agricultural fields and drains to the southwest into STR-5. WTL-1 was observed with a presence of a sparsely vegetated concave surface, drainage patterns, and crayfish burrows, indicating positive wetland hydrology. The wetland was observed with a dominance of hydric vegetation such as black willow (*Salix nigra*), sweetgum, and red maple trees and saplings. Hydric soils were also documented in WTL-1, which were observed with a stripped surface layer and an underlayer of depleted grey hydric soils with a presence of redox concentrations. Due to the observable connectivity to other Waters of the United States (WOTUS), WTL-1 is assumed to be jurisdictional to the USACE and TDEC.

WTL-2 was observed as a floodplain PFO wetland in the southwestern portion of the project study area. WTL-2 is situated on a floodplain terrace for the East Fork Clarks River and presumably collects surface water from the surrounding forested and hillslope areas of the project area and the overflow of the adjacent river. Excess surface water from WTL-2 likely drains into ES-5 and ES-6, connecting it to other WOTUS. WTL-2 was observed with a presence of water-stained leaves, drainage patterns, and geomorphic position, indicating positive wetland hydrology. The wetland was observed with a dominance of hydrophytic vegetation such as sweetgum, red maple, American hornbeam (*Carpinus caroliniana*), jewelweed (*Impatiens capensis*), and jumpseed. Hydric soils were also documented in WTL-2, which were observed with a surface layer of dark silty-loam soils underlain by depleted grey soils with a presence of redox concentrations. WTL-2 is assumed as jurisdictional to the USACE and TDEC due to the observable connectivity to other WOTUS.

WTL-3 was also observed as a floodplain PFO wetland in the southwestern portion of the project study area. Similar to WTL-2, WTL-3 is situated on a floodplain terrace for the East Fork Clarks River and presumably collects surface water from the surrounding forested and hillslope areas of the project area and the overflow of the adjacent river. Excess surface water from WTL-2 likely drains into EPH-5, connecting it to an offsite wetland to the north and potentially to other WOTUS. WTL-3 was observed with a presence of water-stained leaves, drainage patterns, and geomorphic position, indicating positive wetland hydrology. The wetland was observed with a dominance of hydrophytic vegetation such as sweetgum, red maple, slippery elm, sugarberry (*Celtis laevigata*), jumpseed, and Japanese stiltgrass (*Microstegium vimineum*). Hydric soils were also documented in WTL-3, which were observed with a surface layer of dark silty-loam soils underlain by depleted grey soils with a presence of redox concentrations. WTL-3 is assumed as jurisdictional to the USACE and TDEC due to the observable connectivity to other WOTUS.

WTL-4 was observed as a large depressional PFO and PEM wetland in the southwestern portion of the project study area. The depressional wetland likely collects surface water runoff from the surrounding agricultural fields and slowly drains to the north into the East Fork Clarks River. WTL-4 was observed with a presence of crayfish burrows and saturation visible on aerial imagery, indicating positive wetland hydrology. The wetland was observed with a dominance of hydric vegetation such black willow, sycamore, and sweetgum in the PFO portion, and sensitive fern (*Onoclea sensibilis*), boneset, seedbox, barnyard grass (*Echinochloa crus-galli*), and woolgrass in the PEM portion. Hydric soils were also documented in WTL-4, which were observed with a shallow surface layer of dark silty-loam soils underlain by depleted grey soils with a presence of redox concentrations. WTL-4 is assumed as jurisdictional to the USACE and TDEC due to the observable connectivity to other WOTUS.

WTL-5 was observed as a relic man-made pond that has naturally succeeded into a PEM wetland within the southwestern portion of the project study area. The deep depressional wetland likely collects precipitation and excess runoff from the surrounding agricultural fields. No outfall or drainage feature was observed beyond the limits of WTL-5, which isolates the feature from other WOTUS. WTL-5 was observed with a presence of geomorphic position and a positive facultative (FAC)-neutral test, indicating positive wetland hydrology. The wetland was observed with a dominance of hydric vegetation such as spike rush (*Eleocharis palustris*) and barnyard grass. Hydric soils were unobtainable in WTL-5, which were highly compacted. Due to the lack of connectivity to other WOTUS, WTL-5 is assumed to be isolated and non-jurisdictional to the USACE but jurisdictional to TDEC.

WTL-6 was observed as a relic man-made pond that has naturally succeeded into a PEM wetland within the southcentral portion of the project study area. The deep depressional wetland likely collects precipitation and excess runoff from the surrounding agricultural fields. No outfall or drainage feature was observed beyond the limits of WTL-6, which isolates the feature from other WOTUS. WTL-6 was observed with a presence of water-stained leaves, oxidized rhizospheres on living roots, and geomorphic position, indicating positive wetland hydrology. The wetland was observed with a dominance of hydric vegetation such as barnyard grass and cocklebur (*Xanthium strumarium*). Hydric soils were also documented in WTL-6, which were observed with a surface layer of dark silty-loam soils with redox concentrations and underlain by depleted grey soils with a presence of oxidized rhizospheres. Due to the lack of connectivity to other WOTUS, WTL-6 is assumed to be isolated and non-jurisdictional to the USACE but jurisdictional to TDEC.

WTL-7 was observed as a depressional PFO wetland along a slight hillslope below P-11 in the southeastern portion of the project study area. The depressional wetland likely collects surface water runoff from the surrounding agricultural fields and ES-10, then slowly drains to the east into EPH-9. WTL-7 was observed with a presence of drift deposits, drainage patterns, and crayfish burrows, indicating positive wetland hydrology. The wetland was observed with a dominance of hydric vegetation such as red maple, slippery elm, box elder, Japanese stiltgrass, and false nettle (*Boehmeria cylindrica*). Hydric soils were also documented in WTL-7, which were observed with a shallow surface layer of dark silty-loam soils underlain by depleted grey soils with a presence of redox concentrations. WTL-7 is assumed to be jurisdictional to the USACE and TDEC due to the observable connectivity to other WOTUS.

WTL-8 was observed as fringe PFO wetland to man-made farm pond P-12 within the southeastern portion of the project study area. The depressional wetland likely collects precipitation and excess runoff from the surrounding agricultural fields. No outfall or drainage feature was observed beyond the limits of WTL-8 and P-12, which isolates the feature from other WOTUS. WTL-8 was observed with a presence of water-stained leaves and crayfish burrows, indicating positive wetland hydrology. The wetland was observed with a dominance of hydric vegetation such as black willow, red maple, elderberry (*Sambucus nigra*), soft rush (*Juncus effusus*), and fox sedge. Hydric soils were also documented in WTL-8, which were observed with a shallow surface layer of dark silty-loam soils underlain by depleted grey soils with a presence of redox concentrations. Due to the lack of connectivity to other WOTUS, WTL-8 is assumed to be isolated and non-jurisdictional to the USACE but jurisdictional to TDEC.

Man-made farm ponds P-1 through P-13 were observed throughout the project study area. These man-made features were observed with an elevated berm that was occasionally dominated with either upland or hydrophytic herbaceous vegetation or with nearby forested communities. The man-made farm ponds were determined to be PUB features, all which were observed with a bottom substrate of silty-clay mud and organics. Each pond was observed with varying depths of water that ranged between a few inches up to three to four feet deep. P-1, P-3, P-4, P-6, P-7, P-8, P-9, P-10, P-11, and P-13 lacked an observable connection to other WOTUS or wetland features, but are within soil units with a shallow groundwater table. Therefore, these ponds are anticipated to be jurisdictional to TDEC and potentially non-jurisdictional to the USACE. Whereas P-2, P-5, and P-12 were observed with either a constructed outfall or a drainage connection to delineated wetlands and streams. Therefore, P-2, P-5, and P-12 are potentially jurisdictional to the USACE and TDEC.

5.3 State and Federal Concurrence

On March 3, 2023, TDEC released their official concurrence letter for the project study area. The assigned TDEC agent for the project concurred with the findings of the Hydrologic Determination Report, with the exception that all the ponds are jurisdictional to the state due to potential connection to groundwater. The official TDEC Hydrologic Determination Concurrence Letter is provided in Appendix F.

Currently the USACE Approved Jurisdictional Determination for the project study area is still under review.

6.0 WILDLIFE

Native wildlife was observed throughout the project study area. Identified wildlife were observed utilizing the fragmented forested portions of the site and the surrounding residential and agricultural environments. A list of wildlife species observed during the field inspection of the project study area is provided in Table 3 of Appendix C. The largest quantity of wildlife species was birds, which likely reflected the migratory season of the species. The observed wildlife species list is a preliminary species presence record for the project study area and can be seasonally biased.

7.0 FEDERAL AND STATE LISTED SPECIES

The USFWS IPaC online resource was reviewed for potential presence of federally listed animal and plant species within the Project Site (USFWS, n.d.-a). Five species were identified as being potentially present within the Project Site: northern long-eared bat (*Myotis septentrionalis*) (Endangered), tricolored bat (*Perimyotis subflavus*) (Threatened, Proposed Endangered), alligator snapping turtle (*Macrochelys temminckii*) (Proposed Threatened), monarch butterfly

(*Danaus plexippus*) (Candidate Species), and whooping crane (*Grus americana*) (Essential Population, Non-Essential in TN) (Table 4)

Additionally, TVA provided a heritage database query for the Project Site. The search criteria included aquatics (within the HUC boundary for the project), botany (within a 5-mile radius), known caves (within a 3-mile radius), terrestrial zoology (within a 3-mile radius), and natural areas (within a 3-mile radius). These records indicated ten Tennessee state listed species that are either rare, deemed in need of management, special concern, threatened, endangered, or extant. Furthermore, TVA also provided a heritage database query for bats within a 10-mile radius of the Project Site, which also includes the gray bat (*Myotis grisescens*) potentially occurring in the area and within the State of Kentucky (gray bat). Additionally, the Indiana bat (*Myotis sodalis*) was reviewed due to suitable habitat being observed on the Project Site and the project falling within the range of this species (Table 4)

Of the 17 listed state and federal species that could occur on the Project Site, three are currently considered special concern or extant by the state of Tennessee: special concern chain pickerel (*Esox niger*), and blue sage (*Salvia azurea var. grandiflora*), extant from the region rosyside dace (*Clinostomus funduloides*). (Table 4). Of the remaining 14 state and federally protected species that could potentially occur within the Project Site, only the candidate monarch butterfly was observed on the Project Site. Both the preliminary USFWS IPaC Resource List and the TVA heritage database query summary are provided in Appendix G.

7.1 Mammal Species

Suitable habitat for the state and federally endangered Indiana bat and northern long-eared bat was noted during the field inspection. A total of ten potential roost trees were observed and documented within the wooded portions of the project study area, which are identified on the Existing Conditions Map (Appendix A, Figure 7). No suitable caves or potential hibernacula sites for all the federally listed bat species were observed within the project area. Furthermore, state threatened and federally proposed endangered, tricolored bat could potentially utilize the forested areas throughout the project area for summer roosting.

7.1.1 Bat Habitat Assessment Methodology

The quality of bat habitat within the project site was based on the density and maturity of inspected woodland. It was also based on the presence of potential bat roost trees and their location within the surrounding woodland. Below are brief descriptions on the differences between Good, Marginal, and Poor habitat quality for the project:

Good – woodland areas that were rated as “good” were observed with a mature upper forest canopy, a presence of a semi-open mid canopy, and an open understory that allows for travel corridors and foraging opportunities between trees and adequate areas to perform mist net surveys. Typically, these portions of woods lacked dense vines, saplings, and shrubs.

Marginal – resembles that of the “good” quality habitat; however, “marginal” habitat was rated for observed semi-mature forest with younger trees and taller saplings and shrubs within the understory. This portion of the woodland area would be difficult to mist net for, especially between the thickets of undergrowth and the presence of dense vines intermittently throughout.

Poor – these areas of woodland were portions that were nearly absent of mature forest and are entirely dominated with dense tall saplings or shrubs. Mist netting would be nearly impossible within the thickets.

Potential roost trees were also rated on a similar scale. Each tree was rated on its sheltering habitat quality, proper solar exposure, obstructions for traveling in and out of the sheltered area, and its height above the forest floor. For example: a shagbark hickory, or dead tree, with many deep cracks and crevices, with little to no obstructing vines, and some solar exposure will be rated as “good,” whereas a “poor” potential roost tree could be a younger shagbark hickory, or dead tree, with shallow crevices and/or woodpecker holes, multiple obstructing vines, and little to no solar exposure. Furthermore, adequately sized culverts were analyzed for suitable roosting within the project study area.

7.1.2 Bat Habitat Survey Results

Within the project study area, there is approximately 73 acres of forested land. Within the 73 acres forested land, the project study area was observed with multiple forested vegetative communities that were categorized on quality to provide suitable bat roosting habitat. These forested vegetative communities include mature and semi-mature riparian forest, mixed growth hardwood forest, and successional forest. Additionally, a total of ten potential bat roost trees were identified within and immediately adjacent to the project study area. These potential bat roost trees were observed as exfoliating bark on shagbark hickory trees, dead snags or stands, or cracks and crevices in living trees. Furthermore, the observed culverts for the streams and drainages within the project study area ranged from 12 to 36 inches in diameter, unfavorable for roosting bats.

The riparian forest community was the most dominant forested community for the project study area and was observed within the floodplain areas of East Fork Clarks River and STR-3, a large intermittent stream. Two variations of the riparian forest were also documented, which can be categorized as mature with primary and secondary growth trees and semi-mature which was predominantly secondary growth. The mature riparian forest accounted for approximately 21 acres, of which 10 acres was rated as “good” bat habitat and 11 acres being “marginal” due to a presence of constricting vines and undergrowth. Whereas the semi-mature stands accounted for approximately 13 acres. Of which 6 acres were rated as “marginal” for bat habitat in the interior portions of the forest and 7 acres were rated as “poor” along the open field margins with a higher presence of younger growth trees that occupy the midstory.

The successional forest was the second most dominant forested community within the project study area, which accounted for approximately 28 acres of the project study area. The successional forest was observed with a significant presence of midstory and understory growth and was rated as “poor” bat habitat. The mixed growth hardwood forest was observed throughout the project study area and was documented with variable growth stages of canopy and midstory development. The mixed growth hardwood forest accounted for approximately 9 acres of the project study area. Of which 6 acres were rated as “marginal” for bat habitat in the interior portions of the forest and 4 acres were rated as “poor” along the open field margins with a higher presence of climbing vines and intermittent dense stands of tall shrubs and saplings. Lastly approximately 1 acre of single stand residential trees were observed sporadically throughout the project study area and were rated as “poor” bat habitat.

The data forms for each forested vegetative community and its potential for bat habitat within the project are provided in Appendix H. Additionally, the Bat Habitat Map that represents the locations of woodlands and their quality of bat habitat within the project site is provided Appendix A, Figure 8.

7.1.3 Bat Survey Results

USFWS designated bat surveyors within Jackson Group were contracted to evaluate for the potential presence of Indiana bat and northern long-eared bat. Surveys were conducted between the dates of May 19 and May 22, 2023. The mist net surveys were performed in accordance with the 2023 Guidelines, which entail for every 123-acres (0.5km2) of potential summer habitat a minimum of 10 net nights of survey effort are required. In order to collect effective samples of the project study area, two net sites were established within the approximate 65-acres of suitable forested habitat within the overall 611-acre project study area. Net site locations were selected by a permitted bat biologist in the field and were based on the best possible net locations (e.g., streams, trails, corridors) that are typically the most effective places to survey.

The survey was conducted at two net sites for two nights, with two net sets being surveyed on the first night and three net sets on the second night at each net site with a total of ten net-nights of survey effort. A total of three bats were captured during the survey effort. Bat species captured included two eastern red bats (*Lasiurus borealis*) and one silver-haired bat (*Lasionycteris noctivagans*). No threatened or endangered bats were captured during survey efforts. Detailed site-specific information, site diagrams, photographs, Mist Net Survey Data sheets, and the scientific collections permits for the project are provided in the Bat Survey Report, Appendix I.

7.2 Bird Species

The whooping crane is a migratory bird currently classified by the USFWS as an Experimental Population, Non-Essential in Tennessee. It is one of five population that exists in the wild. Whooping cranes that may occur on the Project site would be part of the Eastern Migratory Population that migrates from Wisconsin to Florida. Suitable habitat on the Project site is primarily agricultural fields, pastures, and the ponds.

7.3 Insect Species

The monarch butterfly, a candidate species for listing by USFWS, was observed throughout the Project site. Additionally, milkweed (*Asclepias spp*.), where this species lays its eggs, was observed sporadically along agricultural field and farm pond margins. While no eggs or larvae were observed, it is possible that this species reproduces within the Project Site.

7.4 Fish Species

The goldstripe darter (*Etheostoma parvipinne*), cypress darter (*E. proeliare*), dollar sunfish (*Lepomis marginatus*), and central mudminnow (*Umbra limi*) are listed as threatened or endangered species to potentially occur within the project's watershed. All the listed fish species for the project are state listed for Kentucky and are currently not listed or known to occur within the State of Tennessee. Based on the September 2022 site inspections, only two perennial streams were observed within and immediately adjacent to the project study area. Both STR-9 and the East Fork Clarks River were observed with a presence of blackspotted topminnow, which inhabit similar habitat to central mudminnow. Therefore, central mudminnow could potentially occur in STR-9 and East Fork Clarks River.

Both the cypress darter and the dollar sunfish are known to occur in backwater habitat for the region. No backwater habitat was observed within the project study area or along the channelized portion of the East Fork Clarks River. Additionally, the goldstripe darter prefers clear slow-moving streams, which were not present within the project study area. Therefore, goldstripe darter is not anticipated to be within the project study area.

7.5 Reptile Species

The alligator snapping turtle, a proposed threatened species occurs in deep water of rivers, sloughs, oxbows, swamps, and lakes. It is present in western Tennessee and all or portions of Alabama, Arkansas, Florida, Georgia, Illinois, Kansas, Kentucky, Louisiana, Mississippi, Missouri, Oklahoma, and Texas. This species was not observed while conducting the site visit.

7.6 Crayfish Species

The Blood River crayfish (*Orconectes burri*) is listed as threatened for the State of Kentucky. This species of crayfish prefers small to medium sized streams with a channel substrate of sand and gravel. As the common name implies, this species of crayfish is known to the occupy the Blood River and its unnamed tributaries. The Blood River watershed is located along the eastern limit of the project study area. Only EPH-10 was delineated within the Blood River watershed, which lacks perennial or intermittent waters to provide potentially suitable habitat for the Blood River crayfish. Therefore, the Blood River crayfish is not anticipated to be present within the project study area.

7.7 Plant Species

Tennessee state endangered water-milfoil (*Myriophyllum pinnatum*) and state threatened compass-plant (*Silphium laciniatum*) are listed within a 3-mile radius of the project study area. The water-milfoil prefers moderately deep surface water in wetland and ponds, while the compass-plant prefers open prairies, fallow fields, roadsides, and glades. Habitat for these two state listed species is present within the project study area. However, based on the September 2022 site inspection, all of the 13 delineated ponds were observed with a lack of aquatic vegetation, including water-milfoil. The 13 delineated ponds were observed with a silty-mud bottom, a presence of suspended algal blooms, and fringe vegetation comprised of soft rush, woolgrass, black willow saplings, and cattail. Furthermore, habitat for the compass-plant was present along the gravel access paths for the farms and occasional fallow field areas of the project study area. However, based on the September 2022 site inspection, no compass-plants were observed within the project study area, which should have been in flower for the season. Therefore, both the water-milfoil and compass-plant are not anticipated to be within the project study area.

7.8 Migratory Bird Species

The USFWS IPaC lists five migratory bird species that may be present within the project area. This species list of migratory birds is a listing of Birds of Conservation Concern and not listed as federally threatened or endangered. Note, the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGPA) make it illegal to take, possess, import, export, transport, sell, or purchase any migratory bird or the part, nests, or eggs of such birds except under the terms of a valid federal permit. The potential presence of listed migratory bird species for the project area is detailed below and the USFWS IPaC list is provided in Appendix G.

Bald eagle (*Haliaeetus leucocephalus*), chimney swift (*Chaetura pelagica*), prairie warbler (*Setophaga discolor*), prothonotary warbler (*Protonotaria citrea*), and redheaded woodpecker (*Melanerpes erythrocephalus*) are listed as protected eagles and migratory birds potentially occurring within the project study area. Prairie warbler was observed utilizing the cattle pastures and adjacent early successional woodlands within the project study area. It is also anticipated that the prothonotary warbler, chimney swift, and red-headed woodpecker could be present during the breeding season. To confirm this, a presence/absence survey would be required during the breeding season for each species, preferably during May or June.

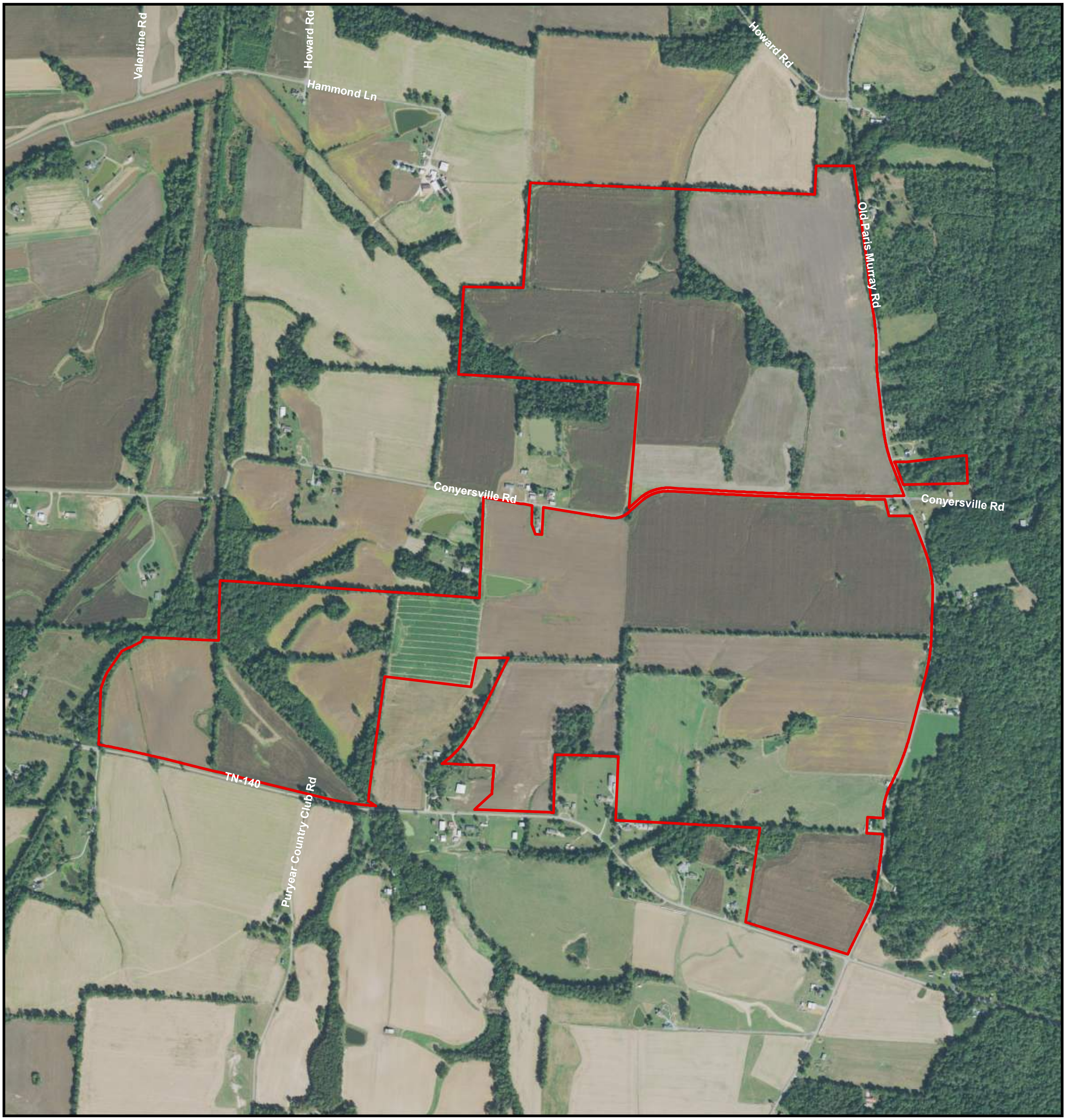
No very large raptor nests were observed within or immediately adjacent to the project study area that can be utilized by bald eagle. Based on the USFWS's Bald Eagle Nests in Tennessee mapper, the nearest known bald eagle nest is on Kentucky Lake, approximately 12-miles from the eastern limit of the project study area. Therefore, bald eagle is not anticipated to occur within the project study area.

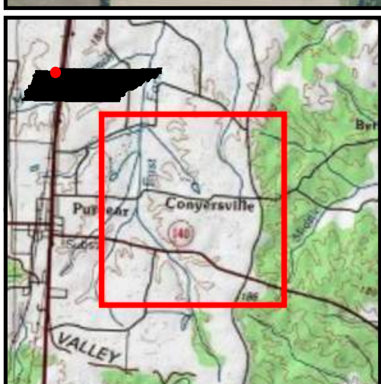
Lastly, a significant quantity of migratory birds were observed during the September 2022 site inspection, Table 3 of Appendix C. While the presence of these birds could be seasonally biased during the migration season, these birds could also be covered by the MBTA during their respective breeding seasons.

8.0 SUMMARY

Two perennial streams, nine intermittent streams, ten ephemeral streams, ten erosional swales, one upland drainage feature, one drainage ditch, eight wetlands, thirteen man-made ponds, and ten potential bat roost trees were identified during the field investigation of the project study area. The Existing Conditions Map (Figure 7, Appendix A) visually represents the boundaries of the non-wetland waters delineated within the project area, and the Bat Habitat Map visually represents good to poor habitat value throughout the project study area. Table 1 and Table 2 (Appendix C) summarize the current locations and linear footages or acres of each wetland and non-wetland feature, and Table 3 details the observed wildlife at the time of the site inspections. Lastly, the wetland and stream determination data forms for the delineated natural resources are provided in Appendix D and photographs of all natural resources, including vegetative communities, are provided in Appendix E.

APPENDIX A - Figures





Project Study Area

Basemap: ESRI World Imagery
Source Data: Tennessee Streets

1 inch = 1,250 feet

0 250 500 1,000 1,500 Feet

N

PROJECT:

Silicon Ranch Corporation
Puryear Solar Project
Puryear, Henry County, Tennessee

TITLE:

AERIAL SITE LOCATION MAP

PROJ NO: 3609518

DATE: July 2023

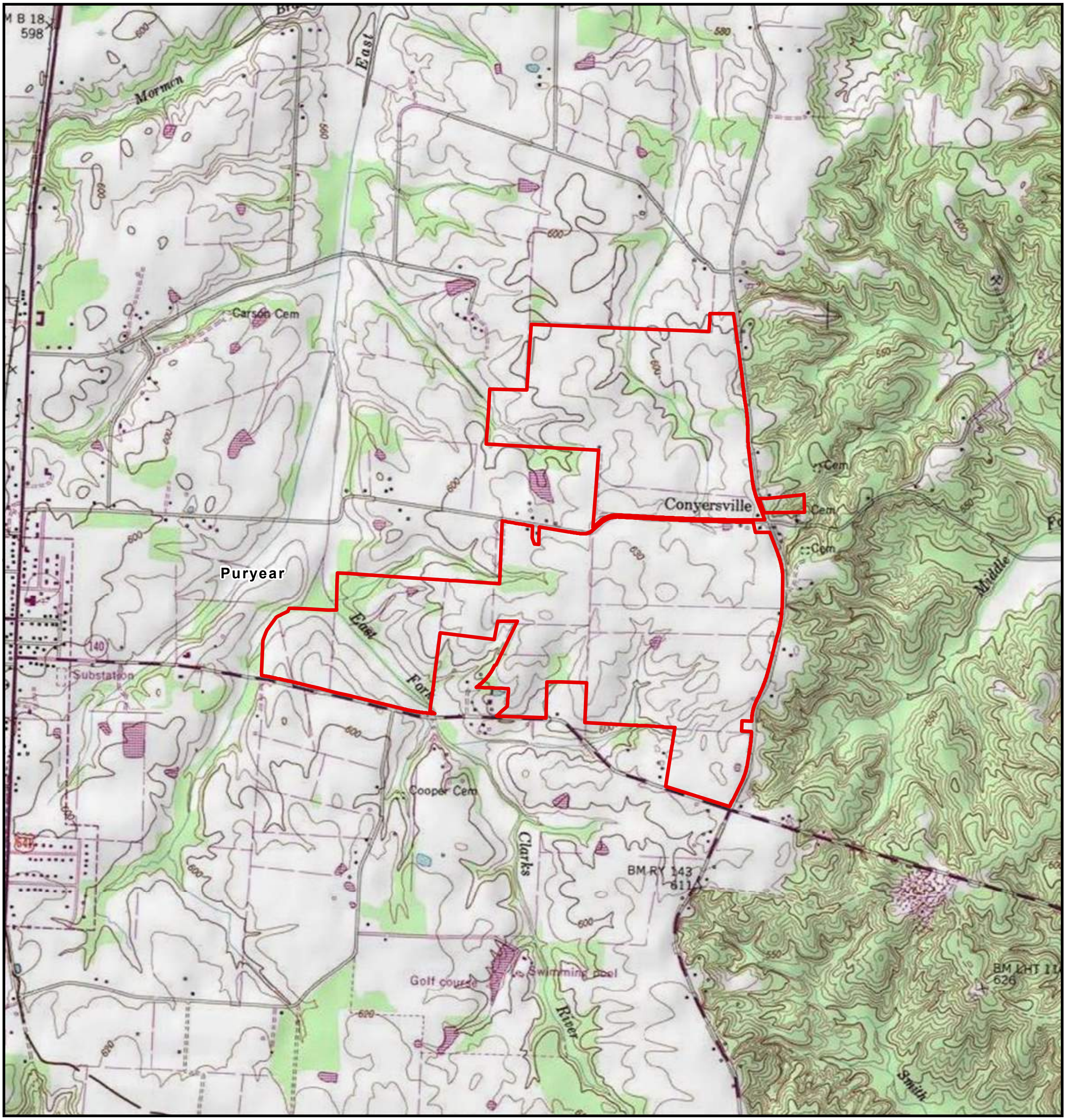
FIGURE 1

BARGE DESIGN SOLUTIONS

615 3rd Avenue South, Suite 700
Nashville, TN 37210

SILICON RANCH

Path: F:\36\36095\3609518\03_PROJECT_EXECUTION\EWR\GIS\MXD\TVA_Natural_Resource_Memo\Figure1_AerialSiteLocationMap.mxd



PURYEAR 7.5 MINUTE QUADRANGLE

Project Study Area

USGS 24k Topo Map Boundary

N

1 inch = 2,000 feet

0 500 1,000 2,000 3,000 Feet

Basemap: ESRI USA Topo Map
Source Data: ESRI 24K Boundaries

PROJECT:
Silicon Ranch Corporation
Puryear Solar Project
Puryear, Henry County, Tennessee

TITLE:
USGS SITE LOCATION MAP

PROJ NO: 3609518

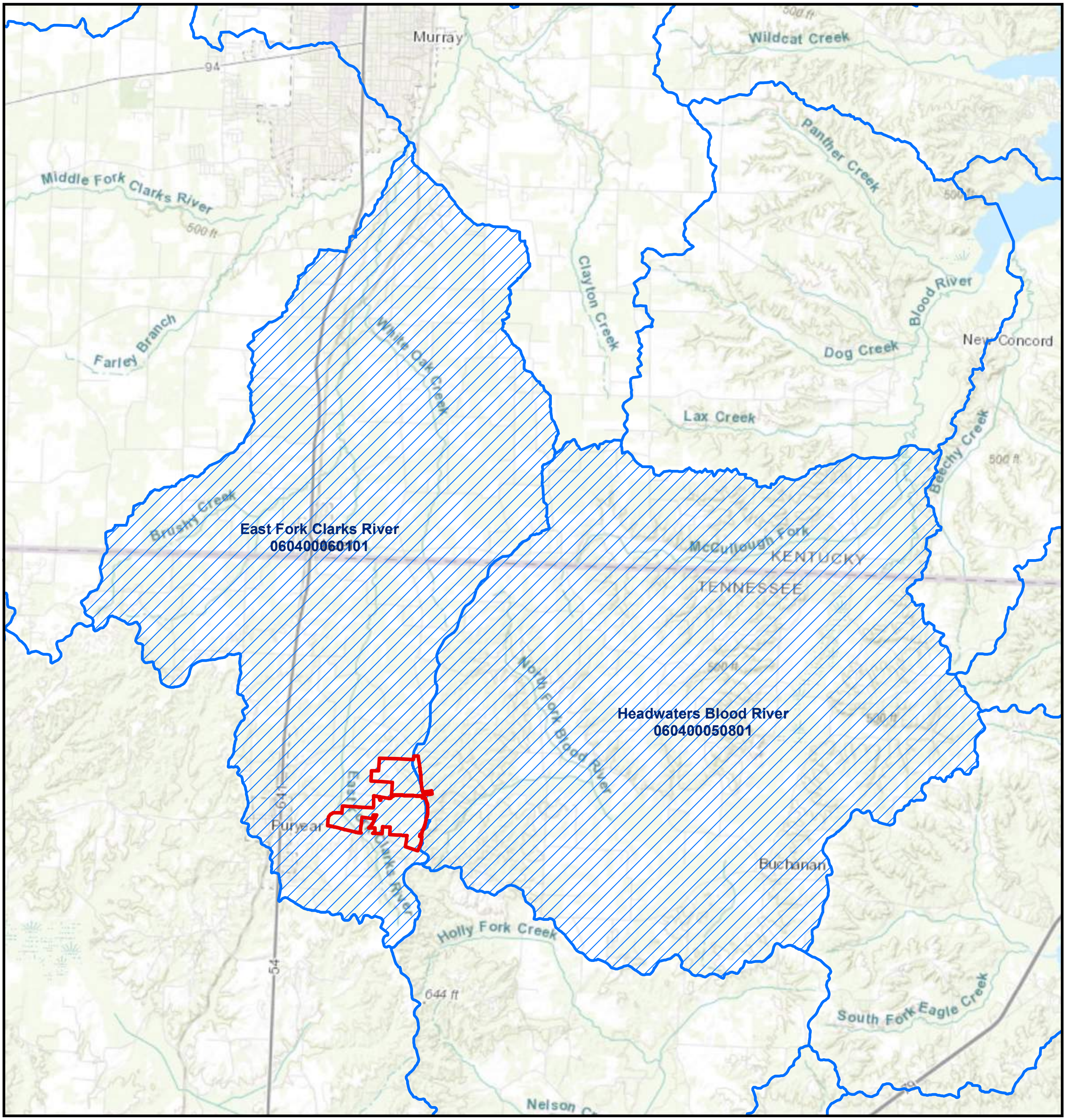
DATE: July 2023

FIGURE 2

BARGE DESIGN SOLUTIONS
615 3rd Avenue South, Suite 700
Nashville, TN 37210

SILICON RANCH

Path: F:\36\36095\3609518\03_PROJECT_EXECUTION\EWR\GIS\MXD\TVA_Natural_Resource_Memo\Figure2_USGSSiteLocationMap.mxd



Basemap: ESRI USA Topo Map
Source Data: ESRI 24K Boundaries

PROJECT:
Silicon Ranch Corporation
Puryear Solar Project
Puryear, Henry County, Tennessee

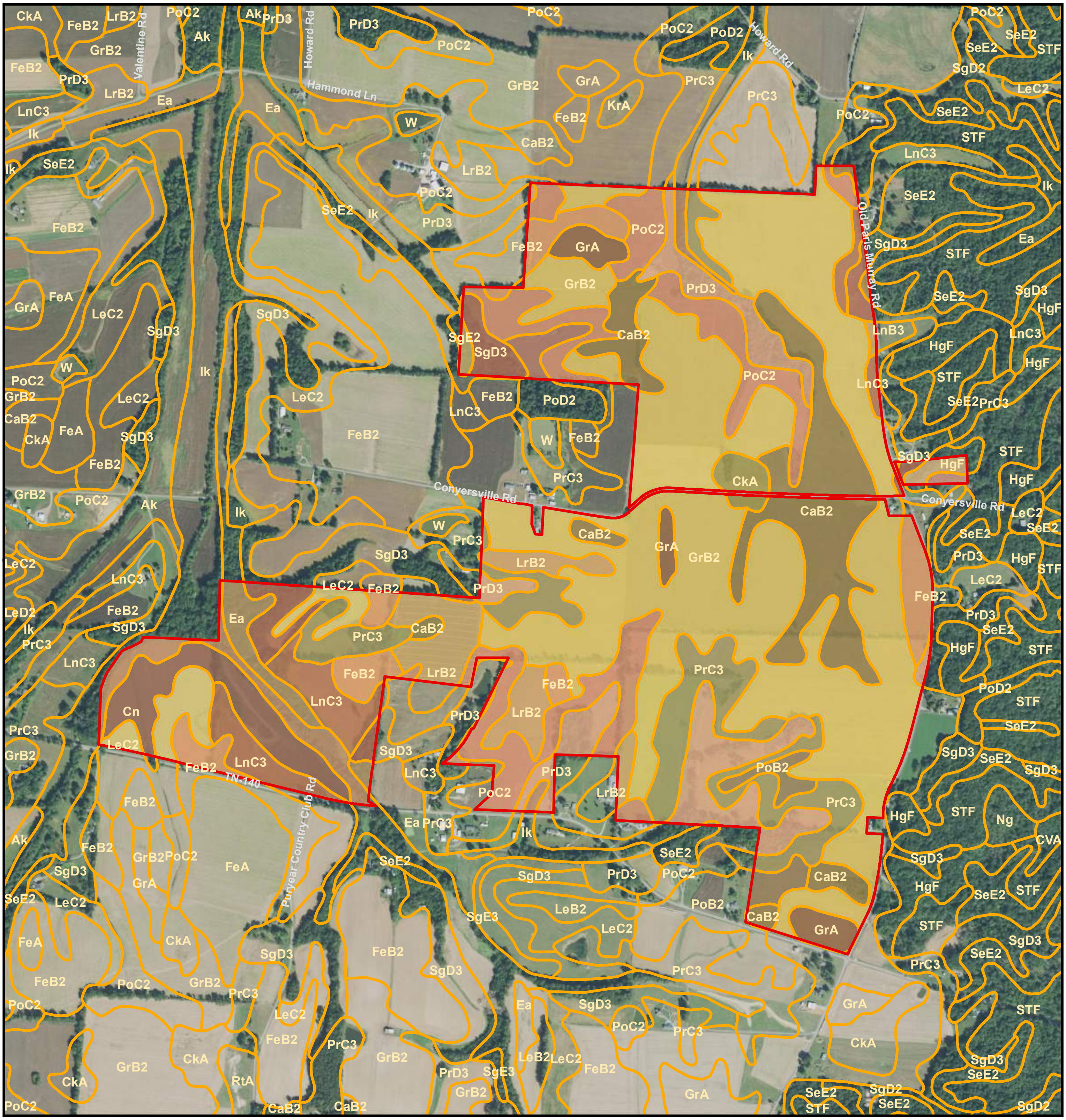
TITLE:
PROJECT WATERSHED MAP

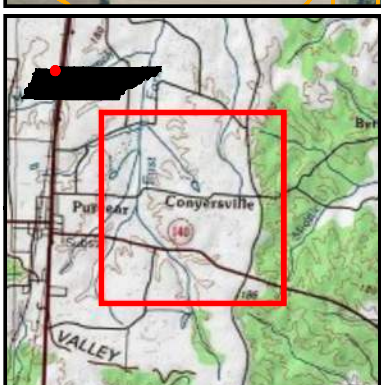
PROJ NO: 3609518	**FIGURE 3**
DATE: July 2023	

BARGE DESIGN SOLUTIONS
615 3rd Avenue South, Suite 700
Nashville, TN 37210

SILICON RANCH

Path: F:\36\36095\3609518\03_PROJECT_EXECUTION\EWR\GIS\MXD\TVA_Natural_Resource_Memo\Figure3_ProjectWatershedMap.mxd





Project Soils

Soil Unit

- CaB2
- CkA
- Cn
- Ea
- FeB2
- GrA
- GrB2
- HgF
- Ik
- LeC2
- LnB3
- LnC3
- LrB2
- PoB2
- PoC2
- PoD2
- PrC3
- PrD3
- STF
- SeE2
- SgD3
- SgE2

Soil Unit

Project Study Area

1 inch = 1,250 feet

0 250 500 1,000 1,500 Feet

N

Basemap: ESRI World Imagery
Source Data: USDA Soil Survey (TN079)

PROJECT:
Silicon Ranch Corporation
Puryear Solar Project
Puryear, Henry County, Tennessee

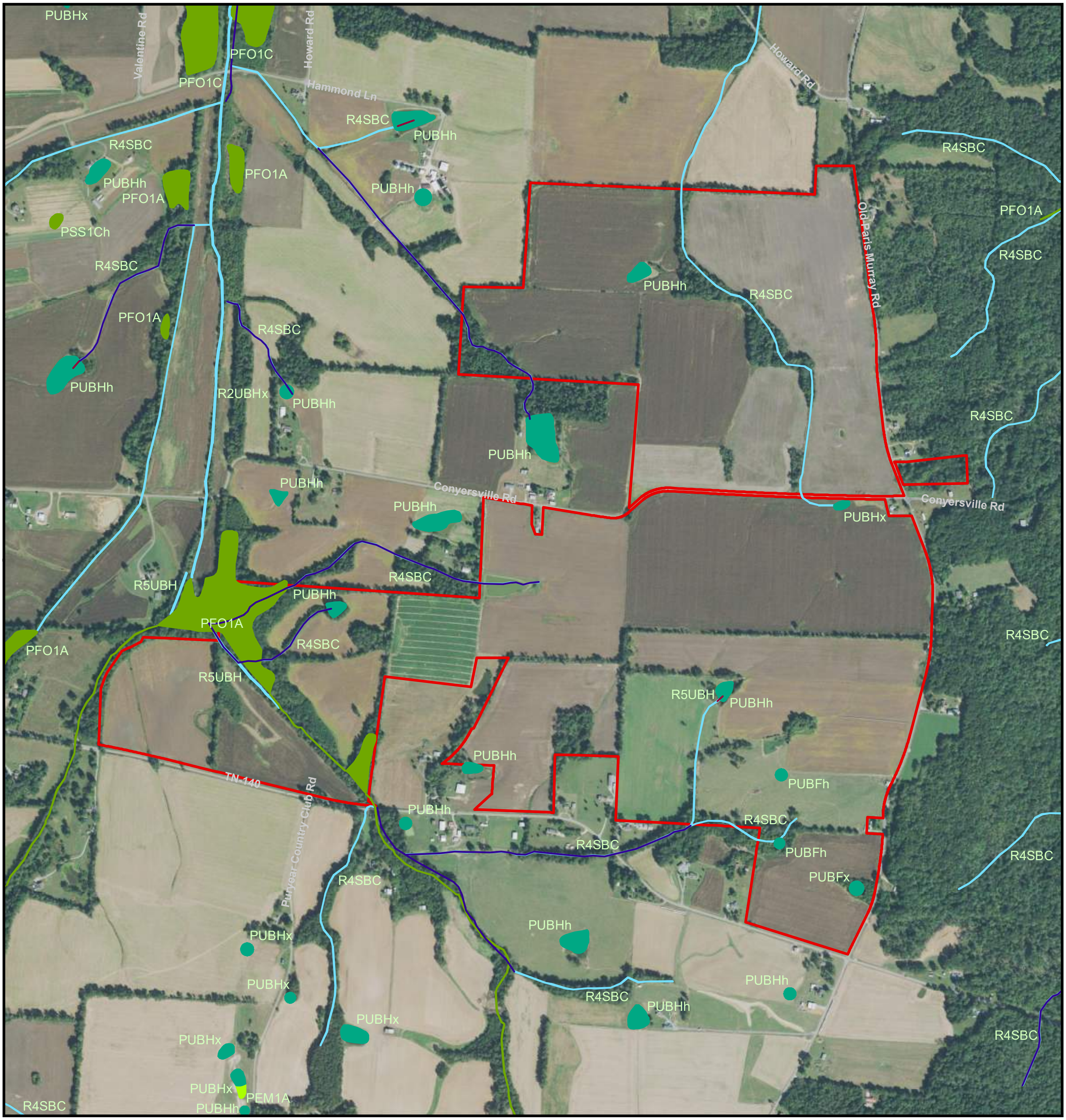
TITLE:
PROJECT SOIL UNIT MAP

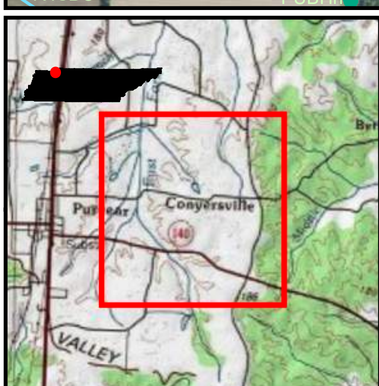
PROJ NO: 3609518	**FIGURE 4**
DATE: July 2023	

BARGE DESIGN SOLUTIONS
615 3rd Avenue South, Suite 700
Nashville, TN 37210

SILICON RANCH

Path: F:\36\36095\3609518\03_PROJECT_EXECUTION\EWR\GIS\MXD\TVA_Natural_Resource_Memo\Figure4_ProjectSoilUnitMap.mxd





NWI Wetland

Wetland Type

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

NHD Flowline

Feature Type

- Artificial Path
- Stream/River
- Project Study Area

N

1 inch = 1,250 feet

0 250 500 1,000 1,500 Feet

Basemap: ESRI World Imagery
Source Data: USFWS NWI (TN), USDA NHD Flowline (TN)

PROJECT:

Silicon Ranch Corporation
Puryear Solar Project
Puryear, Henry County, Tennessee

TITLE:

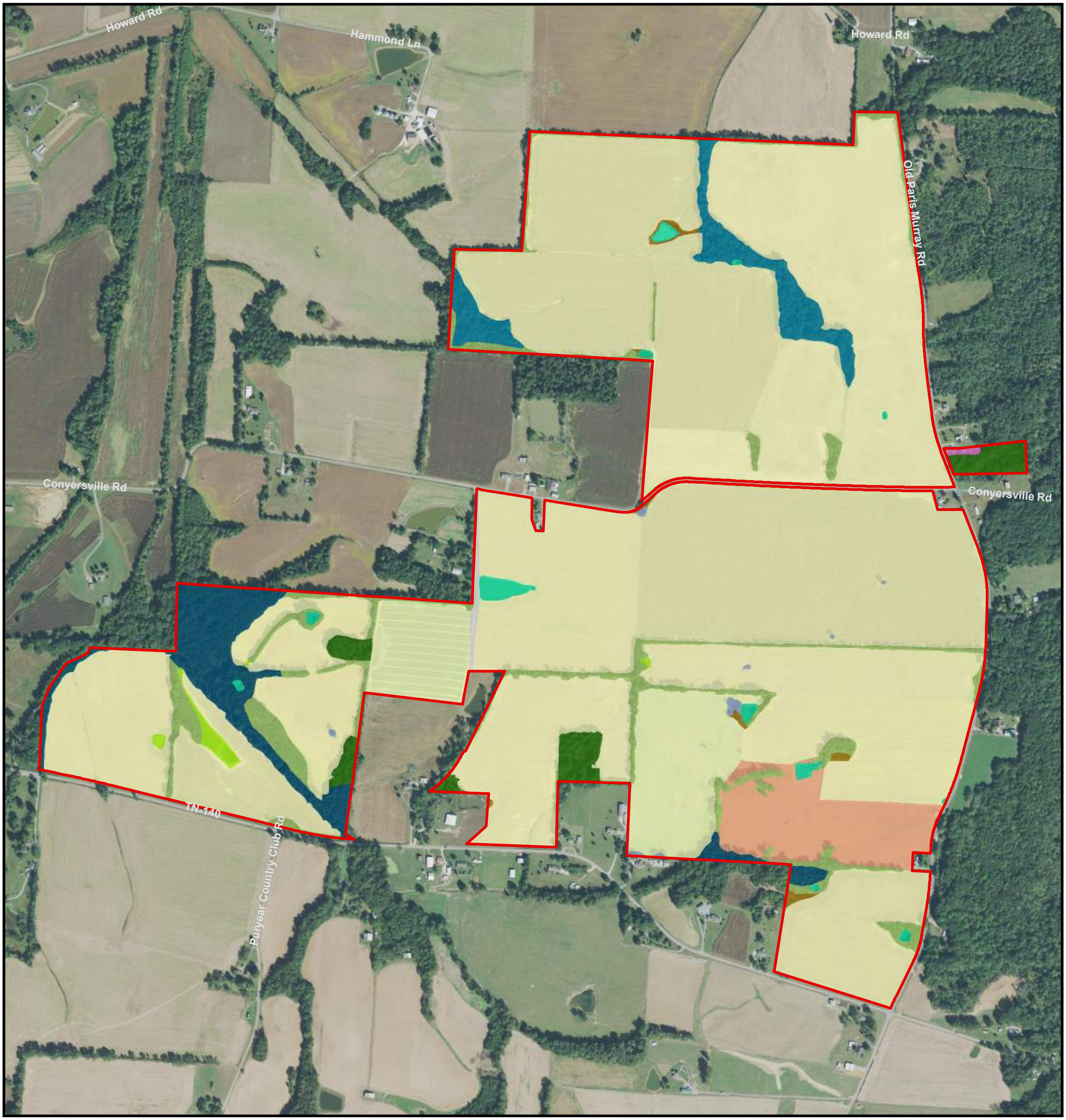
PROJECT SOIL UNIT MAP

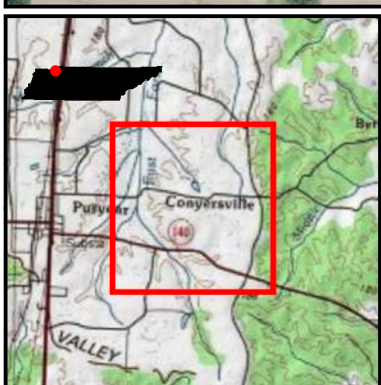
PROJ NO: 3609518	**FIGURE 5**
DATE: July 2023	

BARGE DESIGN SOLUTIONS
615 3rd Avenue South, Suite 700
Nashville, TN 37210

SILICON RANCH

Path: F:\36\36095\3609518\03_PROJECT_EXECUTION\EWR\GIS\MXD\TVA_Natural_Resource_Memo\Figure5_NWI_Map.mxd





Vegetative Community

Community

- Mature Riparian Forest (21 Acres)
- Semi-Mature Riparian Forest (13 Acres)
- Mixed Growth Hardwood Forest (9 Acres)
- Successional Hardwood Forest (28 Acres)
- Shallow Emergent Marsh (2 Acres)
- Man-Made Pond (4 Acres)
- Fallow Field (2 Acres)
- Pastureland (24 Acres)
- Cropland (506 Acres)
- Dirt Road (1 Acre)
- Single Stand of Trees (1 Acre)
- Residental (0.4 Acres)
- Project Study Area

N

1 inch = 1,100 feet

0 200 400 800 1,200 Feet

Basemap: ESRI World Imagery
Source Data: Barge Field Survey (Sept 2022)

PROJECT:
Silicon Ranch Corporation
Puryear Solar Project
Puryear, Henry County, Tennessee

TITLE:
VEGETATIVE COMMUNITY MAP

PROJ NO: 3609518

DATE: July 2023

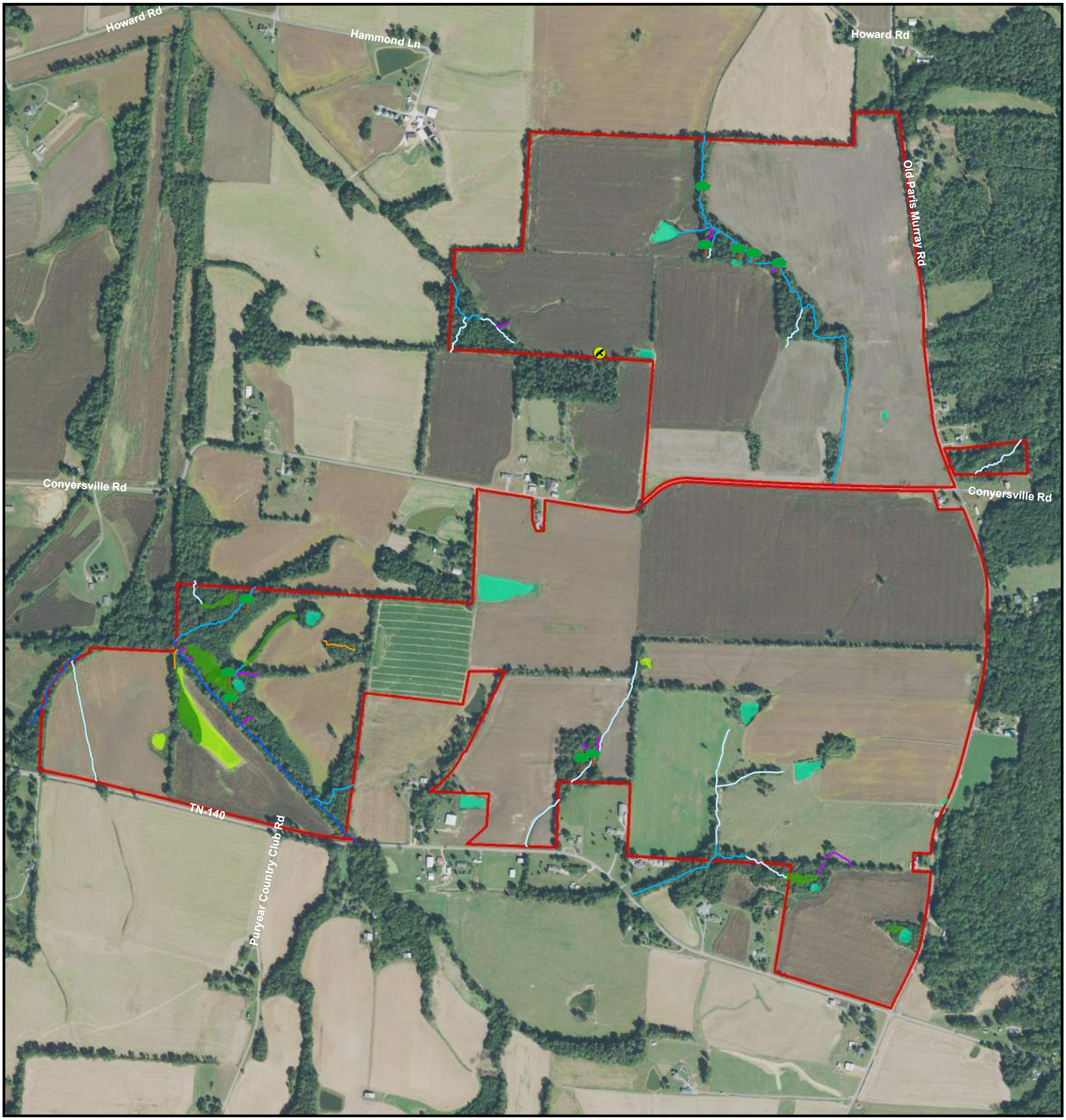
FIGURE 6

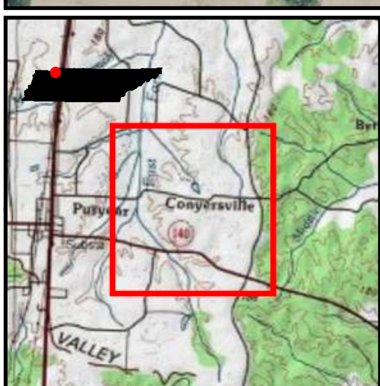
BARGE DESIGN SOLUTIONS

615 3rd Avenue South, Suite 700
Nashville, TN 37210

SILICON RANCH

Path: F:\36\36095\3609518\03_PROJECT_EXECUTION\EWR\GIS\MXD\TVA_Natural_Resource_Memo\Figure6_VegetativeCommunityMap.mxd





Delineated Waterbody
Feature Type
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Erosional Swale
- Drainage

Delineated Wetland
Feature Type
- PEM Wetland
- PFO Wetland
- Farm Pond
- Potential Bat Roost Tree
- Potential Raptor Nest
- Project Study Area

N

1 inch = 1,100 feet
0 200 400 800 1,200
Feet

Basemap: ESRI World Imagery
Source Data: Barge Field Survey (Sept 2022)

PROJECT:
Silicon Ranch Corporation
Puryear Solar Project
Puryear, Henry County, Tennessee

TITLE:
EXISTING CONDITIONS MAP (OVERVIEW)

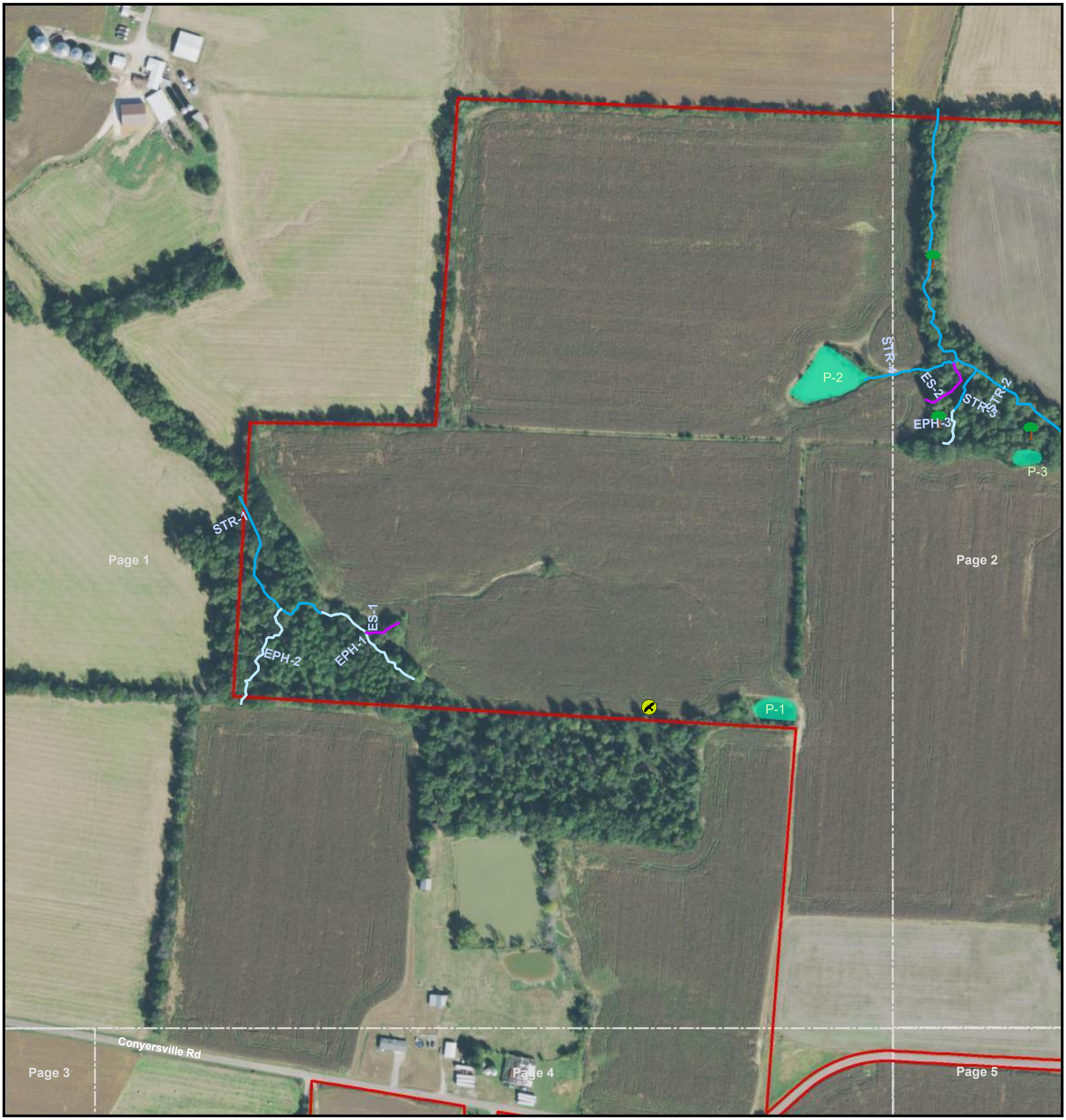
PROJ NO: 3609518
DATE: July 2023

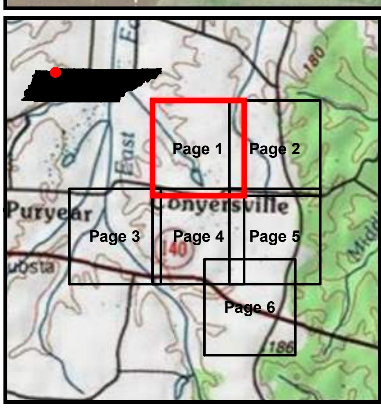
FIGURE 7a

BARGE DESIGN SOLUTIONS
615 3rd Avenue South, Suite 700
Nashville, TN 37210

SILICON RANCH

Path: F:\36\36095\3609518\03_PROJECT_EXECUTION\EWR\GIS\MXD\TVA_Natural_Resource_Memo\Figure7a_ExistingConditionsOverviewMap.mxd





Delineated Waterbody

Feature Type

- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Erosional Swale
- Drainage

Delineated Wetland

Feature Type

- PEM Wetland
- PFO Wetland
- Farm Pond
- Potential Bat Roost Tree
- Potential Raptor Nest
- Culvert Location
- Project Study Area

N

1 inch = 400 feet

0 100 200 400 600 Feet

Basemap: ESRI World Imagery
Source Data: Barge Field Survey (Sept 2022)

PROJECT:
Silicon Ranch Corporation
Puryear Solar Project
Puryear, Henry County, Tennessee

TITLE:
EXISTING CONDITIONS MAP (DETAILED)

PROJ NO: 3609518

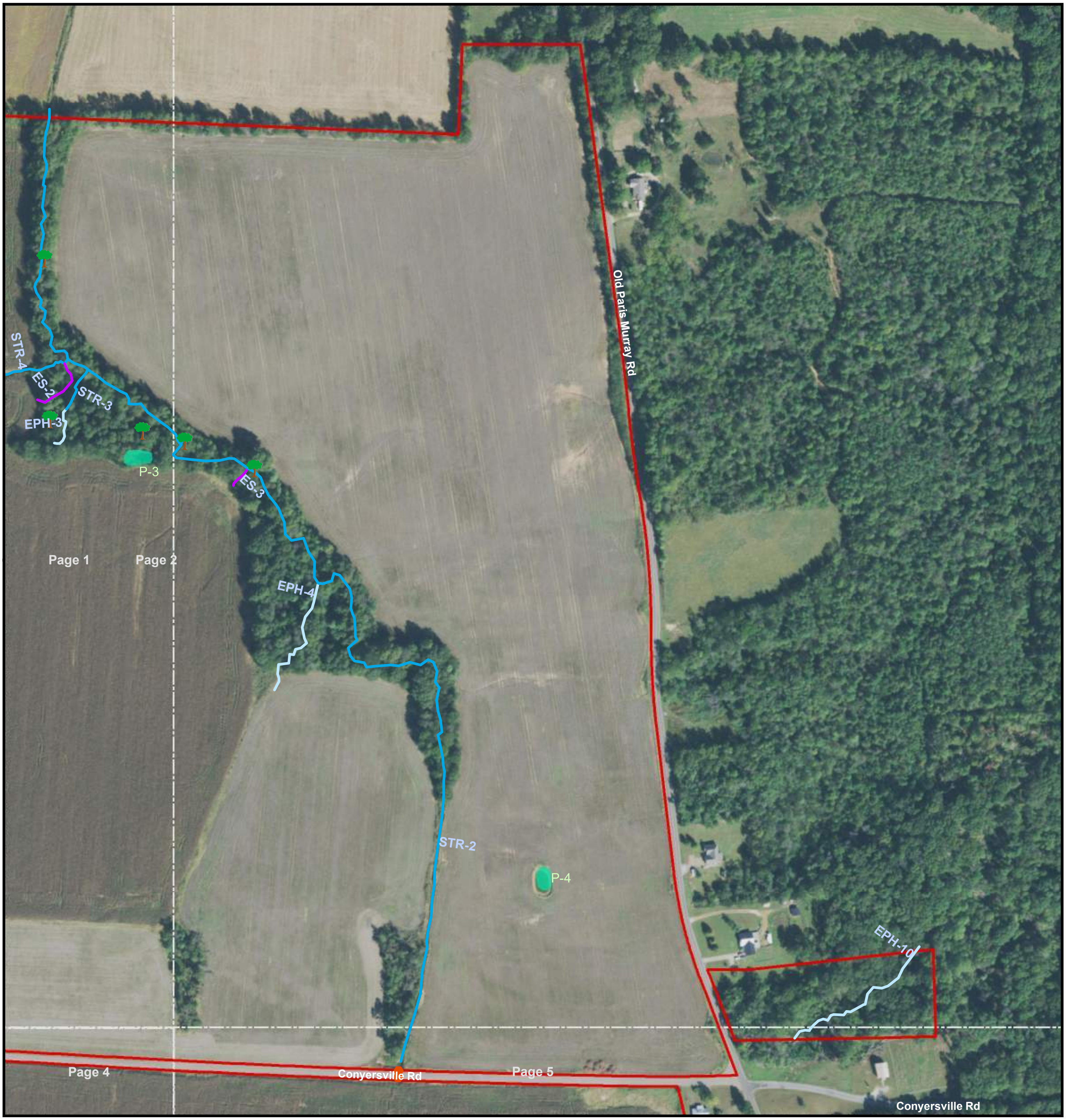
DATE: July 2023

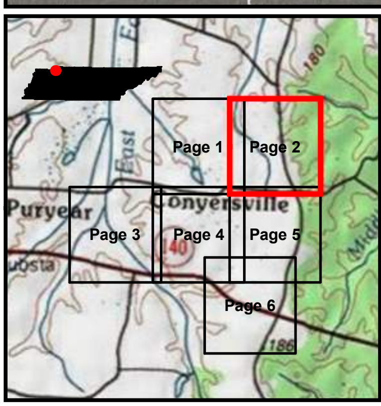
FIGURE 7b-1

BARGE DESIGN SOLUTIONS
615 3rd Avenue South, Suite 700
Nashville, TN 37210

SILICON RANCH

Path: F:\36\36095\3609518\03_PROJECT_EXECUTION\EWR\GIS\MXD\TVA_Natural_Resource_Memo\Figure7b_ExistingConditionsDetailedMap.mxd





Delineated Waterbody

Feature Type

- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Erosional Swale
- Drainage

Delineated Wetland

Feature Type

- PEM Wetland
- PFO Wetland
- Farm Pond
- Potential Bat Roost Tree
- Potential Raptor Nest
- Culvert Location
- Project Study Area

N

1 inch = 400 feet

0 100 200 400 600 Feet

Basemap: ESRI World Imagery
Source Data: Barge Field Survey (Sept 2022)

PROJECT:
Silicon Ranch Corporation
Puryear Solar Project
Puryear, Henry County, Tennessee

TITLE:
EXISTING CONDITIONS MAP (DETAILED)

PROJ NO: 3609518

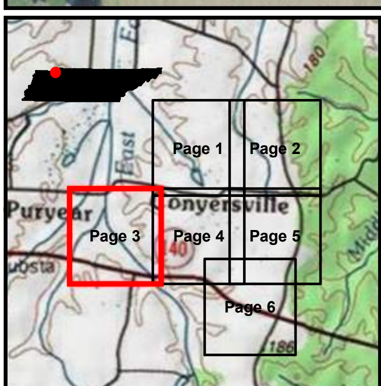
DATE: July 2023

FIGURE 7b-2

BARGE DESIGN SOLUTIONS
615 3rd Avenue South, Suite 700
Nashville, TN 37210

SILICON RANCH

Path: F:\36\36095\3609518\03_PROJECT_EXECUTION\EWR\GIS\MXD\TVA_Natural_Resource_Memo\Figure7b_ExistingConditionsDetailedMap.mxd



Delineated Waterbody
Feature Type
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Erosional Swale
- Drainage

Delineated Wetland
Feature Type
- PEM Wetland
- PFO Wetland
- Farm Pond
- Potential Bat Roost Tree
- Potential Raptor Nest
- Culvert Location
- Project Study Area

Basemap: ESRI World Imagery
Source Data: Barge Field Survey (Sept 2022)

1 inch = 400 feet
0 100 200 400 600 Feet

N

PROJECT:
Silicon Ranch Corporation
Puryear Solar Project
Puryear, Henry County, Tennessee

TITLE:
EXISTING CONDITIONS MAP (DETAILED)

PROJ NO: 3609518

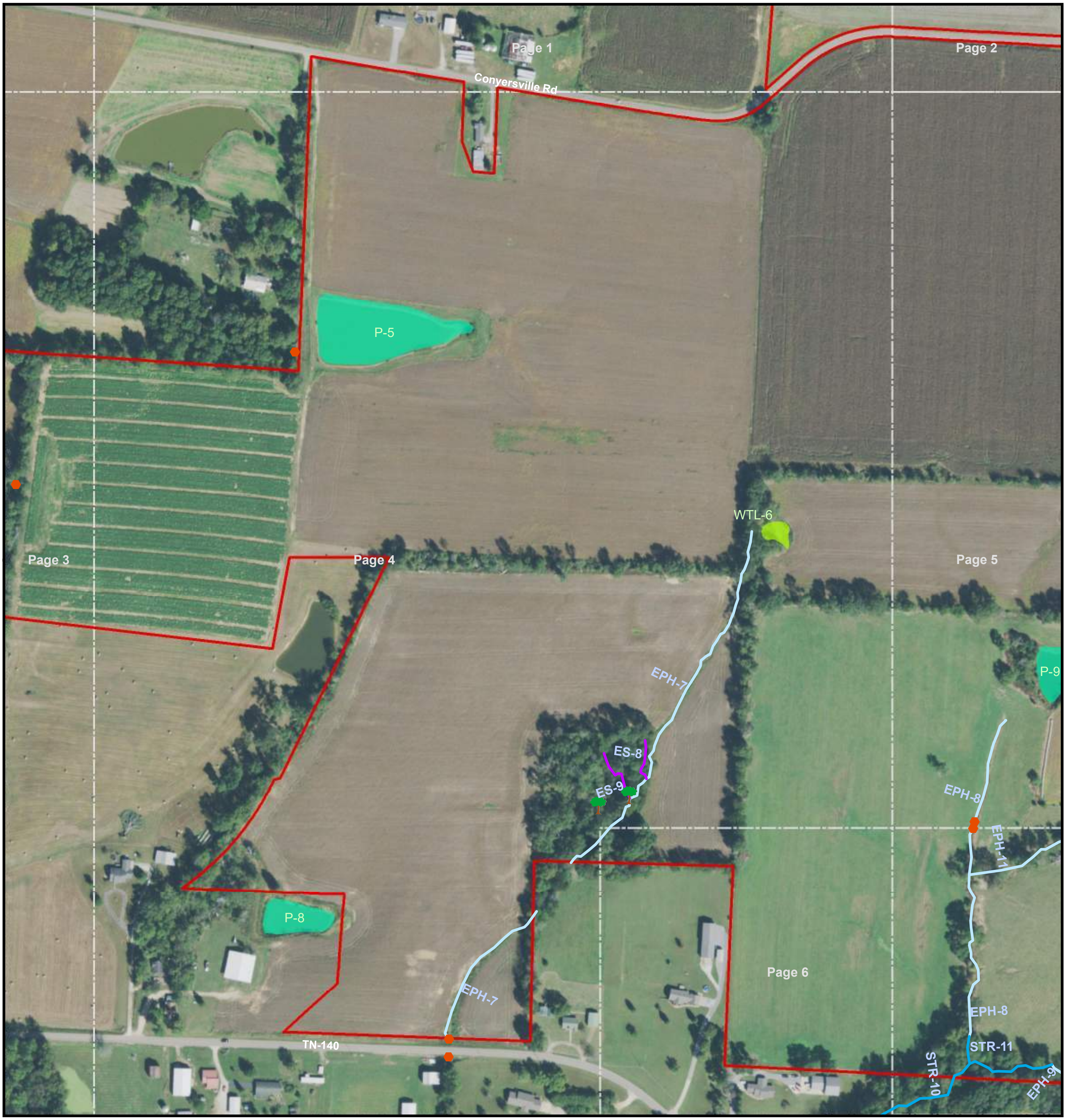
DATE: July 2023

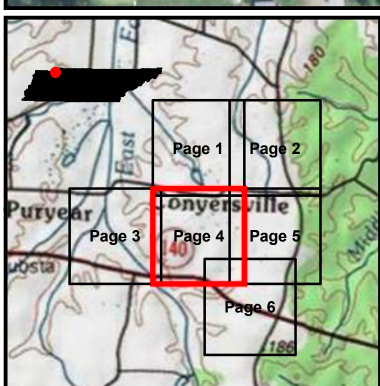
FIGURE 7b-3

BARGE DESIGN SOLUTIONS
615 3rd Avenue South, Suite 700
Nashville, TN 37210

SILICON RANCH

Path: F:\36\36095\3609518\03_PROJECT_EXECUTION\EWR\GIS\MXD\TVA_Natural_Resource_Memo\Figure7b_ExistingConditionsDetailedMap.mxd





Delineated Waterbody

Feature Type

- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Erosional Swale
- Drainage

Delineated Wetland

Feature Type

- PEM Wetland
- PFO Wetland
- Farm Pond
- Potential Bat Roost Tree
- Potential Raptor Nest
- Culvert Location
- Project Study Area

N

1 inch = 400 feet

0 100 200 400 600 Feet

Basemap: ESRI World Imagery
Source Data: Barge Field Survey (Sept 2022)

PROJECT:

Silicon Ranch Corporation
Puryear Solar Project
Puryear, Henry County, Tennessee

TITLE:

EXISTING CONDITIONS MAP (DETAILED)

PROJ NO: 3609518

DATE: July 2023

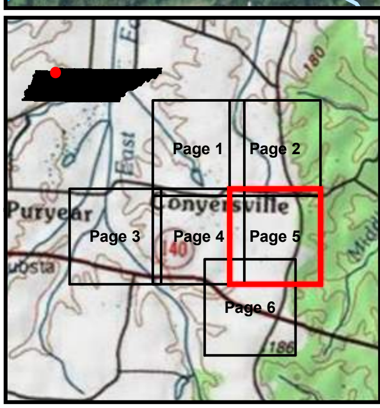
FIGURE 7b-4

BARGE DESIGN SOLUTIONS

615 3rd Avenue South, Suite 700
Nashville, TN 37210

SILICON RANCH

Path: F:\36\36095\3609518\03_PROJECT_EXECUTION\EWR\GIS\MXD\TVA_Natural_Resource_Memo\Figure7b_ExistingConditionsDetailedMap.mxd



Delineated Waterbody

Feature Type

- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Erosional Swale
- Drainage

Delineated Wetland

Feature Type

- PEM Wetland
- PFO Wetland
- Farm Pond
- Potential Bat Roost Tree
- Potential Raptor Nest
- Culvert Location
- Project Study Area

Basemap: ESRI World Imagery
Source Data: Barge Field Survey (Sept 2022)

N

1 inch = 400 feet

0 100 200 400 600 Feet

PROJECT:

Silicon Ranch Corporation
Puryear Solar Project
Puryear, Henry County, Tennessee

TITLE:

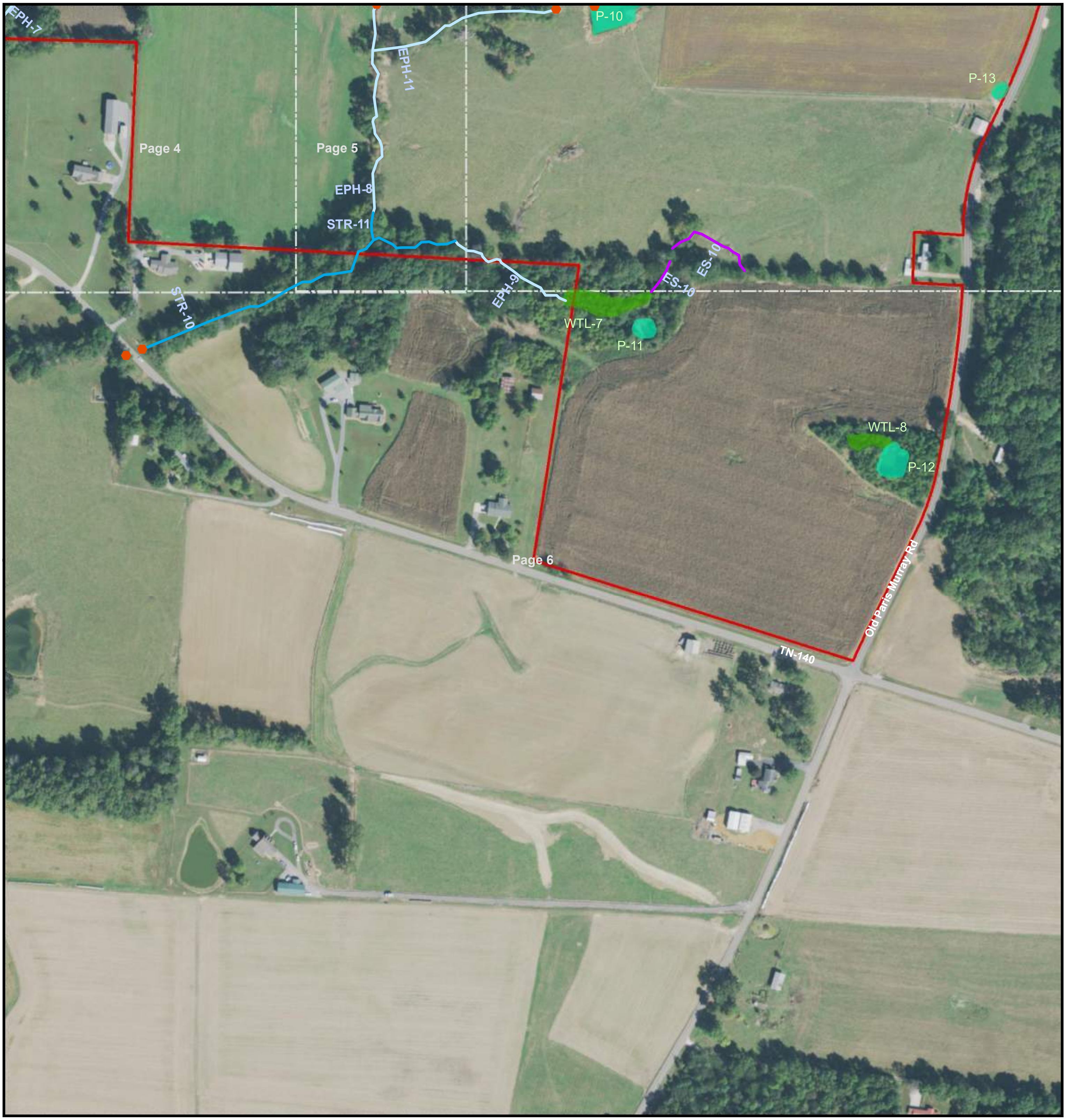
EXISTING CONDITIONS MAP (DETAILED)

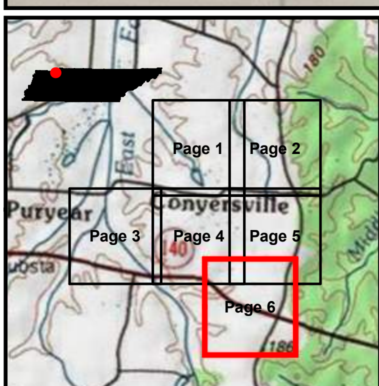
PROJ NO: 3609518	**FIGURE 7b-5**
DATE: July 2023	

BARGE DESIGN SOLUTIONS
615 3rd Avenue South, Suite 700
Nashville, TN 37210

SILICON RANCH

Path: F:\36\36095\3609518\03_PROJECT_EXECUTION\EWR\GIS\MXD\TVA_Natural_Resource_Memo\Figure7b_ExistingConditionsDetailedMap.mxd





Delineated Waterbody
Feature Type
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Erosional Swale
- Drainage

Delineated Wetland
Feature Type
- PEM Wetland
- PFO Wetland
- Farm Pond
- Potential Bat Roost Tree
- Potential Raptor Nest
- Culvert Location
- Project Study Area

1 inch = 400 feet
0 100 200 400 600 Feet
N

Basemap: ESRI World Imagery
Source Data: Barge Field Survey (Sept 2022)

PROJECT:
Silicon Ranch Corporation
Puryear Solar Project
Puryear, Henry County, Tennessee

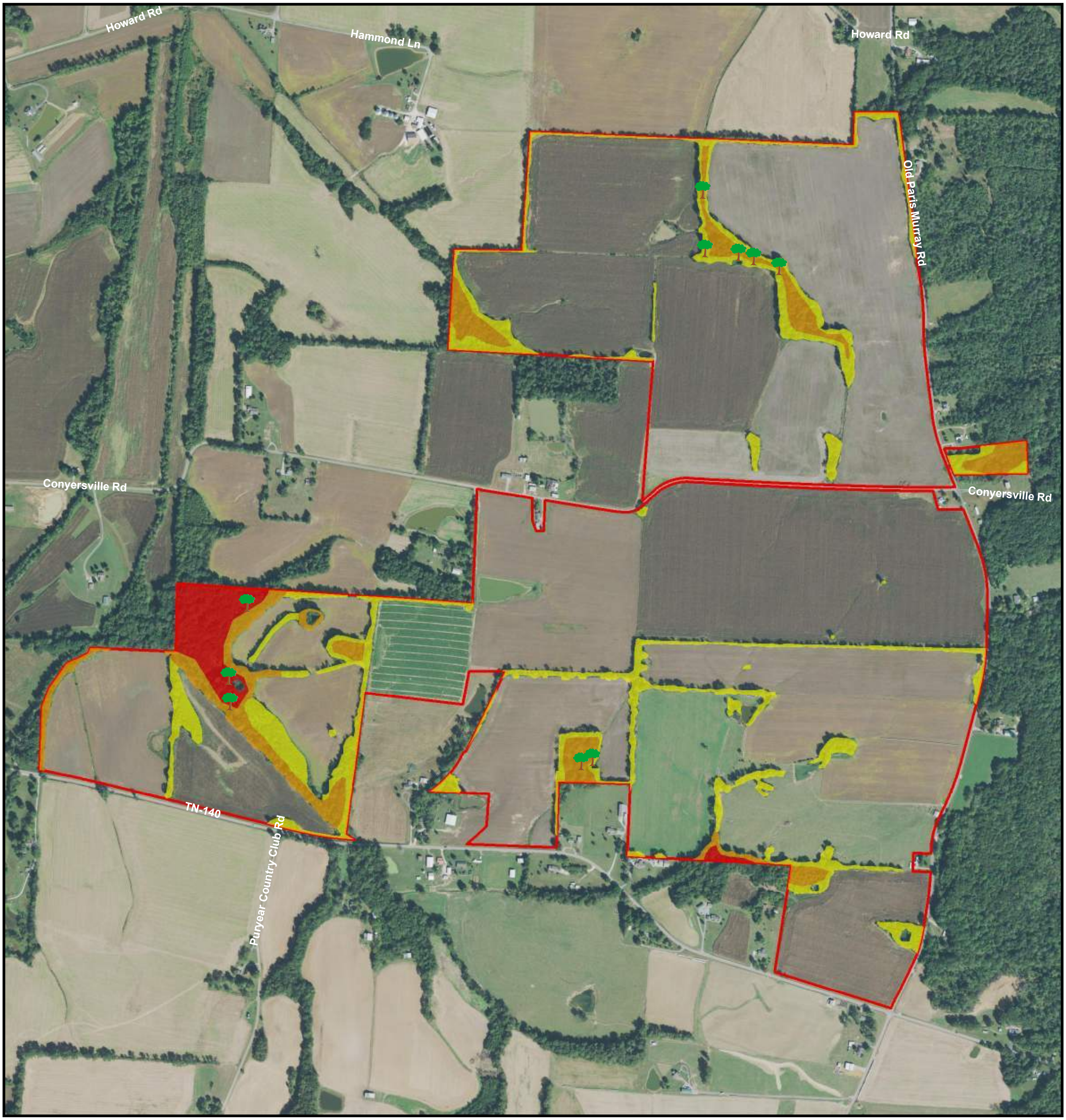
TITLE:
EXISTING CONDITIONS MAP (DETAILED)

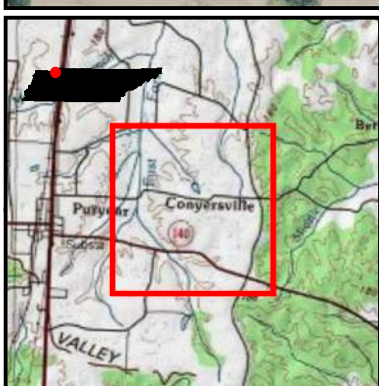
PROJ NO: 3609518	**FIGURE 7b-6**
DATE: July 2023	

BARGE DESIGN SOLUTIONS
615 3rd Avenue South, Suite 700
Nashville, TN 37210

SILICON RANCH

Path: F:\36\36095\3609518\03_PROJECT_EXECUTION\EWR\GIS\MXD\TVA_Natural_Resource_Memo\Figure7b_ExistingConditionsDetailedMap.mxd





Bat Habitat

Habitat Quality

- Good (10 Acres)
- Marginal (23 Acres)
- Poor (40 Acres)
- Potential Bat Roost Tree
- Project Study Area

1 inch = 1,100 feet

0 200 400 800 1,200 Feet

N

Basemap: ESRI World Imagery
Source Data: Barge Field Survey (Sept 2022)

PROJECT:
Silicon Ranch Corporation
Puryear Solar Project
Puryear, Henry County, Tennessee

TITLE:
BAT HABITAT MAP

PROJ NO: 3609518

DATE: July 2023

FIGURE 8

BARGE DESIGN SOLUTIONS

615 3rd Avenue South, Suite 700
Nashville, TN 37210

SILICON RANCH

Path: F:\36\36095\3609518\03_PROJECT_EXECUTION\EWR\GIS\MXD\TVA_Natural_Resource_Memo\Figure8_BatHabitatMap.mxd

APPENDIX B – NRCS Custom Soil Report

United States Department of Agriculture

NRCS

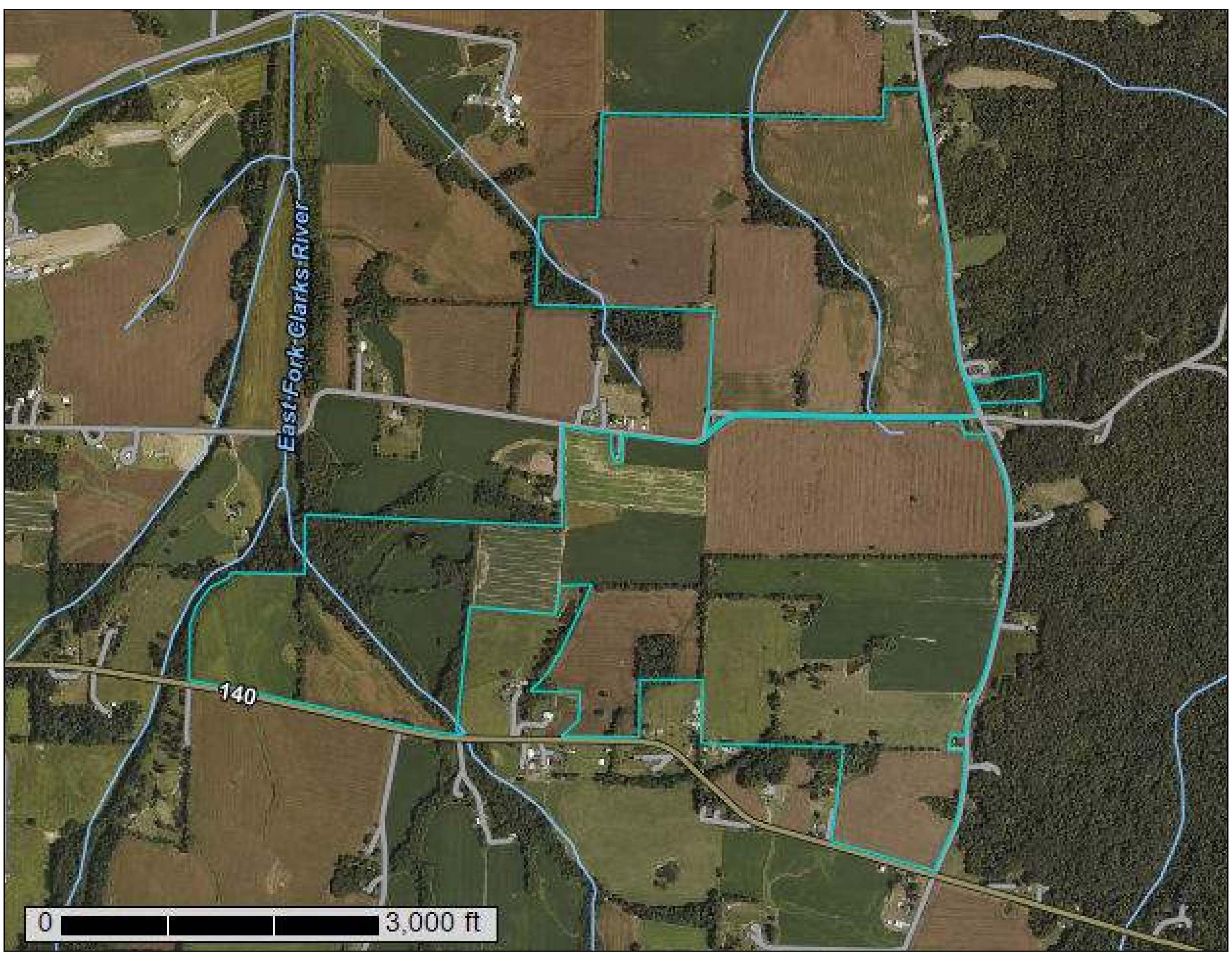
Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Henry County, Tennessee

SR-Puryear



July 7, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

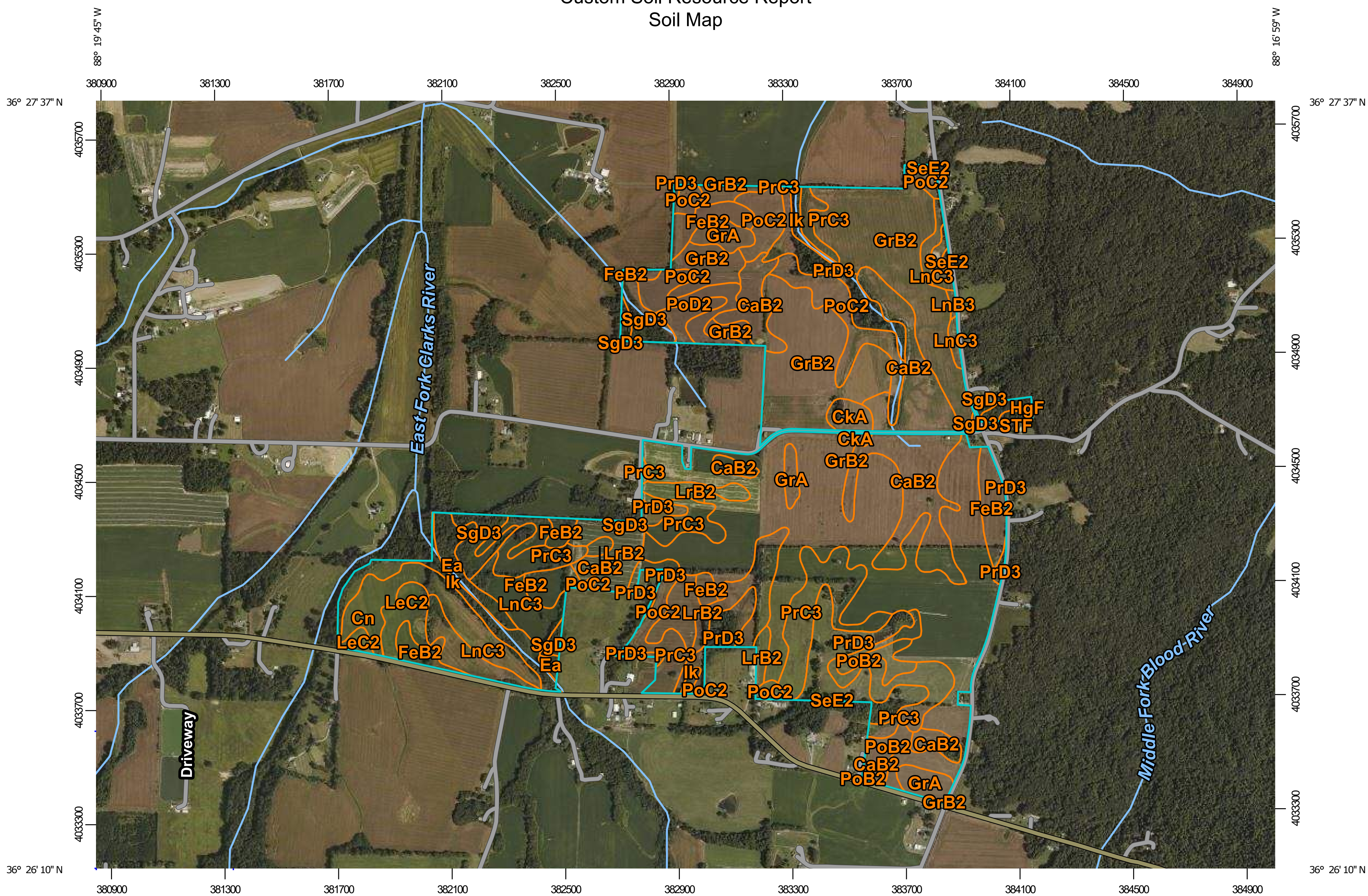
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:19,000 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 250, 500, 1000, 1500

Feet: 0, 500, 1000, 2000, 3000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
Area of Interest (AOI)

Soils
Soil Map Unit Polygons
Soil Map Unit Lines
Soil Map Unit Points

Special Point Features
Blowout
Borrow Pit
Clay Spot
Closed Depression
Gravel Pit
Gravelly Spot
Landfill
Lava Flow
Marsh or swamp
Mine or Quarry
Miscellaneous Water
Perennial Water
Rock Outcrop
Saline Spot
Sandy Spot
Severely Eroded Spot
Sinkhole
Slide or Slip
Sodic Spot
Spoil Area
Stony Spot
Very Stony Spot
Wet Spot
Other
Special Line Features

Water Features
Streams and Canals

Transportation
Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background
Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Henry County, Tennessee
Survey Area Data: Version 18, Sep 15, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 21, 2019—Sep 4, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CaB2	Calloway silt loam, 2 to 5 percent slopes, moderately eroded	58.8	9.6%
CkA	Calloway-Kurk complex, 0 to 2 percent slopes	4.7	0.8%
Cn	Chenneby silt loam, 0 to 2 percent slopes, occasionally flooded	20.0	3.3%
Ea	Enville silt loam, 0 to 2 percent slopes, occasionally flooded	8.1	1.3%
FeB2	Feliciana silt loam, 2 to 5 percent slopes, moderately eroded, northern phase	25.6	4.2%
GrA	Grenada silt loam, 0 to 2 percent slopes	11.1	1.8%
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded	228.9	37.5%
HgF	Hapludults-Gullied land complex, very steep	2.0	0.3%
Ik	Iuka loam, 0 to 2 percent slopes, occasionally flooded	13.9	2.3%
LeC2	Lexington silt loam, 5 to 8 percent slopes, moderately eroded	12.3	2.0%
LnB3	Lexington silty clay loam, 2 to 5 percent slopes, severely eroded	0.5	0.1%
LnC3	Lexington silty clay loam, 5 to 8 percent slopes, severely eroded	21.8	3.6%
LrB2	Loring silt loam, 2 to 5 percent slopes, eroded	24.6	4.0%
PoB2	Providence silt loam, 2 to 5 percent slopes, moderately eroded, north	7.4	1.2%
PoC2	Providence silt loam, 5 to 8 percent slopes, moderately eroded	58.0	9.5%
PoD2	Providence silt loam, 8 to 12 percent slopes, moderately eroded	3.8	0.6%
PrC3	Providence silty clay loam, 5 to 8 percent slopes, severely eroded	49.7	8.1%
PrD3	Providence silty clay loam, 8 to 12 percent slopes, severely eroded	40.3	6.6%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
SeE2	Smithdale loam, 12 to 25 percent slopes, eroded	1.1	0.2%
SgD3	Smithdale-Lexington complex, 8 to 12 percent slopes, severely eroded	16.1	2.6%
SgE2	Smithdale-Lexington complex, 12 to 25 percent slopes, eroded	1.1	0.2%
STF	Smithdale, Toinette and Luverne soils, 25 to 60 percent slopes	0.8	0.1%
Totals for Area of Interest		**610.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Henry County, Tennessee

CaB2—Calloway silt loam, 2 to 5 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2t23h
Elevation: 200 to 520 feet
Mean annual precipitation: 52 to 56 inches
Mean annual air temperature: 46 to 72 degrees F
Frost-free period: 189 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Calloway and similar soils: 87 percent
Minor components: 13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Calloway

Setting

Landform: Loess hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Loess

Typical profile

Ap - 0 to 7 inches: silt loam
Bw - 7 to 19 inches: silt loam
Eg - 19 to 27 inches: silt loam
Btx - 27 to 62 inches: silt loam
C - 62 to 80 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 15 to 30 inches to fragipan
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 7 to 21 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: F134XY004AL - Northern Moderately Wet Loess Interfluve - PROVISIONAL
Hydric soil rating: No

Minor Components

Routon

Percent of map unit: 7 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F134XY005AL - Northern Wet Loess Interfluve - PROVISIONAL
Hydric soil rating: Yes

Loring

Percent of map unit: 6 percent
Landform: Loess hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F134XY012AL - Northern Loess Fragipan Upland - PROVISIONAL
Hydric soil rating: No

CkA—Calloway-Kurk complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2qs7g
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 224 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Calloway and similar soils: 56 percent
Kurk and similar soils: 38 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Calloway

Setting

Landform: Divides
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loess

Typical profile

Ap - 0 to 6 inches: silt loam

Bt - 6 to 21 inches: silt loam
Btx - 21 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 18 to 30 inches to fragipan
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 10 to 14 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Kurk

Setting

Landform: Terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loess over loamy fluviomarine deposits

Typical profile

Ap - 0 to 7 inches: silt loam
Bw, E - 7 to 21 inches: silt loam
Btg - 21 to 56 inches: silty clay loam
2Bt - 56 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 8 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Routon

Percent of map unit: 6 percent
Landform: Divides
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Cn—Chenneby silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2qs7j
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 224 days
Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Chenneby and similar soils: 93 percent
Minor components: 7 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chenneby

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium over loamy alluvium

Typical profile

A - 0 to 8 inches: silt loam
Bw, Cg - 8 to 57 inches: silt loam
Cg - 57 to 79 inches: stratified loamy sand to fine sandy loam to loam to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 12 to 30 inches

Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.4 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Hydric soil rating: No

Minor Components

Rosebloom
Percent of map unit: 7 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Ea—Enville silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting
National map unit symbol: 2vxx8
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 224 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Enville and similar soils: 93 percent
Minor components: 7 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Enville

Setting
Landform: Flood-plain steps
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy alluvium over sandy alluvium

Typical profile
A - 0 to 5 inches: silt loam
C - 5 to 13 inches: silt loam
Cg1 - 13 to 45 inches: stratified sand to loamy sand to sandy loam
2Cg2 - 45 to 79 inches: stratified sand to loamy sand to sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 12 to 18 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Hydric soil rating: No

Minor Components

Bibb

Percent of map unit: 7 percent
Landform: Flood-plain steps
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

FeB2—Feliciana silt loam, 2 to 5 percent slopes, moderately eroded, northern phase

Map Unit Setting

National map unit symbol: 2y71v
Elevation: 300 to 540 feet
Mean annual precipitation: 49 to 55 inches
Mean annual air temperature: 46 to 72 degrees F
Frost-free period: 190 to 245 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Feliciana, northern phase, and similar soils: 94 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Feliciana, Northern Phase

Setting

Landform: Divides
Landform position (two-dimensional): Summit

Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine-silty noncalcareous loess

Typical profile

Ap - 0 to 6 inches: silt loam
Bt1 - 6 to 25 inches: silty clay loam
Bt2 - 25 to 41 inches: silt loam
Bt3 - 41 to 60 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F134XY003AL - Northern Loess Interfluve - PROVISIONAL
Hydric soil rating: No

Minor Components

Loring, northern phase

Percent of map unit: 6 percent
Landform: Loess hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F134XY012AL - Northern Loess Fragipan Upland - PROVISIONAL
Hydric soil rating: No

GrA—Grenada silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2qs81
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 224 days
Farmland classification: Not prime farmland

Map Unit Composition

Grenada and similar soils: 94 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grenada

Setting

Landform: Divides
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loess

Typical profile

Ap - 0 to 9 inches: silt loam
Bt - 9 to 18 inches: silt loam
E / Btx - 18 to 32 inches: silt loam
Btx - 32 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 14 to 28 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Kurk

Percent of map unit: 3 percent
Landform: Terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Calloway

Percent of map unit: 2 percent
Landform: Divides
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave

Across-slope shape: Concave
Hydric soil rating: No

Routon

Percent of map unit: 1 percent
Landform: Divides
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

GrB2—Grenada silt loam, 2 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2qs82
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 224 days
Farmland classification: Not prime farmland

Map Unit Composition

Grenada and similar soils: 99 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Grenada

Setting

Landform: Divides
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loess

Typical profile

Ap - 0 to 6 inches: silt loam
Bt - 6 to 18 inches: silt loam
E / Btx - 18 to 32 inches: silt loam
Btx - 32 to 79 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 14 to 28 inches

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Calloway

Percent of map unit: 1 percent
Landform: Divides
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

HgF—Hapludults-Gullied land complex, very steep

Map Unit Setting

National map unit symbol: 2qs83
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 224 days
Farmland classification: Not prime farmland

Map Unit Composition

Hapludults and similar soils: 60 percent
Gullied land: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hapludults

Setting

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess and/or loamy marine deposits

Typical profile

A - 0 to 4 inches: silt loam
C - 4 to 79 inches: loam

Properties and qualities

Slope: 0 to 45 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Gullied Land

Setting

Landform: Gullies

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8e
Hydric soil rating: No

Ik—Iuka loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2qs88
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 224 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Iuka and similar soils: 89 percent
Minor components: 11 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Iuka

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy alluvium

Typical profile

A - 0 to 5 inches: loam
C1 - 5 to 11 inches: silt loam
C2 - 11 to 30 inches: stratified fine sandy loam
Cg - 30 to 79 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 25 to 35 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Enville

Percent of map unit: 6 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Chenneby

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

LeC2—Lexington silt loam, 5 to 8 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2vxxg
Elevation: 350 to 650 feet
Mean annual precipitation: 51 to 58 inches
Mean annual air temperature: 47 to 72 degrees F
Frost-free period: 196 to 250 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Lexington and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lexington

Setting

Landform: Hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess over marine deposits

Typical profile

Ap - 0 to 6 inches: silt loam
Bt - 6 to 29 inches: silty clay loam
2Bt - 29 to 79 inches: loam

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F134XY003AL - Northern Loess Interfluve - PROVISIONAL
Hydric soil rating: No

Minor Components

Providence

Percent of map unit: 5 percent
Landform: Terraces, divides
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: F134XY012AL - Northern Loess Fragipan Upland - PROVISIONAL
Hydric soil rating: No

LnB3—Lexington silty clay loam, 2 to 5 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2qs8k
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 224 days
Farmland classification: Not prime farmland

Map Unit Composition

Lexington and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lexington

Setting

Landform: Divides
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over marine deposits

Typical profile

Ap - 0 to 3 inches: silty clay loam
Bt - 3 to 29 inches: silty clay loam
2Bt - 29 to 79 inches: loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F134XY003AL - Northern Loess Interfluve - PROVISIONAL
Hydric soil rating: No

Minor Components

Providence

Percent of map unit: 5 percent
Landform: Divides, terraces
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F134XY012AL - Northern Loess Fragipan Upland - PROVISIONAL
Hydric soil rating: No

LnC3—Lexington silty clay loam, 5 to 8 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2qs8l
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 224 days
Farmland classification: Not prime farmland

Map Unit Composition

Lexington and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lexington

Setting

Landform: Divides
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over marine deposits

Typical profile

Ap - 0 to 3 inches: silty clay loam
Bt - 3 to 29 inches: silty clay loam
2Bt - 29 to 79 inches: loam

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F134XY003AL - Northern Loess Interfluve - PROVISIONAL
Hydric soil rating: No

Minor Components

Providence

Percent of map unit: 5 percent
Landform: Divides, terraces
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: F134XY012AL - Northern Loess Fragipan Upland - PROVISIONAL
Hydric soil rating: No

LrB2—Loring silt loam, 2 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2qs8q
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 224 days
Farmland classification: Not prime farmland

Map Unit Composition

Loring and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Loring

Setting

Landform: Divides
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loess over loamy marine deposits

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 27 inches: silt loam

Btx - 27 to 52 inches: silty clay loam
2Btx - 52 to 79 inches: loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 20 to 32 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 19 to 25 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Calloway

Percent of map unit: 5 percent
Landform: Divides
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

PoB2—Providence silt loam, 2 to 5 percent slopes, moderately eroded, north

Map Unit Setting

National map unit symbol: 2vxxl
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 250 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Providence and similar soils: 94 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Providence

Setting

Landform: Divides, terraces
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Linear, concave
Across-slope shape: Linear
Parent material: Loess over loamy marine deposits

Typical profile

Ap - 0 to 6 inches: silt loam
Bt - 6 to 18 inches: silt loam
Btx - 18 to 32 inches: silty clay loam
2Btx - 32 to 62 inches: loam
2Bt - 62 to 79 inches: sandy clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 14 to 21 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 12 to 16 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Lexington

Percent of map unit: 6 percent
Landform: Divides
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

PoC2—Providence silt loam, 5 to 8 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2vxxm
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Providence and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Providence

Setting

Landform: Divides, terraces
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Linear, concave
Across-slope shape: Linear
Parent material: Loess over loamy marine deposits

Typical profile

Ap - 0 to 6 inches: silt loam
Bt - 6 to 18 inches: silt loam
Btx - 18 to 32 inches: silty clay loam
2Btx - 32 to 62 inches: loam
2Bt - 62 to 79 inches: sandy clay loam

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: 14 to 21 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 12 to 16 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Lexington

Percent of map unit: 6 percent
Landform: Divides
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Smithdale

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

PoD2—Providence silt loam, 8 to 12 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2vxxn
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Providence and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Providence

Setting

Landform: Divides, terraces
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Linear, concave
Across-slope shape: Linear
Parent material: Loess over loamy marine deposits

Typical profile

Ap - 0 to 6 inches: silt loam
Bt - 6 to 18 inches: silt loam
Btx - 18 to 32 inches: silty clay loam
2Btx - 32 to 62 inches: loam

2Bt - 62 to 79 inches: sandy clay loam

Properties and qualities

Slope: 8 to 12 percent
Depth to restrictive feature: 14 to 21 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 12 to 16 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Lexington

Percent of map unit: 6 percent
Landform: Divides
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Smithdale

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

PrC3—Providence silty clay loam, 5 to 8 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2qs96
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 224 days
Farmland classification: Not prime farmland

Map Unit Composition

Providence and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Providence

Setting

Landform: Divides, terraces
Landform position (two-dimensional): Summit, footslope
Landform position (three-dimensional): Interfluve, tread
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over loamy marine deposits

Typical profile

Ap - 0 to 3 inches: silty clay loam
Bt - 3 to 15 inches: silty clay loam
Btx - 15 to 22 inches: silty clay loam
2Btx - 22 to 58 inches: loam
2Bt - 58 to 79 inches: sandy clay loam

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: 12 to 18 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 8 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Hydric soil rating: No

PrD3—Providence silty clay loam, 8 to 12 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2qs97
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 224 days
Farmland classification: Not prime farmland

Map Unit Composition

Providence and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Providence

Setting

Landform: Divides
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over loamy marine deposits

Typical profile

Ap - 0 to 3 inches: silty clay loam
Bt - 3 to 15 inches: silty clay loam
Btx - 15 to 22 inches: silty clay loam
2Btx - 22 to 58 inches: loam
2Bt - 58 to 79 inches: sandy clay loam

Properties and qualities

Slope: 8 to 12 percent
Depth to restrictive feature: 12 to 18 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 8 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Hydric soil rating: No

SeE2—Smithdale loam, 12 to 25 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2qs9j
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 224 days
Farmland classification: Not prime farmland

Map Unit Composition

Smithdale and similar soils: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Smithdale

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy marine deposits

Typical profile

A - 0 to 3 inches: loam
E - 3 to 5 inches: loam
Bt1 - 5 to 56 inches: sandy clay loam
Bt2 - 56 to 79 inches: sandy loam

Properties and qualities

Slope: 12 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Hydric soil rating: No

SgD3—Smithdale-Lexington complex, 8 to 12 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 2qs9q
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 224 days
Farmland classification: Not prime farmland

Map Unit Composition

Smithdale and similar soils: 67 percent
Lexington and similar soils: 33 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Smithdale

Setting

Landform: Hills
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy marine deposits

Typical profile

A - 0 to 2 inches: loam
Bt1 - 2 to 56 inches: sandy clay loam
Bt2 - 56 to 79 inches: sandy loam

Properties and qualities

Slope: 8 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Lexington

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over marine deposits

Typical profile

Ap - 0 to 3 inches: silty clay loam
Bt - 3 to 29 inches: silty clay loam
2Bt - 29 to 79 inches: loam

Properties and qualities

Slope: 8 to 12 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: F134XY003AL - Northern Loess Interfluve - PROVISIONAL
Hydric soil rating: No

SgE2—Smithdale-Lexington complex, 12 to 25 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2qs9m
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 224 days
Farmland classification: Not prime farmland

Map Unit Composition

Smithdale and similar soils: 67 percent
Lexington and similar soils: 33 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Smithdale

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy marine deposits

Typical profile

A - 0 to 3 inches: loam
E - 3 to 5 inches: loam
Bt1 - 5 to 56 inches: sandy clay loam
Bt2 - 56 to 79 inches: sandy loam

Properties and qualities

Slope: 12 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Lexington

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loess over marine deposits

Typical profile

Ap - 0 to 6 inches: silt loam
Bt - 6 to 29 inches: silty clay loam
2Bt - 29 to 79 inches: loam

Properties and qualities

Slope: 12 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: F134XY006AL - Northern Loess Sideslope - PROVISIONAL
Hydric soil rating: No

STF—Smithdale, Toinette and Luverne soils, 25 to 60 percent slopes

Map Unit Setting

National map unit symbol: 2vxy0
Elevation: 350 to 650 feet
Mean annual precipitation: 47 to 58 inches
Mean annual air temperature: 46 to 68 degrees F
Frost-free period: 196 to 224 days
Farmland classification: Not prime farmland

Map Unit Composition

Smithdale and similar soils: 64 percent
Toinette and similar soils: 20 percent
Luverne and similar soils: 15 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Smithdale

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy marine deposits

Typical profile

A - 0 to 3 inches: loam
E - 3 to 5 inches: loam
Bt1 - 5 to 56 inches: sandy clay loam
Bt2 - 56 to 79 inches: sandy loam

Properties and qualities

Slope: 25 to 60 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Toinette

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy marine deposits

Typical profile

A - 0 to 3 inches: loamy sand
E - 3 to 25 inches: loamy sand
Bt - 25 to 45 inches: sandy clay loam
Bt/E' - 45 to 79 inches: loamy fine sand

Properties and qualities

Slope: 25 to 60 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Luverne

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Clayey marine deposits

Typical profile

A - 0 to 4 inches: fine sandy loam
E - 4 to 12 inches: fine sandy loam
Bt - 12 to 37 inches: clay
BCt - 37 to 48 inches: clay loam
C - 48 to 79 inches: stratified loamy sand to loam to sandy clay loam

Properties and qualities

Slope: 25 to 60 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Arundel

Percent of map unit: 1 percent

Landform: Divides
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX C – Supplemental Tables

Table 1 – Non-Wetland Features within the Project Study Area

Waterbody I.D.	Description	Location Within Project Boundaries	Linear Feet within Project	HD Score	Federal Jurisdictional Status	State Jurisdictional Status
STR-1	Intermittent Stream	Start: 36.453450, -88.307866 End 36.454391, -88.308686	536	21.25	Yes	Yes
STR-2	Intermittent Stream	Start: 36.450017, -88.297948 End: 36.457746, -88.30176	3,854	24.00	Yes	Yes
STR-3	Intermittent Stream	Start: 36.455209, -88.301457 End: 36.455466, -88.301194	140	20.00	Yes	Yes
STR-4	Intermittent Stream	Start: 36.455539, -88.302408 End: 36.455704, -88.301509	297	19.25	Yes	Yes
STR-5	Intermittent Stream	Start: 36.445431, -88.314349 End: 36.445290, -88.314756	184	19.25	Yes	Yes
STR-6	Intermittent Stream	Start: 36.447332, -88.313994 End: 36.446062, -88.316202	895	19.50	Yes	Yes
STR-7	Perennial Stream	Start: 36.441680, -88.311011 End: 36.446099, -88.316257	2,267	Primary	Yes	Yes
STR-8	Intermittent Stream	Start: 36.442919, -88.311122 End: 36.442594, -88.312169	424	19.50	Yes	Yes
STR-9	Perennial Stream	Start: 36.444164, -88.320173 End: 36.445742, -88.318860	743	Primary	Yes	Yes
STR-10	Intermittent Stream	Start: 36.441546, -88.300116 End: 36.440614, -88.303253	1,059	26.00	Yes	Yes
STR-11	Intermittent Stream	Start: 36.441740, -88.300978 End: 36.441559, -88.300943	82	26.00	Yes	Yes
EPH-1	Ephemeral Stream	Start: 36.452814, -88.306826 End: 36.453450, -88.307866	374	16.75	Unlikely[1]	No[2] (WWC)
EPH-2	Ephemeral Stream	Start: 36.452726, -88.308706 End: 36.453587, -88.308454	374	16.75	Unlikely[1]	No[2] (WWC)
EPH-3	Ephemeral Stream	Start: 36.454977, -88.301705 End: 36.455209, -88.301457	132	13.00	Unlikely[1]	No[2] (WWC)
EPH-4	Ephemeral Stream	Start: 36.453034, -88.299334 End: 36.453922, -88.298913	398	13.50	Unlikely[1]	No[2] (WWC)
EPH-5	Ephemeral Stream	Start: 36.446939, -88.315479 End: 36.447438, -88.315688	223	13.75	Unlikely[1]	No[2] (WWC)
EPH-6	Ephemeral Stream	Start: 36.442922, -88.318325 End: 36.445613, -88.319042	1,025	10.25	Unlikely[1]	No[2] (WWC)
EPH-7	Ephemeral Stream	Start: 36.445870, -88.303291 End: 36.441677, -88.306268	1,686	11.00	Potential[1]	No[2] (WWC)
EPH-8	Ephemeral Stream	Start: 36.444358, -88.300671 End: 36.441801, -88.300959	322	14.75	Potential[1]	No[2] (WWC)
EPH-9	Ephemeral Stream	Start: 36.441077, -88.298986 End: 36.441546, -88.30011	401	13.75	Potential[1]	No[2] (WWC)
EPH-10	Ephemeral Stream	Start: 36.450275, -88.293970 End: 36.451068, -88.292723	513	12.75	Unlikely[1]	No[2] (WWC)
ES-1	Erosional Swale	Start: 36.453407, -88.307094 End: 36.453250, -88.307284	108	11.50	Unlikely[1]	No[2] (WWC)
ES-2	Erosional Swale	Start: 36.455370, -88.301801 End: 36.455670, -88.301532	188	12.50	Unlikely[1]	No[2] (WWC)

Table 1 – Non-Wetland Features within the Project Study Area

Waterbody I.D.	Description	Location Within Project Boundaries	Linear Feet within Project	HD Score	Federal Jurisdictional Status	State Jurisdictional Status
ES-3	Erosional Swale	Start: 36.454714, -88.299795 End: 36.454856, -88.299657	70	12.50	Unlikely[1]	No[2] (WWC)
ES-4	Erosional Swale	Start: 36.445208, -88.313922 End: 36.445261, -88.31442	178	11.00	Unlikely[1]	No[2] (WWC)
ES-5	Erosional Swale	Start: 36.445685, -88.315683 End: 36.445649, -88.315868	63	11.50	Unlikely[1]	No[2] (WWC)
ES-6	Erosional Swale	Start: 36.445897, -88.315882 End: 36.445792, -88.316065	73	11.50	Unlikely[1]	No[2] (WWC)
ES-7	Erosional Swale	Start: 36.444362, -88.313983 End: 36.444234, -88.314285	112	11.50	Unlikely[1]	No[2] (WWC)
ES-8	Erosional Swale	Start: 36.444126, -88.304325 End: 36.443815, -88.304303	126	8.00	Unlikely[1]	No[2] (WWC)
ES-9	Erosional Swale	Start: 36.444014, -88.304738 End: 36.443644, -88.304466	175	8.00	Unlikely[1]	No[2] (WWC)
ES-10	Erosional Swale	Start: 36.441354, -88.297164 End: 36.441169, -88.298121	394	13.25	Unlikely[1]	No[2] (WWC)
UDF-1	Upland Drainage Feature	Start: 36.445988, -88.311172 End: 36.446164, -88.312054	294	--	No	No
D-1	Drainage Ditch	Start: 36.445455, -88.316176 End: 36.445886, -88.316120	166	--	No	No

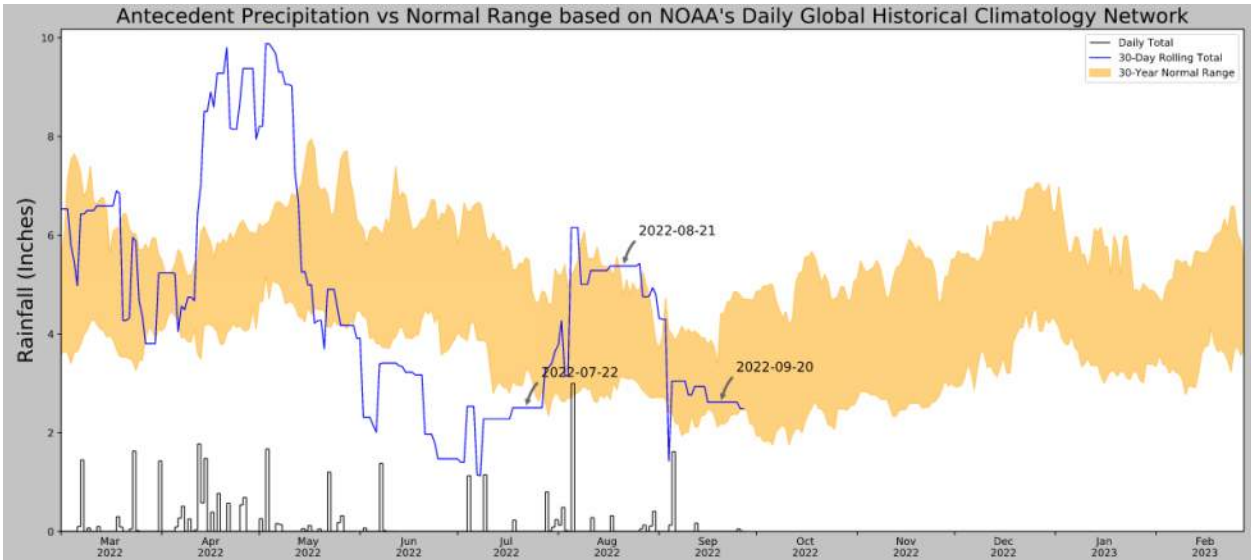
1: Federal jurisdiction status determined by observable connection to RPW and NonRPW WOTUS or significant nexus
2: State Status determined by HD score (<19 is a WWC)

Table 2 – Wetlands within the Project Study Area

Waterbody I.D.	Description	Location Within Project Boundaries	Acreage within Project	Federal Jurisdictional Status	State Jurisdictional Status
WTL-1	PFO	36.446141, -88.313703	0.28	Yes	Yes
WTL-2	PFO	36.445357, -88.315062	1.37	Yes	Yes
WTL-3	PFO	36.446975, -88.314885	0.26	Yes[1]	Yes
WTL-4	PEM	36.443901, -88.315137	1.52	Yes[1]	Yes
	PFO	36.444478, -88.315886	1.06		
WTL-5	PEM	36.443823, -88.316579	0.24	No[1]	Yes
WTL-6	PEM	36.445854, -88.303033	0.10	No[1]	Yes
WTL-7	PFO	36.441045, -88.298593	0.30	Yes[1]	Yes
WTL-8	PFO	36.439863, -88.295632	0.10	No[1]	Yes
P-1	PUB	36.452808, -88.303306	0.16	No[1]	Yes
P-2	PUB	36.455507, -88.302841	0.49	Yes	Yes
P-3	PUB	36.454917, -88.300769	0.07	No[1]	Yes
P-4	PUB	36.451562, -88.296562	0.06	No[1]	Yes
P-5	PUB	36.447414, -88.306998	1.44	Yes[1]	Yes
P-6	PUB	36.446663, -88.312360	0.22	No[1]	Yes
P-7	PUB	36.445118, -88.314370	0.15	No[1]	Yes
P-8	PUB	36.442610, -88.307802	0.37	No[1]	Yes
P-9	PUB	36.444777, -88.300191	0.35	No[1]	Yes
P-10	PUB	36.443494, -88.298429	0.45	No[1]	Yes
P-11	PUB	36.440848, -88.298140	0.08	No[1]	Yes
P-12	PUB	36.439828, -88.295583	0.17	No[1]	Yes
P-13	PUB	36.442879, -88.294633	0.04	No[1]	Yes

1: Federal jurisdiction status determined by observable connection to RPW and NonRPW WOTUS, significant nexus, or is an isolated water

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	36.448487, -88.304940
Observation Date	2022-09-20
Elevation (ft)	623.0
Drought Index (PDSI)	Incipient wetness (2022-08)
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2022-09-20	2.177165	4.416142	2.61811	Normal	2	3	6
2022-08-21	3.125591	4.802756	5.377953	Wet	3	2	6
2022-07-22	3.264567	5.554725	2.507874	Dry	1	1	1
Result							Normal Conditions - 13

Figure and tables made by the **Antecedent Precipitation Tool** Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
MURRAY	36.6122, -88.3083	526.903	11.313	96.097	6.178	11170	85
MURRAY 1.9 WSW	36.5968, -88.3437	543.963	2.233	17.06	1.043	0	4
NEW CONCORD 4NW	36.5964, -88.2194	537.074	5.05	10.171	2.324	91	0
FARMINGTON 5.6 S	36.5891, -88.5082	550.853	11.203	23.95	5.31	0	1
KENLAKE RESORT	36.76, -88.1386	483.924	13.881	42.979	6.843	79	0
WINGO 2.2 SE	36.6172, -88.7143	522.966	22.519	3.937	10.222	4	0
PARIS 2 SE	36.2872, -88.2958	442.913	22.466	83.99	11.997	9	0

TABLE 3 – Observed Wildlife Species List

Common Name	Scientific Name
Birds	
American robin	*Turdus migratorius*
American crow	*Corvus brachyrhynchos*
American goldfinch	*Spinus tristis*
Barn swallow	*Hirundo rustica*
Blue jay	*Cyanocitta cristata*
Blue-gray gnatcatcher	*Polioptila caerulea*
Broad-winged hawk	*Buteo platypterus*
Brown Thrasher	*Toxostoma rufum*
Carolina chickadee	*Poecile carolinensis*
Carolina wren	*Thryothorus ludovicianus*
Common grackle	*Quiscalus quiscula*
Cooper's hawk	*Accipiter cooperii*
Dark-eyed junco	*Junco hyemalis*
Downy woodpecker	*Dryobates pubescens*
Eastern bluebird	*Sialia sialis*
Eastern kingbird	*Tyrannus tyrannus*
Eastern towhee	*Pipilo erythrophthalmus*
Eastern phoebe	*Sayornis phoebe*
European starling	*Sturnus vulgaris*
Field sparrow	*Spizella pusilla*
Gray catbird	*Dumetella carolinensis*
Great crested flycatcher	*Myiarchus crinitus*
Green heron	*Butorides virescens*
House finch	*Haemorhous mexicanus*
Indigo bunting	*Passerina cyanea*
Louisiana waterthrush	*Parkesia motacilla*
Mourning dove	*Zenaida macroura*
Northern cardinal	*Cardinalis cardinalis*
Northern bobwhite	*Colinus virginianus*
Northern mockingbird	*Mimus polyglottos*
Northern parula	*Setophaga americana*
Pileated woodpecker	*Dryocopus pileatus*

Common Name	Scientific Name
Birds cont'd	
Northern cardinal	*Cardinalis cardinalis*
Northern bobwhite	*Colinus virginianus*
Northern mockingbird	*Mimus polyglottos*
Northern parula	*Setophaga americana*
Pileated woodpecker	*Dryocopus pileatus*
Prairie warbler	*Setophaga discolor*
Red-bellied woodpecker	*Melanerpes carolinus*
Red-eyed vireo	*Vireo olivaceus*
Red-shouldered hawk	*Buteo lineatus*
Red tailed hawk	*Buteo jamaicensis*
Red-winged black-bird	*Agelaius phoeniceus*
Ruby-throated hummingbird	*Archilochus colubris*
Summer tanager	*Piranga rubra*
Tufted titmouse	*Baeolophus bicolor*
White-eyed vireo	*Vireo griseus*
Yellow-belied sapsucker	*Sphyrapicus varius*
Yellow-billed cuckoo	*Coccyzus americanus*
Mammals	
Eastern chipmunk	*Tamias striatus*
Eastern gray squirrel	*Sciurus carolinensis*
Eastern red bat	*Lasiurus borealis*
Fox squirrel	*Sciurus niger*
Groundhog	*Marmota monax*
White-tailed deer	*Odocoileus virginianus*
Racoon	*Procyonidae lotor*
Red fox	*Vulpes vulpes fulvus*
Nine banded armadillo	*Dasypus novemcinctus*
Coyote	*Canis latrans*
Silver-haired bat	*Lasionycteris noctivagans*
Virginia opossum	*Didelphis virginiana*

TABLE 3 – Observed Wildlife Species List, Cont'd

Common Name	Scientific Name
Reptiles	
Black racer	*Coluber constrictor*
Common garter snake	*Thamnophis sirtalis*
DeKay's brown snake	*Storeria dekayi*
Eastern box turtle	*Terrapene carolina carolina*
Five-lined skink	*Plestiodon fasciatus*
Ground skink	*Scincella lateralis*
Northern water snake	*Nerodia sipedon*
Amphibians	
American toad	*Anaxyrus americanus*
Bird-voiced treefrog	*Hyla avivoca*
Gray treefrog	*Hyla versicolor*
Green frog	*Lithobates clamitans*
Southern leopard frog	*Lithobates sphenocephalus*
Upland chorus frog	*Pseudacris feriarum*

Common Name	Scientific Name
Fish	
Blackspotted topminnow	*Fundulus olivaceus*
Invertebrates	
Common whitetail	*Plathemis lydia*
Eastern black swallowtail	*Papilio polyxenes*
Eastern tiger swallowtail	*Papilio glaucus*
Monarch butterfly	*Danaus plexippus*
Silver-spotted skipper	*Epargyreus clarus*
Spicebush swallowtail	*Papilio troilus*
Viceroy	*Limenitis archippus*

Table 4 – Listed Species Potentially within the Project Site

Common Name	Species	State Status	Federal Status	Habitat Type	State Rank*	Habitat Present	Observed
Mammal							
Northern long-eared bat	*Myotis septentrionalis*	Endangered	Threatened	Hibernates during winter in caves or occasionally in abandoned mines. Summer roosting season in late spring and summer months. Females would roost on trees with exfoliating bark and/or with cracks, crevices, and hollows. Will rarely roost in barns or other similar shed-like structures.	S1S2	Yes (Roosting)	No
Indiana bat	*Myotis sodalis*	Endangered	Endangered	Hibernates during winter in caves or occasionally in abandoned mines. Summer roosting season in late spring and summer months. Females would roost on trees with exfoliating bark and/or with cracks, crevices, and hollows.	S1	Yes (Roosting)	No
Tricolored bat	*Perimyotis subflavus*	Threatened	Proposed Endangered	Hibernates during winter in caves or occasionally in abandoned mines. Summer roosting season in late spring and summer months. Females would roost in leaf clusters in living or dead trees, as well as utilize cavities in living or dead trees and anthropogenic structures.	S2S3	Yes (Roosting)	No
Gray Bat	*Myotis grisescens*	Endangered	Endangered	Inhabits caves year-round. In the summer the bats inhabit warm caves, dams, mines, quarries, concrete box culverts and undersides of bridges. In the winter hibernation sites are often deep	S2	Yes	No

Table 4 – Listed Species Potentially within the Project Site

Common Name	Species	State Status	Federal Status	Habitat Type	State Rank*	Habitat Present	Observed
				vertical caves that trap cold air. volumes of cold air; these caves are naturally very rare.			
Birds							
Whopping Crane	*Grus americana*	Not Listed	Experimental Population, Non-Essential**	Breeds in freshwater marshes and prairies. Uses grain fields, shallow lakes and lagoons, and saltwater marshes on migration and in winter.	-	Yes	No
Fish							
Rosyside darter	*Clinostomus funduloides*	Extant (KY)	Not Listed	Prefers pools and riffles of clear, cool, medium-sized upland streams flowing over gravel, cobble, or bedrock.	-	No	No
Chain pickerel	*Esox niger*	Special Concern (KY)	Not Listed	Prefers vegetated lakes, swamps, and backwaters and quiet pools of creeks and small to medium rivers.	S3	No	No
Goldstripe darter	*Etheostoma parvipinne*	Endangered (KY)	Not Listed	Inhabits small sluggish streams, spring seepage areas, and small woodland tributaries adjacent to larger streams. Patches of wood debris, leaf material, mud, silt, and sand appear to be favored microhabitats.	S1	No	No
Cypress darter	*Etheostoma proeliare*	Threatened (KY)	Not Listed	Occurs around accumulations of woody debris, leaves, and aquatic vegetation in backwater pools of sluggish streams and swamps.	S2	No	No
Dollar sunfish	*Lepomis marginatus*	Endangered (KY)	Not Listed	Inhabits small to large streams, rivers, reservoirs, and swamps.	S1	No	No

Table 4 – Listed Species Potentially within the Project Site

Common Name	Species	State Status	Federal Status	Habitat Type	State Rank*	Habitat Present	Observed
Central mudminnow	*Umbra limi*	Threatened (KY)	Not Listed	Occurs in quiet areas of streams, sloughs, swamps, and other wetlands over mud and debris. Known to tolerate drought, low oxygen levels, and extreme water temperature.	S2S3	Yes (East Fork Clarks River)	No
Reptiles							
Alligator Snapping Turtle	*Macrochelys temminckii*	Threatened	Proposed Threatened	Occurs in deep water of rivers, sloughs, oxbows, swamps, and lakes	S2S3	Yes	No
Insect							
Monarch butterfly	*Danaus plexippus*	Not Listed	Candidate	Occurs in fallow fields or prairies with a presence of milkweed (*Asclepias spp.*) host plants for larval development.	N/A	Yes	Yes
Crayfish							
Blood River Crayfish	*Orconectes burri*	Threatened (KY)	Not Listed	Occurs in small to medium-sized streams with a channel substrate of sand and gravel.	N/A	No	No
Plants							
Water-milfoil	*Myriophyllum pinnatum*	Endangered	Not Listed	Occurs in moderately deep surface water in wetland and ponds.	S1	Yes	No
Compass plant	*Silphium laciniatum*	Threatened	Not Listed	Occurs in open prairies, fallow fields, roadsides, and glades.	S2	Yes	No
Blue Sage	*Salvia azurea var. grandiflora*	Extant	Not Listed	Occurs in dry prairies, limestone glades and edges of woods, bluffs, and open ground.	S3	Yes	No

APPENDIX D – Wetland and Stream Determination Data Forms

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: STR-1	Date/Time: 9/20/2022/12:45
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.453450, -88.307866 End 36.454391, -88.308686
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : 0.16 sq mi (USGS Stream Stats)	County: Henry
Soil Type(s) / Geology : SgD3: Smithdale-Lexington complex, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	✓	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream ☐
6. Presence of fish (except *Gambusia*)	✓	Stream ☐
7. Presence of naturally occurring ground water table connection	✓	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1” in local watershed	✓	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream ☐

NOTE: If any Primary Indicators 1-9 = “Yes”, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable) = 21.25

Justification / Notes :

Overall hydrologic determination is STREAM based on secondary indicator scores

- Potential historic straightlining of channel between two soy fields

Waterbody Name: STR-1

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 12.0)	**Absent**		**Weak**		**Moderate**		**Strong**
1. Continuous bed and bank	0		1		2	✓	3
2. Sinuous channel	0		1 ✓		2		3
3. In-channel structure: riffle-pool sequences	0		1	✓	2		3
4. Sorting of soil textures or other substrate	0		1		2 ✓		3
5. Active/relic floodplain	0		0.5 ✓		1		1.5
6. Depositional bars or benches	0		1	✓	2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0		0.5 ✓		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0		1 ✓		2		3
11. Grade controls	0		0.5	✓	1		1.5
12. Natural valley or drainageway	0		0.5	✓	1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 4.00)	**Absent**		**Weak**		**Moderate**		**Strong**
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1 ✓		0.5		0
17. Sediment on plants or on debris	0		0.5		1 ✓		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5 ✓		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0				Yes = 1.5 ✓		

C. Biology (Subtotal = 5.25)	**Absent**		**Weak**		**Moderate**		**Strong**
20. Fibrous roots in channel bed [1]	3		2 ✓		1		0
21. Rooted plants in the thalweg [1]	3 ✓		2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28. Wetland plants in channel bed [2]	0	✓	0.5		1		1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 21.25

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Bed and bank present throughout reach, as well as OHWM
- Some sinuosity, feature is mostly riffle/glide
- Some bench floodplain, but mostly incised throughout
- Feature originates at small headcut where hydric soils become observed
- Onoclea sensibilis, Pilea pumilia, Persicaria hydropiper in upper reach
- Moderate amount of sorting of clay bottom with sand, cobble and gravel alluvial deposits
- No water at time and no observable aquatic biota

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: STR-2	Date/Time: 9/20/2022/13:15
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.450017, -88.297948 End: 36.457746, -88.301763
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : 0.31 sq mi (USGS Stream Stats)	County: Henry
Soil Type(s) / Geology : PrD3: Providence silty clay loam, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable) = 24.00

Justification / Notes :

Overall hydrologic determination is STREAM based on secondary indicator scores

- Originates at culvert outfall and flows through agriculture field before entering wooded area

Waterbody Name: STR-2

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 14.50)	**Absent**		**Weak**		**Moderate**		**Strong**
1. Continuous bed and bank	0		1		2 ✓		3
2. Sinuous channel	0		1	✓	2		3
3. In-channel structure: riffle-pool sequences	0		1 ✓		2		3
4. Sorting of soil textures or other substrate	0		1	✓	2		3
5. Active/relic floodplain	0		0.5 ✓		1		1.5
6. Depositional bars or benches	0		1	✓	2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0		0.5 ✓		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0		1	✓	2		3
11. Grade controls	0		0.5		1 ✓		1.5
12. Natural valley or drainageway	0		0.5 ✓		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0				Yes = 3 ✓		

B. Hydrology (Subtotal = 3.50)	**Absent**		**Weak**		**Moderate**		**Strong**
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1 ✓		0.5		0
17. Sediment on plants or on debris	0		0.5 ✓		1		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5 ✓		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0				Yes = 1.5 ✓		

C. Biology (Subtotal = 6.00)	**Absent**		**Weak**		**Moderate**		**Strong**
20. Fibrous roots in channel bed [1]	3 ✓		2		1		0
21. Rooted plants in the thalweg [1]	3 ✓		2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28.Wetland plants in channel bed [2]	0 ✓		0.5		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 24.00

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Bed and bank present throughout, as well as OHWM indicators
- Weak/moderate sinuosity, stronger mid-reach
- Weak/moderate sorting of gravel and sand, weak riffle/pool sequences
- Moderate headcuts and grade controls throughout, along with some depositional benches
- Hydric soils observed despite no standing water
- No terrestrial vegetation or fibrous roots and very little leaf litter in channel
- No aquatic biota or wetland plants present

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: STR-3	Date/Time: 9/20/2022/13:45
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.455209, -88.301457 End: 36.455466, -88.301194
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : ~0.01 sq mi	County: Henry
Soil Type(s) / Geology : PrD3: Providence silty clay loam, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable) = 20.00

Justification / Notes :

Overall hydrologic determination is STREAM based on secondary indicator scores

- Feature drains directly into STR-2
- Was observed with a pool at beginning of resource with red tubificid worms and Physidae snails

Waterbody Name: STR-3

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 10.50)	Absent		Weak		Moderate		Strong
1. Continuous bed and bank	0		1		✓ 2		3
2. Sinuous channel	0		✓ 1		2		3
3. In-channel structure: riffle-pool sequences	0		✓ 1		2		3
4. Sorting of soil textures or other substrate	0		1	✓	2		3
5. Active/relic floodplain	0		✓ 0.5		1		1.5
6. Depositional bars or benches	0		✓ 1		2		3
7. Braided channel	✓ 0		1		2		3
8. Recent alluvial deposits	0		✓ 0.5		1		1.5
9. Natural levees	✓ 0		1		2		3
10. Headcuts	0		1	✓	2		3
11. Grade controls	0		0.5		✓ 1		1.5
12. Natural valley or drainageway	0		✓ 0.5		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 4.00)	Absent		Weak		Moderate		Strong
14. Subsurface flow/discharge into channel	✓ 0		1		2		3
15. Water in channel and >48 hours since sig. rain	0	✓	1		2		3
16. Leaf litter in channel (January – September)	1.5		✓ 1		0.5		0
17. Sediment on plants or on debris	0		✓ 0.5		1		1.5
18. Organic debris lines or piles (wrack lines)	0		✓ 0.5		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0				Yes = 1.5 ✓		

C. Biology (Subtotal = 5.50)	Absent		Weak		Moderate		Strong
20. Fibrous roots in channel bed [1]	3		2	✓	1		0
21. Rooted plants in the thalweg [1]	✓ 3		2		1		0
22. Crayfish in stream (exclude in floodplain)	✓ 0		1		2		3
23. Bivalves/mussels	✓ 0		1		2		3
24. Amphibians	✓ 0		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0	✓	1		2		3
26. Filamentous algae; periphyton	✓ 0		1		2		3
27. Iron oxidizing bacteria/fungus	✓ 0		0.5		1		1.5
28.Wetland plants in channel bed [2]	0		✓ 0.5		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 20.00

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Bed and bank nearly present throughout, as well as OHWM indicators
- Some sorting and sinuosity, likely mostly riffle/glide
- Weak floodplain, mostly incised with some depositional bars
- One pool of water at start of feature, bloodworms and lunged snails present
- Microstegium vimineum and Persicaria hydropiper in channel

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: STR-4	Date/Time: 9/20/2022/14:30
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.455539, -88.302408 End: 36.455704, -88.301509
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : <0.01 sq mi	County: Henry
Soil Type(s) / Geology : PrD3: Providence silty clay loam, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1” in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = “Yes”, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable) = 19.25

Justification / Notes :

Overall hydrologic determination is STREAM based on secondary indicator scores

- Originates from pond P-2 and drains directly into STR-2

Waterbody Name: STR-4

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 10.25)	**Absent**		**Weak**		**Moderate**		**Strong**
1. Continuous bed and bank	0		1		2 ✓		3
2. Sinuous channel	0		1 ✓		2		3
3. In-channel structure: riffle-pool sequences	0		1 ✓		2		3
4. Sorting of soil textures or other substrate	0		1 ✓		2		3
5. Active/relic floodplain	0		0.5	✓	1		1.5
6. Depositional bars or benches	0		1 ✓		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0		0.5 ✓		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0		1	✓	2		3
11. Grade controls	0		0.5		1 ✓		1.5
12. Natural valley or drainageway	0		0.5 ✓		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 3.50)	**Absent**		**Weak**		**Moderate**		**Strong**
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1 ✓		0.5		0
17. Sediment on plants or on debris	0		0.5 ✓		1		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5 ✓		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0				Yes = 1.5 ✓		

C. Biology (Subtotal = 5.50)	**Absent**		**Weak**		**Moderate**		**Strong**
20. Fibrous roots in channel bed [1]	3		2 ✓		1		0
21. Rooted plants in the thalweg [1]	3 ✓		2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28.Wetland plants in channel bed [2]	0		0.5 ✓		1		1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 19.25

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Bed and bank mostly present throughout, as well as OHWM indicators
- Some sorting and sinuosity, mostly riffle/glide
- Mostly incised with weak floodplain and some depositional bars
- No standing water but hydric soils present
- A little Persicaria hydropiper present in channel
- No aquatic biota or terrestrial vegetation in channel

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: STR-5	Date/Time: 9/21/2022/11:25
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.445431, -88.314349 End: 36.445290, -88.314756
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : 0.04 sq mi (USGS Stream Stats)	County: Henry
Soil Type(s) / Geology : LnC3: Lexington silty clay loam, 5 to 8 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	✓	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream ☐
6. Presence of fish (except *Gambusia*)	✓	Stream ☐
7. Presence of naturally occurring ground water table connection	✓	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable) = 19.25

Justification / Notes :

Overall hydrologic determination is STREAM based on secondary indicator scores

- Connects two different wetland areas

Waterbody Name: STR-5

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 10.00)	Absent		Weak		Moderate		Strong
1. Continuous bed and bank	0		1		2 ✓		3
2. Sinuous channel	0		1 ✓		2		3
3. In-channel structure: riffle-pool sequences	0		1 ✓		2		3
4. Sorting of soil textures or other substrate	0		1	✓	2		3
5. Active/relic floodplain	0		0.5		✓		1.5
6. Depositional bars or benches	0		1 ✓		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0		0.5 ✓		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0		1 ✓		2		3
11. Grade controls	0		0.5 ✓		1		1.5
12. Natural valley or drainageway	0		0.5 ✓		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 3.75)	Absent		Weak		Moderate		Strong
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1 ✓		0.5		0
17. Sediment on plants or on debris	0		0.5 ✓		1		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5	✓	1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0				Yes = 1.5 ✓		

C. Biology (Subtotal = 5.50)	Absent		Weak		Moderate		Strong
20. Fibrous roots in channel bed [1]	3		2 ✓		1		0
21. Rooted plants in the thalweg [1]	3 ✓		2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28. Wetland plants in channel bed [2]	0		0.5 ✓		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 19.25

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Moderate bed and bank throughout reach, as well as OHWM
- Weak riffle-pool, mostly riffle-glide, low sinuosity
- Feature starts at small headcut, hydric soils are observed
- Moderate floodplain that that opens into wetland
- Small woody roots present as some grade control, feature dissipates into wetland

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: STR-6	Date/Time: 9/21/2022/13:05
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.447332, -88.313994 End: 36.446062, -88.316202
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : 0.12 sq mi (USGS Stream Stats)	County: Henry
Soil Type(s) / Geology : Ea: Enville silt loam, 0 to 2 percent slopes, occasionally flooded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable) = 19.50

Justification / Notes :

Overall hydrologic determination is STREAM based on secondary indicator scores

-Drains into the East Fork Clarks River

Waterbody Name: STR-6

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 11.00)	Absent		Weak		Moderate		Strong
1. Continuous bed and bank	0		1		2 ✓		3
2. Sinuous channel	0		1	✓	2		3
3. In-channel structure: riffle-pool sequences	0		1 ✓		2		3
4. Sorting of soil textures or other substrate	0		1	✓	2		3
5. Active/relic floodplain	0		0.5 ✓		1		1.5
6. Depositional bars or benches	0		1 ✓		2		3
7. Braided channel	0		1 ✓		2		3
8. Recent alluvial deposits	0 ✓		0.5		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0		1	✓	2		3
11. Grade controls	0		0.5 ✓		1		1.5
12. Natural valley or drainageway	0		0.5 ✓		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 3.00)	Absent		Weak		Moderate		Strong
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1 ✓		0.5		0
17. Sediment on plants or on debris	0 ✓		0.5		1		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5 ✓		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0				Yes = 1.5 ✓		

C. Biology (Subtotal = 5.50)	Absent		Weak		Moderate		Strong
20. Fibrous roots in channel bed [1]	3	✓	2		1		0
21. Rooted plants in the thalweg [1]	3 ✓		2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28. Wetland plants in channel bed [2]	0 ✓		0.5		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 19.50

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Moderate bed and bank, slight loss mid reach
- Some sinuosity with weak/moderate sorting of sand and silt bottom
- Weak channel braiding caused by log jams
- Mostly riffle/glide with 4 small head cuts
- No surface water but hydric soil is present
- Weak leaf litter and no vegetation found in the channel
- No aquatic biota

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: STR-7	Date/Time: 9/21/2022/14:25
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.441680, -88.311011 End: 36.446099, -88.316257
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : 2.00 sq mi (USGS Stream Stats)	County: Henry
Soil Type(s) / Geology : Ik: Iuka loam, 0 to 2 percent slopes, occasionally flooded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	✓	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream ☐
6. Presence of fish (except *Gambusia*)		Stream ✓
7. Presence of naturally occurring ground water table connection	✓	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream ✓
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable) =

Justification / Notes :

Overall hydrologic determination is STREAM based on primary indicators

- East Fork Clarks River
- Top minnow observed
- Flowing water in channel and >7 days since rainfall

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: STR-8	Date/Time: 9/21/2022/16:30
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.442919, -88.311122 End: 36.442594, -88.312169
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : 0.04 sq mi (USGS Stream Stats)	County: Henry
Soil Type(s) / Geology : Ea: Enville silt loam, 0 to 2 percent slopes, occasionally flooded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1” in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = “Yes”, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable) = 19.50

Justification / Notes :

Overall hydrologic determination is STREAM based on secondary indicator scores

- Drains directly into the East Fork Clarks River

Waterbody Name: STR-8

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 10.50)	Absent		Weak		Moderate		Strong
1. Continuous bed and bank	0		1		2 ✓		3
2. Sinuous channel	0		1	✓	2		3
3. In-channel structure: riffle-pool sequences	0		1	✓	2		3
4. Sorting of soil textures or other substrate	0		1 ✓		2		3
5. Active/relic floodplain	0		0.5 ✓		1		1.5
6. Depositional bars or benches	0	✓	1		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0 ✓		0.5		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0		1	✓	2		3
11. Grade controls	0		0.5	✓	1		1.5
12. Natural valley or drainageway	0		0.5 ✓		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 3.50)	Absent		Weak		Moderate		Strong
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1 ✓		0.5		0
17. Sediment on plants or on debris	0		0.5 ✓		1		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5 ✓		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0				Yes = 1.5 ✓		

C. Biology (Subtotal = 5.50)	Absent		Weak		Moderate		Strong
20. Fibrous roots in channel bed [1]	3	✓	2		1		0
21. Rooted plants in the thalweg [1]	3 ✓		2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28. Wetland plants in channel bed [2]	0 ✓		0.5		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 19.50

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Moderate bed and bank throughout reach with sinuosity
- Weak/moderate sorting of sand and silt bottom
- Some small to medium head cuts and grade controls in the form of roots
- Not much leaf litter in channel, weak sediment on plants and wrack lines present
- Hydric soil present, no surface water
- No terrestrial vegetation in channel and very weak amount of fibrous roots
- No aquatic biota or wetland plants present

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: STR-9	Date/Time: 9/22/2022/08:15
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.444164, -88.320173 End: 36.445742, -88.318860
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : 1.01 sq mi (USGS Stream Stats)	County: Henry
Soil Type(s) / Geology : Ik: Iuka loam, 0 to 2 percent slopes, occasionally flooded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	✓	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream ☐
6. Presence of fish (except *Gambusia*)		Stream ✓
7. Presence of naturally occurring ground water table connection	✓	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable) =

Justification / Notes :

Overall hydrologic determination is STREAM based on primary indicators

- Drains into East Fork Clarks River
- Top minnow and mosquito fish observed in pools
- Stream is under drought conditions

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: STR-10	Date/Time: 9/22/2022/13:50
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.441546, -88.300116 End: 36.440614, -88.303253
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : 0.19 sq mi (USGS Stream Stats)	County: Henry
Soil Type(s) / Geology : PrD3: Providence silty clay loam, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	✓	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream ☐
6. Presence of fish (except *Gambusia*)	✓	Stream ☐
7. Presence of naturally occurring ground water table connection	✓	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable) = 26.00

Justification / Notes :

Overall hydrologic determination is STREAM based on secondary indicator scores

- Originates at moderate headcut where EPH-9 ends that likely has a groundwater connection

Waterbody Name: STR-10

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 15.50)	**Absent**		**Weak**		**Moderate**		**Strong**
1. Continuous bed and bank	0		1		2 ✓		3
2. Sinuous channel	0		1 ✓		2		3
3. In-channel structure: riffle-pool sequences	0		1	✓	2		3
4. Sorting of soil textures or other substrate	0		1		2 ✓		3
5. Active/relic floodplain	0		0.5 ✓		1		1.5
6. Depositional bars or benches	0		1	✓	2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0		0.5		1 ✓		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0		1	✓	2		3
11. Grade controls	0		0.5	✓	1		1.5
12. Natural valley or drainageway	0		0.5	✓	1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0				Yes = 3 ✓		

B. Hydrology (Subtotal = 4.50)	**Absent**		**Weak**		**Moderate**		**Strong**
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5 ✓		1		0.5		0
17. Sediment on plants or on debris	0		0.5		1 ✓		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5	✓	1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0				Yes = 1.5 ✓		

C. Biology (Subtotal = 6.00)	**Absent**		**Weak**		**Moderate**		**Strong**
20. Fibrous roots in channel bed [1]	3 ✓		2		1		0
21. Rooted plants in the thalweg [1]	3 ✓		2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28.Wetland plants in channel bed [2]	0 ✓		0.5		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 26.00

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Moderate bed and bank throughout reach with moderate sorting of gravel and sand
- Weak/moderate depositional benches and moderate recent alluvial deposits
- Reach starts at one moderate headcut and has some grade controls, especially in upper reach
- No surface water present but hydric soils observed
- No vegetation or fibrous roots in channel
- No aquatic biota

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: STR-11	Date/Time: 9/22/2022/14:10
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.441740, -88.300978 End: 36.441559, -88.300943
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : 0.10 sq mi (USGS Stream Stats)	County: Henry
Soil Type(s) / Geology : PrD3: Providence silty clay loam, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	✓	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream ☐
6. Presence of fish (except *Gambusia*)	✓	Stream ☐
7. Presence of naturally occurring ground water table connection	✓	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable) = 26.00

Justification / Notes :

Overall hydrologic determination is STREAM based on secondary indicator scores

- Originates at headcut where EPH-8 ends and drains into STR-10

Waterbody Name: STR-11

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 15.50)	Absent		Weak		Moderate		Strong
1. Continuous bed and bank	0		1		2 ✓		3
2. Sinuous channel	0		1 ✓		2		3
3. In-channel structure: riffle-pool sequences	0		1	✓	2		3
4. Sorting of soil textures or other substrate	0		1		2 ✓		3
5. Active/relic floodplain	0		0.5 ✓		1		1.5
6. Depositional bars or benches	0		1	✓	2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0		0.5		1 ✓		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0		1	✓	2		3
11. Grade controls	0		0.5	✓	1		1.5
12. Natural valley or drainageway	0		0.5	✓	1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0				Yes = 3 ✓		

B. Hydrology (Subtotal = 4.50)	Absent		Weak		Moderate		Strong
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5 ✓		1		0.5		0
17. Sediment on plants or on debris	0		0.5		1 ✓		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5	✓	1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0				Yes = 1.5 ✓		

C. Biology (Subtotal = 6.00)	Absent		Weak		Moderate		Strong
20. Fibrous roots in channel bed [1]	3 ✓		2		1		0
21. Rooted plants in the thalweg [1]	3 ✓		2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28. Wetland plants in channel bed [2]	0 ✓		0.5		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 26.00

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Moderate bed and bank throughout reach with moderate sorting of gravel and sand
- Weak/moderate depositional benches and moderate recent alluvial deposits
- Reach starts at one moderate headcut and has some grade controls, especially in upper reach
- No surface water present but hydric soils observed
- No vegetation or fibrous roots in channel
- No aquatic biota

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: EPH-1	Date/Time: 9/20/2022/10:30
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.452814, -88.306826 End: 36.453450, -88.307866
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : 0.13 sq mi (USGS Stream Stats)	County: Henry
Soil Type(s) / Geology : SgD3: Smithdale-Lexington complex, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 16.75

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Channel has been directed on edge of soy field

Waterbody Name: EPH-1

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 9.00)	**Absent**		**Weak**		**Moderate**		**Strong**
1. Continuous bed and bank	0		1		2 ✓		3
2. Sinuous channel	0		1 ✓		2		3
3. In-channel structure: riffle-pool sequences	0		1	✓	2		3
4. Sorting of soil textures or other substrate	0		1 ✓		2		3
5. Active/relic floodplain	0		0.5 ✓		1		1.5
6. Depositional bars or benches	0		1 ✓		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0		0.5 ✓		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0		1 ✓		2		3
11. Grade controls	0 ✓		0.5		1		1.5
12. Natural valley or drainageway	0		0.5 ✓		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 2.00)	**Absent**		**Weak**		**Moderate**		**Strong**
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1 ✓		0.5		0
17. Sediment on plants or on debris	0		0.5 ✓		1		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5 ✓		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓				Yes = 1.5		

C. Biology (Subtotal = 5.75)	**Absent**		**Weak**		**Moderate**		**Strong**
20. Fibrous roots in channel bed [1]	3		2 ✓		1		0
21. Rooted plants in the thalweg [1]	3 ✓		2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28. Wetland plants in channel bed [2]	0		0.5	✓	1		1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 16.75

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Semi continuous bed and bank, as well as OHWM, throughout reach
- Some sinuosity, slight presence of floodplain within top of bank, as well as depositional benches
- No hydric soil or aquatic biota in channel
- Persicaria hydropiper and Pilea pumilia in channel
- No flowing water
- Assumed presence of some pools and mostly glide morphology

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: EPH-2	Date/Time: 9/20/2022/12:00
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.452726, -88.308706 End: 36.453587, -88.308454
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : ~0.01 sq mi	County: Henry
Soil Type(s) / Geology : SgE2: Smithdale-Lexington complex, 12 to 25 percent slopes, eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 16.75

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Man-made drainage into property from adjacent agriculture field

Waterbody Name: EPH-2

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 9.25)	**Absent**		**Weak**		**Moderate**		**Strong**
1. Continuous bed and bank	0		1		2 ✓		3
2. Sinuous channel	0		1		2 ✓		3
3. In-channel structure: riffle-pool sequences	0		1 ✓		2		3
4. Sorting of soil textures or other substrate	0		1 ✓		2		3
5. Active/relic floodplain	0 ✓		0.5		1		1.5
6. Depositional bars or benches	0		1 ✓		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0		0.5 ✓		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0 ✓		1		2		3
11. Grade controls	0		0.5		1 ✓		1.5
12. Natural valley or drainageway	0		0.5	✓	1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 2.50)	**Absent**		**Weak**		**Moderate**		**Strong**
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1 ✓		0.5		0
17. Sediment on plants or on debris	0		0.5 ✓		1		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5		1 ✓		1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓				Yes = 1.5		

C. Biology (Subtotal = 5.00)	**Absent**		**Weak**		**Moderate**		**Strong**
20. Fibrous roots in channel bed [1]	3		2 ✓		1		0
21. Rooted plants in the thalweg [1]	3 ✓		2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28.Wetland plants in channel bed [2]	0 ✓		0.5		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 16.75

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Bed and bank present nearly throughout reach
- Sinuosity is present, frequently crosses a straight line
- Feature is mostly a glide/riffle, channel is heavily incised
- Moderate amount of shallow grade control structures
- Moderate wrack lines in channel, but no vegetation in channel

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: EPH-3	Date/Time: 9/20/2022/14:00
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.454977, -88.301705 End: 36.455209, -88.301457
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : ~0.01 sq mi	County: Henry
Soil Type(s) / Geology : PrD3: Providence silty clay loam, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☐ Absent ☑	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 13.00

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Ephemeral channel drains directly into STR-3

Waterbody Name: EPH-3

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 7.00)	**Absent**		**Weak**		**Moderate**		**Strong**
1. Continuous bed and bank	0		1	✓	2		3
2. Sinuous channel	0		1 ✓		2		3
3. In-channel structure: riffle-pool sequences	0		1 ✓		2		3
4. Sorting of soil textures or other substrate	0	✓	1		2		3
5. Active/relic floodplain	0		0.5 ✓		1		1.5
6. Depositional bars or benches	0	✓	1		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0		0.5 ✓		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0	✓	1		2		3
11. Grade controls	0		0.5 ✓		1		1.5
12. Natural valley or drainageway	0		0.5 ✓		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		✓		Yes = 3		

B. Hydrology (Subtotal = 2.00)	**Absent**		**Weak**		**Moderate**		**Strong**
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1 ✓		0.5		0
17. Sediment on plants or on debris	0		0.5 ✓		1		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5 ✓		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0		✓		Yes = 1.5		

C. Biology (Subtotal = 4.00)	**Absent**		**Weak**		**Moderate**		**Strong**
20. Fibrous roots in channel bed [1]	3		2	✓	1		0
21. Rooted plants in the thalweg [1]	3	✓	2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28.Wetland plants in channel bed [2]	0 ✓		0.5		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 13.00

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Bed and bank present intermittently throughout reach
- Sinuosity and riffle-pool very weak, mostly riffle with little sorting
- Little to no connection to floodplain, small head cuts and grade controls present
- Some leaf-litter and wrack lines present
- High amounts of fibrous roots and terrestrial vegetation (Polygonum virginiana) in channel
- No surface water or aquatic biota

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: EPH-4	Date/Time: 9/20/2022/16:20
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.453034, -88.299334 End: 36.453922, -88.298913
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : 0.03 sq mi (USGS Stream Stats)	County: Henry
Soil Type(s) / Geology : PrD3: Providence silty clay loam, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 13.50

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Ephemeral channel drains directly into STR-2

- Originates from agriculture field

Waterbody Name: EPH-4

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 7.50)	**Absent**		**Weak**		**Moderate**		**Strong**
1. Continuous bed and bank	0		1	✓	2		3
2. Sinuous channel	0		1 ✓		2		3
3. In-channel structure: riffle-pool sequences	0		1 ✓		2		3
4. Sorting of soil textures or other substrate	0		1 ✓		2		3
5. Active/relic floodplain	0		0.5 ✓		1		1.5
6. Depositional bars or benches	0	✓	1		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0 ✓		0.5		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0	✓	1		2		3
11. Grade controls	0		0.5 ✓		1		1.5
12. Natural valley or drainageway	0		0.5 ✓		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 2.00)	**Absent**		**Weak**		**Moderate**		**Strong**
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1 ✓		0.5		0
17. Sediment on plants or on debris	0		0.5 ✓		1		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5 ✓		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓				Yes = 1.5		

C. Biology (Subtotal = 4.00)	**Absent**		**Weak**		**Moderate**		**Strong**
20. Fibrous roots in channel bed [1]	3		2	✓	1		0
21. Rooted plants in the thalweg [1]	3	✓	2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28.Wetland plants in channel bed [2]	0 ✓		0.5		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 13.50

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Bed and bank present intermittently throughout reach
- Sinuosity and riffle-pool very weak, mostly riffle with weak sorting
- Little to no connection to floodplain, small head cuts and grade controls present
- Some leaf-litter and wrack lines present
- High amounts of fibrous roots and terrestrial vegetation (Polygonum virginiana) in channel
- No surface water or aquatic biota

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: EPH-5	Date/Time: 9/21/2022/14:00
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.446939, -88.315479 End: 36.447438, -88.315688
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : ~0.01 sq mi	County: Henry
Soil Type(s) / Geology : Ea: Enville silt loam, 0 to 2 percent slopes, occasionally flooded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	✓	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream ☐
6. Presence of fish (except *Gambusia*)	✓	Stream ☐
7. Presence of naturally occurring ground water table connection	✓	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1” in local watershed	✓	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream ☐

NOTE: If any Primary Indicators 1-9 = “Yes”, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 13.75

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Drains WTL-3 to an off-site wetland that was approximated

Waterbody Name: EPH-5

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 7.00)	Absent		Weak		Moderate		Strong
1. Continuous bed and bank	0		1	✓	2		3
2. Sinuous channel	0		1	✓	2		3
3. In-channel structure: riffle-pool sequences	0		1 ✓		2		3
4. Sorting of soil textures or other substrate	0		1 ✓		2		3
5. Active/relic floodplain	0		0.5		1 ✓		1.5
6. Depositional bars or benches	0 ✓		1		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0 ✓		0.5		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0 ✓		1		2		3
11. Grade controls	0		0.5		1 ✓		1.5
12. Natural valley or drainageway	0 ✓		0.5		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 2.25)	Absent		Weak		Moderate		Strong
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1 ✓		0.5		0
17. Sediment on plants or on debris	0		0.5	✓	1		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5 ✓		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓				Yes = 1.5		

C. Biology (Subtotal = 4.50)	Absent		Weak		Moderate		Strong
20. Fibrous roots in channel bed [1]	3		2		1 ✓		0
21. Rooted plants in the thalweg [1]	3 ✓		2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28. Wetland plants in channel bed [2]	0		0.5 ✓		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 13.75

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Weak/moderate bed and bank as well as sinuosity throughout reach
- Moderate amount of small grade controls in the form of root masses
- Weak sorting of silt and clay bottom, weak riffle/pool sequence
- No surface water or hydric soil
- Weak wetland plants such as Polygonum virginianum, Pilea pumilia, and boehmeria cylindrica
- No terrestrial vegetation or aquatic biota
- Small amounts of leaf litter, moderate roots in channel and sediment on vegetation

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: EPH-6	Date/Time: 9/22/2022/08:05
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.442922, -88.318325 End: 36.445613, -88.319042
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : 0.06 sq mi (USGS Stream Stats)	County: Henry
Soil Type(s) / Geology : Cn: Chenneby silt loam, 0 to 2 percent slopes, occasionally flooded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 10.25

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Drains directly into STR-9 which eventually drains into East Fork Clarks River
- Functions solely as an agricultural drainage, could have historical straightening of channel

Waterbody Name: EPH-6

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 5.50)	Absent		Weak		Moderate		Strong
1. Continuous bed and bank	0		1		2	✓	3
2. Sinuous channel	0 ✓		1		2		3
3. In-channel structure: riffle-pool sequences	0		1 ✓		2		3
4. Sorting of soil textures or other substrate	0		1	✓	2		3
5. Active/relic floodplain	0 ✓		0.5		1		1.5
6. Depositional bars or benches	0 ✓		1		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0 ✓		0.5		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0 ✓		1		2		3
11. Grade controls	0 ✓		0.5		1		1.5
12. Natural valley or drainageway	0		0.5 ✓		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 2.25)	Absent		Weak		Moderate		Strong
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5 ✓		1		0.5		0
17. Sediment on plants or on debris	0 ✓		0.5		1		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5	✓	1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓				Yes = 1.5		

C. Biology (Subtotal = 2.50)	Absent		Weak		Moderate		Strong
20. Fibrous roots in channel bed [1]	3		2		1 ✓		0
21. Rooted plants in the thalweg [1]	3		2	✓	1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28. Wetland plants in channel bed [2]	0 ✓		0.5		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 10.25

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Moderate/strong bed and bank throughout reach, acts as agricultural drainage through field
- No sinuosity possibly due to historical straightening to use as drainage ditch
- Mostly riffle/glide sequence with weak/moderate sorting, stronger sorting near end of reach
- No surface water or hydric soil
- No headcut, starts at culvert outfall
- Some terrestrial vegetation in channel such as Johnson grass, morning glory, and annual ragweed
- Moderate fibrous roots in channel with weak wrack lines
- No aquatic biota or wetland plants

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: EPH-7	Date/Time: 9/22/2022/09:40
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.445870, -88.303291 End: 36.441677, -88.306268
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : 0.07 sq mi (USGS Stream Stats)	County: Henry
Soil Type(s) / Geology : PrD3: Providence silty clay loam, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 11.00

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Channel is somewhat defined and is likely man-made for agricultural drainage

Waterbody Name: EPH-7

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 5.75)	**Absent**		**Weak**		**Moderate**		**Strong**
1. Continuous bed and bank	0		1	✓	2		3
2. Sinuous channel	0	✓	1		2		3
3. In-channel structure: riffle-pool sequences	0		1 ✓		2		3
4. Sorting of soil textures or other substrate	0		1 ✓		2		3
5. Active/relic floodplain	0	✓	0.5		1		1.5
6. Depositional bars or benches	0 ✓		1		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0 ✓		0.5		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0		1 ✓		2		3
11. Grade controls	0 ✓		0.5		1		1.5
12. Natural valley or drainageway	0		0.5 ✓		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 2.25)	**Absent**		**Weak**		**Moderate**		**Strong**
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5 ✓		1		0.5		0
17. Sediment on plants or on debris	0 ✓		0.5		1		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5	✓	1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓				Yes = 1.5		

C. Biology (Subtotal = 3.00)	**Absent**		**Weak**		**Moderate**		**Strong**
20. Fibrous roots in channel bed [1]	3		2	✓	1		0
21. Rooted plants in the thalweg [1]	3		2	✓	1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28. Wetland plants in channel bed [2]	0 ✓		0.5		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 11.00

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Weak/moderate bed and bank throughout reach, very slight sinuosity
- Mostly riffle/glide sequences with 3 small headcuts
- No grade controls or leaf litter
- Slight floodplain and no natural valley
- No surface water or hydric soil
- Weak/moderate fibrous roots and wrack lines in upper reach
- Terrestrial vegetation such as Johnson grass and hophornbeam copperfleaf mid reach
- No aquatic biota or wetland plants present

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: EPH-8	Date/Time: 9/22/2022/11:45
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.444358, -88.300671 End: 36.441801, -88.300959
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : 0.10 sq mi (USGS Stream Stats)	County: Henry
Soil Type(s) / Geology : PrD3: Providence silty clay loam, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 14.75

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Starts in hayfield and eventually develops into STR-11 before draining into STR-10

Waterbody Name: EPH-8

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8.50)	**Absent**		**Weak**		**Moderate**		**Strong**
1. Continuous bed and bank	0		1	✓	2		3
2. Sinuous channel	0		1 ✓		2		3
3. In-channel structure: riffle-pool sequences	0 ✓		1		2		3
4. Sorting of soil textures or other substrate	0		1 ✓		2		3
5. Active/relic floodplain	0	✓	0.5		1		1.5
6. Depositional bars or benches	0 ✓		1		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0 ✓		0.5		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0		1 ✓		2		3
11. Grade controls	0	✓	0.5		1		1.5
12. Natural valley or drainageway	0		0.5 ✓		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ☐				Yes = 3 ✓		

B. Hydrology (Subtotal = 2.25)	**Absent**		**Weak**		**Moderate**		**Strong**
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5	✓	1		0.5		0
17. Sediment on plants or on debris	0		0.5 ✓		1		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5 ✓		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓				Yes = 1.5 ☐		

C. Biology (Subtotal = 4.00)	**Absent**		**Weak**		**Moderate**		**Strong**
20. Fibrous roots in channel bed [1]	3		2	✓	1		0
21. Rooted plants in the thalweg [1]	3		2 ✓		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28.Wetland plants in channel bed [2]	0		0.5 ✓		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 14.75

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Weak/moderate bed and bank that is stronger at the lower portion of the reach
- Some sorting of gravel, sand, and clay
- Very weak floodplain that is mostly incised
- 3 small headcuts and very weak grade controls
- No surface water or hydric soils
- Weak sediment on plants and wrack lines with very slight amount of leaf litter
- Weak/moderate fibrous roots and some terrestrial vegetation
- Weak amount of wetland plants present, some Persicaria hydropiper
- No aquatic vegetation

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: EPH-9	Date/Time: 9/22/2022/13:15
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.441077, -88.298986 End: 36.441546, -88.300116
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : 0.05 sq mi (USGS Stream Stats)	County: Henry
Soil Type(s) / Geology : PrD3: Providence silty clay loam, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 13.75

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Drains WTL-7 into STR-10

Waterbody Name: EPH-9

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 7.00)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	✓	2	3
2. Sinuous channel	0	✓	2	3
3. In-channel structure: riffle-pool sequences	0	✓	2	3
4. Sorting of soil textures or other substrate	0	✓	2	3
5. Active/relic floodplain	0	0.5	✓	1.5
6. Depositional bars or benches	0 ✓	1	2	3
7. Braided channel	0 ✓	1	2	3
8. Recent alluvial deposits	0 ✓	0.5	1	1.5
9. Natural levees	0 ✓	1	2	3
10. Headcuts	0	✓ 1	2	3
11. Grade controls	0	0.5	✓	1.5
12. Natural valley or drainageway	0	0.5 ✓	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓		Yes = 3	

B. Hydrology (Subtotal = 2.75)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0 ✓	1	2	3
15. Water in channel and >48 hours since sig. rain	0 ✓	1	2	3
16. Leaf litter in channel (January – September)	1.5	✓	0.5	0
17. Sediment on plants or on debris	0	0.5	✓ 1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	✓	1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓		Yes = 1.5	

C. Biology (Subtotal = 4.00)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed [1]	3	2	✓	0
21. Rooted plants in the thalweg [1]	3 ✓	2	1	0
22. Crayfish in stream (exclude in floodplain)	0 ✓	1	2	3
23. Bivalves/mussels	0 ✓	1	2	3
24. Amphibians	0 ✓	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0 ✓	1	2	3
26. Filamentous algae; periphyton	0 ✓	1	2	3
27. Iron oxidizing bacteria/fungus	0 ✓	0.5	1	1.5
28. Wetland plants in channel bed [2]	0 ✓	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 13.75

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Weak bed and bank as well as sinuosity throughout reach
- Weak sorting of gravel, sand, and silt
- Mostly riffle sequences with moderate root grade controls and two small headcuts
- Moderate floodplain with a weak natural valley
- No standing water or hydric soil
- Moderate fibrous roots and wrack lines observed, weak leaf litter
- No vegetation or aquatic biota present in channel

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: EPH-10	Date/Time: 9/22/2022/16:20
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400050801	Lat/Long: Start: 36.450275, -88.293970 End: 36.451068, -88.292723
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : ~0.01 sq mi	County: Henry
Soil Type(s) / Geology : HgF: Hapludults-Gullied land complex, very steep	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	✓	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream ☐
6. Presence of fish (except *Gambusia*)	✓	Stream ☐
7. Presence of naturally occurring ground water table connection	✓	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 12.75

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Originates from deep valley

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8.75)	**Absent**		**Weak**		**Moderate**		**Strong**
1. Continuous bed and bank	0		1	✓	2		3
2. Sinuous channel	0		1	✓	2		3
3. In-channel structure: riffle-pool sequences	0		1 ✓		2		3
4. Sorting of soil textures or other substrate	0		1		2 ✓		3
5. Active/relic floodplain	0 ✓		0.5		1		1.5
6. Depositional bars or benches	0 ✓		1		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0 ✓		0.5		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0		1 ✓		2		3
11. Grade controls	0		0.5 ✓		1		1.5
12. Natural valley or drainageway	0		0.5		1	✓	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 1.00)	**Absent**		**Weak**		**Moderate**		**Strong**
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1		0.5 ✓		0
17. Sediment on plants or on debris	0 ✓		0.5		1		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5 ✓		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓				Yes = 1.5		

C. Biology (Subtotal = 3.00)	**Absent**		**Weak**		**Moderate**		**Strong**
20. Fibrous roots in channel bed [1]	3		2	✓	1		0
21. Rooted plants in the thalweg [1]	3		2	✓	1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28. Wetland plants in channel bed [2]	0 ✓		0.5		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 12.75

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Weak/moderate bed and bank throughout reach
- Weak/moderate sinuosity with no floodplain
- Moderate sorting of sand and gravel
- Steep natural valley
- Weak headcuts and grade controls
- No hydric soil or standing water
- Some fibrous roots and terrestrial plants in channel
- No aquatic biota or wetland plants present

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: ES-1	Date/Time: 9/20/2022/11:25
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.453407, -88.307094 End: 36.453250, -88.307284
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : <0.01 sq mi	County: Henry
Soil Type(s) / Geology : SgD3: Smithdale-Lexington complex, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 11.50

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Slight channelization adjacent to soy bean field

Waterbody Name: ES-1

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 5.50)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	✓ 2	3
2. Sinuous channel	0	1 ✓	2	3
3. In-channel structure: riffle-pool sequences	0	1 ✓	2	3
4. Sorting of soil textures or other substrate	0	✓ 1	2	3
5. Active/relic floodplain	0	0.5 ✓	1	1.5
6. Depositional bars or benches	0 ✓	1	2	3
7. Braided channel	0 ✓	1	2	3
8. Recent alluvial deposits	0	✓ 0.5	1	1.5
9. Natural levees	0 ✓	1	2	3
10. Headcuts	0 ✓	1	2	3
11. Grade controls	0	0.5	✓ 1	1.5
12. Natural valley or drainageway	0	0.5 ✓	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓		Yes = 3	

B. Hydrology (Subtotal = 1.50)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	0 ✓	1	2	3
15. Water in channel and >48 hours since sig. rain	0 ✓	1	2	3
16. Leaf litter in channel (January – September)	1.5	1 ✓	0.5	0
17. Sediment on plants or on debris	0	0.5 ✓	1	1.5
18. Organic debris lines or piles (wrack lines)	0 ✓	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓		Yes = 1.5	

C. Biology (Subtotal = 4.50)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	✓ 1	0
21. Rooted plants in the thalweg [1]	3 ✓	2	1	0
22. Crayfish in stream (exclude in floodplain)	0 ✓	1	2	3
23. Bivalves/mussels	0 ✓	1	2	3
24. Amphibians	0 ✓	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0 ✓	1	2	3
26. Filamentous algae; periphyton	0 ✓	1	2	3
27. Iron oxidizing bacteria/fungus	0 ✓	0.5	1	1.5
28. Wetland plants in channel bed [2]	0 ✓	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 11.50

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: ES-2	Date/Time: 9/20/2022/15:00
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.455370, -88.301801 End: 36.455670, -88.301532
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : <0.01 sq mi	County: Henry
Soil Type(s) / Geology : PrD3: Providence silty clay loam, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 12.50

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Slight channelization as a result of runoff from nearby agriculture field
- Drains into STR-4

Waterbody Name: ES-2

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 6.00)	Absent		Weak		Moderate		Strong
1. Continuous bed and bank	0		1	✓	2		3
2. Sinuous channel	0		1	✓	2		3
3. In-channel structure: riffle-pool sequences	0		1 ✓		2		3
4. Sorting of soil textures or other substrate	0	✓	1		2		3
5. Active/relic floodplain	0		0.5 ✓		1		1.5
6. Depositional bars or benches	0 ✓		1		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0 ✓		0.5		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0 ✓		1		2		3
11. Grade controls	0		0.5 ✓		1		1.5
12. Natural valley or drainageway	0		0.5 ✓		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 1.50)	Absent		Weak		Moderate		Strong
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1 ✓		0.5		0
17. Sediment on plants or on debris	0		0.5 ✓		1		1.5
18. Organic debris lines or piles (wrack lines)	0 ✓		0.5		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓				Yes = 1.5		

C. Biology (Subtotal = 5.00)	Absent		Weak		Moderate		Strong
20. Fibrous roots in channel bed [1]	3		2 ✓		1		0
21. Rooted plants in the thalweg [1]	3 ✓		2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28. Wetland plants in channel bed [2]	0 ✓		0.5		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 12.50

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Weak/moderate bed and bank throughout reach with some sinuosity
- Some small roots that act as grade controls
- Weak riffle/pool and sorting present
- No hydric soils or standing water
- Weak wrack lines and sediment on plants observed
- No aquatic biota or wetland plants in channel
- Small amount of fibrous roots observed in channel

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: ES-3	Date/Time: 9/20/2022/15:40
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.454714, -88.299795 End: 36.454856, -88.299657
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : <0.01 sq mi	County: Henry
Soil Type(s) / Geology : PrD3: Providence silty clay loam, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 12.50

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Slight channelization as a result of runoff from nearby agriculture field
- Drains into STR-2

Waterbody Name: ES-3

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 6.00)	Absent		Weak		Moderate		Strong
1. Continuous bed and bank	0		1	✓	2		3
2. Sinuous channel	0		1	✓	2		3
3. In-channel structure: riffle-pool sequences	0		1 ✓		2		3
4. Sorting of soil textures or other substrate	0	✓	1		2		3
5. Active/relic floodplain	0		0.5 ✓		1		1.5
6. Depositional bars or benches	0 ✓		1		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0 ✓		0.5		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0 ✓		1		2		3
11. Grade controls	0		0.5 ✓		1		1.5
12. Natural valley or drainageway	0		0.5 ✓		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 1.50)	Absent		Weak		Moderate		Strong
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1 ✓		0.5		0
17. Sediment on plants or on debris	0		0.5 ✓		1		1.5
18. Organic debris lines or piles (wrack lines)	0 ✓		0.5		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓				Yes = 1.5		

C. Biology (Subtotal = 5.00)	Absent		Weak		Moderate		Strong
20. Fibrous roots in channel bed [1]	3		2 ✓		1		0
21. Rooted plants in the thalweg [1]	3 ✓		2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28.Wetland plants in channel bed [2]	0 ✓		0.5		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 12.50

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Weak/moderate bed and bank throughout reach with some sinuosity
- Some small roots that act as grade controls
- Weak riffle/pool and sorting present
- No hydric soils or standing water
- Weak wrack lines and sediment on plants observed
- No aquatic biota or wetland plants in channel
- Small amount of fibrous roots observed in channel

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: ES-4	Date/Time: 9/21/2022/11:15
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.445208, -88.313922 End: 36.445261, -88.314421
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : <0.01 sq mi	County: Henry
Soil Type(s) / Geology : LnC3: Lexington silty clay loam, 5 to 8 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 11.00

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Drainage from agriculture field that drains directly into STR-5

Waterbody Name: ES-4

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 6.00)	**Absent**		**Weak**		**Moderate**		**Strong**
1. Continuous bed and bank	0		1		2 ✓		3
2. Sinuous channel	0	✓	1		2		3
3. In-channel structure: riffle-pool sequences	0		1 ✓		2		3
4. Sorting of soil textures or other substrate	0		1 ✓		2		3
5. Active/relic floodplain	0 ✓		0.5		1		1.5
6. Depositional bars or benches	0 ✓		1		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0 ✓		0.5		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0		1 ✓		2		3
11. Grade controls	0		0.5 ✓		1		1.5
12. Natural valley or drainageway	0 ✓		0.5		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 1.00)	**Absent**		**Weak**		**Moderate**		**Strong**
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1		0.5 ✓		0
17. Sediment on plants or on debris	0 ✓		0.5		1		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5 ✓		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓				Yes = 1.5		

C. Biology (Subtotal = 4.00)	**Absent**		**Weak**		**Moderate**		**Strong**
20. Fibrous roots in channel bed [1]	3		2		1 ✓		0
21. Rooted plants in the thalweg [1]	3 ✓		2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28. Wetland plants in channel bed [2]	0 ✓		0.5		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 11.00

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Bed and bank moderate throughout reach
- Little sinuosity and sorting, weak riffle/pool mostly riffle/glide
- Weak wrack lines, two small headcuts and grade controls (roots)
- No aquatic biota or hydric soils present

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: ES-5	Date/Time: 9/21/2022/12:50
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.445685, -88.315683 End: 36.445649, -88.315868
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : <0.01 sq mi	County: Henry
Soil Type(s) / Geology : Ik: Iuka loam, 0 to 2 percent slopes, occasionally flooded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 11.50

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Connects WTL-2 to the East Fork Clarks River

Waterbody Name: ES-5

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 6.50)	**Absent**		**Weak**		**Moderate**		**Strong**
1. Continuous bed and bank	0		1	✓	2		3
2. Sinuous channel	0		1 ✓		2		3
3. In-channel structure: riffle-pool sequences	0		1 ✓		2		3
4. Sorting of soil textures or other substrate	0		1 ✓		2		3
5. Active/relic floodplain	0 ✓		0.5		1		1.5
6. Depositional bars or benches	0 ✓		1		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0 ✓		0.5		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0		1 ✓		2		3
11. Grade controls	0		0.5		1 ✓		1.5
12. Natural valley or drainageway	0 ✓		0.5		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 0.50)	**Absent**		**Weak**		**Moderate**		**Strong**
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1		0.5 ✓		0
17. Sediment on plants or on debris	0 ✓		0.5		1		1.5
18. Organic debris lines or piles (wrack lines)	0 ✓		0.5		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓				Yes = 1.5		

C. Biology (Subtotal = 4.50)	**Absent**		**Weak**		**Moderate**		**Strong**
20. Fibrous roots in channel bed [1]	3		2		1 ✓		0
21. Rooted plants in the thalweg [1]	3 ✓		2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28.Wetland plants in channel bed [2]	0		0.5 ✓		1		1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 11.50

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Bed and bank present throughout part of reach
- Weak sinuosity and weak riffle/pool, all riffle
- Weak sorting with clay and silt bottom, small headcut and some grade controls
- Moderate fibrous roots and leaf litter present, some Polygonum virginicum also present
- No surface water or aquatic biota present

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: ES-6	Date/Time: 9/21/2022/12:50
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.445897, -88.315882 End: 36.445792, -88.316065
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : <0.01 sq mi	County: Henry
Soil Type(s) / Geology : Ik: Iuka loam, 0 to 2 percent slopes, occasionally flooded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	✓	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream ☐
6. Presence of fish (except *Gambusia*)	✓	Stream ☐
7. Presence of naturally occurring ground water table connection	✓	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 11.50

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Connects WTL-2 to the East Fork Clarks River

Waterbody Name: ES-6

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 6.50)	**Absent**	**Weak**	**Moderate**	**Strong**
1. Continuous bed and bank	0	1	✓ 2	3
2. Sinuous channel	0	✓ 1	2	3
3. In-channel structure: riffle-pool sequences	0	✓ 1	2	3
4. Sorting of soil textures or other substrate	0	✓ 1	2	3
5. Active/relic floodplain	✓ 0	0.5	1	1.5
6. Depositional bars or benches	✓ 0	1	2	3
7. Braided channel	✓ 0	1	2	3
8. Recent alluvial deposits	✓ 0	0.5	1	1.5
9. Natural levees	✓ 0	1	2	3
10. Headcuts	0	✓ 1	2	3
11. Grade controls	0	0.5	✓ 1	1.5
12. Natural valley or drainageway	✓ 0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓		Yes = 3	

B. Hydrology (Subtotal = 0.50)	**Absent**	**Weak**	**Moderate**	**Strong**
14. Subsurface flow/discharge into channel	✓ 0	1	2	3
15. Water in channel and >48 hours since sig. rain	✓ 0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	✓ 0.5	0
17. Sediment on plants or on debris	✓ 0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	✓ 0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓		Yes = 1.5	

C. Biology (Subtotal = 4.50)	**Absent**	**Weak**	**Moderate**	**Strong**
20. Fibrous roots in channel bed [1]	3	2	✓ 1	0
21. Rooted plants in the thalweg [1]	✓ 3	2	1	0
22. Crayfish in stream (exclude in floodplain)	✓ 0	1	2	3
23. Bivalves/mussels	✓ 0	1	2	3
24. Amphibians	✓ 0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	✓ 0	1	2	3
26. Filamentous algae; periphyton	✓ 0	1	2	3
27. Iron oxidizing bacteria/fungus	✓ 0	0.5	1	1.5
28. Wetland plants in channel bed [2]	0	✓ 0.5	1	1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 11.50

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Bed and bank present throughout part of reach
- Weak sinuosity and weak riffle/pool, all riffle
- Weak sorting with clay and silt bottom, small headcut and some grade controls
- Moderate fibrous roots and leaf litter present, some Polygonum virginicum also present
- No surface water or aquatic biota present

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: ES-7	Date/Time: 9/21/2022/16:03
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.444362, -88.313983 End: 36.444234, -88.314285
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : <0.01 sq mi	County: Henry
Soil Type(s) / Geology : Ea: Enville silt loam, 0 to 2 percent slopes, occasionally flooded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 11.50

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Erosional swale coming from agriculture field

Waterbody Name: ES-7

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 6.50)	Absent		Weak		Moderate		Strong
1. Continuous bed and bank	0		1	✓	2		3
2. Sinuous channel	0		1 ✓		2		3
3. In-channel structure: riffle-pool sequences	0		1 ✓		2		3
4. Sorting of soil textures or other substrate	0		1 ✓		2		3
5. Active/relic floodplain	0 ✓		0.5		1		1.5
6. Depositional bars or benches	0 ✓		1		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0 ✓		0.5		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0		1 ✓		2		3
11. Grade controls	0		0.5		1 ✓		1.5
12. Natural valley or drainageway	0 ✓		0.5		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 0.50)	Absent		Weak		Moderate		Strong
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1		0.5 ✓		0
17. Sediment on plants or on debris	0 ✓		0.5		1		1.5
18. Organic debris lines or piles (wrack lines)	0 ✓		0.5		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓				Yes = 1.5		

C. Biology (Subtotal = 4.50)	Absent		Weak		Moderate		Strong
20. Fibrous roots in channel bed [1]	3		2		1 ✓		0
21. Rooted plants in the thalweg [1]	3 ✓		2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28.Wetland plants in channel bed [2]	0		0.5 ✓		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 11.50

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Bed and bank present throughout part of reach
- Weak sinuosity and weak riffle/pool, all riffle
- Weak sorting with clay and silt bottom, small headcut and some grade controls
- Moderate fibrous roots and leaf litter present, some Polygonum virginicum also present
- No surface water or aquatic biota present

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: ES-8	Date/Time: 9/22/2022/09:50
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.444126, -88.304325 End: 36.443815, -88.304303
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : <0.01 sq mi	County: Henry
Soil Type(s) / Geology : PrD3: Providence silty clay loam, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 8.00

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Confluence to EPH-7, erosional swale from nearby agriculture field

Waterbody Name: ES-8

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 4.00)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	✓	2	3
2. Sinuous channel	0	✓	2	3
3. In-channel structure: riffle-pool sequences	0 ✓	1	2	3
4. Sorting of soil textures or other substrate	0	✓	2	3
5. Active/relic floodplain	0	0.5 ✓	1	1.5
6. Depositional bars or benches	0 ✓	1	2	3
7. Braided channel	0 ✓	1	2	3
8. Recent alluvial deposits	0 ✓	0.5	1	1.5
9. Natural levees	0 ✓	1	2	3
10. Headcuts	0 ✓	1	2	3
11. Grade controls	0 ✓	0.5	1	1.5
12. Natural valley or drainageway	0	0.5 ✓	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓		Yes = 3	

B. Hydrology (Subtotal = 1.00)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0 ✓	1	2	3
15. Water in channel and >48 hours since sig. rain	0 ✓	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5 ✓	0
17. Sediment on plants or on debris	0 ✓	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5 ✓	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓		Yes = 1.5	

C. Biology (Subtotal = 3.00)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed [1]	3	2	1 ✓	0
21. Rooted plants in the thalweg [1]	3	2 ✓	1	0
22. Crayfish in stream (exclude in floodplain)	0 ✓	1	2	3
23. Bivalves/mussels	0 ✓	1	2	3
24. Amphibians	0 ✓	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0 ✓	1	2	3
26. Filamentous algae; periphyton	0 ✓	1	2	3
27. Iron oxidizing bacteria/fungus	0 ✓	0.5	1	1.5
28. Wetland plants in channel bed [2]	0 ✓	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.
[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 8.00

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Weak bed and bank as well as slight sinuosity throughout reach
- Weak sorting present only in the lower reach with moderate leaf litter in the upper reach
- No hydric soil or surface water
- Moderate fibrous roots in channel and some terrestrial vegetation
- No aquatic biota or wetland plants present

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: ES-9	Date/Time: 9/22/2022/10:15
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.444014, -88.304738 End: 36.443644, -88.304466
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : <0.01 sq mi	County: Henry
Soil Type(s) / Geology : PrD3: Providence silty clay loam, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1” in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = “Yes”, then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 8.00

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Confluence to EPH-7, erosional swale from nearby agriculture field

Waterbody Name: ES-9

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 4.00)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	✓	2	3
2. Sinuous channel	0	✓	2	3
3. In-channel structure: riffle-pool sequences	0 ✓	1	2	3
4. Sorting of soil textures or other substrate	0	✓	2	3
5. Active/relic floodplain	0	0.5 ✓	1	1.5
6. Depositional bars or benches	0 ✓	1	2	3
7. Braided channel	0 ✓	1	2	3
8. Recent alluvial deposits	0 ✓	0.5	1	1.5
9. Natural levees	0 ✓	1	2	3
10. Headcuts	0 ✓	1	2	3
11. Grade controls	0 ✓	0.5	1	1.5
12. Natural valley or drainageway	0	0.5 ✓	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓		Yes = 3	

B. Hydrology (Subtotal = 1.00)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0 ✓	1	2	3
15. Water in channel and >48 hours since sig. rain	0 ✓	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5 ✓	0
17. Sediment on plants or on debris	0 ✓	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5 ✓	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓		Yes = 1.5	

C. Biology (Subtotal = 3.00)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed [1]	3	2	✓	0
21. Rooted plants in the thalweg [1]	3	2 ✓	1	0
22. Crayfish in stream (exclude in floodplain)	0 ✓	1	2	3
23. Bivalves/mussels	0 ✓	1	2	3
24. Amphibians	0 ✓	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0 ✓	1	2	3
26. Filamentous algae; periphyton	0 ✓	1	2	3
27. Iron oxidizing bacteria/fungus	0 ✓	0.5	1	1.5
28.Wetland plants in channel bed [2]	0 ✓	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 8.00

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Weak bed and bank, loses definition towards end of reach
- Weak sorting present only in the lower reach with moderate leaf litter in the upper reach
- No hydric soil or surface water
- Moderate fibrous roots in channel and some terrestrial vegetation
- No aquatic biota or wetland plants present

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: ES-10	Date/Time: 9/22/2022/12:25
Assessors/Affiliation: Barge Design Solutions - Frank Amatucci (TN QHP 1203-TN21), Cameron Brueck	Project ID : 3609518
Site Name/Description: Puryear Solar Site	
Site Location: Puryear, Henry County, TN	
HUC (12 digit): 060400060101	Lat/Long: Start: 36.441354, -88.297164 End: 36.441169, -88.298121
Previous Rainfall (7-days) : 0.00 inches (CoCoRaHs #TN-HY-8)	
Precipitation this Season vs. Normal : abnormally wet ☐ elevated ☐ average ☑ low ☐ abnormally dry ☐ unknown ☐ Source of recent & seasonal precip data :	
Watershed Size : ~0.01 sq mi	County: Henry
Soil Type(s) / Geology : PrD3: Providence silty clay loam, 8 to 12 percent slopes, severely eroded	Source: NRCS
Surrounding Land Use : Agricultural, residential, and woodland	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe ☐ Moderate ☐ Slight ☑ Absent ☐	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	☑	WWC ☐
2. Defined bed and bank absent, vegetation composed of upland and FACU species	☑	WWC ☐
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	☑	WWC ☐
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	☑	WWC ☐
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	☑	Stream ☐
6. Presence of fish (except *Gambusia*)	☑	Stream ☐
7. Presence of naturally occurring ground water table connection	☑	Stream ☐
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	☑	Stream ☐
9. Evidence watercourse has been used as a supply of drinking water	☑	Stream ☐

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 13.25

Justification / Notes :

Overall hydrologic determination is WWC based on secondary indicator scores

- Two separate channels that are interrupted by a cattle pasture
- Dissipates to overland sheetflow downslope of the cattle pasture
- Drains into WTL-7

Waterbody Name: ES-10

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 7.25)	**Absent**		**Weak**		**Moderate**		**Strong**
1. Continuous bed and bank	0		1	✓	2		3
2. Sinuous channel	0		1	✓	2		3
3. In-channel structure: riffle-pool sequences	0		1 ✓		2		3
4. Sorting of soil textures or other substrate	0		1 ✓		2		3
5. Active/relic floodplain	0		0.5 ✓		1		1.5
6. Depositional bars or benches	0 ✓		1		2		3
7. Braided channel	0 ✓		1		2		3
8. Recent alluvial deposits	0 ✓		0.5		1		1.5
9. Natural levees	0 ✓		1		2		3
10. Headcuts	0		1 ✓		2		3
11. Grade controls	0	✓	0.5		1		1.5
12. Natural valley or drainageway	0		0.5 ✓		1		1.5
13. At least second order channel on existing USGS or NRCS map	No = 0 ✓				Yes = 3		

B. Hydrology (Subtotal = 2.00)	**Absent**		**Weak**		**Moderate**		**Strong**
14. Subsurface flow/discharge into channel	0 ✓		1		2		3
15. Water in channel and >48 hours since sig. rain	0 ✓		1		2		3
16. Leaf litter in channel (January – September)	1.5		1	✓	0.5		0
17. Sediment on plants or on debris	0		0.5	✓	1		1.5
18. Organic debris lines or piles (wrack lines)	0		0.5 ✓		1		1.5
19. Hydric soils in channel bed or sides of channel	No = 0 ✓				Yes = 1.5		

C. Biology (Subtotal = 4.00)	**Absent**		**Weak**		**Moderate**		**Strong**
20. Fibrous roots in channel bed [1]	3		2		1 ✓		0
21. Rooted plants in the thalweg [1]	3 ✓		2		1		0
22. Crayfish in stream (exclude in floodplain)	0 ✓		1		2		3
23. Bivalves/mussels	0 ✓		1		2		3
24. Amphibians	0 ✓		0.5		1		1.5
25. Macrobenthos (record type & abundance)	0 ✓		1		2		3
26. Filamentous algae; periphyton	0 ✓		1		2		3
27. Iron oxidizing bacteria/fungus	0 ✓		0.5		1		1.5
28.Wetland plants in channel bed [2]	0 ✓		0.5		1		1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 13.25

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

- Weak/moderate bed and bank that is interrupted mid-reach by cattle pasture
- Weak/moderate sinuosity from one large bend that the channel follows
- Weak sorting of clay and silt, mostly riffle/glide sequences
- Channel starts at one headcut and shows a few minor grade controls throughout
- No standing water of hydric soils
- Weak wrack lines and a moderate amount of fibrous roots in the channel
- No vegetation or aquatic biota present

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Puryear Solar Site City/County: Puryear / Henry Sampling Date: 09/21/22

Applicant/Owner: Barge Design Solutions State: TN Sampling Point: WTL-1

Investigator(s): F. Amatucci and C. Brueck Section, Township, Range: ____

Landform (hillside, terrace, etc.): Depressional/Slope Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 36.446141 Long: ='Page 1 (Hydrology)'!AF25 Datum: NAD83

Soil Map Unit Name: SgD3: Smithdale-Lexington complex, 8 to 12 percent slopes, severly eroded NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?**	**Yes** X **No** ____
Hydric Soil Present?	Yes X No ____		
Wetland Hydrology Present?	Yes X No ____		

Remarks:
Drought conditions observed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? Yes X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Microtopography observed

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: WTL-1

Tree Stratum (Plot size: 30 ft)

	Species	Absolute % Cover	Dominant Species?	Indicator Status
1.	*Salix nigra*	40	Yes	OBL
2.	*Acer rubrum*	35	Yes	FAC
3.	*Liquidambar styraciflua*	25	Yes	FAC
4.				
5.				
6.				
7.				
8.				
		100	=Total Cover	

50% of total cover: 50 20% of total cover: 20

Sapling/Shrub Stratum (Plot size: 15 ft)

	Species	Absolute % Cover	Dominant Species?	Indicator Status
1.	*Liquidambar styraciflua*	25	Yes	FAC
2.	*Acer rubrum*	15	Yes	FAC
3.				
4.				
5.				
6.				
7.				
8.				
		40	=Total Cover	

50% of total cover: 20 20% of total cover: 8

Herb Stratum (Plot size:)

	Species	Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
			=Total Cover	

50% of total cover: 20% of total cover:

Woody Vine Stratum (Plot size:)

	Species	Absolute % Cover	Dominant Species?	Indicator Status
1.				
2.				
3.				
4.				
5.				
			=Total Cover	

50% of total cover: 20% of total cover:

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	0	x 2 =	0
FAC species	100	x 3 =	300
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	140 (A)		340 (B)

Prevalence Index = B/A = 2.43

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: WTL-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 6/2	65	10YR 6/6	35	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR, P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) (**MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**

___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No ___

Remarks:

Surface soils stripped by overland sheetflow

This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Puryear Solar Site City/County: Puryear / Henry Sampling Date: 09/21/22

Applicant/Owner: Barge Design Solutions State: TN Sampling Point: UPL-1

Investigator(s): F. Amatucci and C. Brueck Section, Township, Range: ______

Landform (hillside, terrace, etc.): Hillslope/Ag-field Local relief (concave, convex, none): Convex Slope (%): 1-3

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 36.445193 Long: -88.313262 Datum: NAD83

Soil Map Unit Name: PrC3: Providence silty clay loam, 5 to 8 percent slopes, severly eroded NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No ___

Are Vegetation ___, Soil ___, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___ No X	
Wetland Hydrology Present?	Yes ___ No X	

Remarks:
Drought conditions observed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: UPL-1

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	=Total Cover		
50% of total cover:		20% of total cover:	

Sapling/Shrub Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	=Total Cover		
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 5 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Zea mays*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 =Total Cover		
50% of total cover: 50		20% of total cover: 20	

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: UPL-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-1	10YR 4/3	100					Loamy/Clayey	
1-18	10YR 5/4	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR, P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) (**MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ___
Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Puryear Solar Site City/County: Puryear / Henry Sampling Date: 09/21/22

Applicant/Owner: Barge Design Solutions State: TN Sampling Point: WTL-2

Investigator(s): F. Amatucci and C. Brueck Section, Township, Range: ____

Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 0-1

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 36.445357 Long: -88.315062 Datum: NAD83

Soil Map Unit Name: Ea: Enville silt loam, 0 to 2 percent slopes, occasionally flooded NWI classification: PFO1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:
Drought conditions observed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

____ Surface Water (A1)	____ Aquatic Fauna (B13)
____ High Water Table (A2)	____ Marl Deposits (B15) **(LRR U)**
____ Saturation (A3)	____ Hydrogen Sulfide Odor (C1)
____ Water Marks (B1)	____ Oxidized Rhizospheres on Living Roots (C3)
____ Sediment Deposits (B2)	____ Presence of Reduced Iron (C4)
____ Drift Deposits (B3)	____ Recent Iron Reduction in Tilled Soils (C6)
____ Algal Mat or Crust (B4)	____ Thin Muck Surface (C7)
____ Iron Deposits (B5)	____ Other (Explain in Remarks)
____ Inundation Visible on Aerial Imagery (B7)	
X Water-Stained Leaves (B9)	

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Microtopography observed

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: WTL-2

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Liquidambar styraciflua*	45	Yes	FAC
2. *Acer rubrum*	35	Yes	FAC
3. *Populus deltoides*	10	No	FAC
4. *Ulmus rubra*	10	No	FAC
5.			
6.			
7.			
8.			
	100	=Total Cover	
50% of total cover: 50		20% of total cover: 20	

Sapling/Shrub Stratum (Plot size: 15 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Carpinus caroliniana*	5	Yes	FAC
2. *Acer rubrum*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	15	=Total Cover	
50% of total cover: 8		20% of total cover: 3	

Herb Stratum (Plot size: 5 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Impatiens capensis*	40	Yes	FACW
2. *Persicaria virginiana*	55	Yes	FAC
3. *Carex crinita*	2	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	97	=Total Cover	
50% of total cover: 49		20% of total cover: 20	

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	42	x 2 =	84
FAC species	170	x 3 =	510
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	212 (A)		594 (B)

Prevalence Index = B/A = 2.80

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: WTL-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					Loamy/Clayey	
3-18	10YR 4/2	60	10YR 5/6	40	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes X **No** ___

Remarks:
This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Puryear Solar Site City/County: Puryear / Henry Sampling Date: 09/21/22

Applicant/Owner: Barge Design Solutions State: TN Sampling Point: UPL-2

Investigator(s): F. Amatucci and C. Brueck Section, Township, Range: ____

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 2-4

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 36.445763 Long: -88.314790 Datum: NAD83

Soil Map Unit Name: SgD3: Smithdale-Lexington complex, 8 to 12 precent slopes, severely eroded NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Drought conditions observed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)	___ Aquatic Fauna (B13)
___ High Water Table (A2)	___ Marl Deposits (B15) **(LRR U)**
___ Saturation (A3)	___ Hydrogen Sulfide Odor (C1)
___ Water Marks (B1)	___ Oxidized Rhizospheres on Living Roots (C3)
___ Sediment Deposits (B2)	___ Presence of Reduced Iron (C4)
___ Drift Deposits (B3)	___ Recent Iron Reduction in Tilled Soils (C6)
___ Algal Mat or Crust (B4)	___ Thin Muck Surface (C7)
___ Iron Deposits (B5)	___ Other (Explain in Remarks)
___ Inundation Visible on Aerial Imagery (B7)	
___ Water-Stained Leaves (B9)	

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: UPL-2

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus alba*	35	Yes	FACU
2. *Liquidambar styraciflua*	35	Yes	FAC
3. *Liriodendron tulipifera*	15	No	FACU
4.			
5.			
6.			
7.			
8.			
	85	=Total Cover	
50% of total cover: 43		20% of total cover: 17	
Sapling/Shrub Stratum (Plot size: 15)			
1. *Ulmus rubra*	35	Yes	FAC
2. *Carya glabra*	10	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	45	=Total Cover	
50% of total cover: 23		20% of total cover: 9	
Herb Stratum (Plot size: 5 ft)			
1. *Persicaria virginiana*	35	Yes	FAC
2. *Smilax glauca*	45	Yes	FAC
3. *Rubus argutus*	15	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	95	=Total Cover	
50% of total cover: 48		20% of total cover: 19	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	165	x 3 =	495
FACU species	60	x 4 =	240
UPL species	0	x 5 =	0
Column Totals:	225 (A)		735 (B)

Prevalence Index = B/A = 3.27

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: UPL-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/3	100					Loamy/Clayey	
2-18	10YR 5/4	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR, P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) (**MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ **No** X

Remarks:
This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Puryear Solar Site | City/County: Puryear / Henry | Sampling Date: 09/21/22

Applicant/Owner: Barge Design Solutions | State: TN | Sampling Point: WTL-3

Investigator(s): F. Amatucci and C. Brueck | Section, Township, Range: ______

Landform (hillside, terrace, etc.): Depression/Floodplain | Local relief (concave, convex, none): Concave | Slope (%): 0-2

Subregion (LRR or MLRA): LRR P, MLRA 134 | Lat: 36.446975 | Long: -88.314885 | Datum: NAD83

Soil Map Unit Name: Ea: Enville silt loam, 0 to 2 percent slopes, occasionally flooded | NWI classification: PFO1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____
Hydric Soil Present?	Yes X	No ____
Wetland Hydrology Present?	Yes X	No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Remarks:
Drought conditions observed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Microtopography observed

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: WTL-3

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	65	Yes	FAC
2. *Betula nigra*	10	No	FACW
3. *Liquidambar styraciflua*	35	Yes	FAC
4.			
5.			
6.			
7.			
8.			
	110	=Total Cover	
50% of total cover:	55	20% of total cover:	22
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Ulmus rubra*	15	Yes	FAC
2. *Celtis laevigata*	15	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
	30	=Total Cover	
50% of total cover:	15	20% of total cover:	6
Herb Stratum (Plot size: 5 ft)			
1. *Persicaria virginiana*	45	Yes	FAC
2. *Microstegium vimineum*	30	Yes	FAC
3. *Boehmeria cylindrica*	15	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90	=Total Cover	
50% of total cover:	45	20% of total cover:	18
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	40	x 2 =	80
FAC species	190	x 3 =	570
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	230 (A)		650 (B)

Prevalence Index = B/A = 2.83

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: WTL-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2	95	10YR 4/4	5	C	M	Loamy/Clayey	Distinct redox concentrations
4-18	10YR 5/2	65	10YR 5/6	35	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR, P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) (**MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ____________
Depth (inches): ____________

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Puryear Solar Site City/County: Puryear / Henry Sampling Date: 09/21/22

Applicant/Owner: Barge Design Solutions State: TN Sampling Point: UPL-3

Investigator(s): F. Amatucci and C. Brueck Section, Township, Range: ____

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 2-4

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 36.447231 Long: -88.315026 Datum: NAD83

Soil Map Unit Name: SgD3: Smithdale-Lexington complex, 8 to 12 percent slopes, severely eroded NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Drought conditions observed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: UPL-3

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus alba*	30	Yes	FACU
2. *Liquidambar styraciflua*	40	Yes	FAC
3. *Liriodendron tulipifera*	10	No	FACU
4.			
5.			
6.			
7.			
8.			
	80	=Total Cover	
50% of total cover: 40		20% of total cover: 16	

Sapling/Shrub Stratum (Plot size: 15 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ulmus rubra*	40	Yes	FAC
2. *Carya glabra*	10	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	50	=Total Cover	
50% of total cover: 25		20% of total cover: 10	

Herb Stratum (Plot size: 5 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Persicaria virginiana*	40	Yes	FAC
2. *Smilax glauca*	35	Yes	FAC
3. *Rubus argutus*	10	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85	=Total Cover	
50% of total cover: 43		20% of total cover: 17	

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	165	x 3 =	495
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	215 (A)		695 (B)

Prevalence Index = B/A = 3.23

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: UPL-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/3	100					Loamy/Clayey	
2-18	10YR 5/4	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Puryear Solar Site City/County: Puryear / Henry Sampling Date: 09/21/22

Applicant/Owner: Barge Design Solutions State: TN Sampling Point: WTL-4

Investigator(s): F. Amatucci and C. Brueck Section, Township, Range: ____

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 36.444086 Long: -88.315377 Datum: NAD83

Soil Map Unit Name: Cn: Chenneby silt loam, 0 to 2 percent slopes, occasionally flooded NWI classification: PEM/PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Microtopography observed

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: WTL-4

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	20	Yes	OBL
2. *Platanus occidentalis*	15	Yes	FACW
3. *Liquidambar styraciflua*	10	Yes	FAC
4.			
5.			
6.			
7.			
8.			
	45	=Total Cover	
50% of total cover: 23		20% of total cover: 9	

Sapling/Shrub Stratum (Plot size: 15 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	25	Yes	OBL
2. *Platanus occidentalis*	10	Yes	FACW
3. *Liquidambar styraciflua*	10	Yes	FAC
4.			
5.			
6.			
7.			
8.			
	45	=Total Cover	
50% of total cover: 23		20% of total cover: 9	

Herb Stratum (Plot size: 5 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Onoclea sensibilis*	15	Yes	FACW
2. *Boehmeria cylindrica*	10	No	FACW
3. *Eupatorium perfoliatum*	20	Yes	FACW
4. *Ludwigia alternifolia*	20	Yes	OBL
5. *Typha latifolia*	5	No	OBL
6. *Mimulus ringens*	15	Yes	OBL
7. *Echinochloa crus-galli*	15	Yes	FACW
8. *Scirpus cyperinus*	20	Yes	OBL
9. *Carex vulpinoidea*	10	No	FACW
10.			
11.			
12.			
	130	=Total Cover	
50% of total cover: 65		20% of total cover: 26	

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 12 (A)

Total Number of Dominant Species Across All Strata: 12 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	105	x 1 =	105
FACW species	95	x 2 =	190
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	220 (A)		355 (B)

Prevalence Index = B/A = 1.61

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: WTL-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 3/2	100					Loamy/Clayey	
1-18	10YR 4/2	70	10YR 5/6	30	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR, P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) (**MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Puryear Solar Site City/County: Puryear / Henry Sampling Date: 09/21/22

Applicant/Owner: Barge Design Solutions State: TN Sampling Point: UPL-4

Investigator(s): F. Amatucci and C. Brueck Section, Township, Range: ____

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 1-3

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 36.443567 Long: -88.315586 Datum: NAD83

Soil Map Unit Name: LnC3: Lexington silty clay loam, 5 to 8 percent slopes, severely eroded NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No ___

Are Vegetation ___, Soil ___, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:
Drought conditions observed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: UPL-4

Tree Stratum (Plot size:)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
=Total Cover			

50% of total cover: 20% of total cover:

Sapling/Shrub Stratum (Plot size:)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
=Total Cover			

50% of total cover: 20% of total cover:

Herb Stratum (Plot size: 5 ft)

	Absolute % Cover	Dominant Species?	Indicator Status
1. *Glycine max*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
=Total Cover	100		

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size:)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
=Total Cover			

50% of total cover: 20% of total cover:

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: UPL-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/3	100					Loamy/Clayey	
2-18	10YR 4/4	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR, P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) (**MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ______
Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Puryear Solar Site City/County: Puryear / Henry Sampling Date: 09/21/22

Applicant/Owner: Barge Design Solutions State: TN Sampling Point: WTL-5

Investigator(s): F. Amatucci and C. Brueck Section, Township, Range: ____

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 1-4

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 36.443823 Long: -88.316579 Datum: NAD83

Soil Map Unit Name: LeC2: Lexington silt loam, 5 to 8 percent slopes, moderately eroded NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:
Drought conditions observed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Microtopography observed

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: WTL-5

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	
Herb Stratum (Plot size: 5 ft)			
1. *Eleocharis palustris*	65	Yes	OBL
2. *Bidens frondosa*	15	No	FACW
3. *Echinochloa crus-galli*	20	Yes	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	=Total Cover	
50% of total cover:	50	20% of total cover:	20
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	65	x 1 =	65
FACW species	35	x 2 =	70
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		135 (B)

Prevalence Index = B/A = 1.35

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: WTL-5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR, P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) (**MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.
Soils are highly compacted

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Puryear Solar Site City/County: Puryear / Henry Sampling Date: 09/21/22

Applicant/Owner: Barge Design Solutions State: TN Sampling Point: UPL-5

Investigator(s): F. Amatucci and C. Brueck Section, Township, Range: ____

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 1-3

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 36.443784 Long: -88.317220 Datum: NAD83

Soil Map Unit Name: FeB2: Feliciana silt loam, 2 to 5 percent slopes, modertately eroded NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X
Hydric Soil Present?	Yes ____	No X
Wetland Hydrology Present?	Yes ____	No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

Remarks:
Drought conditions observed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: UPL-5

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Sapling/Shrub Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 5 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Glycine max*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	=Total Cover	
50% of total cover:	50	20% of total cover:	20

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: UPL-5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/3	100					Loamy/Clayey	
2-18	10YR 4/4	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR, P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) (**MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ___
Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Puryear Solar Site City/County: Puryear / Henry Sampling Date: 09/22/22

Applicant/Owner: Barge Design Solutions State: TN Sampling Point: WTL-6

Investigator(s): F. Amatucci and C. Brueck Section, Township, Range: ____

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 36.445854 Long: -88.303033 Datum: NAD83

Soil Map Unit Name: PoC2: Providence silt loam, 5 to 8 percent slopes, moderately eroded NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:
Drought conditions observed. Relic farm pond

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Microtopography observed

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: WTL-6

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Cercis canadensis*	5	Yes	UPL
2. *Ulmus rubra*	10	Yes	FAC
3. *Liquidambar styraciflua*	5	Yes	FAC
4.			
5.			
6.			
7.			
8.			
	20	=Total Cover	
50% of total cover: 10		20% of total cover:	4

Sapling/Shrub Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 5 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Echinochloa crus-galli*	45	Yes	FACW
2. *Xanthium strumarium*	35	Yes	FAC
3. *Sagittaria latifolia*	5	No	OBL
4. *Cyperus esculentus*	15	No	FAC
5. *Persicaria hydropiper*	10	No	OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	110	=Total Cover	
50% of total cover: 55		20% of total cover:	22

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	45	x 2 =	90
FAC species	65	x 3 =	195
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	130 (A)		325 (B)

Prevalence Index = B/A = 2.50

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: WTL-6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/1	95	10YR 5/6	5	C	M	Loamy/Clayey	Prominent redox concentrations
5-18	10YR 4/1	80	10YR 6/6	20	C	PL/M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR, P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) (**MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ______
Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Puryear Solar Site　City/County: Puryear / Henry　Sampling Date: 09/22/22

Applicant/Owner: Barge Design Solutions　State: TN　Sampling Point: UPL-6

Investigator(s): F. Amatucci and C. Brueck　Section, Township, Range: ____

Landform (hillside, terrace, etc.): Hillslope　Local relief (concave, convex, none): Convex　Slope (%): 1-3

Subregion (LRR or MLRA): LRR P, MLRA 134　Lat: 36.445816　Long: -88.302629　Datum: NAD83

Soil Map Unit Name: GrB2: Grenada silt loam, 2 to 5 percent slopes, eroded　NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No	
Hydrophytic Vegetation Present?		X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?		X	
Wetland Hydrology Present?		X	

Remarks:
Drought conditions observed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?		X	
Water Table Present?		X	
Saturation Present? (includes capillary fringe)		X	

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: UPL-6

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Sapling/Shrub Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 5 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Glycine max*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	=Total Cover	
50% of total cover:	50	20% of total cover:	20

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: UPL-6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/3	100					Loamy/Clayey	
2-18	10YR 4/4	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR, P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) (**MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____

Depth (inches): ____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Puryear Solar Site City/County: Puryear / Henry Sampling Date: 09/22/22

Applicant/Owner: Barge Design Solutions State: TN Sampling Point: WTL-7

Investigator(s): F. Amatucci and C. Brueck Section, Township, Range: ____

Landform (hillside, terrace, etc.): Slight slope Local relief (concave, convex, none): Concave Slope (%): 1-2

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 36.441045 Long: -88.298593 Datum: NAD83

Soil Map Unit Name: PrD3: Providence silty clay loam, 8 to 12 percent slopes, severely eroded NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:
Drought conditions observed. Wetland likely affiliated with overland sheet flow and perched water.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Buttressed roots and microtopography observed

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: WTL-7

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	45	Yes	FAC
2. *Ulmus rubra*	35	Yes	FAC
3. *Acer negundo*	20	Yes	FAC
4.			
5.			
6.			
7.			
8.			
	100	=Total Cover	
50% of total cover:	50	20% of total cover:	20

Sapling/Shrub Stratum (Plot size: 15 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ulmus rubra*	15	Yes	FAC
2. *Acer rubrum*	15	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	30	=Total Cover	
50% of total cover:	15	20% of total cover:	6

Herb Stratum (Plot size: 5 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Microstegium vimineum*	25	Yes	FAC
2. *Sceptridium dissectum*	5	No	FAC
3. *Boehmeria cylindrica*	10	Yes	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40	=Total Cover	
50% of total cover:	20	20% of total cover:	8

Woody Vine Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	160	x 3 =	480
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	170 (A)		500 (B)

Prevalence Index = B/A = 2.94

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: WTL-7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 4/1	100					Loamy/Clayey	
1-18	10YR 5/1	65	10YR 6/6	35	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR, P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A**)
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Puryear Solar Site City/County: Puryear / Henry Sampling Date: 09/22/22

Applicant/Owner: Barge Design Solutions State: TN Sampling Point: UPL-7

Investigator(s): F. Amatucci and C. Brueck Section, Township, Range: ____

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 2-4

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 36.440846 Long: -88.298676 Datum: NAD83

Soil Map Unit Name: PrD3: Providence silty clay loam, 8 to 12 percent slopes, severely eroded NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No ___

Are Vegetation ___, Soil ___, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___ No X	
Wetland Hydrology Present?	Yes ___ No X	

Remarks:
Drought conditions observed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: UPL-7

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	45	Yes	FAC
2. *Ulmus rubra*	35	Yes	FAC
3. *Acer negundo*	20	Yes	FAC
4.			
5.			
6.			
7.			
8.			
	100	=Total Cover	
50% of total cover:	50	20% of total cover:	20
Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Ulmus rubra*	15	Yes	FAC
2. *Acer rubrum*	15	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	30	=Total Cover	
50% of total cover:	15	20% of total cover:	6
Herb Stratum (Plot size: 5 ft)			
1. *Microstegium vimineum*	25	Yes	FAC
2. *Sceptridium dissectum*	5	No	FAC
3. *Boehmeria cylindrica*	10	Yes	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40	=Total Cover	
50% of total cover:	20	20% of total cover:	8
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	10	x 2 = 20
FAC species	160	x 3 = 480
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	170 (A)	500 (B)

Prevalence Index = B/A = 2.94

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: UPL-7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	100					Loamy/Clayey	
2-18	10YR 5/4	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR, P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) (**MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
_?_ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** _X_

Remarks:
This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Puryear Solar Site City/County: Puryear / Henry Sampling Date: 09/22/22

Applicant/Owner: Barge Design Solutions State: TN Sampling Point: WTL-8

Investigator(s): F. Amatucci and C. Brueck Section, Township, Range: ____

Landform (hillside, terrace, etc.): Fringe to pond Local relief (concave, convex, none): Concave Slope (%): 0-1

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 36.439863 Long: -88.295632 Datum: NAD83

Soil Map Unit Name: CaB2: Calloway silt loam, 2 to 5 percent slopes, moderately eroded NWI classification: PUBFx

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No X (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:
Drought conditions observed. Wetland is upper fringe to pond.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 10

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Microtopography observed

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: WTL-8

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	25	Yes	OBL
2. *Acer rubrum*	35	Yes	FAC
3. *Liquidambar styraciflua*	10	No	FAC
4.			
5.			
6.			
7.			
8.			
	70	=Total Cover	
50% of total cover:	35	20% of total cover:	14

Sapling/Shrub Stratum (Plot size: 15 ft)			
1. *Acer rubrum*	10	Yes	FAC
2. *Sambucus nigra*	10	Yes	FAC
3. *Ulmus rubra*	10	Yes	FAC
4.			
5.			
6.			
7.			
8.			
	30	=Total Cover	
50% of total cover:	15	20% of total cover:	6

Herb Stratum (Plot size: 5 ft)			
1. *Juncus effusus*	25	Yes	OBL
2. *Carex vulpinoidea*	30	Yes	FACW
3. *Boehmeria cylindrica*	10	No	FACW
4. *Ulmus rubra*	5	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70	=Total Cover	
50% of total cover:	35	20% of total cover:	14

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	50	x 1 =	50
FACW species	40	x 2 =	80
FAC species	80	x 3 =	240
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	170 (A)		370 (B)

Prevalence Index = B/A = 2.18

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: WTL-8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-1	10YR 3/1	100					Loamy/Clayey	
1-18	10YR 5/1	80	10YR 6/6	20	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR, P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) **(MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**

___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
X Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Puryear Solar Site City/County: Puryear / Henry Sampling Date: 09/22/22

Applicant/Owner: Barge Design Solutions State: TN Sampling Point: UPL-8

Investigator(s): F. Amatucci and C. Brueck Section, Township, Range: ______

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 1-3

Subregion (LRR or MLRA): LRR P, MLRA 134 Lat: 36.439750 Long: -88.296324 Datum: NAD83

Soil Map Unit Name: GrB2: Grenada silt loam, 0 to 2 percent slopes NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ___ No X (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No ___

Are Vegetation ___, Soil ___, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X
Hydric Soil Present?	Yes ___	No X
Wetland Hydrology Present?	Yes ___	No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

Remarks:
Drought conditions observed

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T,U)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: UPL-8

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		=Total Cover	
50% of total cover:		20% of total cover:	
Herb Stratum (Plot size: 5 ft)			
1. *Glycine max*	100	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100	=Total Cover	
50% of total cover: 50		20% of total cover:	20
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	100	x 5 =	500
Column Totals:	100 (A)		500 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL

Sampling Point: UPL-8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/3	100					Loamy/Clayey	
2-18	10YR 4/4	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR, P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) (**MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ______
Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Atlantic and Gulf Coastal Plain Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.

Wetland Background Information

Name(s) of Field Personnel:	Frank Amatucci & Cameron Brueck
Assessment Date:	Sept 22, 2022
Agency/Organization:	Barge Design Solutions, Inc.
Office Address:	615 3rd Avenue South, Suite 700, Nashville, TN, 37210
Phone Number:	615-252-4406
E-mail Address:	frank.amatucci@bargedesign.com
Wetland Name(s):	WTL-1

Wetland Location:

Include drawing or map of project area limits or attach map showing location and project area limits, county, nearest street address, and narrative description of location, etc.

Wetland is located in the southwestern portion of the project study area.

Wetland is affiliated with agricultural drainage

Watershed (12-Digit HUC):	East Fork Clarks River (060400060101)
Lat/Long (dd.dddd, -dd.dddd) or UTM Coordinates (m easting, m northing):	36.446141, -88.313534
Circle coordinate system used:	NAD83 WGS84 UTM NAD27
USGS Quad Name:	Puryear
Depicted on National Wetland Inventory Map: (Y/N)	N
Soil Survey Map Units, Hydric Rating:	SgD3: Smithdale-Lexington complex, 8 to 12
Cowardin Wetland Type(s):	PFO
HGM Classification:	Non-HGM
Final Score: Non-HGM TRAM Form	23

NON-HGM Tennessee Rapid Assessment Method for Wetlands

June 2015

State of Tennessee
Department of Environment and Conservation
Division of Water Resources
Natural Resources Unit
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243

Quantitative Rating

<u>Metric 1. Wetland area (max 6 pts).</u> Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.		
7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	0
2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.		
7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	1

Metric 2 Total 1

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	3
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located <u>between</u> a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a other nearby wetland or upland habitat areas.	
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

x	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
x	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
x	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	3
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

Metric 3 Total 11

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): _x_ filling and grading _x_ plowing ____ grazing (hooves) _x_ vehicle use (off-road vehicles, construction vehicles) ____ sedimentation ____ dredging, and other mechanical disturbances to the soil

	YES	NO	NOT SURE
Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	Assign a score of 4 since there are no or no apparent modifications.	Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	2
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	2
1pt	POOR. Wetland appears <u>not</u> to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

x	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
x	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
x	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

Metric 4 Total 7

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
5pts	> 10m^2, sphagnum or other moss or vernal pools	5pts	Superior fish, waterfowl, bat, or amphibian breeding habitat
10pts 5pts 3pts	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)	5pts	Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water quality of a 303(d) listed stream and/or to surface or and/or ground water
10pts	Older-aged mature forested wetland avg. DBH >= 30 inches	10 pts	Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present <u>both vertically and horizontally</u> within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp., *Spirodela* spp.) are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	0
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	1
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	1
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	1
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	0
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	0

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt	LOW Wetland has a low degree of interspersion.	1
0pt	NONE Wetland has no plan view interspersion	

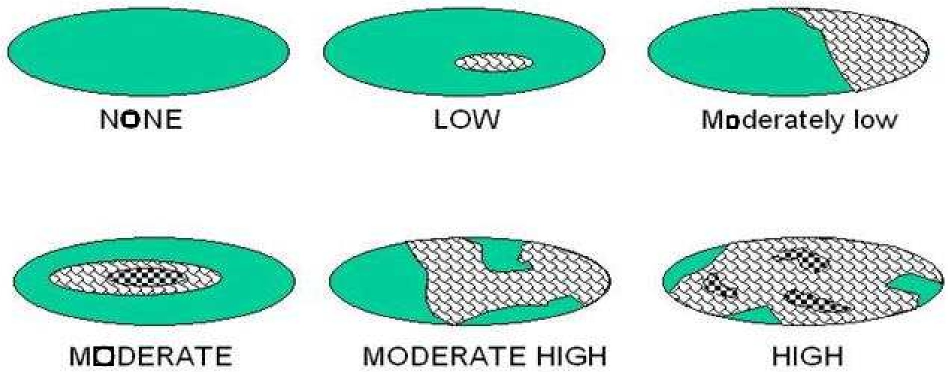


Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	-1
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 3

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	1
	Metric 3: Hydrology	11
	Metric 4: Habitat	7
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	3
	TOTAL SCORE	23

Wetland Background Information

Name(s) of Field Personnel:	Frank Amatucci & Cameron Brueck
Assessment Date:	Sept 22, 2022
Agency/Organization:	Barge Design Solutions, Inc.
Office Address:	615 3rd Avenue South, Suite 700, Nashville, TN 37210
Phone Number:	(615) 252-4406
E-mail Address:	frank.amatucci@bargedesign.com
Wetland Name(s):	WTL-2

Wetland Location:

Include drawing or map of project area limits or attach map showing location and project area limits, county, nearest street address, and narrative description of location, etc.

Wetland is located in the southwestern portion of the project study area.

Wetland determined as a floodplain wetland adjacent to the East Fork Clarks River

Watershed (12-Digit HUC):	East Fork Clarks River (060400060101)
Lat/Long (dd.dddd, -dd.dddd) or UTM Coordinates (m easting, m northing):	36.445357, -88.315062
Circle coordinate system used:	**NAD83** **WGS84** **UTM** **NAD27**
USGS Quad Name:	Puryear
Depicted on National Wetland Inventory Map: (Y/N)	N
Soil Survey Map Units, Hydric Rating:	Ea: Enville silt loam, 0 to 2 percent slopes, oc
Cowardin Wetland Type(s):	PFO
HGM Classification:	Riverine
Final Score:	74

Key to Wetland HGM Classes in Tennessee

1a. Wetland is within the active floodplain..**2**

1b. Wetland is not within the active floodplain..**3**

2a. Wetland is not in a closed topographic depression; primary water source is overbank flooding……...**Riverine**

2b. Wetland is not in a closed topographic depression; primary water source is groundwater discharge………………………...**Slope**

3a. Topography is flat; primary water source is precipitation..................................**Flat**

3b. Topography is not flat...**4**

4a. Wetland is in a closed topographic depression; primary water source is surface flow or groundwater discharge...**Depression**

4b. Wetland is not in a closed topographic depression...**5**

5a. Wetland is associated with a water body that has semi-permanent to permanent water more than 6 ft. deep in most years..**Fringe**

5b. Wetland is sloping or located at base of slope; primary water source is groundwater discharge...**Slope**

NOTE: Use TRAM User Guide before keying wetland types. If wetland does not fall into one of the types listed above use the Non-HGM TRAM.

An affirmative response to 1-6 of the Decision Table identifies the wetland per rule as an Outstanding Natural Resource Water (ONRW) or Exceptional Tennessee Waters (ETW). A positive response to 7-13 requires a final determination by the Department.

#	Wetland Feature Decision Table	Yes/No	Affirmative Result
1	The wetland has been designated as an **Outstanding Natural Resource Water (ONRW)** by the Department under 0400-40-03-.06(5)(a)**.**	No	**ORNW**
2	The wetland has previously been designated and documented as an Exceptional Tennessee Water (ETW) by the Department under 0400-40-03-.06(4)(a)(7)	No	**ETW**
3	The wetland is within state or national parks, wildlife refuges, forests, wilderness areas, natural areas, or is a designated State Scenic Rivers or Federal Wild and Scenic Rivers.	No	**ETW**
4	The wetland is known to contain a documented non-experimental population of state or federally listed threatened or endangered aquatic or semi-aquatic plants, or aquatic animals.	No	**ETW**
5	The wetland or the area it is in has been designated by the U.S. Fish and Wildlife Service as **"Critical Habitat"** for any threatened or endangered aquatic or semi-aquatic plant or aquatic animal species.	No	**ETW**
6	The wetland falls within an area designated as Lands Unsuitable for Mining pursuant to the federal Surface Mining Control and Reclamation Act where such designation is based in whole or in part on impacts to water resource values	No	**ETW**
7	**The wetland exhibits outstanding ecological or recreational values such as, but not limited to, those as outlined in 8-12**		Determination Required by TDEC
8	The wetland fits within the species composition concept for any plant community found in the state of Tennessee **ranked G2, G1, or more imperiled** at the "Association" classification level according to the NatureServe and Natural Heritage Ranking system (e.g. "bog", "fen", and "wet prairie/barren" communities).		Determination Required by TDEC
9	The wetland is **an uncommon resource** (e.g. vernal pools, headwater wetlands, sinks, spring/seeps, glades, newly described communities, high recreational or socioeconomic value) in the region and/or is deemed such by concurrence of qualified scientists.		Determination Required by TDEC
10	The wetland is an **older aged forested wetland** comprised of overstory trees with an average diameter at breast height (dbh) being **greater than or equal to 30 in** within the WAA.		Determination Required by TDEC
11	The wetland is observed and documented to be a **significant waterfowl, songbird, shorebird, amphibian, bat, fish habitat area**. These may include rookeries, migratory congregations, nesting sites, breeding areas, etc.		Determination Required by TDEC
12	The wetland is **hydrologically connected** to and/or has significant ecological contribution to an **ETW**		Determination Required by TDEC
13	The wetland has High Resource Value as determined by a **score of 75 and above** using the TRAM or non-HGM TRAM (to be determined after completing the quantitative portion of this manual)		Determination Required by TDEC

End of Narrative Rating. Begin Quantitative Rating on Next Page.

Quantitative Rating

Value Added Section

Wetland Size – Wetland size may increase particular wetland functions or provide greater habitat value to wildlife. In some regions, large wetlands or wetlands of certain types may be rare and may play a vital and significant local and/or regional ecological role. Refer to Tables 1 through 3 below for assessing value added points to wetland size.

Other Significant Value – See Table 4 for value added due to other significant wetland values

Critical Sizes for Tennessee Wetlands by HGM Class and Region of State

Table 1. Depression wetland size throughout Tennessee (max 5 pts). Estimate the area of wetland. Select the appropriate size class and assign score.	**Score**
≥5 acres	5
3 - <5 acres	3

Table 2. Slope and Flat wetland size throughout Tennessee (max 5 pts). Estimate the area of wetland. Select the appropriate size class and assign score.	**Score**
≥50 acres	5
25 - <50 acres	3
10 - <25 acres	2
5 - <10 acres	1

Table 3. Riverine wetland size in central and eastern Tennessee (max 5 pts). Estimate the area of wetland. Select the appropriate size class and assign score.	**Score**
≥50acres	5
25 - <50 acres	3
10 - <25 acres	2
5 - <10 acres Not Applicable: WTL-2 is 1.37 acres delineated	1

Table 4. Other significant value (max 5 pts). Estimate the area of wetland. Select the appropriate size class and assign score.	**Score**
Wetland falls within a category **from lines 8-12 of the Exceptional Status Wetlands Decision Table** (pg. 18) but has not been determined by TDEC to qualify for Exceptional Tennessee Waters status.	5

TRAM Summary Worksheet

Exceptional Status Wetlands	WTL-2	**Check if applicable**
	1. **ONRW**	No
	2. **ETW**	No
	3. **Further Review Requested:** Attach Wetland Background and Exceptional Status Wetlands Worksheet	
	COMMENTS/NOTES:	
Quantitative Rating scores	Function: Hydrologic Regime	0.75
	Function: Biogeochemical Processes	0.63
	Function: Retain Particulates	0.81
	Function: Plant Community	0.77
	Function: Wildlife Community	0.64
	Quantitative Score (Average of FCIs x 100)	0.74
	Value Added (Significant Size) Total	0
Total of Quantitative and Value Added Scores	**TOTAL SCORE**	74

HGM FUNCTIONAL ASSESSMENT
RIVERINE WETLANDS

Date: 9/21/2022 Project Name Puryear Solar

Field Personnel FCA, CB Wetland Name/Location WTL-2

Read instructions prior to conducting assessments. If project area is large or highly heterogeneous requiring the designation of several WAAs, a separate assessment should be performed for each WAA. CHECK THE APPROPRIATE BLANK(S) BELOW.

V1: River Connection (RIVCON)

1. Overbank flooding has not been impacted (SI = 1.0)
   - no artificial levee(s), spoil piles, roads, or other obstructions
   - no channelization; channel is naturally meandering
   - no channel downcutting
   - no lateral cutting and no bank failure
   - flood frequency < 2 years
   - local knowledge
   - gauge data
2. Overbank flooding slightly impacted (SI = 0.75)
   - levee(s) etc. present but most overbank flooding occurs
   - channelization
   - slight channel downcutting
   - slight lateral cutting and bank failure
   - flooding frequency < 2 years
   - local knowledge
   - gauge data
3. Overbank flooding moderately impacted (SI = 0.5)
   - levee (s) etc. present but some overbank flow occurs
   - channelization
   - moderate channel downcutting
   - moderate lateral cutting and bank failure
   - local knowledge
   - gauge data
4. Overbank flooding significantly impacted (SI = 0.25)
   - levee (s) etc. present but some overbank flow occurs
   - channelization
   - significant channel downcutting
   - significant lateral cutting and bank failure
   - local knowledge
   - gauge data
5. Overbank flooding severely impacted (SI = 0.1)
   - levee(s) etc. have eliminated overbank flooding
   - channelization
   - severe channel downcutting
   - severe lateral cutting and bank failure
   - natural flood regime no longer occurs
   - local knowledge
   - gauge data

V2: Hydroperiod (HYDRO)

1. Hydrologic storage not altered (SI = 1.0)
   - no fill material or excessive sediment
   - no ditches/drainage tiles
   - no artificial levees or other structures that cause prolonged ponding
   - no land leveling
2. Hydrologic storage slightly impacted (SI = 0.75)
   - portion of site impacted by fill or excessive sediment
   - ditches/drainage tiles present over portion of site
   - portion of the site impacted by dikes or other structures that cause prolonged ponding
   - land leveling of portion of site
3. Hydrologic storage moderately impacted (SI = 0.50)
   - portion of site impacted by fill or excessive sediment
   - widely spaced ditches/drainage tiles present over entire site
   - portion of the site impacted by dikes or other structures that cause prolonged ponding
   - land leveling of portion of site
4. Hydrologic storage significantly impacted (SI = 0.25)
   - portion of site impacted by fill or excessive sediment
   - moderately spaced ditches/drainage tiles present over entire site
   - portion of the site impacted by dikes or other structures that cause prolonged ponding
   - land leveling of portion of site
5. Hydrologic storage severely impacted (SI = 0.1)
   - entire site impacted by fill, excessive sediment, or leveling
   - closely spaced ditches/tiles present over entire site
   - entire site impacted by dikes or other structures that cause prolonged ponding
   - land leveling of entire site

V3: Canopy Tree Size Class (TSIZE)

1. Average size of canopy trees > 3 in. DBH

☑ > 16 in. (SI = 1.0) ☐ 10 – 16 in. (SI = 0.75) ☐ 5 – 9 in. (SI = 0.5) ☐ 3 – 4 in. (SI = 0.25)
☐ < 4 in. or no trees present, go to V5

V4: Canopy Tree Density (TDEN)

1. Average number of canopy trees (> 3 in. DBH) per 30-ft. radius plot

☐ 8 – 16 (SI = 1.0) ☐ 17 – 50 (SI = 0.75) ☐ > 50 (SI = 0.5) ☑ 3 – 7 (SI = 0.5) ☐ 1– 2 (SI = 0.25)

V5: Shrub Cover (SCOV)

1. Average percent cover of shrubs (woody stems < 3 in. DBH and taller than 3 ft.) per 30-ft. radius plot

☐ ≥ 20 (SI = 1.0)) ☑ < 20, go to V6

V6: Ground Vegetation Cover (GVC)

1. Average percent cover of ground vegetation per 30-ft. radius plot

☐ ≥ 70 (SI = 1.0) ☐ 55 – 69 (SI = 0.75) ☐ 45 – 54 (SI = 0.5) ☑ 30 – 44 (SI = 0.25) ☐ 20 – 29 (SI = 0.1)
☐ < 20 (SI=0.0)

V7: Vegetation Composition and Diversity (COMP)

1. Check the dominant species from Groups 1, 2, and 3 below using the 50/20 rule. If tree cover is < 20%, check the dominants in the next tallest stratum. If a dominant does not appear in lists below, but is a native species, it can be added as a Group 2 species. Native shrub and herbaceous species are assigned to Group 2. When using shrub or herbaceous write in the number of dominant species. Dominant invasive species are checked regardless of stratum.*

GROUP 1 (Reference Standard)		GROUP 2 (Native Ubiquitous)		GROUP 3 (Invasive)
☐ Water oak	☐ Shumard oak	☐ American elm	☐ River birch	☐ European/Chinese privet
☐ Willow oak	☐ Overcup oak	☑ Slippery elm	☐ Boxelder	☐ Japanese honeysuckle
☐ Cherrybark oak	☐ Water hickory	☐ Silver maple	☐ Deciduous holly	☐ Japanese stiltgrass
☐ Pin oak	☐ Honey locust	☑ Red maple	☐ Sugarberry	☐ Giant reed
☐ Swamp chestnut oak	☐ Water tupelo	☐ Black willow	☐ Silky dogwood	☐ Tall fescue
☐ Bur oak	☐ Bald cypress	☑ Sweetgum	☑ Cottonwo	☐ Purple loosestrife
☐ Nuttall oak	☑ Am. hornbeam	☐ Green ash	☐ ____________	☐ ____________
☐ Swamp white oak	☐ ____________	☐ Number native shrub spp.		
☐ ____________	☐ ____________	☐ Number native herbaceous spp.		

2. Using the checked dominants in Groups 1, 2, and 3 above, calculate a quality index (Q) using the following formula: [(1.0 x # of checked dominants in Group 1) + (0.66 x # of checked dominants in Group 2) + (0.0 x # of checked dominants in Group 3)]/ total # of checked dominants in all groups = 0.73

3. Multiply Q above by one of the following constants that reflects species richness:[1]

a) if ≥ 4 species from Groups 1 and/or 2 occur as dominants, multiply Q by 1.0 0.73
b) if 3 species from Groups 1 and/or 2 occur as dominant, multiply Q by 0.75 ____________
c) if 2 species from Groups 1 and/or 2 occur as dominants, multiply Q by 0.50 ____________
d) if 1 species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.25 ____________
e) if no species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.0 ____________

4. Calculate the square root of the value from Step 3 above. This is the SI for V7 0.85

* In some Riverine wetlands and in some small WAAs (e.g., <0.5 acres), relatively few species (e.g., overcup oak) may be present. In cases where this is the normal condition, Q can be multiplied by 1.0 if only 1 or 2 species are dominant.

V8: Soil Organic Matter (ORGANIC)

1. Surface horizons unaltered

☑ 100 percent cover of O and/or A horizon present (SI = 1.0)

2. Surface horizons altered. Estimate the percent of the WAA in which neither an O or A horizon is present.

3. Subtract the sum of the values from Step 2 from 100. Convert this value to a decimal. This is the SI for V8 (e.g., if 75 % of the WAA does not have an O or A horizon due to a significant disturbance, it will have an SI of 0.25).

V9: Tract Size (TRACT)

1. Area (acres) of adjacent wetland and upland forest that is contiguous with the WAA. These values are for western Tennessee are negligible unless greater than the value added section limits for the remainder of the state.

☐ > 7,000 (SI = 1.0) ☐ >200 – 1,000 (SI = 0.5) ☐ < 1(SI = 0.00)
☐ >1,000 – 7,000 (SI = 0.75) ☑ 1 – 200 (SI = 0.25) ☐ In Eastern or Central Tennessee (SI=1.0)

VALUES USED TO CALCULATE FUNCTIONAL CAPACITY INDICES (FCIs)

SUBINDEX VALUES:

V1 0.75 (RIVCON) V3 1.00 (TSIZE) V5 0.00 (SCOV) V7 0.85 (COMP) V9 0.25 (TRACT)

V2 0.75 (HYDRO) V4 0.50 (TDEN) V6 0.25 (GCV) V8 1.00 (ORGANIC)

WETLAND FUNCTIONS

FUNCITION 1: MAINTAIN HYDROLOGIC REGIME

FCI 1: $(\text{V1 x V2})^{1/2} \Rightarrow (\_\_\_\_ \text{ x } \boxed{})^{1/2}$ = 0.75

FUNCTION 2: RETAIN PARTICULATES

FCI 2: (trees present) = $\dfrac{(\text{V1 x V2})^{1/2} + \text{V4}}{2} \Rightarrow \dfrac{(\text{FCI 1}) + \boxed{}}{2}$ = 0.63

FCI 2: (shrubs present) = $\dfrac{(\text{V1 x V2})^{1/2} + \text{V5}}{2} \Rightarrow \dfrac{(\text{FCI 1}) + \boxed{}}{2}$ = ____

FCI 2: (ground cover) = $\dfrac{(\text{V1 x V2})^{1/2} + \text{V6}}{3} \Rightarrow \dfrac{(\text{FCI 1}) + \boxed{}}{3}$ = ____

FUNCTION 3: MAINTAIN BIOGEOCHEMICAL PROCESSES

FCI 3: (trees present)= $\left((\text{V1 x V2})^{1/2} \text{ x } \left(\dfrac{\frac{\text{V3+V4}}{2} + \text{V8}}{2}\right)\right)^{1/2} \Rightarrow \left((\text{FCI 1}) \text{ x } \left(\dfrac{\frac{\_\_\_+\_\_\_}{2} + \_\_\_}{2}\right)\right)^{1/2}$ = 0.81

FCI 3: (shrubs present)= $\left((\text{V1 x V2})^{1/2} \text{ x } \dfrac{\text{V5+V8}}{3}\right)^{1/2} \Rightarrow \left((\text{FCI 1}) \text{ x } \dfrac{\_\_\_+\_\_\_}{3}\right)^{1/2}$ = ____

FCI 3: (ground cover)= $\left((\text{V1 x V2})^{1/2} \text{ x } \dfrac{\text{V6+V8}}{5}\right)^{1/2} \Rightarrow \left((\text{FCI 1}) \text{ x } \dfrac{\_\_\_+\_\_\_}{5}\right)^{1/2}$ = ____

FUNCTION 4: MAINTAIN CHARACTERISTIC PLANT COMMUNITY

FCI 4: (trees present) = $\dfrac{(\text{V1 x V2})^{1/2} + 2\left(\frac{\text{V3+V4+V7}}{3}\right)}{3} \Rightarrow \dfrac{(\text{FCI 1}) + 2\left(\frac{\_\_\_+\_\_\_+\boxed{}}{3}\right)}{3}$ = 0.77

FCI 4: (shrubs present) = $\dfrac{(\text{V1 x V2})^{1/2} + 2\left(\frac{\text{V5+V7}}{2}\right)}{6} \Rightarrow \dfrac{(\text{FCI 1}) + (\_\_\_+\_\_\_)}{6}$ = ____

FCI 4: (groundcover) = $\dfrac{(\text{V1 x V2})^{1/2} + 2\left(\frac{\text{V6+V7}}{2}\right)}{9} \Rightarrow \dfrac{(\text{FCI 1}) + (\_\_\_+\_\_\_)}{9}$ = ____

FUNCTION 5: MAINTAIN CHARACTERISTIC WILDILFE COMMUNITY

FCI 5: (trees) = $\dfrac{(\text{V1 x V2})^{1/2} + 2\left(\frac{\text{V3+V4+V7}}{3}\right) + \text{V9}}{4} \Rightarrow \dfrac{(\text{FCI 1}) + 2\left(\frac{\boxed{}+\_\_\_+\boxed{}}{3}\right) + \boxed{}}{4}$ = 0.64

FCI 5: (shrubs present) = $\dfrac{(\text{V1 x V2})^{1/2} + 2\left(\frac{\text{V5+V7}}{2}\right) + \text{V9}}{6} \Rightarrow \dfrac{(\text{FCI 1}) + (\_\_\_+\boxed{}) + \boxed{}}{6}$ = ____

FCI 5: (groundcover) = $\dfrac{(\text{V1 x V2})^{1/2} + 2\left(\frac{\text{V6+V7}}{2}\right) + \text{V9}}{9} \Rightarrow \dfrac{(\text{FCI 1}) + (\_\_\_+\boxed{}) + \boxed{}}{9}$ = ____

Wetland Background Information

Name(s) of Field Personnel:	Frank Amatucci & Cameron Brueck
Assessment Date:	Sept 22, 2022
Agency/Organization:	Barge Design Solutions, Inc.
Office Address:	615 3rd Avenue South, Suite 700, Nashville, TN 37210
Phone Number:	(615) 252-4406
E-mail Address:	frank.amatucci@bargedesign.com
Wetland Name(s):	WTL-3

Wetland Location:

Include drawing or map of project area limits or attach map showing location and project area limits, county, nearest street address, and narrative description of location, etc.

Wetland is located in the southwestern portion of the project study area.

Wetland determined as a floodplain wetland adjacent to the East Fork Clarks River

Watershed (12-Digit HUC):	East Fork Clarks River (060400060101)
Lat/Long (dd.dddd, -dd.dddd) or UTM Coordinates (m easting, m northing):	36.446975, -88.314885
Circle coordinate system used:	NAD83 WGS84 UTM NAD27
USGS Quad Name:	Puryear
Depicted on National Wetland Inventory Map: (Y/N)	N
Soil Survey Map Units, Hydric Rating:	Ea: Enville silt loam, 0 to 2 percent slopes, o
Cowardin Wetland Type(s):	PFO
HGM Classification:	Riverine
Final Score:	58

Key to Wetland HGM Classes in Tennessee

1a. Wetland is within the active floodplain..2

1b. Wetland is not within the active floodplain...3

2a. Wetland is not in a closed topographic depression; primary water source is overbank flooding……..**Riverine**

2b. Wetland is not in a closed topographic depression; primary water source is groundwater discharge…………………………...**Slope**

3a. Topography is flat; primary water source is precipitation.................................**Flat**

3b. Topography is not flat...**4**

4a. Wetland is in a closed topographic depression; primary water source is surface flow or groundwater discharge...**Depression**

4b. Wetland is not in a closed topographic depression...**5**

5a. Wetland is associated with a water body that has semi-permanent to permanent water more than 6 ft. deep in most years..**Fringe**

5b. Wetland is sloping or located at base of slope; primary water source is groundwater discharge...**Slope**

NOTE: Use TRAM User Guide before keying wetland types. If wetland does not fall into one of the types listed above use the Non-HGM TRAM.

An affirmative response to 1-6 of the Decision Table identifies the wetland per rule as an Outstanding Natural Resource Water (ONRW) or Exceptional Tennessee Waters (ETW). A positive response to 7-13 requires a final determination by the Department.

#	Wetland Feature Decision Table	Yes/No	Affirmative Result
1	The wetland has been designated as an **Outstanding Natural Resource Water (ONRW)** by the Department under 0400-40-03-.06(5)(a)**.**	No	**ORNW**
2	The wetland has previously been designated and documented as an Exceptional Tennessee Water (ETW) by the Department under 0400-40-03-.06(4)(a)(7)	No	**ETW**
3	The wetland is within state or national parks, wildlife refuges, forests, wilderness areas, natural areas, or is a designated State Scenic Rivers or Federal Wild and Scenic Rivers.	No	**ETW**
4	The wetland is known to contain a documented non-experimental population of state or federally listed threatened or endangered aquatic or semi-aquatic plants, or aquatic animals.	No	**ETW**
5	The wetland or the area it is in has been designated by the U.S. Fish and Wildlife Service as **"Critical Habitat"** for any threatened or endangered aquatic or semi-aquatic plant or aquatic animal species.	No	**ETW**
6	The wetland falls within an area designated as Lands Unsuitable for Mining pursuant to the federal Surface Mining Control and Reclamation Act where such designation is based in whole or in part on impacts to water resource values	No	**ETW**
7	**The wetland exhibits outstanding ecological or recreational values such as, <u>but not limited to</u>, those as outlined in 8-12**		Determination Required by TDEC
8	The wetland fits within the species composition concept for any plant community found in the state of Tennessee **ranked G2, G1, or more imperiled** at the "Association" classification level according to the NatureServe and Natural Heritage Ranking system (e.g. "bog", "fen", and "wet prairie/barren" communities).		Determination Required by TDEC
9	The wetland is **an uncommon resource** (e.g. vernal pools, headwater wetlands, sinks, spring/seeps, glades, newly described communities, high recreational or socioeconomic value) in the region and/or is deemed such by concurrence of qualified scientists.		Determination Required by TDEC
10	The wetland is an **older aged forested wetland** comprised of overstory trees with an average diameter at breast height (dbh) being **greater than or equal to 30 in** within the WAA.		Determination Required by TDEC
11	The wetland is observed and documented to be a **significant waterfowl, songbird, shorebird, amphibian, bat, fish habitat area**. These may include rookeries, migratory congregations, nesting sites, breeding areas, etc.		Determination Required by TDEC
12	The wetland is **hydrologically connected** to and/or has significant ecological contribution to an **ETW**		Determination Required by TDEC
13	The wetland has High Resource Value as determined by a **score of 75 and above** using the TRAM or non-HGM TRAM (to be determined after completing the quantitative portion of this manual)		Determination Required by TDEC

End of Narrative Rating. Begin Quantitative Rating on Next Page.

Quantitative Rating

Value Added Section

Wetland Size – Wetland size may increase particular wetland functions or provide greater habitat value to wildlife. In some regions, large wetlands or wetlands of certain types may be rare and may play a vital and significant local and/or regional ecological role. Refer to Tables 1 through 3 below for assessing value added points to wetland size.

Other Significant Value – See Table 4 for value added due to other significant wetland values

Critical Sizes for Tennessee Wetlands by HGM Class and Region of State

Table 1. Depression wetland size throughout Tennessee (max 5 pts). Estimate the area of wetland. Select the appropriate size class and assign score.	**Score**
≥5 acres	5
3 - <5 acres	3

Table 2. Slope and Flat wetland size throughout Tennessee (max 5 pts). Estimate the area of wetland. Select the appropriate size class and assign score.	**Score**
≥50 acres	5
25 - <50 acres	3
10 - <25 acres	2
5 - <10 acres	1

Table 3. Riverine wetland size in central and eastern Tennessee (max 5 pts). Estimate the area of wetland. Select the appropriate size class and assign score.	**Score**
≥50acres	5
25 - <50 acres	3
10 - <25 acres	2
5 - <10 acres Not Applicable: WTL-3 is 0.26 acres delineated	1

Table 4. Other significant value (max 5 pts). Estimate the area of wetland. Select the appropriate size class and assign score.	**Score**
Wetland falls within a category **from lines 8-12 of the Exceptional Status Wetlands Decision Table** (pg. 18) but has not been determined by TDEC to qualify for Exceptional Tennessee Waters status.	5

TRAM Summary Worksheet

Exceptional Status Wetlands	WTL-3	**Check if applicable**
	1. **ONRW**	No
	2. **ETW**	No
	3. **Further Review Requested:** Attach Wetland Background and Exceptional Status Wetlands Worksheet	
	COMMENTS/NOTES:	
Quantitative Rating scores	Function: Hydrologic Regime	0.50
	Function: Biogeochemical Processes	0.50
	Function: Retain Particulates	0.66
	Function: Plant Community	0.66
	Function: Wildlife Community	0.56
	Quantitative Score (Average of FCIs x 100)	58
	Value Added (Significant Size) Total	0
Total of Quantitative and Value Added Scores	**TOTAL SCORE**	58

HGM FUNCTIONAL ASSESSMENT
RIVERINE WETLANDS

Date: 9/21/2022 Project Name Puryear Solar

Field Personnel FCA, CB Wetland Name/Location WTL-2

Read instructions prior to conducting assessments. If project area is large or highly heterogeneous requiring the designation of several WAAs, a separate assessment should be performed for each WAA. CHECK THE APPROPRIATE BLANK(S) BELOW.

V1: River Connection (RIVCON)

1. Overbank flooding has not been impacted (SI = 1.0)
   - no artificial levee(s), spoil piles, roads, or other obstructions
   - no channelization; channel is naturally meandering
   - no channel downcutting
   - no lateral cutting and no bank failure
   - flood frequency < 2 years
   - local knowledge
   - gauge data
2. Overbank flooding slightly impacted (SI = 0.75)
   - levee(s) etc. present but most overbank flooding occurs
   - channelization
   - slight channel downcutting
   - slight lateral cutting and bank failure
   - flooding frequency < 2 years
   - local knowledge
   - gauge data
3. Overbank flooding moderately impacted (SI = 0.5)
   - levee (s) etc. present but some overbank flow occurs
   - channelization
   - moderate channel downcutting
   - moderate lateral cutting and bank failure
   - local knowledge
   - gauge data
4. Overbank flooding significantly impacted (SI = 0.25)
   - levee (s) etc. present but some overbank flow occurs
   - channelization
   - significant channel downcutting
   - significant lateral cutting and bank failure
   - local knowledge
   - gauge data
5. Overbank flooding severely impacted (SI = 0.1)
   - levee(s) etc. have eliminated overbank flooding
   - channelization
   - severe channel downcutting
   - severe lateral cutting and bank failure
   - natural flood regime no longer occurs
   - local knowledge
   - gauge data

V2: Hydroperiod (HYDRO)

1. Hydrologic storage not altered (SI = 1.0)
   - no fill material or excessive sediment
   - no ditches/drainage tiles
   - no artificial levees or other structures that cause prolonged ponding
   - no land leveling
2. Hydrologic storage slightly impacted (SI = 0.75)
   - portion of site impacted by fill or excessive sediment
   - ditches/drainage tiles present over portion of site
   - portion of the site impacted by dikes or other structures that cause prolonged ponding
   - land leveling of portion of site
3. Hydrologic storage moderately impacted (SI = 0.50)
   - portion of site impacted by fill or excessive sediment
   - widely spaced ditches/drainage tiles present over entire site
   - portion of the site impacted by dikes or other structures that cause prolonged ponding
   - land leveling of portion of site
4. Hydrologic storage significantly impacted (SI = 0.25)
   - portion of site impacted by fill or excessive sediment
   - moderately spaced ditches/drainage tiles present over entire site
   - portion of the site impacted by dikes or other structures that cause prolonged ponding
   - land leveling of portion of site
5. Hydrologic storage severely impacted (SI = 0.1)
   - entire site impacted by fill, excessive sediment, or leveling
   - closely spaced ditches/tiles present over entire site
   - entire site impacted by dikes or other structures that cause prolonged ponding
   - land leveling of entire site

V3: Canopy Tree Size Class (TSIZE)

1. Average size of canopy trees > 3 in. DBH

☑ > 16 in. (SI = 1.0) ☐ 10 – 16 in. (SI = 0.75) ☐ 5 – 9 in. (SI = 0.5) ☐ 3 – 4 in. (SI = 0.25)
☐ < 4 in. or no trees present, go to V5

V4: Canopy Tree Density (TDEN)

1. Average number of canopy trees (> 3 in. DBH) per 30-ft. radius plot

☐ 8 – 16 (SI = 1.0) ☐ 17 – 50 (SI = 0.75) ☐ > 50 (SI = 0.5) ☑ 3 – 7 (SI = 0.5) ☐ 1– 2 (SI = 0.25)

V5: Shrub Cover (SCOV)

1. Average percent cover of shrubs (woody stems < 3 in. DBH and taller than 3 ft.) per 30-ft. radius plot

☐ ≥20 (SI = 1.0)) ☑ < 20, go to V6

V6: Ground Vegetation Cover (GVC)

1. Average percent cover of ground vegetation per 30-ft. radius plot

☐ ≥70 (SI = 1.0) ☐ 55 – 69 (SI = 0.75) ☐ 45 – 54 (SI = 0.5) ☑ 30 – 44 (SI = 0.25) ☐ 20 – 29 (SI = 0.1) ☐ < 20 (SI=0.0)

V7: Vegetation Composition and Diversity (COMP)

1. Check the dominant species from Groups 1, 2, and 3 below using the 50/20 rule. If tree cover is < 20%, check the dominants in the next tallest stratum. If a dominant does not appear in lists below, but is a native species, it can be added as a Group 2 species. Native shrub and herbaceous species are assigned to Group 2. When using shrub or herbaceous write in the number of dominant species. Dominant invasive species are checked regardless of stratum.*

GROUP 1 (Reference Standard)		GROUP 2 (Native Ubiquitous)		GROUP 3 (Invasive)
☐ Water oak	☐ Shumard oak	☐ American elm	☑ River birch	☐ European/Chinese privet
☐ Willow oak	☐ Overcup oak	☑ Slippery elm	☐ Boxelder	☐ Japanese honeysuckle
☐ Cherrybark oak	☐ Water hickory	☐ Silver maple	☐ Deciduous holly	☑ Japanese stiltgrass
☐ Pin oak	☐ Honey locust	☑ Red maple	☑ Sugarberry	☐ Giant reed
☐ Swamp chestnut oak	☐ Water tupelo	☐ Black willow	☐ Silky dogwood	☐ Tall fescue
☐ Bur oak	☐ Bald cypress	☐ Sweetgum	☐ ___________	☐ Purple loosestrife
☐ Nuttall oak	☐ Am. hornbeam	☐ Green ash	☐ ___________	☐ ___________
☐ Swamp white oak	☐ ___________	☐ Number native shrub spp.		
☐ ___________	☐ ___________	☐ Number native herbaceous spp.		

2. Using the checked dominants in Groups 1, 2, and 3 above, calculate a quality index (Q) using the following formula: [(1.0 x # of checked dominants in Group 1) + (0.66 x # of checked dominants in Group 2) + (0.0 x # of checked dominants in Group 3)]/ total # of checked dominants in all groups = 0.52

3. Multiply Q above by one of the following constants that reflects species richness:[1]

a) if ≥ 4 species from Groups 1 and/or 2 occur as dominants, multiply Q by 1.0 0.53

b) if 3 species from Groups 1 and/or 2 occur as dominant, multiply Q by 0.75 ___________

c) if 2 species from Groups 1 and/or 2 occur as dominants, multiply Q by 0.50 ___________

d) if 1 species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.25 ___________

e) if no species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.0 ___________

4. Calculate the square root of the value from Step 3 above. This is the SI for V7 0.73

* In some Riverine wetlands and in some small WAAs (e.g., <0.5 acres), relatively few species (e.g., overcup oak) may be present. In cases where this is the normal condition, Q can be multiplied by 1.0 if only 1 or 2 species are dominant.

V8: Soil Organic Matter (ORGANIC)

1. Surface horizons unaltered

☑ 100 percent cover of O and/or A horizon present (SI = 1.0)

2. Surface horizons altered. Estimate the percent of the WAA in which neither an O or A horizon is present.

3. Subtract the sum of the values from Step 2 from 100. Convert this value to a decimal. This is the SI for V8 (e.g., if 75 % of the WAA does not have an O or A horizon due to a significant disturbance, it will have an SI of 0.25).

V9: Tract Size (TRACT)

1. Area (acres) of adjacent wetland and upland forest that is contiguous with the WAA. These values are for western Tennessee are negligible unless greater than the value added section limits for the remainder of the state.

☐ > 7,000 (SI = 1.0) ☐ >200 – 1,000 (SI = 0.5) ☐ < 1(SI = 0.00)

☐ >1,000 – 7,000 (SI = 0.75) ☑ 1 – 200 (SI = 0.25) ☐ In Eastern or Central Tennessee (SI=1.0)

VALUES USED TO CALCULATE FUNCTIONAL CAPACITY INDICES (FCIs)

SUBINDEX VALUES:

V1 0.50 (RIVCON) V3 1.00 (TSIZE) V5 0.00 (SCOV) V7 0.73 (COMP) V9 0.25 (TRACT)

V2 0.50 (HYDRO) V4 0.50 (TDEN) V6 0.25 (GCV) V8 1.00 (ORGANIC)

WETLAND FUNCTIONS

FUNCITION 1: MAINTAIN HYDROLOGIC REGIME

FCI 1: $(\text{V1 x V2})^{1/2} \Rightarrow (\underline{\quad} \text{ x } \boxed{})^{1/2}$ = 0.50

FUNCTION 2: RETAIN PARTICULATES

FCI 2: (trees present) = $\dfrac{(\text{V1 x V2})^{1/2} + \text{V4}}{2} \Rightarrow \dfrac{(\text{FCI 1}) + \boxed{}}{2}$ = 0.50

FCI 2: (shrubs present) = $\dfrac{(\text{V1 x V2})^{1/2} + \text{V5}}{2} \Rightarrow \dfrac{(\text{FCI 1}) + \boxed{}}{2}$ = $\boxed{}$

FCI 2: (ground cover) = $\dfrac{(\text{V1 x V2})^{1/2} + \text{V6}}{3} \Rightarrow \dfrac{(\text{FCI 1}) + \boxed{}}{3}$ = $\boxed{}$

FUNCTION 3: MAINTAIN BIOGEOCHEMICAL PROCESSES

FCI 3: (trees present)= $\left((\text{V1 x V2})^{1/2} \text{ x } \left(\dfrac{\frac{\text{V3+V4}}{2} + \text{V8}}{2}\right)\right)^{1/2} \Rightarrow \left((\text{FCI 1}) \text{ x } \left(\dfrac{\frac{\underline{\quad}+\underline{\quad}}{2} + \underline{\quad}}{2}\right)\right)^{1/2}$ = 0.66

FCI 3: (shrubs present)= $\left((\text{V1 x V2})^{1/2} \text{ x } \dfrac{\text{V5+V8}}{3}\right)^{1/2} \Rightarrow \left((\text{FCI 1}) \text{ x } \dfrac{\underline{\quad}+\underline{\quad}}{3}\right)^{1/2}$ = $\boxed{}$

FCI 3: (ground cover)= $\left((\text{V1 x V2})^{1/2} \text{ x } \dfrac{\text{V6+V8}}{5}\right)^{1/2} \Rightarrow \left((\text{FCI 1}) \text{ x } \dfrac{\underline{\quad}+\underline{\quad}}{5}\right)^{1/2}$ = $\boxed{}$

FUNCTION 4: MAINTAIN CHARACTERISTIC PLANT COMMUNITY

FCI 4: (trees present) = $\dfrac{(\text{V1 x V2})^{1/2} + 2\left(\frac{\text{V3+V4+V7}}{3}\right)}{3} \Rightarrow \dfrac{(\text{FCI 1}) + 2\left(\frac{\underline{\quad}+\underline{\quad}+\boxed{}}{3}\right)}{3}$ = 0.66

FCI 4: (shrubs present) = $\dfrac{(\text{V1 x V2})^{1/2} + 2\left(\frac{\text{V5+V7}}{2}\right)}{6} \Rightarrow \dfrac{(\text{FCI 1}) + (\underline{\quad}+\underline{\quad})}{6}$ = ______

FCI 4: (groundcover) = $\dfrac{(\text{V1 x V2})^{1/2} + 2\left(\frac{\text{V6+V7}}{2}\right)}{9} \Rightarrow \dfrac{(\text{FCI 1}) + (\underline{\quad}+\underline{\quad})}{9}$ = ______

FUNCTION 5: MAINTAIN CHARACTERISTIC WILDILFE COMMUNITY

FCI 5: (trees) = $\dfrac{(\text{V1 x V2})^{1/2} + 2\left(\frac{\text{V3+V4+V7}}{3}\right) + \text{V9}}{4} \Rightarrow \dfrac{(\text{FCI 1}) + 2\left(\frac{\boxed{}+\underline{\quad}+\boxed{}}{3}\right) + \boxed{}}{4}$ = 0.56

FCI 5: (shrubs present) = $\dfrac{(\text{V1 x V2})^{1/2} + 2\left(\frac{\text{V5+V7}}{2}\right) + \text{V9}}{6} \Rightarrow \dfrac{(\text{FCI 1}) + (\underline{\quad}+\boxed{}) + \boxed{}}{6}$ = ______

FCI 5: (groundcover) = $\dfrac{(\text{V1 x V2})^{1/2} + 2\left(\frac{\text{V6+V7}}{2}\right) + \text{V9}}{9} \Rightarrow \dfrac{(\text{FCI 1}) + (\underline{\quad}+\boxed{}) + \boxed{}}{9}$ = ______

Wetland Background Information

Name(s) of Field Personnel:	Frank Amatucci & Cameron Brueck
Assessment Date:	Sept 22, 2022
Agency/Organization:	Barge Design Solutions, Inc.
Office Address:	615 3rd Avenue South, Suite 700, Nashville, TN, 37210
Phone Number:	615-252-4406
E-mail Address:	frank.amatucci@bargedesign.com
Wetland Name(s):	WTL-4

Wetland Location:

Include drawing or map of project area limits or attach map showing location and project area limits, county, nearest street address, and narrative description of location, etc.

Wetland is located in the southwestern portion of the project study area.

Wetland is affiliated with agricultural drainage

Watershed (12-Digit HUC):	East Fork Clarks River (060400060101)
Lat/Long (dd.dddd, -dd.dddd) or UTM Coordinates (m easting, m northing):	36.444086, -88.315377
Circle coordinate system used:	NAD83 WGS84 UTM NAD27
USGS Quad Name:	Puryear
Depicted on National Wetland Inventory Map: (Y/N)	N
Soil Survey Map Units, Hydric Rating:	Cn: Chenneby silt loam, 0 to 2 percent slopes
Cowardin Wetland Type(s):	PFO/PEM
HGM Classification:	Non-HGM
Final Score: Non-HGM TRAM Form	27

NON-HGM Tennessee Rapid Assessment Method for Wetlands

June 2015

State of Tennessee
Department of Environment and Conservation
Division of Water Resources
Natural Resources Unit
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243

Quantitative Rating

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	2
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 2

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.		
7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	0
2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.		
7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	1

Metric 2 Total 1

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	3
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	1
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located <u>between</u> a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a other nearby wetland or upland habitat areas.	
1pt	**Part of riparian corridor**.	1
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	3
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

x	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
x	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
x	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	3
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

Metric 3 Total 13

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): x filling and grading x plowing ____grazing (hooves) x vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

	YES	NO	NOT SURE
Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	Assign a score of 4 since there are no or no apparent modifications.	Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	2
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	2
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

x	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
x	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
x	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

Metric 4 Total 7

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
5pts	> $10m^2$, sphagnum or other moss or vernal pools	5pts	Superior fish, waterfowl, bat, or amphibian breeding habitat
10pts 5pts 3pts	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)	5pts	Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water quality of a 303(d) listed stream and/or to surface or and/or ground water
10pts	Older-aged mature forested wetland avg. DBH >= 30 inches	10 pts	Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present <u>both vertically and horizontally</u> within the wetland with an area of at least 0.1 hectares or $1000m^2$ (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp., *Spirodela* spp.) are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	0
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	1
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	1
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	1
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	0
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	0

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of “low,” “moderate,” and “high” quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland’s vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland’s vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland’s vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland’s vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland’s vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a “low”, “moderate,” or “ high” quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant “weedy” species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant “weedy” species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.	Score
5pts HIGH Wetland has a high degree of interspersion	
4pts MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts MODERATE Wetland has a moderate degree of interspersion	
2pts MODERATELY LOW Wetland has a moderately low degree of interspersion	2
1pt LOW Wetland has a low degree of interspersion.	
0pt NONE Wetland has no plan view interspersion	

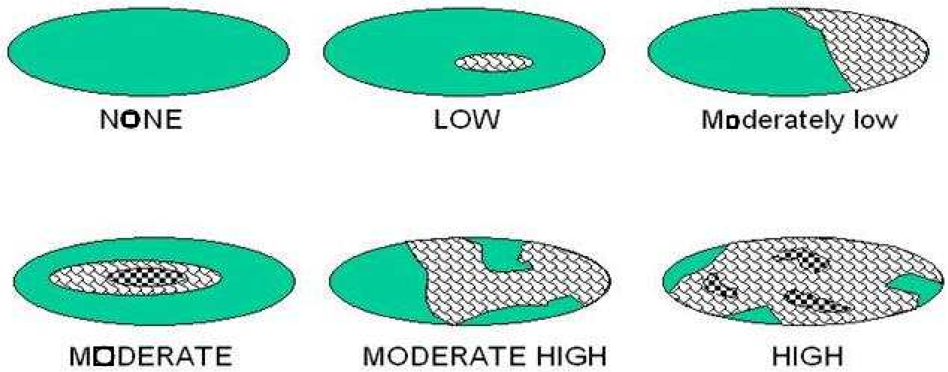


Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.		Score
-5pts	Extensive >75% areal cover of invasive species	
-3pts	Moderate 25-75% areal cover of invasive species	
-1pts	Sparse 5-25% areal cover of invasive species	-1
0pt	Nearly absent. <5% areal cover of invasive species	
1pt	Absent	
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.		Score
Vegetated hummocks and tussocks		
Coarse woody debris >15cm (6in) in diameter		
Standing dead trees >25cm (10in) diameter at breast height		
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction		

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 4

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	2
	Metric 2: Buffers and surrounding land use	1
	Metric 3: Hydrology	13
	Metric 4: Habitat	7
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	4
	TOTAL SCORE	27

Wetland Background Information

Name(s) of Field Personnel:	Frank Amatucci & Cameron Brueck
Assessment Date:	Sept 22, 2022
Agency/Organization:	Barge Design Solutions, Inc.
Office Address:	615 3rd Avenue South, Suite 700, Nashville, TN, 37210
Phone Number:	615-252-4406
E-mail Address:	frank.amatucci@bargedesign.com
Wetland Name(s):	WTL-5

Wetland Location:

Include drawing or map of project area limits or attach map showing location and project area limits, county, nearest street address, and narrative description of location, etc.

Wetland is located in the southwestern portion of the project study area.

Wetland is likely a relic farm pond

Watershed (12-Digit HUC):	East Fork Clarks River (060400060101)
Lat/Long (dd.dddd, -dd.dddd) or UTM Coordinates (m easting, m northing):	36.443823, -88.316579
Circle coordinate system used:	NAD83 WGS84 UTM NAD27
USGS Quad Name:	Puryear
Depicted on National Wetland Inventory Map: (Y/N)	N
Soil Survey Map Units, Hydric Rating:	LeC2: Lexington silt loam, 5 to 8 percent slor
Cowardin Wetland Type(s):	PEM
HGM Classification:	Non-HGM
Final Score: Non-HGM TRAM Form	14

NON-HGM Tennessee Rapid Assessment Method for Wetlands

June 2015

State of Tennessee
Department of Environment and Conservation
Division of Water Resources
Natural Resources Unit
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243

Quantitative Rating

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.		
7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	0
2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.		
7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	1

Metric 2 Total 1

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located <u>between</u> a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a other nearby wetland or upland habitat areas.	
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	2
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

x	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
x	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
x	stormwater inputs (addition of water)		other (specify)

	YES	NO	NOT SURE
Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	Assign a score of 12 since there are no or no apparent modifications.	Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	1

Metric 3 Total 5

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): _x__filling and grading _x__plowing ____grazing (hooves) _x__vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

	YES	NO	NOT SURE
Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	Assign a score of 4 since there are no or no apparent modifications.	Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	1

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	1

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

x	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
x	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
x	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 9 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	1

Metric 4 Total 3

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
5pts	> $10m^2$, sphagnum or other moss or vernal pools	5pts	Superior fish, waterfowl, bat, or amphibian breeding habitat
10pts 5pts 3pts	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)	5pts	Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water quality of a 303(d) listed stream and/or to surface or and/or ground water
10pts	Older-aged mature forested wetland avg. DBH >= 30 inches	10 pts	Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present <u>both vertically and horizontally</u> within the wetland with an area of at least 0.1 hectares or $1000m^2$ (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp., *Spirodela* spp.) are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	0
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	2
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	0
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	0
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	0
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	0

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt	LOW Wetland has a low degree of interspersion.	1
0pt	NONE Wetland has no plan view interspersion	

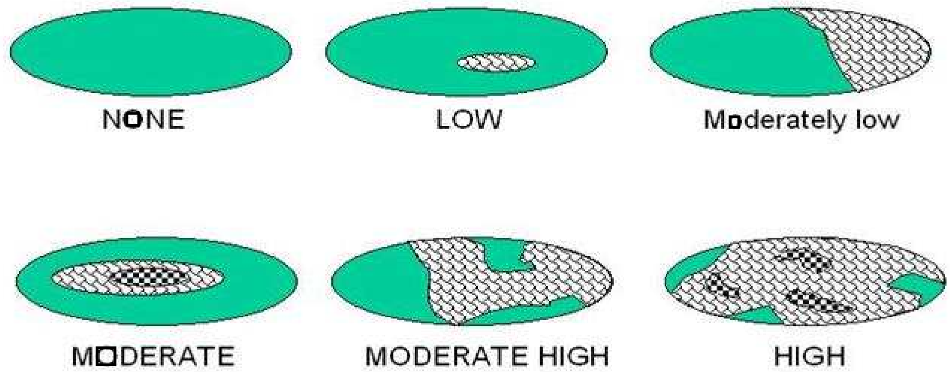


Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.		Score
-5pts	Extensive >75% areal cover of invasive species	
-3pts	Moderate 25-75% areal cover of invasive species	
-1pts	Sparse 5-25% areal cover of invasive species	
0pt	Nearly absent. <5% areal cover of invasive species	
1pt	Absent	1

6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 4

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	1
	Metric 3: Hydrology	5
	Metric 4: Habitat	3
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	4
	TOTAL SCORE	14

Wetland Background Information

Name(s) of Field Personnel:	Frank Amatucci & Cameron Brueck
Assessment Date:	Sept 22, 2022
Agency/Organization:	Barge Design Solutions, Inc.
Office Address:	615 3rd Avenue South, Suite 700, Nashville, TN, 37210
Phone Number:	615-252-4406
E-mail Address:	frank.amatucci@bargedesign.com
Wetland Name(s):	WTL-6

Wetland Location:

Include drawing or map of project area limits or attach map showing location and project area limits, county, nearest street address, and narrative description of location, etc.

Wetland is located in the southwestern portion of the project study area.

Wetland is likely a relic farm pond

Watershed (12-Digit HUC):	East Fork Clarks River (060400060101)
Lat/Long (dd.dddd, -dd.dddd) or UTM Coordinates (m easting, m northing):	36.445854, -88.303033
Circle coordinate system used:	NAD83 WGS84 UTM NAD27
USGS Quad Name:	Puryear
Depicted on National Wetland Inventory Map: (Y/N)	N
Soil Survey Map Units, Hydric Rating:	PoC2: Providence silt loam, 5 to 8 percent sl
Cowardin Wetland Type(s):	PEM
HGM Classification:	Non-HGM
Final Score: Non-HGM TRAM Form	14

NON-HGM Tennessee Rapid Assessment Method for Wetlands

June 2015

State of Tennessee
Department of Environment and Conservation
Division of Water Resources
Natural Resources Unit
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243

Quantitative Rating

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.		
7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	0
2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.		
7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	1

Metric 2 Total 1

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity**. A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	
1pts	Precipitation	1
3pts	Seasonal surface water	
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located between a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a other nearby wetland or upland habitat areas.	
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	
1pt	<0.4m (<15.7in)	1
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	2
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the “intactness” of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

x	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
x	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
x	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES	NO	NOT SURE
	Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	Assign a score of 12 since there are no or no apparent modifications.	Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	1

Metric 3 Total 5

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): _x__filling and grading _x__plowing ____grazing (hooves) _x__vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

	YES	NO	NOT SURE
Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	Assign a score of 4 since there are no or no apparent modifications.	Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	1

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	1

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

x	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
x	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
x	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	YES	NO	NOT SURE
	Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	Assign a score of 9 since there are no or no apparent modifications.	Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	1

Metric 4 Total 3

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
5pts	> 10m^2, sphagnum or other moss or vernal pools	5pts	Superior fish, waterfowl, bat, or amphibian breeding habitat
10pts 5pts 3pts	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)	5pts	Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water quality of a 303(d) listed stream and/or to surface or and/or ground water
10pts	Older-aged mature forested wetland avg. DBH >= 30 inches	10 pts	Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 0

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp., *Spirodela* spp.) are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	0
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	2
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	0
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	0
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	0
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	0

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	
1pt	LOW Wetland has a low degree of interspersion.	1
0pt	NONE Wetland has no plan view interspersion	

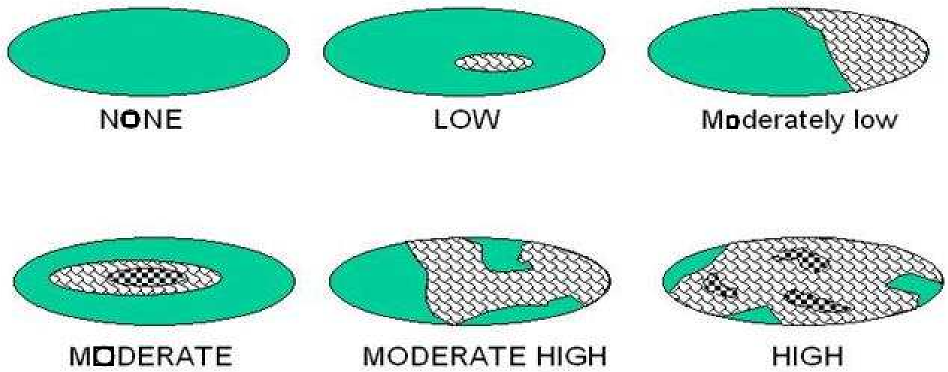


Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.	Score
-5pts Extensive >75% areal cover of invasive species	
-3pts Moderate 25-75% areal cover of invasive species	
-1pts Sparse 5-25% areal cover of invasive species	
0pt Nearly absent. <5% areal cover of invasive species	
1pt Absent	1
6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 4

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	1
	Metric 3: Hydrology	5
	Metric 4: Habitat	3
	Metric 5: Special Wetland Communities	0
	Metric 6: Plant communities, interspersion, microtopography	4
	TOTAL SCORE	14

Wetland Background Information

Name(s) of Field Personnel:	Frank Amatucci & Cameron Brueck
Assessment Date:	Sept 22, 2022
Agency/Organization:	Barge Design Solutions, Inc.
Office Address:	615 3rd Avenue South, Suite 700, Nashville, TN 37210
Phone Number:	(615) 252-4406
E-mail Address:	frank.amatucci@bargedesign.com
Wetland Name(s):	WTL-7

Wetland Location:

Include drawing or map of project area limits or attach map showing location and project area limits, county, nearest street address, and narrative description of location, etc.

Wetland is located in the southeastern portion of the project study area.

Wetland determined as a slope wetland with a presence of an intermittent groundwater table potentially affiliated with P-11.

Watershed (12-Digit HUC):	East Fork Clarks River (060400060101)
Lat/Long (dd.dddd, -dd.dddd) or UTM Coordinates (m easting, m northing):	36.441045, -88.298593
Circle coordinate system used:	**NAD83** **WGS84** **UTM** **NAD27**
USGS Quad Name:	Puryear
Depicted on National Wetland Inventory Map: (Y/N)	N
Soil Survey Map Units, Hydric Rating:	PrD3: Providence silty clay loam, 8 to 12 perc
Cowardin Wetland Type(s):	PFO
HGM Classification:	Slope
Final Score:	52

Key to Wetland HGM Classes in Tennessee

1a. Wetland is within the active floodplain... **2**

1b. Wetland is not within the active floodplain... **3**

2a. Wetland is not in a closed topographic depression; primary water source is overbank flooding……...**Riverine**

2b. Wetland is not in a closed topographic depression; primary water source is groundwater discharge……………………………..**Slope**

3a. Topography is flat; primary water source is precipitation..................................**Flat**

3b. Topography is not flat...**4**

4a. Wetland is in a closed topographic depression; primary water source is surface flow or groundwater discharge...**Depression**

4b. Wetland is not in a closed topographic depression...**5**

5a. Wetland is associated with a water body that has semi-permanent to permanent water more than 6 ft. deep in most years...**Fringe**

5b. Wetland is sloping or located at base of slope; primary water source is groundwater discharge...**Slope**

NOTE: Use TRAM User Guide before keying wetland types. If wetland does not fall into one of the types listed above use the Non-HGM TRAM.

An affirmative response to 1-6 of the Decision Table identifies the wetland per rule as an Outstanding Natural Resource Water (ONRW) or Exceptional Tennessee Waters (ETW). A positive response to 7-13 requires a final determination by the Department.

#	Wetland Feature Decision Table	Yes/No	Affirmative Result
1	The wetland has been designated as an **Outstanding Natural Resource Water (ONRW)** by the Department under 0400-40-03-.06(5)(a).	No	**ORNW**
2	The wetland has previously been designated and documented as an Exceptional Tennessee Water (ETW) by the Department under 0400-40-03-.06(4)(a)(7)	No	**ETW**
3	The wetland is within state or national parks, wildlife refuges, forests, wilderness areas, natural areas, or is a designated State Scenic Rivers or Federal Wild and Scenic Rivers.	No	**ETW**
4	The wetland is known to contain a documented non-experimental population of state or federally listed threatened or endangered aquatic or semi-aquatic plants, or aquatic animals.	No	**ETW**
5	The wetland or the area it is in has been designated by the U.S. Fish and Wildlife Service as **"Critical Habitat"** for any threatened or endangered aquatic or semi-aquatic plant or aquatic animal species.	No	**ETW**
6	The wetland falls within an area designated as Lands Unsuitable for Mining pursuant to the federal Surface Mining Control and Reclamation Act where such designation is based in whole or in part on impacts to water resource values	No	**ETW**
7	**The wetland exhibits outstanding ecological or recreational values such as, but not limited to, those as outlined in 8-12**		Determination Required by TDEC
8	The wetland fits within the species composition concept for any plant community found in the state of Tennessee **ranked G2, G1, or more imperiled** at the "Association" classification level according to the NatureServe and Natural Heritage Ranking system (e.g. "bog", "fen", and "wet prairie/barren" communities).		Determination Required by TDEC
9	The wetland is **an uncommon resource** (e.g. vernal pools, headwater wetlands, sinks, spring/seeps, glades, newly described communities, high recreational or socioeconomic value) in the region and/or is deemed such by concurrence of qualified scientists.		Determination Required by TDEC
10	The wetland is an **older aged forested wetland** comprised of overstory trees with an average diameter at breast height (dbh) being **greater than or equal to 30 in** within the WAA.		Determination Required by TDEC
11	The wetland is observed and documented to be a **significant waterfowl, songbird, shorebird, amphibian, bat, fish habitat area**. These may include rookeries, migratory congregations, nesting sites, breeding areas, etc.		Determination Required by TDEC
12	The wetland is **hydrologically connected** to and/or has significant ecological contribution to an **ETW**		Determination Required by TDEC
13	The wetland has High Resource Value as determined by a **score of 75 and above** using the TRAM or non-HGM TRAM (to be determined after completing the quantitative portion of this manual)		Determination Required by TDEC

End of Narrative Rating. Begin Quantitative Rating on Next Page.

Quantitative Rating

Value Added Section

Wetland Size – Wetland size may increase particular wetland functions or provide greater habitat value to wildlife. In some regions, large wetlands or wetlands of certain types may be rare and may play a vital and significant local and/or regional ecological role. Refer to Tables 1 through 3 below for assessing value added points to wetland size.

Other Significant Value – See Table 4 for value added due to other significant wetland values

Critical Sizes for Tennessee Wetlands by HGM Class and Region of State

Table 1. Depression wetland size throughout Tennessee (max 5 pts). Estimate the area of wetland. Select the appropriate size class and assign score.	**Score**
≥5 acres	5
3 - <5 acres	3

Table 2. Slope and Flat wetland size throughout Tennessee (max 5 pts). Estimate the area of wetland. Select the appropriate size class and assign score.	**Score**
≥50 acres	5
25 - <50 acres	3
10 - <25 acres	2
5 - <10 acres Not Applicable: WTL-7 is 0.30 acres delineated	1

Table 3. Riverine wetland size in central and eastern Tennessee (max 5 pts). Estimate the area of wetland. Select the appropriate size class and assign score.	**Score**
≥50acres	5
25 - <50 acres	3
10 - <25 acres	2
5 - <10 acres	1

Table 4. Other significant value (max 5 pts). Estimate the area of wetland. Select the appropriate size class and assign score.	**Score**
Wetland falls within a category **from lines 8-12 of the Exceptional Status Wetlands Decision Table** (pg. 18) but has not been determined by TDEC to qualify for Exceptional Tennessee Waters status.	5

TRAM Summary Worksheet

Exceptional Status Wetlands	WTL-7	**Check if applicable**
	1. **ONRW**	No
	2. **ETW**	No
	3. **Further Review Requested:** Attach Wetland Background and Exceptional Status Wetlands Worksheet	
	COMMENTS/NOTES:	
Quantitative Rating scores	Function: Hydrologic Regime	0.60
	Function: Biogeochemical Processes	0.45
	Function: Retain Particulates	
	Function: Plant Community	0.56
	Function: Wildlife Community	0.54
	Quantitative Score (Average of FCIs x 100)	0.52
	Value Added (Significant Size) Total	0
Total of Quantitative and Value Added Scores	**TOTAL SCORE**	52

HGM FUNCTIONAL ASSESSMENT
SLOPE WETLANDS

Date: 9/22/2022 Project Name Puryear Solar

Field Personnel FCA, CB Wetland Name/Location WTL-7

Read instructions prior to conducting assessments. If project area is large or highly heterogeneous requiring the designation of several WAAs, a separate assessment should be performed for each WAA. CHECK THE APPROPRIATE BLANK(S) BELOW.

V1: Hydroperiod (HYDRO)

1. Hydrology not altered (SI = 1.0)
   - no fill material or excessive sediment
   - no ditches/drainage tiles
   - no alteration to overland runoff, groundwater discharge/recharge
   - no roads or other impediments to surface ground water
   - no excavation
2. Hydrology slightly altered (SI = 0.75)
   - portion of site with minimal fill or sediment
   - portion of site with drainage ditches/tiles
   - some alteration to overland runoff, groundwater discharge/recharge
   - roads or other impediments, water flow slightly altered
   - minor portion of site excavated
3. Hydrology moderately altered (SI = 0.5)
   - portion of site with moderate fill or sediment
   - portion of site with drainage ditches/tiles
   - some alteration to overland runoff, groundwater discharge/recharge
   - roads or other impediments, water flow moderately altered
   - moderate portion of site excavated
4. Hydrology significantly altered (SI = 0.25)
   - portion of site with significant fill or sediment
   - portion of site with drainage ditches/tiles
   - significant alteration to overland runoff, groundwater discharge/recharge
   - roads or other impediments, water flow significantly altered
   - significant portion of site excavated
5. Hydrology severely altered (SI = 0.1)
   - entire site impacted by fill or excessive sediment
   - entire site with numerous drainage ditches/tiles
   - no contributions to or from overland runoff, groundwater discharge/recharge
   - roads or other impediments, water flow completely blocked
   - entire wetland affected

V2: Wetland Watershed Integrity (WSHEDINT)

Use weighted average as discussed on page 10. Examples of land uses and multipliers listed below

A = Percentage forested with no impervious surfaces 0.15
B = Percentage permeable land, e.g. park, golf course, pasture, hay, orchard, tree farm, or similar 0.62
C = Percentage low density residential, construction, or similar 0.21
D = Percentage high density residential, or similar 0.01
E = Percentage urban, commercial, industrial, or similar 0.01

V2 = (A x 1.0) + (B x 0.75) + (C x 0.5) + (D x 0.25) + (E x 0.01)/(100) = 0.73

V3: Canopy Tree Size Class (TSIZE)

1. Average size of canopy trees > 3 in. DBH

☐ ≥ 15 in. (SI = 1.0) ☐ 10 – 14 in. (SI = 0.75) ☑ 6 – 9 in. (SI = 0.5) ☐ 4 – 5 in. (SI = 0.25)
☐ < 4 in. or no trees present, go to V5

V4: Canopy Tree Density (TDEN)

1. Average number of canopy trees (> 3 in. DBH) per 30-ft. radius plot

☐ 5 – 10 (SI = 1.0) ☐ 11 – 15 (SI = 0.75) ☑ > 15 (SI = 0.5) ☐ 1 – 4 (SI = 0.5)

V5: Shrub Cover (SCOV)

1. Average percent cover of shrubs (woody stems < 3 in. DBH and taller than 3 ft.) per 30-ft. radius plot

☐ > 20 (SI = 1.0) ☑ < 20, go to V6

V6: Ground Vegetation Cover (GVC)

1. Average percent cover of ground vegetation per 30-ft. radius plot

☐ ≥ 70 (SI = 1.0) ☐ 55 – 69 (SI = 0.75) ☐ 45 – 54 (SI = 0.5) ☐ 30 – 44 (SI = 0.25) ☑ 20 – 29 (SI = 0.1)
☐ < 20 (SI=0.0)

V7: Vegetation Composition and Diversity (COMP)

1. Check the dominant species from Groups 1, 2, and 3 below using the 50/20 rule. If tree cover is < 20%, check the dominants in the next tallest stratum. If a dominant does not appear in lists below, but is a native species, it can be added as a Group 2 species. Native shrub and herbaceous species are assigned to Group 2. When using shrub or herbaceous write in the number of dominant species. Dominant invasive species are checked regardless of stratum. *

GROUP 1 (Reference Standard)		GROUP 2 (Native Ubiquitous)		GROUP 3 (Invasive)
☐ Water oak	☐ Pin oak	☐ American elm	☐ Green ash	☐ European/Chinese privet
☐ Bur oak	☐ Shumard oak	☑ Slippery elm	☑ Red maple	☐ Japanese honeysuckle
☐ Willow oak	☐ Bald cypress	☐ Sweetgum	☐ Silver maple	☑ Japanese stiltgrass
☐ Swamp chestnut oak	☐ Water tupelo	☐ Blackgum	☐ Black willow	☐ Purple loosestrife
☐ Cherrybark oak	☐ S. black gum	☐ Silky dogwood	☐ Sycamore	☐ Giant reed
☐ Swamp white oak	☐ Persimmon	☑ Boxelder	☐ ___________	☐ Tall fescue
☐ Nuttall oak	☐ Am. hornbeam	☐ Tulip poplar	☐ ___________	☐ Phragmites
☐ Overcup oak	☐ ___________	____ Number native shrub spp.		☐ ___________
☐ ___________	☐ ___________	____ Number native herbaceous spp.		☐ ___________

2. Using the number of dominants in Groups 1, 2, and 3 above, calculate a quality index (Q) using the following formula: [(1.0 x # of checked dominants in Group 1) + (0.66 x # of checked dominants in Group 2) + (0.0 x # of checked dominants in Group 3)]/ total # of checked dominants in all groups = 4

3. Multiply Q above by one of the following constants that reflects species richness:[1]

a) if ≥ 4 species from Groups 1 and/or 2 occur as dominants, multiply Q by 1.0 ___________

b) if 3 species from Groups 1 and/or 2 occur as dominant, multiply Q by 0.75 0.37

c) if 2 species from Groups 1 and/or 2 occur as dominants, multiply Q by 0.50 ___________

d) if 1 species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.25 ___________

e) if no species from Groups 1 and/or 2 occurs as dominant, multiply Q by 0.0 ___________

4. Calculate the square root of the value from Step 3 above. This is the SI for **V7**= 0.61

*In some Depression wetlands and in some small WAAs (e.g., <0.5 acres), relatively few species (e.g., overcup oak) may be present. In cases in which this is the normal condition, Q can be multiplied by 1.0 if only 1 or 2 species are dominant.

V8: Soil Organic Matter (ORGANIC)

1. Surface horizons unaltered

☑ 100 percent cover of O and/or A horizon present (SI = 1.0)

2. Surface horizons altered. Estimate the percent of the WAA in which neither an O or A horizon is present.

3. Subtract the sum of the values from Step 2 from 100. Convert this value to a decimal. This is the SI for V8 (e.g., if 75 % of the WAA does not have an O or A horizon due to a significant disturbance, it will have an SI of 0.25).

V9: Buffer (BUFFER)

1. Determine the Connection Index (CI) by estimating the percent of the wetland surrounded by suitable buffer habitat.

☐ 90% – 100% (CI = 1.0) ☑ 75% – 89% (CI = 0.75) ☐ 40% – 74% (CI = 0.5) ☐ 10% – 39% (CI = 0.25)
☐ < 10% (CI = 0.1)

2. Multiply the CI by one if the following values:

a) if average buffer width is ≥ 492 ft., multiply by 1.0

b) if average buffer is 98 ft to 491 ft., multiply by 0.66

c) if average buffer width is 33 ft to 97 ft., multiply by 0.33

d) if average buffer width is < 33 ft., multiply by 0.1

3. This value is the SI for **V9** = 0.50.

VALUES USED TO CALCULATE FUNCTIONAL CAPACITY INDICES (FCIs)

SUBINDEX VALUES:

V1 0.50 (HYDRO)	V3 0.50 (TSIZE)	V5 0.00 (SCOV)	V7 0.61 (COMP)	V9 0.50 (BUFFER)
V2 0.73 (WSHEDINT)	V4 0.50 (TDEN)	V6 0.10 (GVC)	V8 1.00 (ORGANIC)	

WETLAND FUNCTIONS

FUNCITION 1: MAINTAIN HYDROLOGIC REGIME

FCI 1: $(V1 \times V2)^{1/2} \Rightarrow (\_\_\_\_ \times \boxed{})^{1/2}$ = 0.60

FUNCTION 2: MAINTAIN BIOGEOCHEMICAL PROCESSES

FCI (trees present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{\frac{V3+V4}{2}+V8}{2}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\left(\frac{\_\_\_\_+\_\_\_\_}{2}\right)+\_\_\_\_}{2}\right)\right)^{1/2}$ = 0.45

FCI (shrubs present)= $\left((V1 \times V2)^{1/2} \times \left(\frac{V5+V8}{3}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\_\_\_\_+\_\_\_\_}{3}\right)\right)^{1/2}$ = ______

FCI (ground cover) $\left((V1 \times V2)^{1/2} \times \left(\frac{V6+V8}{5}\right)\right)^{1/2} \Rightarrow \left((FCI\ 1) \times \left(\frac{\_\_\_\_+\_\_\_\_}{5}\right)\right)^{1/2}$ = ______

FUNCTION 3: MAINTAIN CHARACTERISTIC PLANT COMMUNITY

FCI (trees present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)}{3} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\_\_\_\_+\_\_\_\_+\boxed{}}{3}\right)}{3}$ = 0.56

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)}{6} \Rightarrow \frac{(FCI\ 1)+(\_\_\_\_+\_\_\_\_)}{6}$ = ______

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)}{9} \Rightarrow \frac{(FCI\ 1)+(\_\_\_\_+\_\_\_\_)}{9}$ = ______

FUNCTION 4: MAINTAIN CHARACTERISTIC WILDILFE COMMUNITY

FCI (trees) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V3+V4+V7}{3}\right)+V9}{4} \Rightarrow \frac{(FCI\ 1)+2\left(\frac{\boxed{}+\_\_\_\_+\boxed{}}{3}\right)+\boxed{}}{4}$ = 0.54

FCI (shrubs present) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V5+V7}{2}\right)+V9}{6} \Rightarrow \frac{(FCI\ 1)+(\_\_\_\_+\_\_\_\_+\boxed{})}{6}$ = ______

FCI (groundcover) = $\frac{(V1 \times V2)^{1/2}+2\left(\frac{V6+V7}{2}\right)+V9}{9} \Rightarrow \frac{(FCI\ 1)+(\_\_\_\_+\_\_\_\_+\boxed{})}{9}$ = ______

Wetland Background Information

Name(s) of Field Personnel:	Frank Amatucci & Cameron Brueck
Assessment Date:	Sept 22, 2022
Agency/Organization:	Barge Design Solutions, Inc.
Office Address:	615 3rd Avenue South, Suite 700, Nashville, TN, 37210
Phone Number:	615-252-4406
E-mail Address:	frank.amatucci@bargedesign.com

Wetland Name(s): WTL-8

Wetland Location:

Include drawing or map of project area limits or attach map showing location and project area limits, county, nearest street address, and narrative description of location, etc.

Wetland is located in the southwestern portion of the project study area.

Wetland directly abuts a farm pond

Watershed (12-Digit HUC):	East Fork Clarks River (060400060101)
Lat/Long (dd.dddd, -dd.dddd) or UTM Coordinates (m easting, m northing):	36.439863, -88.295632
Circle coordinate system used:	NAD83 WGS84 UTM NAD27
USGS Quad Name:	Puryear
Depicted on National Wetland Inventory Map: (Y/N)	N
Soil Survey Map Units, Hydric Rating:	CaB2: Calloway silt loam, 2 to 5 percent slop
Cowardin Wetland Type(s):	PFO
HGM Classification:	Non-HGM
Final Score: Non-HGM TRAM Form	38

NON-HGM Tennessee Rapid Assessment Method for Wetlands

June 2015

State of Tennessee
Department of Environment and Conservation
Division of Water Resources
Natural Resources Unit
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243

Quantitative Rating

Metric 1. Wetland area (max 6 pts). Estimate the area of wetland and select the appropriate size class and assign score. Estimated areas should clearly place the wetland within the appropriate class.

6pts	>50 acres (west TN)	>25 acres (middle TN)	>10 acres (east TN *)	
5pts	25 - <50 acres (west TN)	10- 25 acres (middle TN)	7-<10 acres (east TN*)	
4pts	10 - <25 acres (west TN)	7-< 25acres (middle TN)	3-<7 acres (east TN*)	
3pts	3 - <10 acres(west TN)	3< 7 acres (middle TN)	1-<3 acres (east TN)	
2pts	0.3 - <3 acres (west TN)	0.5- <3 acres (middle TN)	0.5-<1 acres (east TN)	
1pt	0.1 - <0.3 acres(west TN)	<0.5 acres (middle TN)	<0.5 acres (east TN)	1

*More applicable to West Tennessee; use with discretion in Middle Tennessee, Consult TDEC-DWR Natural Resources Unit for use in East Tennessee.

Table 2. Metric to English conversion table with visual estimation sizes.

acres	ft^2	yd^2	ft on side	yd on side	ha	m^2	m on side
50	2,177,983	241,998	1476	492	20.2	202,000	449
25	1,088,992	120,999	1044	348	10.1	101,000	318
10	435,596	48,340	660	220	4.1	41,000	203
3	130,679	14,520	362	121	1.2	12,000	110
0.3	13,067	1,452	114	38	0.12	1,200	35
0.1	4,356	484	66	22	0.04	400	20

Metric 1 Total 1

Metric 2. Upland buffers and intensity of surrounding land uses (Max 14 points). Wetlands without upland "buffers", or that are located where human land use is more intensive, are often, but not always, more degraded and often have lower wildlife habitat resource value.

2a. Average Buffer Width (ABW). Calculate the average buffer width and select only one score. To calculate ABW, estimate buffer width on each side (max of 50m) and divide by the number of sides. Example: ABW of a wetland with buffers of 100m, 25m, 10m and 0m would be calculated as follows: ABW = (50m + 25m + 10m + 0m)/4 = 21.25m. Intensive land uses are not buffers, e.g. active row cropping, paved areas, housing developments, etc.		
7pts	WIDE. >50m (164ft) or more around perimeter.	
4pts	MEDIUM. 25m to <50m (82 to <164ft) around the perimeter.	
1pt	NARROW. 10m to <25m (32 to <82ft) around the perimeter.	
0pts	VERY NARROW. <10m (<32ft) around perimeter.	0
2b. Intensity of predominant surrounding land use(s) Select one, or choose up to two and average score, for the intensity of the predominant land use(s) outside the wetland's buffer zone.		
7pts	VERY LOW. 2nd growth or older forest, prairie, barren, wildlife area, etc.	
5pts	LOW. Old fallow field, shrub land, early successional young forest, etc.	
3pts	MODERATELY HIGH. Residential, pasture, orchard, park, conservation tillage, mowed field, etc.	
1pt	HIGH. urban, industrial, row cropping, mining, construction, etc.	1

Metric 2 Total 1

Metric 3. Hydrology (Max 30 points). This metric evaluates the wetland's water budget, hydroperiod, the hydrologic connectivity of the wetland to other surface waters, and the degree to which the wetland's hydrology has been altered by human activity. **A wetland can receive no more than 30 points for Metric 3 even though it is possible to score more than 30 points.**

3a. Sources of Water. Select all that apply and sum the score. This question relates to a wetland's water budget. It also is reflective that wetlands with certain types of water sources, or multiple water sources, e.g. high pH groundwater or perennial surface water connections, can be very high quality wetlands or can have high functions and values.		
5pts	High pH groundwater (7.5-9.0)	
3pts	Other groundwater	3
1pts	Precipitation	1
3pts	Seasonal surface water	3
5pts	Perennial surface water (lake or stream)	
3b. Connectivity. Select all that apply and sum score		
1pt	**100 year floodplain.** "Floodplain" is defined as "...the relatively level land next to a stream or river channel that is periodically submerged by flood waters. It is composed of alluvium deposited by the present stream or river when it floods." Where they are available, flood insurance rate maps (FIRMs) and flood boundary and floodway maps may be used.	
1pt	**Between stream/lake and other human land use.** This question asks whether the wetland is located <u>between</u> a surface water and a different adjacent land use, such that run-off from the adjacent land use could flow through wetland before it discharges into the surface water buffering it. "Different adjacent land uses" include agricultural, commercial, industrial, mining, or residential uses.	
1pt	**Part of a larger wetland or upland complex.** This question asks whether the wetland is in physical proximity to, or a other nearby wetland or upland habitat areas.	
1pt	**Part of riparian corridor**.	
3c. Maximum water depth. Select only one and assign score. The evaluator *does not* need to actually observe the wetland when its water depth is greatest in order to award the maximum points for this question. The use of secondary indicators, as outlined in the 1987 Manual will be useful in answering this question.		
3 pts	>0.7m (27.6in)	
2pts	0.4 to 0.7m (15.7 to 27.6in)	2
1pt	<0.4m (<15.7in)	
3d. Duration of inundation/saturation. Select one or double check and average the scores if duration is uncertain. The use of ACOE 1987 Manual secondary indicators is necessary and expected in order to properly answer this question.		
4pts	Semi-permanently to permanently inundated or saturated	4
3pts	Regularly inundated or saturated	
2pts	Seasonally inundated	
1pt	Seasonally saturated in the upper 30cm (12in) of soil	

3e. Modifications to natural hydrologic regime. Check all observable modifications from list below. Score by selecting the most appropriate description of the wetland. Scores may be double checked and averaged. This question asks the evaluator to assess the "intactness" of, or lack of disturbance to, the natural hydrologic regime of the type of wetland that is being evaluated.

Once the evaluator has listed all possible past and ongoing disturbances, the evaluator should check the most appropriate category to describe the present state of the wetland. In instances where the evaluator believes that a wetland falls between two categories, or where the evaluator is uncertain as to which category is appropriate, it is appropriate to choose more than one and average the score.

The evaluator may check one or several of these possible disturbances, yet still determine that the natural hydrologic regime is intact. However, see Metric 4 where these same disturbances may be habitat alterations.

Check all that are observed present in or near the wetland.

x	ditch(es), in or near the wetland		point source discharges to the (non-stormwater)
x	tile(s), in or near the wetland		filling/grading activities in or near the wetland
	dike(s), in or near the wetland		road beds/RR beds in or near the wetland
	weir(s), in or near the wetland		dredging activities in or near the wetland
x	stormwater inputs (addition of water)		other (specify)

Have any of the disturbances identified above caused or appear to have caused more than trivial alterations to the wetland's natural hydrologic regime.	YES Assign a score 1, 3 or 7, or an intermediate score, depending on degree of recovery from the disturbance.	NO Assign a score of 12 since there are no or no apparent modifications.	NOT SURE Choose "recovered" and assign a score of 9.5.

Select one or double check adjoining numbers and average the score.		**score**
12pts	NONE OR NONE APPARENT. There are no modifications or no modifications that are apparent to the evaluator.	
7pts	RECOVERED. The wetland appears to have recovered from past modifications.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past modifications.	3
1pt	RECENT OR NO RECOVERY. The modifications have occurred recently occurred, and/or the wetland has not recovered from past modifications, and/or the modifications are ongoing.	

Metric 3 Total 16

Metric 4. Habitat Alteration and Development (Max 20 points). While hydrology may be the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes, there is a range of other factors and activities which affect wetland quality and cause disturbances to wetlands that are unrelated to hydrology. These disturbances are termed "habitat alteration." In many instances, items checked as hydrologic disturbances in Question 3e will present as alterations to a wetland's habitat or disruptions in its development (successional state). In some instances, a disturbance may be appropriately considered under both Metric 3 and Metric 4. To determine the appropriate metric scores, the evaluator should carefully determine the actual cause of the disturbance to the wetland.

4a. Substrate/Soil Disturbance. Select one or double check and average. This question evaluates physical disturbances to the soil and surface substrates of the wetland. Note also that the labels on the scoring categories are intended to be descriptive but not controlling. In some instances, it may be more appropriate to consider the scoring categories as fixed locations on a disturbance continuum, from very high to very low or no disturbance.	Examples of substrate/soil disturbance include (circle all that apply): _x_ filling and grading _x_ plowing ____grazing (hooves) _x_ vehicle use (off-road vehicles, construction vehicles) ____sedimentation ____dredging, and other mechanical disturbances to the soil

Have any of soil or substrate disturbances caused or appear to have caused more than trivial alterations to the wetland's natural soils	YES	NO	NOT SURE
	Assign a score 1, 2 or 3, or an intermediate score, depending on degree of recovery from the disturbance.	Assign a score of 4 since there are no or no apparent modifications.	Choose "recovered" and assign a score of 3.5.

Select one or double check adjoining numbers and average the score.		
4pts	NONE OR NONE APPARENT. There are no disturbances or no disturbances apparent to the evaluator.	
3pts	RECOVERED. The wetland appears to have recovered from past disturbances.	
2pts	RECOVERING. The wetland appears to be in the process of recovering from past disturbances.	2
1pt	RECENT OR NO RECOVERY. The disturbances have occurred recently, and/or the wetland has not recovered from past disturbances, and/or the disturbances are ongoing.	

4b. Habitat development. Select only one and assign score. This question asks the evaluator to assign an overall qualitative rating of how well-developed the wetland is in comparison to other ecologically and/or hydrogeomorphically similar wetlands. This question presumes knowledge of the types of wetlands and the range in quality typical of the region or access to data from reference standard examples. If unsure, score as GOOD or MODERATELY GOOD.

7pts	EXCELLENT. Wetland appears to represent the best of its type or class.	
6pts	VERY GOOD. Wetland appears to be a very good example of its type or class but is lacking in characteristics which would make it excellent.	
5pts	GOOD. Wetland appears to be a good example of its type or class but because of past or present disturbances, successional state, or other reasons, is not excellent.	
4pts	MODERATELY GOOD. Wetland appears to be a fair to good example of its type or class.	
3pts	FAIR. Wetland appears to be a moderately good example of its type or class but because of past or present disturbances, successional state, etc. is not good.	
2pts	POOR TO FAIR. Wetland appears to be a poor to fair example of its type or class.	2
1pt	POOR. Wetland appears not to be a good example of its type or class because of past or present disturbances, successional state, etc.	

4c. Habitat alteration. This question evaluates the "intactness" the natural habitat of the type of wetland that is being evaluated. This question does not discriminate between wetlands with different types of habitat. Check all possible alterations that are observed. All available information, field visits, aerial photos, maps, etc. can be used to identify possible alterations. Evaluate whether the alteration is trivial in relation to the wetlands overall habitat. Select the most appropriate score that best describes the present state of the wetland. It is appropriate to "double check" and average scores. **The evaluator may check one or several of these possible disturbances, yet still determine that the natural habitat is intact.**

Check all that are observed present in or near the wetland

x	Mowing		Herbaceous layer/aquatic bed removal
	Grazing (cattle, horses, etc.)		Sedimentation
x	Clearcutting		Dredging
	Selective cutting		Row-crop or orchard farming
x	Woody debris removal		Nutrient enrichment, e.g. nuisance algae
	Toxic pollutants		Other (specify):
	Shrub/sapling removal		Other (specify):

Have any of the disturbances identified above caused or appeared to cause more than trivial alterations to the wetland's natural habitat.	<u>YES</u> Assign a score 1, 3 or 6, or an intermediate score, depending on degree of recovery from the disturbance.	<u>NO</u> Assign a score of 9 since there are no or no apparent modifications.	<u>NOT SURE</u> Choose "recovered" and assign a score of 6.

Select one score or double check adjoining numbers and average the score.		Score
9pts	NONE OR NONE APPARENT. There are no past or current alterations that are apparent to the evaluator.	
6pts	RECOVERED. The wetland appears to have recovered from past alterations.	
3pts	RECOVERING. The wetland appears to be in the process of recovering from past alterations.	3
1pt	RECENT OR NO RECOVERY. The alterations have occurred recently, and/or the wetland has not recovered from past alterations, and/or the alterations are ongoing.	

Metric 4 Total 7

Metric 5. Special wetland communities. Assign points in left column if the wetland meets the associated criteria below. Refer to Narrative Rating for guidance. If wetland scores over 30 points within Metric 5 further determination needed to assess if the wetland exhibits outstanding ecological or recreational values as discussed in the Narrative Rating Section.			
5pts	> 10m^2, sphagnum or other moss or vernal pools	5pts	Superior fish, waterfowl, bat, or amphibian breeding habitat
10pts 5pts 3pts	Ecological community with global rank (NatureServe): G1 (10pts), G2 (5pts), G2/G3 (3pts) or uncommon ecological resource in the ecoregion (habitat and/or species diversity, geology, wetland type, distribution/ occurrence) (10 pts)	5pts	Wetland contains and is a buffer for a headwater stream or wetland contributes significantly to the water quality of a 303(d) listed stream and/or to surface or and/or ground water
10pts	Older-aged mature forested wetland avg. DBH >= 30 inches	10 pts	Supports species Deemed in Need of Management by TWRA or TN Special Concern by TDEC

Metric 5 Total 5

Metric 6. Vegetation, Interspersion, and Microtopography (Max 20 points). **6a. Wetland Vegetation Communities** Check each community present both vertically and horizontally within the wetland with an area of at least 0.1 hectares or 1000m^2 (0.2471 acres). Assign a score of 0 to 3 using Table 3 for 1-4 or Table 5 for 5-6. Sum the scores for the classes present.	Score
1)Aquatic Bed Includes areas of wetlands dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Floating aquatic species like duckweed (*Lemna* spp., *Spirodela* spp.) are excluded from definition of "aquatic bed." Aquatic beds often occur as a distinct zone as an "understory" below shrubs or trees.	0
2)Emergent Includes areas of wetlands dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Common names for emergent communities include marsh, wet meadow, wet prairie, sedge meadow, and fens.	1
3)Shrub Includes areas of wetlands dominated by woody vegetation less than 1m (3ft.) - 6m (20 ft) tall with a dbh of <3in. The plant species include true shrubs, young trees, or trees or shrubs that are small or stunted because of environmental conditions. Shrub wetlands may represent a successional stage leading to a forested wetland or they may be relatively stable plant communities.	0
4)Forested Includes wetlands or areas of wetlands characterized by woody vegetation greater than 6m (20ft) or taller. Forested wetlands have an overstory of trees and often contain an understory of young trees and shrubs and an herbaceous layer, although the young tree/shrub and herbaceous layers can be largely missing from some types of forested wetlands. Some forested wetlands are "vernal pools".	1
5)Mudflats The "mudflat" class is equivalent to the "unconsolidated bottom/mud" class/subclass (PUB_3) described in Cowardin et al. (1979) and includes areas of wetlands characterized by exposed or shallowly inundated substrates with vegetative cover less than 30%.	0
6)Open water The "open water" class is equivalent to the "open water - unknown bottom" class in Cowardin et al. (1979) and includes areas that are 1) inundated, 2) un-vegetated, and 3) and "open", i.e. there is no "canopy" of any type of vegetation.	1

Table 3. Use this table to assign a cover score for Metric 6a to each of the vegetation communities identified on the preceding page. Refer to Table 4 for narrative description of "low," "moderate," and "high" quality.

Cover Scale	Description
0	The vegetation community is either 1) absent from wetland or 2) Comprises less than 0.1 ha (.2471 acres) of contiguous area within the wetland
1	Vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of low or moderate quality, or 2) if it comprises a significant part of the wetland's vegetation and is of low quality
2	Thee vegetation community is present and either, 1) comprises a significant part of the wetland's vegetation and is of moderate quality, or 2) the vegetation community comprises a small part of the wetland's vegetation but is of high quality
3	The vegetation community is of high quality and comprises a significant part, or more, of the wetland's vegetation

Table 4. Use this table in conjunction with Table 3 to determine what is a "low", "moderate," or " high" quality community.

Narrative	Description
Low	Low species richness and a predominance of invasive, non-native, or disturbance tolerant "weedy" species.
Moderate	Native species are the dominant component of the vegetation, although non-native or disturbance tolerant "weedy" species can also be present, and species richness is moderate to moderately high, but generally without the presence of rare, threatened, or endangered species.
High	A predominance of native species, with non-native species absent or virtually absent, and high species diversity and/or the presence of rare, threatened or endangered species.

Table 5. Mudflat and open water community cover scale.

0	Absent <0.1 ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 ha to < 4 ha (2.47 to 9.88 acres)
3	High 4 ha (9.88 acres) or more

6b. Horizontal (plan view) interspersion. Evaluate the wetland from a "plan view," i.e. as if the looking down upon it. See Figure 1.		Score
5pts	HIGH Wetland has a high degree of interspersion	
4pts	MODERATELY HIGH Wetland has a moderately high degree of interspersion	
3pts	MODERATE Wetland has a moderate degree of interspersion	
2pts	MODERATELY LOW Wetland has a moderately low degree of interspersion	2
1pt	LOW Wetland has a low degree of interspersion.	
0pt	NONE Wetland has no plan view interspersion	

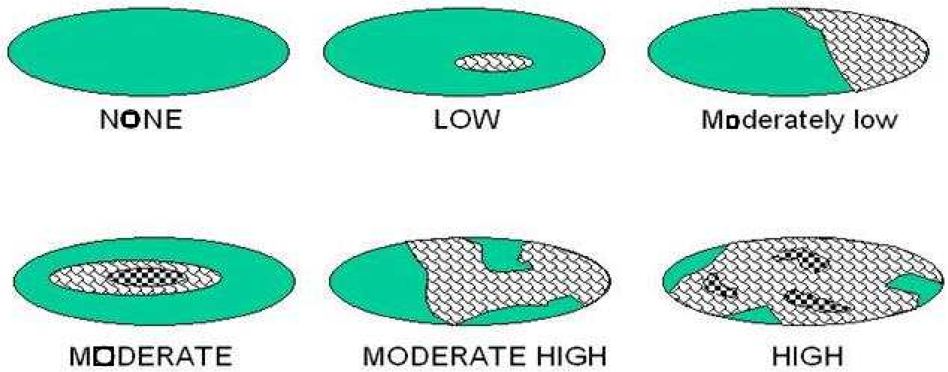


Figure 1. Hypothetical Wetlands for estimating degree of interspersion

6c. Coverage of Invasive Plant Species. Refer to Tennessee Exotic Pest Plant Council (http://www.tneppc.org/) for official list. Select only one and assign score.		Score
-5pts	Extensive >75% areal cover of invasive species	
-3pts	Moderate 25-75% areal cover of invasive species	
-1pts	Sparse 5-25% areal cover of invasive species	
0pt	Nearly absent. <5% areal cover of invasive species	
1pt	Absent	1

6d. Microtopography. Check each feature present in the wetland. Assign cover score of 0 to 3 using Table 6. Evaluate various microtopograhic habitat features often present in wetlands.	Score
Vegetated hummocks and tussocks	1
Coarse woody debris >15cm (6in) in diameter	
Standing dead trees >25cm (10in) diameter at breast height	
Amphibian breeding habitat, e.g. vernal pools with standing water of sufficient duration and depth to support reproduction, or habitat for frog reproduction	1

Table 6. Cover scale for microtopographic habitat features

Microtopographic habitat quality	**Narrative description**
0	Feature is absent or functionally absent from the wetland
1	Feature is present in the wetland in very small amounts or if more common, of low quality
2	Feature is present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of the highest quality

Metric 6 Total 4

NON-HGM TRAM Summary Worksheet

Non-HGM Quantitative Rating	Metric 1: Size	1
	Metric 2: Buffers and surrounding land use	1
	Metric 3: Hydrology	16
	Metric 4: Habitat	7
	Metric 5: Special Wetland Communities	5
	Metric 6: Plant communities, interspersion, microtopography	8
	TOTAL SCORE	38

APPENDIX E – Photographic Summary

Photo: 1
By: F. Amatucci
Date: September 20, 2022
Feature: STR-1
Lat: 36.453509
Long: -88.307909

Representative conditions of STR-1, facing downstream after transition from EPH-1.

Photo: 2
By: F. Amatucci
Date: September 20, 2022
Feature: STR-1
Lat: 36.454358
Long: -88.308687

Representative conditions of STR-1, facing upstream at end of reach before flowing out of project study area.

Photo: 3
By: F. Amatucci
Date: September 20, 2022
Feature: STR-2
Lat: 36.450051
Long: -88.297952

Representative conditions of STR-2 at beginning of reach, facing downstream from culvert outlet.

Photo: 4
By: F. Amatucci
Date: September 20, 2022
Feature: STR-2
Lat: 36.457604
Long: -88.301766

Representative conditions of STR-2 facing downstream towards the property limits.

Photo: 5
By: F. Amatucci
Date: September 20, 2022
Feature: STR-3
Lat: 36.455326
Long: -88.301486

Representative conditions of STR-3 facing upstream at beginning of reach before transition into EPH-3.

Photo: 6
By: F. Amatucci
Date: September 20, 2022
Feature: STR-3
Lat: 36.455458
Long: -88.301416

Representative conditions of STR-3 facing downstream at middle of reach before confluence with STR-2.

Photo: 7
By: F. Amatucci
Date: September 20, 2022
Feature: STR-4
Lat: 36.455562
Long: -88.302260

Representative conditions of STR-4 facing downstream at beginning of reach from P-2.

Photo: 8
By: F. Amatucci
Date: September 20, 2022
Feature: STR-4
Lat: 36.455656
Long: -88.301680

Representative conditions of STR-4 near end of reach before confluence with STR-2.

Photo: 9
By: F. Amatucci
Date: September 21, 2022
Feature: STR-5
Lat: 36.445551
Long: -88.314272

Representative conditions of STR-5 mid-reach after forming at bottom of WTL-1.

Photo: 10
By: F. Amatucci
Date: September 21, 2022
Feature: STR-5
Lat: 36.445376
Long: -88.314691

Representative conditions of STR-5 at end of reach before dissipating into WTL-2.

Photo: 11
By: F. Amatucci
Date: September 21, 2022
Feature: STR-6
Lat: 36.446991
Long: -88.314278

Representative conditions of STR-6 at beginning of reach, facing upstream before leaving property limits.

Photo: 12
By: F. Amatucci
Date: September 21, 2022
Feature: STR-6
Lat: 36.446525
Long: -88.314973

Representative conditions of STR-6 at mid-reach, facing downstream before eventual confluence with STR-7.

Photo: 13
By: F. Amatucci
Date: September 21, 2022
Feature: STR-7
Lat: 36.442557
Long: -88.312158

Representative conditions of STR-7 at beginning of reach near confluence with STR-8.

Photo: 14
By: F. Amatucci
Date: September 21, 2022
Feature: STR-7
Lat: 36.445963
Long: -88.316184

Representative conditions of STR-7 at end of reach near confluence with STR-6.

Photo: 15
By: F. Amatucci
Date: September 21, 2022
Feature: STR-8
Lat: 36.442818
Long: -88.311687

Representative conditions of STR-7 at mid-reach, facing upstream before leaving property limits.

Photo: 16
By: F. Amatucci
Date: September 21, 2022
Feature: STR-8
Lat: 36.442585
Long: -88.312120

Representative conditions of STR-8 at end of reach, facing downstream before confluence with STR-7.

Photo: 17
By: F. Amatucci
Date: September 22, 2022
Feature: STR-9
Lat: 36.444509
Long: -88.319904

Representative conditions of STR-9 at beginning of reach before leaving property limits.

Photo: 18
By: F. Amatucci
Date: September 22, 2022
Feature: STR-9
Lat: 36.445578
Long: -88.319126

Representative conditions of STR-9 at end of reach near confluence with EPH-6 before leaving property limits.

Photo: 19
By: F. Amatucci
Date: September 22, 2022
Feature: STR-10
Lat: 36.441538
Long: -88.300116

Representative conditions of STR-10 at beginning of reach, begins at moderate headcut after transition from EPH-9.

Photo: 20
By: F. Amatucci
Date: September 22, 2022
Feature: STR-10
Lat: 36.440701
Long: -88.302991

Representative conditions of STR-10 near end of reach before entering culver inlet.

Photo: 21
By: F. Amatucci
Date: September 22, 2022
Feature: STR-11
Lat: 36.441718
Long: -88.300966

Representative conditions of STR-11 at beginning of reach after transitioning from EPH-8.

Photo: 22
By: F. Amatucci
Date: September 22, 2022
Feature: STR-11
Lat: 36.441570
Long: -88.300961

Representative conditions of STR-11 at end of reach before confluence with STR-10.

Photo: 23
By: F. Amatucci
Date: September 20, 2022
Feature: EPH-1
Lat: 36.452990
Long: -88.306954

Representative conditions of EPH-1 beginning of reach facing downstream.

Photo: 24
By: F. Amatucci
Date: September 20, 2022
Feature: EPH-1
Lat: 36.453510
Long: -88.307864

Representative conditions of EPH-1 at end of reach, facing upstream before transition into STR-1.

Photo: 25
By: F. Amatucci
Date: September 20, 2022
Feature: EPH-2
Lat: 36.452844
Long: -88.308641

Representative conditions of EPH-2 at beginning of reach, facing downstream after entering property limits.

Photo: 26
By: F. Amatucci
Date: September 20, 2022
Feature: EPH-2
Lat: 36.453291
Long: -88.308433

Representative conditions of EPH-2 near end of reach before confluence with STR-1.

Photo: 27
By: F. Amatucci
Date: September 20, 2022
Feature: EPH-3
Lat: 36.455032
Long: -88.301540

Representative conditions of EPH-3 at beginning of reach facing upstream.

Photo: 28
By: F. Amatucci
Date: September 20, 2022
Feature: EPH-3
Lat: 36.455276
Long: -88.301521

Representative conditions of EPH-3 near end of reach, facing upstream before transition into STR-3.

Photo: 29
By: F. Amatucci
Date: September 20, 2022
Feature: EPH-4
Lat: 36.453201
Long: -88.299290

Representative conditions of EPH-4 at beginning of reach facing downstream.

Photo: 30
By: F. Amatucci
Date: September 20, 2022
Feature: EPH-4
Lat: 36.453786
Long: -88.298962

Representative conditions of EPH-4 at end of reach before confluence with STR-2.

Photo: 31
By: F. Amatucci
Date: September 21, 2022
Feature: EPH-5
Lat: 36.446949
Long: -88.315475

Representative conditions of EPH-5 at beginning of reach facing downstream after beginning at WTL-3.

Photo: 32
By: F. Amatucci
Date: September 21, 2022
Feature: EPH-5
Lat: 36.447274
Long: -88.315688

Representative conditions of EPH-5 at end of reach, facing downstream before leaving property limits and dissipating into offsite wetland.

Photo: 33
By: F. Amatucci
Date: September 22, 2022
Feature: EPH-6
Lat: 36.443158
Long: -88.318401

Representative conditions of EPH-6 at beginning of reach after culvert outfall.

Photo: 34
By: F. Amatucci
Date: September 22, 2022
Feature: EPH-6
Lat: 36.445500
Long: -88.319028

Representative conditions of EPH-6 at end of reach, facing downstream before confluence with STR-9

Photo: 35
By: F. Amatucci
Date: September 22, 2022
Feature: EPH-7
Lat: 36.444101
Long: -88.304215

Representative conditions of EPH-7 mid-reach near confluence with two erosional swales.

Photo: 36
By: F. Amatucci
Date: September 22, 2022
Feature: EPH-7
Lat: 36.443141
Long: -88.305020

Representative conditions of EPH-7 mid-reach, facing downstream before entering agriculture field.

Photo: 37
By: F. Amatucci
Date: September 22, 2022
Feature: EPH-8
Lat: 36.444253
Long: -88.300739

Representative conditions of EPH-8 at beginning of reach, facing downstream.

Photo: 38
By: F. Amatucci
Date: September 22, 2022
Feature: EPH-8
Lat: 36.442403
Long: -88.300951

Representative conditions of EPH-8 at mid-reach, facing downstream before eventual transition into STR-11.

Photo: 39
By: F. Amatucci
Date: September 22, 2022
Feature: EPH-9
Lat: 36.441120
Long: -88.299178

Representative conditions of EPH-9 at beginning of reach, forming at the bottom of WTL-7.

Photo: 40
By: F. Amatucci
Date: September 22, 2022
Feature: EPH-9
Lat: 36.441463
Long: -88.299950

Representative conditions of EPH-9 at end of reach, facing downstream before transition into STR-10.

Photo: 41
By: F. Amatucci
Date: September 22, 2022
Feature: EPH-10
Lat: 36.450455
Long: -88.293666

Representative conditions of EPH-10 at beginning of reach, facing upstream into valley.

Photo: 42
By: F. Amatucci
Date: September 22, 2022
Feature: EPH-10
Lat: 36.450826
Long: -88.292933

Representative conditions of EPH-10 at end of reach, facing downstream before leaving property limits.

Photo: 43
By: F. Amatucci
Date: September 20, 2022
Feature: ES-1
Lat: 36.453360
Long: -88.307257

Representative conditions of ES-1 at mid-reach, facing upstream before confluence with EPH-1.

Photo: 44
By: F. Amatucci
Date: September 20, 2022
Feature: ES-2
Lat: 36.455463
Long: -88.301556

Representative conditions of ES-2 at mid-reach before confluence with STR-4.

Photo: 45
By: F. Amatucci
Date: September 20, 2022
Feature: ES-3
Lat: 36.454810
Long: -88.299689

Representative conditions of ES-3 at end of reach, facing upstream before confluence with STR-2.

Photo: 46
By: F. Amatucci
Date: September 21, 2022
Feature: ES-4
Lat: 36.445409
Long: -88.314287

Representative conditions of ES-4 near end of reach before confluence with STR-5.

Photo: 47
By: F. Amatucci
Date: September 21, 2022
Feature: ES-5
Lat: 36.445683
Long: -88.315795

Representative conditions of ES-5 near end of reach, facing downstream before confluence with STR-7.

Photo: 48
By: F. Amatucci
Date: September 21, 2022
Feature: ES-6
Lat: 36.445845
Long: -88.316036

Representative conditions of ES-6 near end of reach, facing downstream before confluence with STR-7.

Photo: 49
By: F. Amatucci
Date: September 21, 2022
Feature: ES-7
Lat: 36.444257
Long: -88.314270

Representative conditions of ES-7 near end of reach, facing upstream before confluence with STR-7.

Photo: 50
By: F. Amatucci
Date: September 22, 2022
Feature: ES-8
Lat: 36.443848
Long: -88.304328

Representative conditions of ES-8 near end of reach, facing downstream before confluence with EPH-7.

Photo: 51
By: F. Amatucci
Date: September 22, 2022
Feature: ES-9
Lat: 36.443730
Long: -88.304519

Representative conditions of ES-9 near end of reach before confluence with EPH-7.

Photo: 52
By: F. Amatucci
Date: September 22, 2022
Feature: ES-10
Lat: 36.441588
Long: -88.297518

Representative conditions of ES-10 mid-reach before dissipating into WTL-7.

Photo: 53
By: F. Amatucci
Date: September 21, 2022
Feature: D-1
Lat: 36.445858
Long: -88.316180

Representative conditions of D-1 at end of reach, facing upstream before confluence with STR-7.

Photo: 54
By: F. Amatucci
Date: September 21, 2022
Feature: UDF-1
Lat: 36.446064
Long: -88.311563

Representative conditions of UDF-1 mid-reach facing downslope.

Photo: 55
By: F. Amatucci
Date: September 21, 2022
Feature: WTL-1
Lat: 36.446343
Long: -88.313457

Representative conditions of WTL-1 facing downslope before draining into STR-5.

Photo: 56
By: F. Amatucci
Date: September 21, 2022
Feature: WTL-2
Lat: 36.445698
Long: -88.315024

Representative conditions of floodplain WTL-2.

Photo: 57
By: F. Amatucci
Date: September 21, 2022
Feature: WTL-3
Lat: 36.446842
Long: -88.315317

Representative conditions of WTL-3 before draining into EPH-5.

Photo: 58
By: F. Amatucci
Date: September 21, 2022
Feature: WTL-4
Lat: 36.443708
Long: -88.315054

Representative conditions of emergent portion of WTL-4.

Photo: 59
By: F. Amatucci
Date: September 21, 2022
Feature: WTL-4
Lat: 36.444377
Long: -88.315614

Representative conditions of forested portion of WTL-4.

Photo: 60
By: F. Amatucci
Date: September 21, 2022
Feature: WTL-5
Lat: 36.443830
Long: -88.316536

Representative conditions of depressional WTL-5, relic farm pond.

Photo: 61
By: F. Amatucci
Date: September 22, 2022
Feature: WTL-6
Lat: 36.445833
Long: -88.303028

Representative conditions of depressional WTL-6, relic farm pond.

Photo: 62
By: F. Amatucci
Date: September 22, 2022
Feature: WTL-7
Lat: 36.441109
Long: -88.298613

Representative conditions of WTL-7 facing downslope before draining into EPH-9.

Photo: 63
By: F. Amatucci
Date: September 22, 2022
Feature: WTL-8
Lat: 36.439989
Long: -88.295782

Representative conditions of WTL-8, fringe wetland to P-12.

Photo: 64
By: F. Amatucci
Date: September 20, 2022
Feature: P-1
Lat: 36.452776
Long: -88.303313

Representative conditions of farm pond P-1.

Photo: 65
By: F. Amatucci
Date: September 20, 2022
Feature: P-2
Lat: 36.455505
Long: -88.302763

Representative conditions of farm pond P-2.

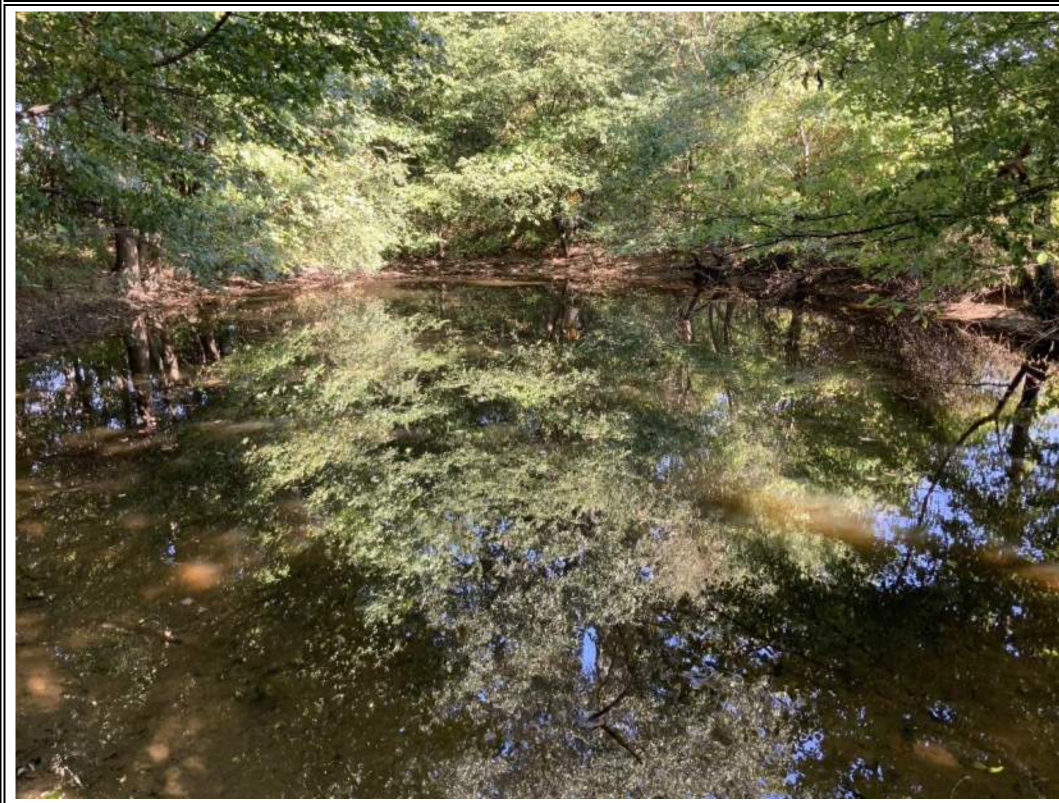


Photo: 66
By: F. Amatucci
Date: September 20, 2022
Feature: P-3
Lat: 36.454950
Long: -88.300701

Representative conditions of farm pond P-3.

Photo: 67
By: F. Amatucci
Date: September 20, 2022
Feature: P-4
Lat: 36.451544
Long: -88.296563

Representative conditions of farm pond P-4.

Photo: 68
By: F. Amatucci
Date: September 21, 2022
Feature: P-6
Lat: 36.446685
Long: -88.312390

Representative conditions of farm pond P-6.

Photo: 69
By: F. Amatucci
Date: September 21, 2022
Feature: P-7
Lat: 36.445152
Long: -88.314391

Representative conditions of farm pond P-7.

Photo: 70
By: F. Amatucci
Date: September 22, 2022
Feature: P-8
Lat: 36.442592
Long: -88.307931

Representative conditions of farm pond P-8.

Photo: 71
By: F. Amatucci
Date: September 22, 2022
Feature: P-9
Lat: 36.444728
Long: -88.300209

Representative conditions of farm pond P-9.

Photo: 72
By: F. Amatucci
Date: September 22, 2022
Feature: P-10
Lat: 36.443472
Long: -88.298525

Representative conditions of farm pond P-10.

Photo: 73
By: F. Amatucci
Date: September 22, 2022
Feature: P-11
Lat: 36.440946
Long: -88.298142

Representative conditions of farm pond P-11.

Photo: 74
By: F. Amatucci
Date: September 22, 2022
Feature: P-12
Lat: 36.439828
Long: -88.295630

Representative conditions of farm pond P-12, adjacent to fringe wetland WTL-8.

Photo: 75
By: F. Amatucci
Date: September 22, 2022
Feature: P-13
Lat: 36.442887
Long: -88.294656

Representative conditions of farm pond P-13, adjacent to roadway.

Photo: 76
By: F. Amatucci
Date: September 20, 2022
Feature: Cropland
Lat: 36.452092
Long: -88.303009

Representative cropland vegetative community observed within project study area.

Photo: 77
By: F. Amatucci
Date: September 20, 2022
Feature: Semi-Mature Riparian Forest
Lat: 36.453317
Long: -88.307325

Representative semi-mature riparian forest vegetative community observed within project study area.

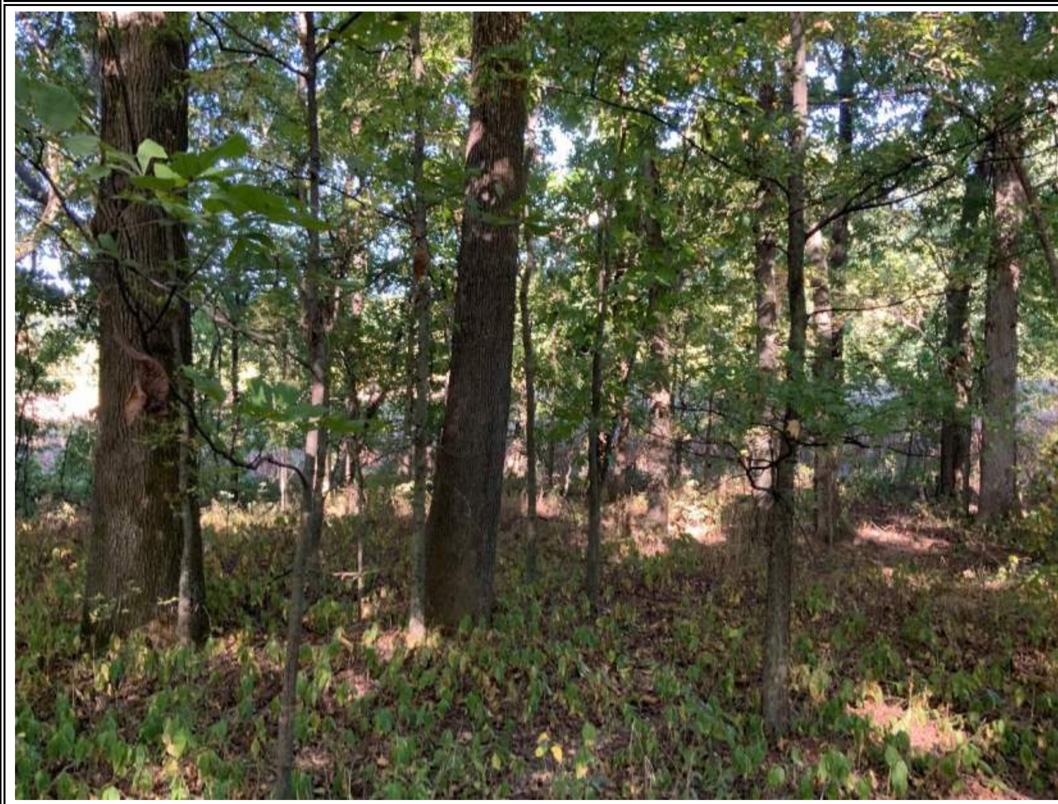


Photo: 78
By: F. Amatucci
Date: September 21, 2022
Feature: Mixed Growth Hardwood Forest
Lat: 36.445996
Long: -88.311310

Representative mixed growth hardwood forest vegetative community observed within project study area.

Photo: 79
By: F. Amatucci
Date: September 21, 2022
Feature: Successional Hardwood Forest
Lat: 36.446276
Long: -88.313518

Representative successional hardwood forest vegetative community observed within project study area.

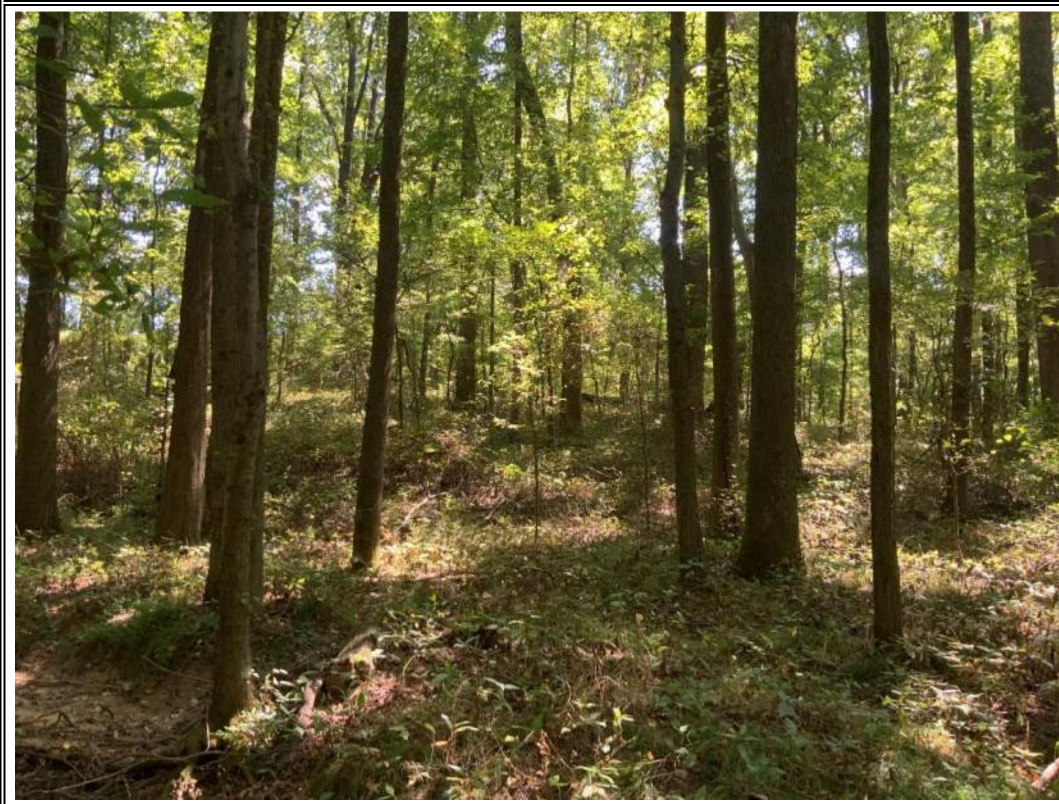


Photo: 80
By: F. Amatucci
Date: September 21, 2022
Feature: Mature Riparian Forest
Lat: 36.446857
Long: -88.314967

Representative mature riparian forest vegetative community observed within project study area.

Photo: 81
By: F. Amatucci
Date: September 21, 2022
Feature: Shallow Emergent Marsh
Lat: 36.443780
Long: -88.314995

Representative shallow emergent marsh vegetative community observed within project study area.

Photo: 82
By: F. Amatucci
Date: September 22, 2022
Feature: Pastureland (Cattle)
Lat: 36.442526
Long: -88.300671

Representative pastureland (cattle) vegetative community observed within project study area.

Photo: 83
By: F. Amatucci
Date: September 22, 2022
Feature: Mature Oak-Hickory Forest
Lat: 36.441005
Long: -88.301010

Representative mature oak-hickory forest vegetative community observed within project study area.

Photo: 84
By: F. Amatucci
Date: September 22, 2022
Feature: Fallow Field
Lat: 36.442530
Long: -88.307386

Representative fallow field vegetative community observed within project study area.

Photo: 85
By: F. Amatucci
Date: September 22, 2022
Feature: Residential
Lat: 36.442617
Long: -88.308422

Representative residential vegetative community observed within project study area.

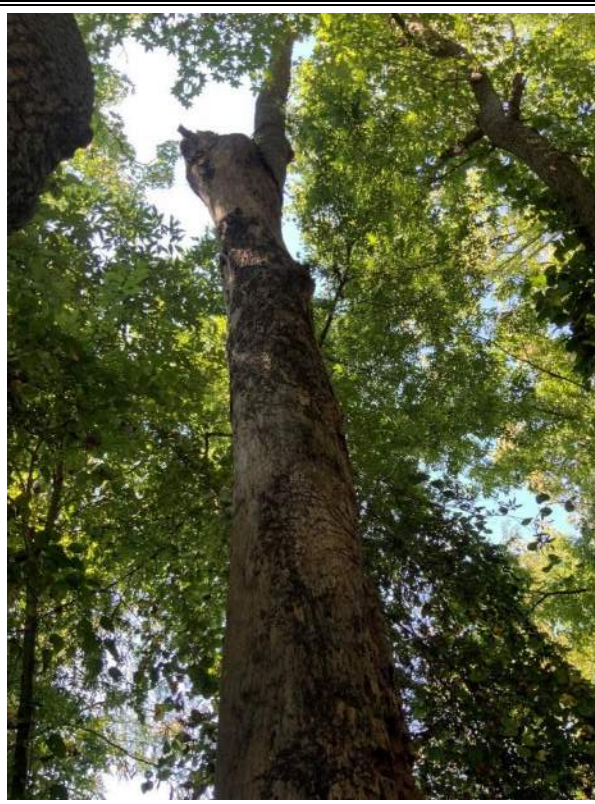


Photo: 86
By: F. Amatucci
Date: September 20, 2022
Feature: PRT-1
Lat: 36.456535
Long: -88.301773

Potential bat roost tree observed as dead, 32 inches in diameter, approximately 20 percent exfoliating bark, slight solar exposure, and with suitable habitat 30 plus fee above the ground.

Photo: 87
By: F. Amatucci
Date: September 20, 2022
Feature: PRT-2
Lat: 36.440939
Long: -88.300829

Potential bat roost tree observed a living shagbark hickory, 20 inches in diameter, approximately 85 percent exfoliating bark, high solar exposure, and with suitable habitat 15 plus fee above the ground.

Photo: 88
By: F. Amatucci
Date: September 20, 2022
Feature: PRT-3
Lat: 36.455097
Long: -88.300605

Potential bat roost tree observed as dead, 30 inches in diameter, with a large crack and crevice down the trunk, moderate solar exposure, and with suitable habitat 10 plus fee above the ground.

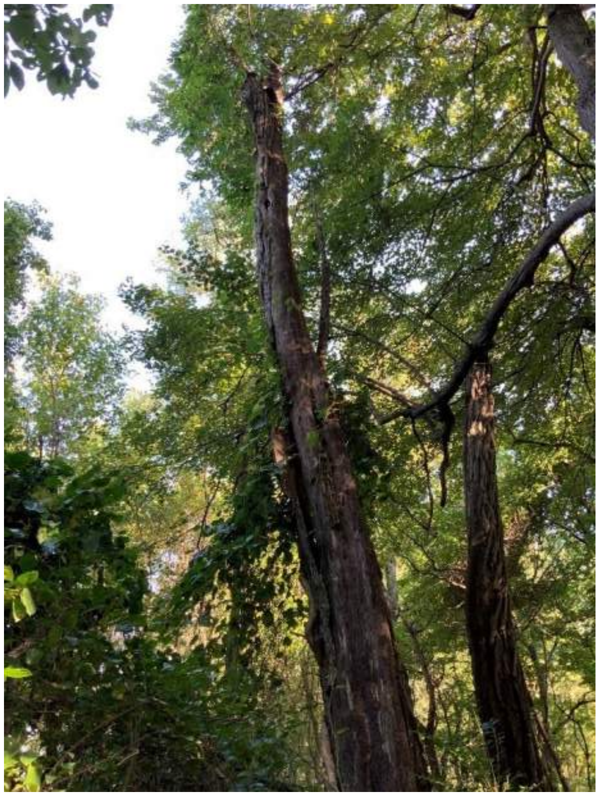


Photo: 89
By: F. Amatucci
Date: September 20, 2022
Feature: PRT-4
Lat: 36.455143
Long: -88.300737

Potential bat roost tree observed as dead, 24 inches in diameter, approximately 45 percent exfoliating bark, high solar exposure, and with suitable habitat 20 plus fee above the ground.

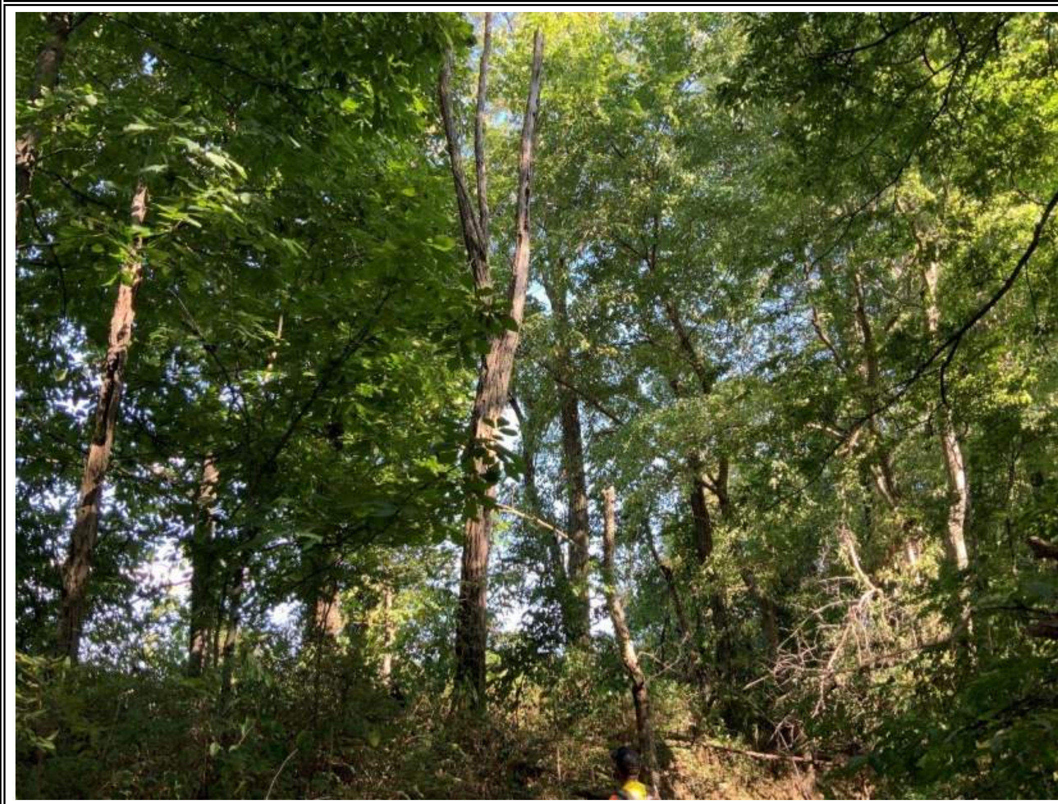


Photo: 90
By: F. Amatucci
Date: September 20, 2022
Feature: PRT-5
Lat: 36.454856
Long: -88.299593

Potential bat roost tree observed as dead, 18 inches in diameter, with crack and crevice holes in upper limbs, little solar exposure, and with suitable habitat 30 plus fee above the ground.

Photo: 91
By: F. Amatucci
Date: September 21, 2022
Feature: PRT-6
Lat: 36.444750
Long: -88.314635

Potential bat roost tree observed as dead, 10 inches in diameter, approximately 10 percent exfoliating bark, some binding vines limiting access, slight solar exposure, and with suitable habitat 15 plus fee above the ground.

Photo: 92
By: F. Amatucci
Date: September 21, 2022
Feature: PRT-8
Lat: 36.447105
Long: -88.314483

Potential bat roost tree observed as dead, 28 inches in diameter, some presence of relic woodpecker holes that could be utilized, slight solar exposure, and with suitable habitat 15 plus fee above the ground.

Photo: 93
By: F. Amatucci
Date: September 22, 2022
Feature: PRT-9
Lat: 36.443677
Long: -88.304481

Potential bat roost tree observed in a living red maple, 24 inches in diameter, with a large hole in the tree, moderate solar exposure, and with suitable habitat 20 plus fee above the ground.

Photo: 94
By: F. Amatucci
Date: September 20, 2022
Feature: PRN-1
Lat: 36.452736
Long: -88.303842

Potential raptor nest located in large tree within the project study area.

APPENDIX F – State and Federal Concurrence Documents

STATE OF TENNESSEE
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
JACKSON ENVIRONMENTAL FIELD OFFICE
1625 HOLLYWOOD DRIVE
JACKSON, TN 38301

March 3, 2023

Frank Amatucci, QHP # TN-QHP #1203-TN21
Barge Designs Solutions, Inc.
615 3rd Ave. South, Suite 700
Nashville, TN 37210

Re: Hydrologic Determination of Water Resources (DWR ID No. 31983)
Puryear Solar Site
East Fork Creek watershed, Henry County, TN

Dear Frank:

The Tennessee Department of Environment and Conservation, Division of Water Resources (TDEC-DWR), Jackson Field Office has reviewed the following report “Hydrologic Determination Report for Puryear Solar Site, Puryear, Henry County, Tennessee. This report was submitted on behalf of Silicon Ranch Corporation, to our office, on January 27, 2023, in support of jurisdictional hydrologic determinations of water features associated with the above referenced site. These water features are located on property located at the general location of between Highway 140 East, Conyersville Road, and Old Paris-Murray Road, approximately 0.7 miles east of the city square of Puryear and Highway 641. Water features pond 6, WL 1, pond 7, WL 2, pond 12, WL 8, pond 11, WL 7 and Eph 4 were field verified on March 2, 2023. Please note that all geographic coordinates provided in this letter have a limited precision and should be considered approximate.

Based on the information and documentation submitted in the report, and the Division’s rules and guidance regarding hydrologic determinations, the Division accepts and concurs with the jurisdictional determination of the assessed water features as documented in the submitted report and portrayed in Appendix C table 1 and 2 in your report entitled Hydrologic Determination Request Package for the Puryear Solar Site **with the exception of** the non-jurisdictional determination of all the pond features on the properties. All pond features are to be considered jurisdictional ponds based upon the prevalence of and a likelihood of a connection of the pond(s) to the seasonal high-water table(s) in the vicinity of each pond.

It is important to note that the Division’s evaluation and concurrence is restricted to only the water features identified within the submitted report. Only these water features were assessed as part of this hydrologic determination, therefore this correspondence is not intended to represent a comprehensive water resource inventory of the entire site. It is the property owner’s responsibility to consider and report any additional water features within the property boundaries that may be affected by any construction activities associated with future development.

Any alterations to jurisdictional streams, wetlands, or open water features may only be performed under the coverage of, and conformance to, a valid Aquatic Resource Alteration Permit (ARAP) issued by the Division. ARAP applications and provisions are available on-line at https://www.tn.gov/environment/permit-permits/water-permits1/aquatic-resource-alteration-permit--arap-.html. Alterations to Wet Weather Conveyances typically may be performed without application or notification to the Division, provided they conform to the provisions found under Tennessee Code Annotated § 69-3-108 (q).

Please note that coverage under the General NPDES Permit for Stormwater Discharges from Construction Activities (CGP) will be needed if the proposed land disturbance activity for this project is one acre or more in size. Information and applications regarding the Division's construction storm water program can be found online. A completed Notice of Intent form, an application fee, and a storm water pollution prevention plan should be submitted to the above address for review and coverage under this permit prior to any land disturbance.

Discharges and alterations to sinkholes may require the submittal of an application and written authorization under the provisions of TDEC Rules. Information and applications regarding the Underground Injection Control program may be seen online at https://www.tn.gov/environment/permit-permits/water-permits1/underground-injection-control-permit.html. Physical alterations or re-routing of surface hydrology to a sinkhole may require coverage under the Class V Injection Control Permit.

Hydrologic determinations are advised and governed by Tennessee Department of Environment and Conservation (TDEC) rules and regulations, and therefore only apply to the State's permitting process. Because these and other various water features on-site may potentially also be considered jurisdictional Waters of the United States, any alterations to them should only be performed after consultation with the U.S. Army Corps of Engineers.

We appreciate the opportunity to assess the jurisdictional status of these water features prior to site plan finalization and initiation of construction activities. Because natural variation and human activities can alter hydrologic conditions, the Division reserves the right to reassess the status of the water features in the future.

Thank you for your interest in water quality in Tennessee. Please contact me at 731-388-3950 or by email at amy.fritz@tn.gov if you have any questions.

Respectfully,

Amy Fritz

TN Department of Environment & Conservation

Amy Fritz, Environmental Consultant 1
Division of Water Resources
Jackson Environmental Field Office

Cc: File copy
USACE District Memphis: CEMVMRegulatory@usace.army.mil

Table 1 – Non-Wetland Features within the Project Study Area

Waterbody I.D.	Description	Location Within Project Boundaries	Linear Feet within Project	HD Score	Federal Jurisdictional Status	State Jurisdictional Status
STR-1	Intermittent Stream	Start: 36.453450, -88.307866 End 36.454391, -88.308686	536	21.25	Yes	Yes
STR-2	Intermittent Stream	Start: 36.450017, -88.297948 End: 36.457746, -88.30176	3,854	24.00	Yes	Yes
STR-3	Intermittent Stream	Start: 36.455209, -88.301457 End: 36.455466, -88.301194	140	20.00	Yes	Yes
STR-4	Intermittent Stream	Start: 36.455539, -88.302408 End: 36.455704, -88.301509	297	19.25	Yes	Yes
STR-5	Intermittent Stream	Start: 36.445431, -88.314349 End: 36.445290, -88.314756	184	19.25	Yes	Yes
STR-6	Intermittent Stream	Start: 36.447332, -88.313994 End: 36.446062, -88.316202	895	19.50	Yes	Yes
STR-7	Perennial Stream	Start: 36.441680, -88.311011 End: 36.446099, -88.316257	2,267	Primary	Yes	Yes
STR-8	Intermittent Stream	Start: 36.442919, -88.311122 End: 36.442594, -88.312169	424	19.50	Yes	Yes
STR-9	Perennial Stream	Start: 36.444164, -88.320173 End: 36.445742, -88.318860	743	Primary	Yes	Yes
STR-10	Intermittent Stream	Start: 36.441546, -88.300116 End: 36.440614, -88.303253	1,059	26.00	Yes	Yes
STR-11	Intermittent Stream	Start: 36.441740, -88.300978 End: 36.441559, -88.300943	82	26.00	Yes	Yes
EPH-1	Ephemeral Stream	Start: 36.452814, -88.306826 End: 36.453450, -88.307866	374	16.75	Potential[1]	No[2] (WWC)
EPH-2	Ephemeral Stream	Start: 36.452726, -88.308706 End: 36.453587, -88.308454	374	16.75	Unlikely[1]	No[2] (WWC)
EPH-3	Ephemeral Stream	Start: 36.454977, -88.301705 End: 36.455209, -88.301457	132	13.00	Potential[1]	No[2] (WWC)
EPH-4	Ephemeral Stream	Start: 36.453034, -88.299334 End: 36.453922, -88.298913	398	13.50	Unlikely[1]	No[2] (WWC)
EPH-5	Ephemeral Stream	Start: 36.446939, -88.315479 End: 36.447438, -88.315688	223	13.75	Potential[1]	No[2] (WWC)
EPH-6	Ephemeral Stream	Start: 36.442922, -88.318325 End: 36.445613, -88.319042	1,025	10.25	Unlikely[1]	No[2] (WWC)
EPH-7	Ephemeral Stream	Start: 36.445870, -88.303291 End: 36.441677, -88.306268	1,686	11.00	Potential[1]	No[2] (WWC)
EPH-8	Ephemeral Stream	Start: 36.444358, -88.300671 End: 36.441801, -88.300959	322	14.75	Potential[1]	No[2] (WWC)
EPH-9	Ephemeral Stream	Start: 36.441077, -88.298986 End: 36.441546, -88.30011	401	13.75	Potential[1]	No[2] (WWC)
EPH-10	Ephemeral Stream	Start: 36.450275, -88.293970 End: 36.451068, -88.292723	513	12.75	Unlikely[1]	No[2] (WWC)
ES-1	Erosional Swale	Start: 36.453407, -88.307094 End: 36.453250, -88.307284	108	11.50	Unlikely[1]	No[2] (WWC)
ES-2	Erosional Swale	Start: 36.455370, -88.301801 End: 36.455670, -88.301532	188	12.50	Unlikely[1]	No[2] (WWC)

Table 1 – Non-Wetland Features within the Project Study Area

Waterbody I.D.	Description	Location Within Project Boundaries	Linear Feet within Project	HD Score	Federal Jurisdictional Status	State Jurisdictional Status
ES-3	Erosional Swale	Start: 36.454714, -88.299795 End: 36.454856, -88.299657	70	12.50	Unlikely[1]	No[2] (WWC)
ES-4	Erosional Swale	Start: 36.445208, -88.313922 End: 36.445261, -88.31442	178	11.00	Unlikely[1]	No[2] (WWC)
ES-5	Erosional Swale	Start: 36.445685, -88.315683 End: 36.445649, -88.315868	63	11.50	Unlikely[1]	No[2] (WWC)
ES-6	Erosional Swale	Start: 36.445897, -88.315882 End: 36.445792, -88.316065	73	11.50	Unlikely[1]	No[2] (WWC)
ES-7	Erosional Swale	Start: 36.444362, -88.313983 End: 36.444234, -88.314285	112	11.50	Unlikely[1]	No[2] (WWC)
ES-8	Erosional Swale	Start: 36.444126, -88.304325 End: 36.443815, -88.304303	126	8.00	Unlikely[1]	No[2] (WWC)
ES-9	Erosional Swale	Start: 36.444014, -88.304738 End: 36.443644, -88.304466	175	8.00	Unlikely[1]	No[2] (WWC)
ES-10	Erosional Swale	Start: 36.441354, -88.297164 End: 36.441169, -88.298121	394	13.25	Unlikely[1]	No[2] (WWC)
UDF-1	Upland Drainage Feature	Start: 36.445988, -88.311172 End: 36.446164, -88.312054	294	--	No	No
D-1	Drainage Ditch	Start: 36.445455, -88.316176 End: 36.445886, -88.316120	166	--	No	No

1: Federal jurisdiction status determined by observable connection to RPW and NonRPW WOTUS or significant nexus
2: State Status determined by HD score (<19 is a WWC)

Table 2 – Wetlands within the Project Study Area

Waterbody I.D.	Description	Location Within Project Boundaries	Acreage within Project	Federal Jurisdictional Status	State Jurisdictional Status
WTL-1	PFO	36.446141, -88.313703	0.28	Yes	Yes
WTL-2	PFO	36.445357, -88.315062	1.37	Yes	Yes
WTL-3	PFO	36.446975, -88.314885	0.26	Yes[1]	Yes
WTL-4	PEM	36.443901, -88.315137	1.52	Yes[1]	Yes
	PFO	36.444478, -88.315886	1.06		
WTL-5	PEM	36.443823, -88.316579	0.24	No[1]	Yes
WTL-6	PEM	36.445854, -88.303033	0.10	No[1]	Yes
WTL-7	PFO	36.441045, -88.298593	0.30	Yes[1]	Yes
WTL-8	PFO	36.439863, -88.295632	0.10	No[1]	Yes
P-1	PUB	36.452808, -88.303306	0.16	No[1]	Yes
P-2	PUB	36.455507, -88.302841	0.49	Yes	Yes
P-3	PUB	36.454917, -88.300769	0.07	No[1]	Yes
P-4	PUB	36.451562, -88.296562	0.06	No[1]	Yes
P-5	PUB	36.447414, -88.306998	1.44	Yes[1]	Yes
P-6	PUB	36.446663, -88.312360	0.22	No[1]	Yes
P-7	PUB	36.445118, -88.314370	0.15	No[1]	Yes
P-8	PUB	36.442610, -88.307802	0.37	No[1]	Yes
P-9	PUB	36.444777, -88.300191	0.35	No[1]	Yes
P-10	PUB	36.443494, -88.298429	0.45	No[1]	Yes
P-11	PUB	36.440848, -88.298140	0.08	No[1]	Yes
P-12	PUB	36.439828, -88.295583	0.17	No[1]	Yes
P-13	PUB	36.442879, -88.294633	0.04	No[1]	Yes

1: Federal jurisdiction status determined by observable connection to RPW and NonRPW WOTUS, significant nexus, or is an isolated water

APPENDIX G – Rare, Threatened and Endangered Species Lists

IPaC **U.S. Fish & Wildlife Service**

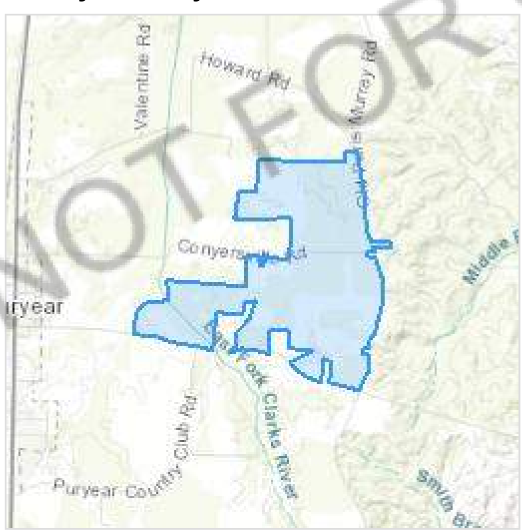
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Henry County, Tennessee



Local office

Tennessee Ecological Services Field Office

(931) 528-6481
(931) 528-7075

446 Neal Street

Cookeville, TN 38501-4027

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

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 either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat Perimyotis subflavus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

Birds

NAME	STATUS
Whooping Crane Grus americana No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/758	EXPN

Reptiles

NAME	STATUS
Alligator Snapping Turtle Macrochelys temminckii Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4658	Proposed Threatened

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

There are no documented cases of eagles being present at this location. However, if you believe eagles may be using your site, please reach out to the local Fish and Wildlife Service office.

Additional information can be found using the following links:

- Eagle Managment https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

Bald and Golden Eagle information is not available at this time

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

Migratory bird information is not available at this time

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

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

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

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.

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

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.

TVA Natural Heritage database queried by jhterrel on 07/13/2022 for the heritage review for ESCS 41214 Puryear Solar PPA EA Query Feature, Selection Map_Selection, (1*)

Records of state- and federal-listed Aquatic Animals points located within the HUC boundary of ESCS 41214 Puryear Solar PPA EA Query Feature, Selection Map_Selectior

Scientific Name	Common Name	EO Rank (2*)	State	State Rank (3*)	State Status (4*)	Federal Status (4*)
Clinostomus funduloides	Rosyside Dace	E - Verified extant (viability not assessed)	KY			
Esox niger	Chain Pickerel	H? - Possibly historical	KY	S3	S	
Etheostoma parvipinne	Goldstripe Darter	D - Poor estimated viability	KY	S1	E	
Etheostoma proeliare	Cypress Darter	D - Poor estimated viability	KY	S2	T	
Lepomis marginatus	Dollar Sunfish	E - Verified extant (viability not assessed)	KY	S1	E	
Orconectes burri	Blood River Crayfish	B - Good estimated viability	KY	S2	T	
Umbra limi	Central Mudminnow	A - Excellent estimated viability	KY	S2S3	T	

Records of state- and federal-listed Plants and Champion Trees points located within a 5 Mile radius search of ESCS 41214 Puryear Solar PPA EA Query Feature, Selection Map_Selectior

Scientific Name	Common Name	EO Rank (2*)	State	State Rank (3*)	State Status (4*)	Federal Status (4*)
Myriophyllum pinnatum	Water-milfoil	H? - Possibly historical	TN	S1	E	
Salvia azurea var. grandiflora	Blue Sage	H - Historical	TN	S3	S	
Silphium laciniatum	Compass-plant	H? - Possibly historical	TN	S2	T	

Records of state- and federal-listed Caves points located within a 3 Mile radius search of ESCS 41214 Puryear Solar PPA EA Query Feature, Selection Map_Selectior

Scientific Name	Common Name	EO Rank (2*)	State	State Rank (3*)	State Status (4*)	Federal Status (4*)

Records of state- and federal-listed Terrestrial Animals points located within a 3 Mile radius search of ESCS 41214 Puryear Solar PPA EA Query Feature, Selection Map_Selectior

Scientific Name	Common Name	EO Rank (2*)	State	State Rank (3*)	State Status (4*)	Federal Status (4*)

Records of Heritage Natural Areas points located within a 3 Mile radius search of ESCS 41214 Puryear Solar PPA EA Query Feature, Selection Map_Selectior

MA Name	MA Type	MA Unit Code	State	Acres	Status	Key ID No

1* Source: TVA Regional Natural Heritage Database; USFWS Information for Planning and Consultation (IPaC) resource list (https://ecos.fws.gov/ipac/) -If Relevan

2* EO = Element Occurrence; Common ranks: A= Excellent est. viability/ecol. Integrity; B= Good est. viability/ecol. Integrity; C= Fair est. viability/ecol. Integrity E= Verified extant (viability/ecological integrity not assessed); H= Historical; X= Extirpated; NR= Not ranked. See Heritage Data Viewer Handbook for more ranks

3* State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure; S5 = Secure; SX = Presumed Extirpated. See Heritage Data Viewer Handbook for more ranks.

4* Status Codes: D= Deemed in Need of Management; DM= Delisted, still being monitored; E= Endangered; LE= Listed Endangered; LT= Listed Threatened; C= Candidate; PS= Partial Status; T= Threatened; E-P= Endangered/Possibly Extirp.; E-PT= Endangered/Proposed Threatened; RARE= Rare; SLNS= State listed, no status; S= Special Concern; S-P= Special Concern/Possibly Extirp.; S-CE= Special Concern/Commerc. Exploited; T-CE= Threatened/Commerc. Exploitec

5* See Heritage Data Viewer Handbook for full scope of Natural Areas as well as definitions of Natural Area types and units

APPENDIX H – USFWS Bat Habitat Data Forms

INDIANA BAT HABITAT ASSESSMENT DATASHEET

Project Name: Silicon Ranch - Puryear Solar Project Date: Sept. 21, 22

Township/Range/Section: Puryear, Henry Co., TN

Lat Long/UTM/ Zone: 36.448250, -88.303215 (NAD83) Surveyor: FCA, CB

Brief Project Description

Multiple properties proposed for solar farm development, comprised mostly of agricultural land

Project Area

	Total Acres	Forest Acres		Open Acres
Project	~~629~~	~~78~~		~~551~~
Proposed Tree Removal (ac)	Completely cleared	Partially cleared (will leave trees)	Preserve acres- no clearing	
	UNK	⟶	⟶	

Vegetation Cover Types

Pre-Project	Post-Project
Agricultural fields	Solar farm development
Riparian forest	Could potentially remain
~~Oak-hickory forest~~	
Mixed-growth hardwood forest	UNK
Early successional	

Landscape within 5 mile radius

Flight corridors to other forested areas?

Larger vast woods to the east. Surrounding area is mostly Agricultural

Describe Adjacent Properties (e.g. forested, grassland, commercial or residencial development, water sources)

Agricultural, residential, forested (East), Commercial, East Fork Clarks River

Proximity to Public Land

What is the distance (mi.) from the project area to forested public lands (e.g., national or state forests, national or state parks, conservation areas, wildlife management areas)?

~ 15 miles to Big Sandy National Wildlife Refuge

~ 25 miles to Land Between the Lakes

**Property Limits Revised 07-2023

Total Acres = 611; Forested Acres = 73; Open Acres = 538

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description

Sample Site No.(s): ______

21 ~~22~~ acres, 13 acres

Riparian Forest (Mature [Good], Semi-Mature [Moderate])

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral: ~ 2	Intermittent: ~ 4	Perennial: 1	Describe existing condition of water sources: East ~~Clar~~ Fork Clarks River and adjacent tribs
Pools/Ponds (# and size)	2	Open and accessible to bats? Yes		
Wetlands (approx. ac.)	Permanent:	Seasonal: 2		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50') 5	Midstory (20-50') 3	Understory (<20') 2	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81-100%
Dominant Species of Mature Trees	Sweet gum, red maple, Green ash, Sycamore, Box elder, Slippery elm			
% Trees w/ Exfoliating Bark	2			
Size Composition of Live Trees (%)	Small (3-8 in) 15	Med (9-15 in) 40	Large (>15 in) 45	
No. of Suitable Snags	~ 7			

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Yes

Additional Comments:

Different growth stages of same community which are likely floodplains. The mature stand along East Fork Clarks River is very good for foraging

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations, understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): Mixed Growth Hardwood Forest (Marginal) ~~10~~ Acres 9

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral: 3	Intermittent: —	Perennial: —	Describe existing condition of water sources:
Pools/Ponds (# and size)	—	Open and accessible to bats?		
Wetlands (approx. ac.)	Permanent: —	Seasonal: —		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50') 4	Midstory (20-50') 4	Understory (<20') 3	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81=100%
Dominant Species of Mature Trees	Hickory, Oak, Maple, Elm, Hackberry, red cedar, Basswood			
% Trees w/ Exfoliating Bark	1			
Size Composition of Live Trees (%)	Small (3-8 in) 25	Med (9-15 in) 50	Large (>15 in) 25	
No. of Suitable Snags	1			

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? Potential

Additional Comments:
Mix of Successional growth and surrounding Mature Stands.
- moderate dominance of saplings + Vines into the midstory
-

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations; understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

A single sheet can be used for multiple sample sites if habitat is the same

Sample Site Description
Sample Site No.(s): Successional forest & Wooded fence rows (Poor) ~~~30~~ acres 28

Water Resources at Sample Site				
Stream Type (# and length)	Ephemeral: 3	Intermittent: —	Perennial: —	Describe existing condition of water sources:
Pools/Ponds (# and size)	~4	Open and accessible to bats? potential		
Wetlands (approx. ac.)	Permanent: —	Seasonal: 2		

Forest Resources at Sample Site				
Closure/Density	Canopy (> 50') 2	Midstory (20-50') 5	Understory (<20') 4	1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, 5=61-80%, 6=81-100%
Dominant Species of Mature Trees	Oak, Hackberry, Red cedar, barswood, Honey locust, Privet			
% Trees w/ Exfoliating Bark	0			
Size Composition of Live Trees (%)	Small (3-8 in) 60	Med (9-15 in) 30	Large (>15 in) 10	
No. of Suitable Snags	1			

Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable.

IS THE HABITAT SUITABLE FOR INDIANA BATS? unlikely

Additional Comments:

Young growth with little to no flight corridors for bats.

- community situated along fence lines or adjacent to recently disturbed Mature/semi Stands

Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations, understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

APPENDIX I – Bat Survey Report

Bat Survey Report
Puryear Solar Project

Henry County, Tennessee

Prepared by:

Jackson Group
3945 Simpson Lane
Richmond, KY 40475
www.jacksongroupco.com

Prepared for:

Barge Design Solutions
615 3rd Ave South, Suite 700
Nashville, TN 37210

June 26, 2023

Table of Contents

Jackson Group
501.339.3580 | 3925 Simpson Lane | Richmond, KY 40475
jacksongroupco.com

1.0 INTRODUCTION

Projects within the state of Tennessee lie within the range of the federally endangered Indiana bat (*Myotis sodalis*) and the federally threatened northern long-eared bat (*Myotis septentrionalis*). Jackson Group was contracted by Barge Design to conduct a summer mist-net survey to determine the presence or probable absence of threatened and endangered (T&E) bat species for the proposed Puryear Solar project located in Henry County, TN.

A mist net survey study plan was subsequently submitted to the US Fish and Wildlife resources (USFWS). The study plan was approved to conduct mist net surveys on 16 May 2023. Study plan approval is provided in Appendix E.

1.1 Project Description

Silicon Ranch is developing utility-scale, ground-mounted Solar Photovoltaic (PV) projects throughout the Southeastern United States. The Puryear Solar project site is located approximately one mile east of the Town of Puryear, in Henry County, Tennessee, and approximately 10 miles north of the City of Paris, Tennessee. The Project Site layout would occupy approximately 611 acres, of which approximately 425 acres would be permanently disturbed. The project will interconnect to the Eagle Creek Substation via a new transmission line that will be constructed by the time construction of Puryear Solar is completed.

2.0 METHODS

Federal and State permitted biologists conducted a mist net survey according to the 2023 Range-Wide Indiana Bat and Northern Long-eared Survey Guidelines (USFWS 2023), to evaluate presence/probable absence T&E bat species within the proposed Project area (federal and state permits are provided in Appendix D). Surveys were conducted on and between 19 May – 22 May 2023. Per the 2023 Guidelines, for every 123 acres ($0.5km^2$) of potential summer habitat a minimum of 10 net nights of survey effort are required. Net-nights are to be distributed in a manner that effectively samples the project area. There are approximately 65 acres of suitable forested habitat within the 629-acre project area and 2 net sites were established. Net site locations were selected by a permitted bat biologist in the field and were based on the best possible net locations (e.g., streams, trails, corridors) that are typically the most effective places to survey. The survey was conducted at two net sites for two nights with two nets sets being surveyed on the first night and three net sets on the second night at each net site with total of 10 net-nights of survey effort. Additionally, all netting was conducted using the most current National White-Nose Syndrome (WNS) Decontamination Protocol.

Upon capture, bats were removed from the nets, identified to species, weighed, measured, and released unharmed near the point of capture. The following data was recorded for each individual captured: species, age, reproductive condition, right forearm length (millimeters), weight (grams), time of capture, and WNS damage index score based upon Reichard and Kunz's (2009) Wing Damage Index. All bats were identified to species based upon distinctive morphological characteristics (e.g. body size, hair color, ear length, tragus shape, presence/absence of a keeled calcar, etc.). Age was determined by the degree of epiphyseal – diaphyseal fusion. Adult female bats were considered reproductive if they were pregnant (based upon palpation of the abdomen), or bore signs of nursing young (i.e. lack of hair surrounding the teats). Males were considered reproductive if the testes were descended into the scrotum.

Jackson Group
501.339.3580 | 3925 Simpson Lane | Richmond, KY 40475
jacksongroupco.com

3.0 RESULTS

3.1 Mist-Netting Survey

A total of three bats were captured during the survey effort. Bat species captured included eastern red bat (*Lasiurus borealis*, n=2), and silver-haired bat (*Lasionycteris noctivagans*, n=1). No threatened or endangered bats were captured during survey efforts. Detailed site specific information and site diagrams are provided on the Mist Net Survey Data sheets in Appendix B. Mist net site net set photographs can be found in Appendix C and scientific collections permits in Appendix D.

3.2 Radio Telemetry

No threatened or endangered bats were captured during survey efforts; therefore no radio tracking was conducted.

4.0 DISCUSSION

This summer mist net survey was conducted with the appropriate level of effort and under the appropriate conditions to investigate the presence/absence of threatened and endangered bat species at the proposed Puryear Solar Farm Project. A total of three bats, comprised of two species, were captured during survey efforts. No threatened or endangered bat species were captured during the mist net survey efforts. No winter habitat was observed within the Project area.

The species captured during the survey are representative of bat species known to occur in the region. Given that the species captured during the survey are ubiquitous on the landscape and the absence of federally threatened or endangered bats, it is the opinion of Jackson Group that the proposed Project will not likely adversely affect threatened and endangered bat species populations in the project area.

Jackson Group
501.339.3580 | 3925 Simpson Lane | Richmond, KY 40475
jacksongroupco.com

5.0 REFERENCES

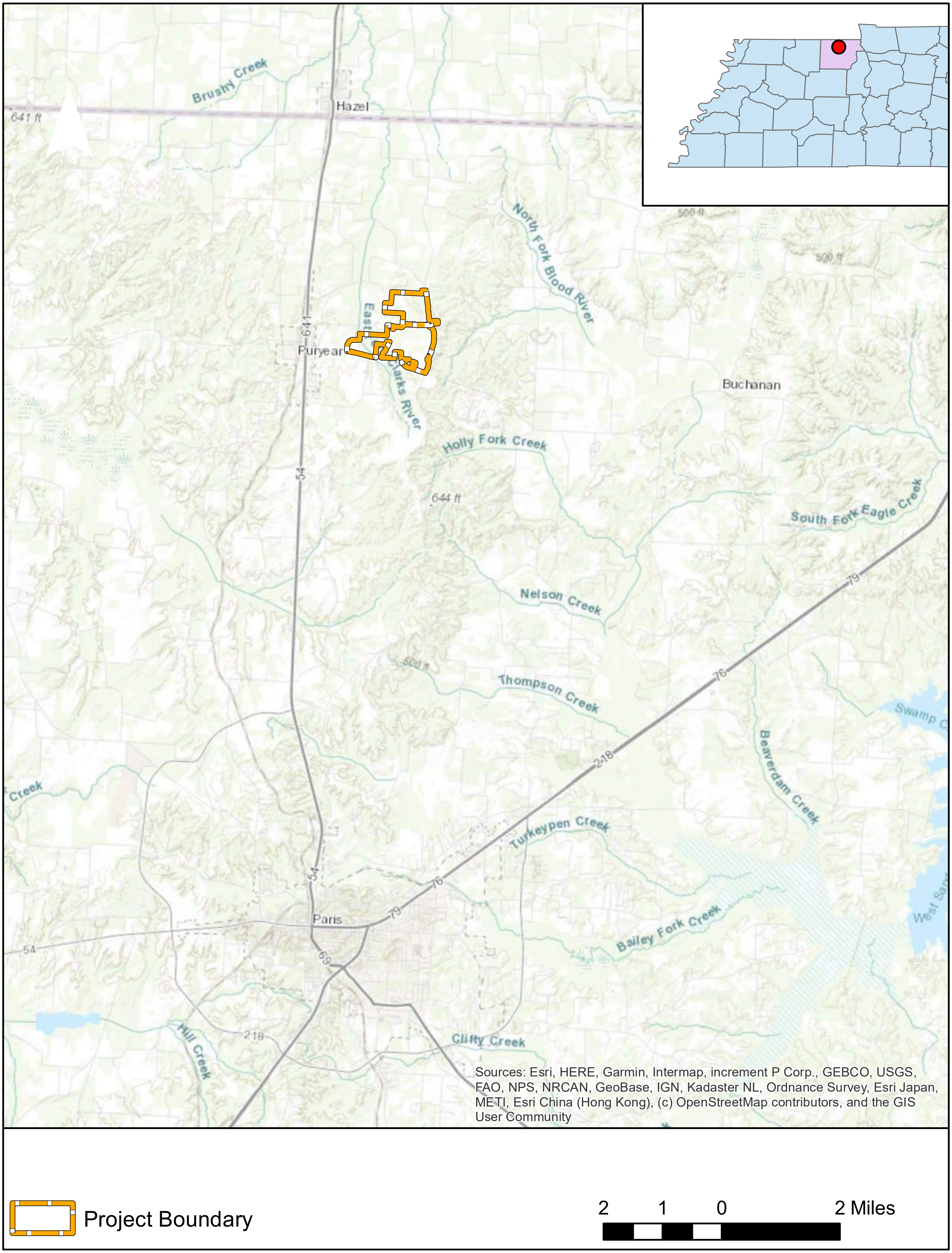
United States Fish and Wildlife Service (USFWS). 2020. White Nose Syndrome Decontamination Protocol, U.S Fish and Wildlife Service, Version 09.13.2018.

United States Fish and Wildlife Service (USFWS). 2023. Range-Wide Indiana Bat and Northern Long-eared bat Survey Guidelines, March 2023.

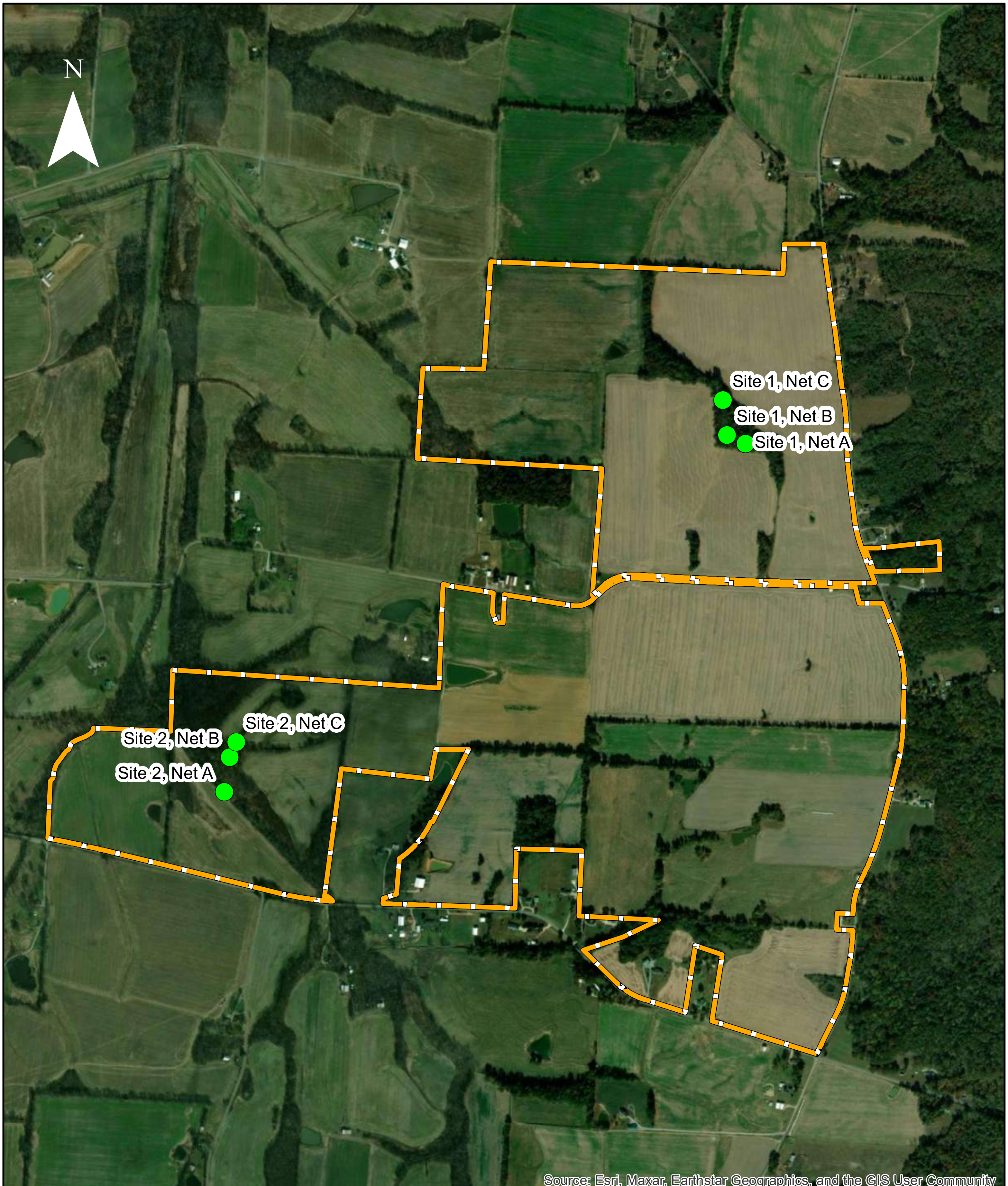
Jackson Group
501.339.3580 | 3925 Simpson Lane | Richmond, KY 40475
jacksongroupco.com

Appendix A

Project Mapping



Brushy Creek
Hazel
641 ft
N
North Fork Blood River
500 ft
500 ft
Puryear
East Fork Clarks River
641
Buchanan
Holly Fork Creek
54
644 ft
South Fork Eagle Creek
Nelson Creek
79
500 ft
Thompson Creek
76
Swamp C
218
Beaverdam Creek
Creek
Turkeypen Creek
54
76
Paris
79
West Sa
Bailey Fork Creek
54
69
Hill Creek
218
Clifty Creek
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Project Boundary
2 1 0 2 Miles



Net Sites

Project Boundary

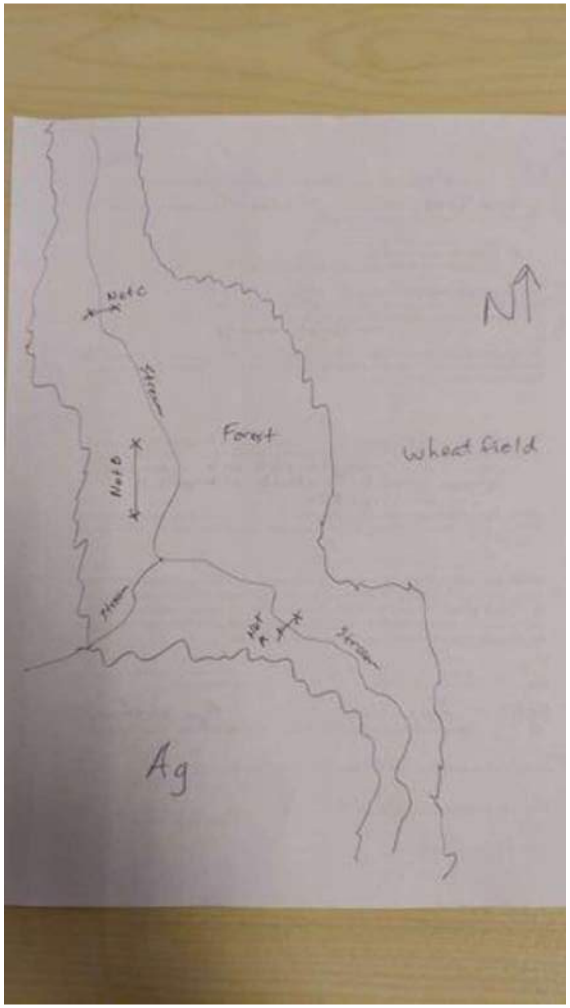
1,200 600 0 1,200 Feet

Appendix B

Bat Capture Data Sheets

Site No. 1	**Project Name:** Puryear
Date: May 19, 2023	

Net Site Diagram



Comments:

Dominant Vegetation
C. occidentalis
C. glabra
Q. nigra
P. occidentalis
Privet spp

Nets by Habitat

Unit	River	Stream	Pond	Road Rut	Corridor	Cave/ Mine	Forest Edge	Interior Forest	Wetland
A	☐	☑	☐	☐	☐	☐	☐	☐	☐
B	☐	☐	☐	☐	☐	☐	☐	☑	☐
C	☐	☑	☐	☐	☐	☐	☐	☐	☐

Net Height (m) X Net Length (m)

Unit	Net Length	Net Height	Total
A	6	9	54
B	9	9	81
C	6	9	54
		Total Area	189

Other Species:

CEC Bat Capture Data Sheet

Site No. 1	**Project Name:** Puryear		**Date:** May 19, 2023
County: Henry	**State:** Tennessee (TN)	**Client:** Jackson Group	**Surveyors:** R. Slack & G. Trombley
Permit # (State & Fed): ES07358A-13 & 1487 (TN)			

No.	Time	Species	Age	Sex	Repro. Cond.[1]	RFA (mm)	Mass (g)	Net/ Ht	Guano/ Hair	Wing Score	Band # Type
		NO BATS CAPTURED									

[1]**Repro. Cond (Reproductive Condition):** (P) pregnant; (L) lactating; (PL) post-lactating; (NR) non-reproductive, (TD) testes descended

[2]**Sky Code:** 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm

[3]**Wind Code :** 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

Moon Phase:	**Percent**
New Moon	0%

	Rise	**Set**
Moon	05:31	20:21
Sun	05:43	19:56

Time	Temp	Sky[2]	Wind[3]
20:00	68 °F	2	0
21:00	68 °F	1	0
22:00	67 °F	1	0
23:00	66 °F	1	0
00:00	66 °F	1	0
01:00	65 °F	0	0

Net Coordinates		
Unit	**Latitude**	**Longitude**
A	36.453321	-88.298605
B	36.453582	-88.298712

CEC Bat Capture Data Sheet

Site No. 1	Project Name: Puryear		Date: May 20, 2023
County: Henry	State: Tennessee (TN)	Client: Jackson Group	Surveyors: R. Slack & G. Trombley
Permit # (State & Fed): ES07358A-13 & 1487 (TN)			

No.	Time	Species	Age	Sex	Repro. Cond.[1]	RFA (mm)	Mass (g)	Net/ Ht	Guano/ Hair	Wing Score	Band # Type
1	01:26	LANO	A	M	NR	41	10.3	C/6m	N/A	0	N/A

[1]**Repro. Cond (Reproductive Condition):** (P) pregnant; (L) lactating; (PL) post-lactating; (NR) non-reproductive, (TD) testes descended

[2]**Sky Code:** 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm

[3]**Wind Code :** 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

Moon Phase:	Percent
Waxing Crescent	1.4%

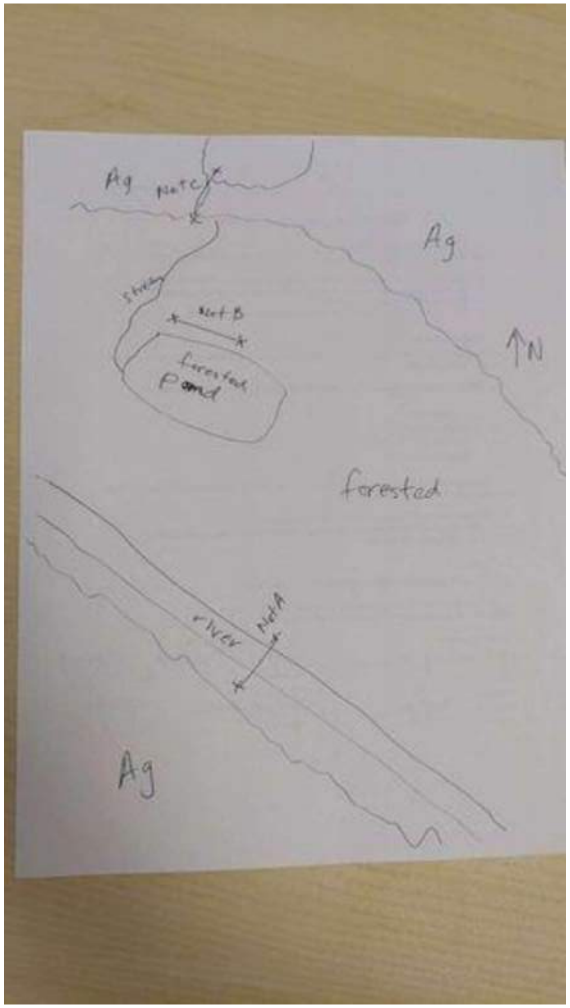
	Rise	Set
Moon	06:09	21:26
Sun	05:43	19:57

Time	Temp	Sky[2]	Wind[3]
20:00	65 °F	0	0
21:00	63 °F	0	0
22:00	58 °F	0	0
23:00	56 °F	0	0
00:00	55 °F	0	0
01:00	54 °F	0	0

Net Coordinates		
Unit	Latitude	Longitude
A	36.453321	-88.298605
B	36.453582	-88.298712
C	36.454071	-88.298994

Site No. 2	**Project Name:** Puryear
Date: May 21, 2023	

Net Site Diagram



Comments:

Dominant Vegetation
A. rubrum
J. nigra
L. styraciflua
Q. nigra
P. occidentalis

Nets by Habitat

Unit	River	Stream	Pond	Road Rut	Corridor	Cave/ Mine	Forest Edge	Interior Forest	Wetland
A	☐	☑	☐	☐	☐	☐	☐	☐	☐
B	☐	☐	☑	☐	☐	☐	☐	☑	☐
C	☐	☐	☐	☐	☑	☐	☐	☐	☐

Net Height (m) X Net Length (m)

Unit	Net Length	Net Height	Total
A	6	9	54
B	9	9	81
C	6	9	54
		Total Area	189

Other Species:

CEC Bat Capture Data Sheet

Site No. 2	**Project Name:** Puryear		**Date:** May 21, 2023
County: Henry	**State:** Tennessee (TN)	**Client:** Jackson Group	**Surveyors:** R. Slack and G. Trombley
Permit # (State & Fed): ES07358A-13 & 1487 (TN)			

No.	Time	Species	Age	Sex	Repro. Cond.[1]	RFA (mm)	Mass (g)	Net/ Ht	Guano/ Hair	Wing Score	Band # Type
1	22:28	LABO	A	F	P	38	12.9	B/4m		0	None

[1]**Repro. Cond (Reproductive Condition):** (P) pregnant; (L) lactating; (PL) post-lactating; (NR) non-reproductive, (TD) testes descended

[2]**Sky Code:** 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm

[3]**Wind Code :** 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

Moon Phase:	Percent
Waxing Crescent	5%

	Rise	Set
Moon	06:53	22:26
Sun	05:42	19:57

Time	Temp	Sky[2]	Wind[3]
20:00	67 °F	0	0
21:00	62 °F	0	0
22:00	59 °F	0	0
23:00	57 °F	0	0
00:00	56 °F	0	0
01:00	55 °F	0	0

Net Coordinates		
Unit	Latitude	Longitude
A	36.444367	-88.314486
B	36.445232	-88.314346

CEC Bat Capture Data Sheet

Site No. 2	**Project Name:** Puryear		**Date:** May 22, 2023
County: Henry	**State:** Tennessee (TN)	**Client:** Jackson Group	**Surveyors:** R. Slack & G. Trombley
Permit # (State & Fed): ES07358A-13 & 1487 (TN)			

No.	Time	Species	Age	Sex	Repro. Cond.[1]	RFA (mm)	Mass (g)	Net/ Ht	Guano/ Hair	Wing Score	Band # Type
1	01:02	LABO (Escaped)	UN	UN				B/5m			

[1]**Repro. Cond (Reproductive Condition):** (P) pregnant; (L) lactating; (PL) post-lactating; (NR) non-reproductive, (TD) testes descended

[2]**Sky Code:** 0- Clear, 1- Few Clouds, 2- Partly Cloudy, 3- Cloudy or Overcast, 4- Smoke or Fog, 5- Drizzle or Light rain, 6- Thunderstorm

[3]**Wind Code :** 0- Calm (0 mph), 1- Light wind (1-3 mph), 2- Light breeze (4-7 mph), 3- Gentle breeze (8-12 mph), 4- Moderate breeze (13-18 mph)

Moon Phase:		**Percent**
Waxing Crescent		10.4%
	Rise	**Set**
Moon	07:43	23:19
Sun	05:41	19:58

Time	Temp	Sky[2]	Wind[3]
20:00	73 °F	0	0
21:00	65 °F	0	0
22:00	62 °F	0	0
23:00	60 °F	0	0
00:00	60 °F	0	0
01:00	59 °F	0	0

Net Coordinates		
Unit	**Latitude**	**Longitude**
A	36.444367	-88.314486
B	36.445232	-88.314346
C	36.445385	-88.313847

Appendix C

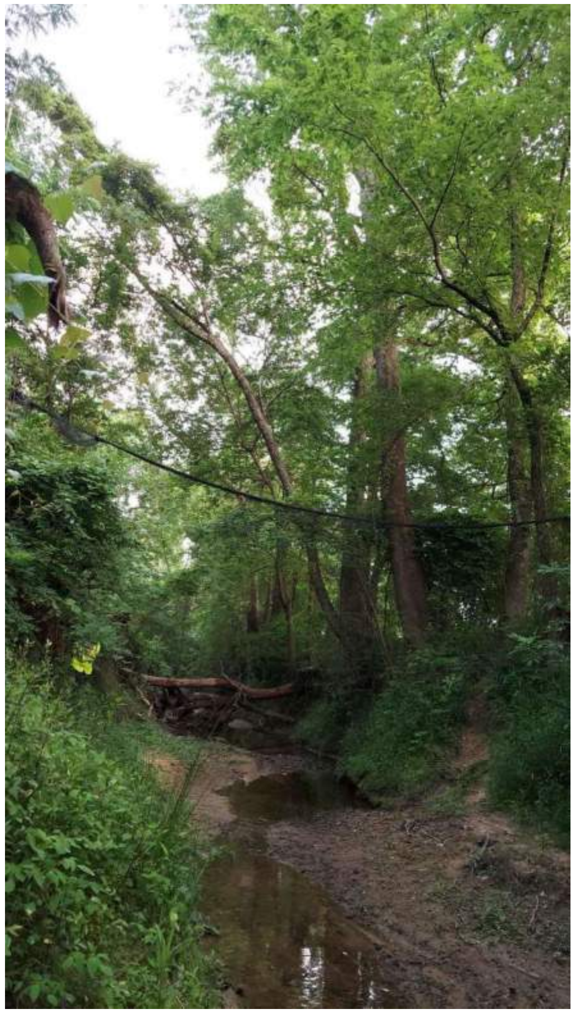
Photographs

Net Site 1, Net A

Net Site 1, Net B

Net Site 1, Net C

Captured Silver-haired bat



Net Site 2, Net A

Net Site 2, Net B

Net Site 2, Net C

Appendix D

State and Federal Scientific Collection Permits

NATIVE ENDANGERED & THREATENED SP. RECOVERY

Permit Number: ES07358A

Version Number: 13

Effective: 2023-03-17 **Expires:** 2027-12-31

Issuing Office:

Department of the Interior

U.S. FISH AND WILDLIFE SERVICE

ES Bloomington Permit Office
5600 American Boulevard, West, Suite 990
Bloomington, Minnesota 55437-1458
permitsR3ES@fws.gov

Digitally signed by

KAREN HERRINGTON

Digitally signed by KAREN HERRINGTON
Date: 2023.03.15 09:10:11 -05'00'

Midwest Region Ecological Services Program Leader

Permittee:

CIVIL AND ENVIRONMENTAL CONSULTANTS, INC.

530 EAST OHIO STREET SUITE G

INDIANAPOLIS, IN 46204

US

Name and Title of Principal Officer:

RYAN SLACK

Authority: Statutes and Regulations: 16 U.S.C. 1539 (a), 16 U.S.C. 1533 (d) 50 CFR 17.22, 50 CFR 17.32, 50 CFR 13

Location where authorized activity may be conducted:

ON LANDS SPECIFIED WITHIN THE ATTACHED SPECIAL TERMS AND CONDITIONS

Reporting requirements:

See permit conditions for reporting requirements.

An annual report is due on 1/31 following each year that this permit is in effect.

Authorizations and Conditions:

A. General Conditions set out in Subpart B of 50 CFR 13, and specific Conditions contained in Federal regulations cited above, are hereby made a part of this permit. All activities authorized herein must be carried out in accord with and for the purposes described in the application submitted. Continued validity, or renewal of this permit is subject to complete and timely compliance with all applicable Conditions, including the filing of all required information and reports.

B. The validity of this permit is also conditioned upon strict observance of all applicable foreign, state, local, tribal, or other Federal law. Necessary state and/or local permits where applicable, must also be acquired and observed; this permit is invalid without such permits.

C. Valid for use by those identified in the List of Authorized Individuals.

C.1. Authorized Individuals:

Only individuals on the attached List of Authorized Individuals (LAI) are authorized to conduct activities pursuant to this permit. The LAI, printed on U.S. Fish and Wildlife Service (USFWS) letterhead, and signed and dated by the Region 3 permit issuing office or a Region 3 lead species Field Office, may identify special conditions or circumstances under which individuals can conduct authorized activities and it must be retained with these Authorizations and Conditions. Each named individual shall be responsible for compliance with the Authorizations and Conditions of this permit.

Trained assistants not named on the attached LAI may work on permitted activities under the direct and on-site supervision of the individuals named on the LAI. "On-site supervision" is defined as having the Permittee at a distance close enough to enable immediate assistance to a supervised individual, as needed, while the supervised individual conducts an authorized activity. Trained assistants may not work independently at a site. **At least one Permittee must remain present at each mist-net/harp trap site while it is being operated.**

Permittee shall replace outdated LAIs and attach the subsequent current updated version of the LAI to this recovery permit upon receipt. **This permit will be considered invalid without a current attached LAI.**

C.2. To request changes to the LAI, the Permittee (Principal Officer for business permits) shall submit an amendment request via ePermits (epermits.fws.gov). The request shall be submitted at least 30 days prior to the desired effective date. The Permittee shall submit a $50.00 processing fee unless fee exempt [see 50 CFR 13.11 (d)], the request should include a desired effective date and shall include the following information:

a. The name of each individual (first name, middle initial, last name) to be appended to the LAI, confirmation that the individual is not permitted under another business or individual Federal recovery permit, and indicate the species they will be working with and the activities they will be conducting;

b. The resume/qualifications of each person, including specific information on previous professional experience working with the species/activity affected by the request. Information should include: the approximate number of hours of focused activity with each species in occupied habitat; approximate numbers of each species the applicant has worked with at each site (i.e., indicate the number specimens at specific sites or specific activities); names, dates, and location of areas surveyed; and experience with similar species;

c. For each individual: the names, titles, organizations, emails, and telephone numbers of a minimum of two references who can verify experience with the species (reference letters are preferred and always appreciated); and

d. The names of any individuals to be deleted from the LAI.

D. Acceptance of this permit serves as evidence that the Permittee understands and agrees to abide by the terms of this permit and all sections of Title 50 Code of Federal Regulations (CFR), Parts 13 and 17, pertinent to issued permits (https://www.ecfr.gov/current/title-50/chapter-I/subchapter-B/part-13 and https://www.ecfr.gov/current/title-50/part-17 (https://www.ecfr.gov/current/title-50/part-17)). Section 11 of the Endangered Species Act of 1973, as amended, provides for civil and criminal penalties for failure to comply with permit conditions.

A request for permit renewal and the $100 application processing fee must be received **at least 30 days prior to the expiration date** of this permit to continue conducting authorized activities under the expired permit while your application is being processed (subject to compliance with 50 CFR, Parts 13.21 and 13.22). Please use https://fwsepermits.servicenowservices.com/fws to obtain specific information regarding the new ePermitting process to apply for and submit your digital recovery permit application and application processing fee. When these requirements are not met, this permit becomes invalid on the expiration date. *Unless otherwise instructed within the Authorizations and Conditions*, **annual reports** are due by January 31 following each year your permit is in effect and shall be submitted to all offices identified in the permit Conditions.

E. Permittees, as identified under C.1. are authorized to take (capture with mist nets, harp trap, handle, identify, radio-tag, band, collect non-intrusive measurements, and release) Indiana bat (*Myotis sodalis*), gray bat (*Myotis grisescens*), northern long-eared bat (*Myotis septentrionalis*) Ozark big-eared bat (*Corynorhinus townsendii igens*) and Virginia big-eared bat (*C.t.virginianus*) for scientific research aimed at recovery of the species including presence/absence surveys, studies to document habitat use, population monitoring, and evaluation of potential impacts. This permit does **not** authorize the collection of voucher specimens.

F. Activities are authorized at the following locations:

F.1. Within the U.S. Fish and Wildlife Service (USFWS) Region 2: Oklahoma, upon receipt of written concurrence from the Field Supervisor, and upon coordination with Ozark Plateau National Wildlife Refuge prior to (1) surveys of caves known to be used by federally-listed bats, and (2) examinations of caves suspected of containing federally-listed bat species (some presence/absence surveys may require the presence of a U.S. Fish and Wildlife Service Biologist), and as outlined in Condition G.

F.2. Within the USFWS Region 3: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio and Wisconsin, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.3. Within the USFWS Region 4: Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina and Tennessee, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.4. Within the USFWS Region 5: Connecticut, Delaware, District of Columbia, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia and West Virginia, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

F.5. Within the USFWS Region 6: Kansas, Montana, Nebraska, North Dakota, South Dakota, and Wyoming, upon receipt of written concurrence from the Field Supervisor, as outlined in Condition G.

G. Permittee shall notify and request approval from the USFWS Field Supervisor for the state in which activities are proposed to occur at least 15 days prior to conducting any activities. Contact information is available at: https://www.fws.gov/media/region-3-recovery-permit-contact-information. Your request for this site-specific approval must be in writing and must indicate:

G.1. Species for which proposed activities are being conducted.

G.2. Location of proposed activities, including project site, county, and state.

G.3. A complete description of activities (i.e., proposed project plan, including purpose and need, surveys, methods, etc.).

G.4. Dates when the project is proposed to take place.

G.5. Evidence that Permittee has received any required contracts to complete the activities.

G.6. Whether all annual reporting requirements have been fulfilled.

You may proceed with only the activities described in your written concurrence letter, upon receipt from the applicable USFWS Field Supervisor. ***Your concurrence letter must be carried with this permit to authorize site-specific activities.***

H. Permittee shall adhere to the following conditions involving capture and handling of bats:

H.1. Bats may be captured with mist nets following the protocol included in the Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines. Guidelines are available at: https://fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines. Note: Permittee must use the most up-to-date version of the Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines, available on the USFWS website page, for your summer surveys. The monitoring interval for mist nets is +/- 10 minutes and may not exceed 15 minutes. Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.

H.2. Bats may be captured with harp traps with written concurrence from the Field Supervisor in the state in which trapping is proposed. Harp traps must be continually monitored. Captured bats may be held for a maximum of 30 minutes, unless injured. In extenuating circumstances, bats shall be held for no longer than 45 minutes.

At least one named Permittee must remain present at each mist net and harp trap site while it is being operated.

H.3. Permittee shall carry out non-intrusive measurements on all captured bats. Data shall be recorded for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data sheet provided by the USFWS (e.g., Bat Reporting Spreadsheet). Handling should be limited to the maximum extent practicable and should cease immediately at signs of undue stress (e.g., bat becoming unresponsive, etc.). Bats that appear stressed from handling should be placed in a dark, quiet location away from activity where it can safely fly away after recovery, and should be checked to ensure successful recovery before leaving the study site. Photographs of the identifying characteristics for each individual federally-listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

H.4. Lipped metal bands having a unique identifier may be applied to the forearm of captured bats prior to release. No more than one band per bat may be used. Bands should be applied to the forearm of captured bats prior to release. Position the band on the wing so that when the bat is hanging upside down, the band numbers are right-side up. A single band should be placed on the right forearm of each male and the left forearm of each female bat.

H.5. Radio transmitters may be applied during spring, summer, and fall roosting and migration periods via nontoxic skin bond adhesive. The total weight of the transmitter may not exceed 5% of the bat's body weight and the total weight of the package (forearm band, transmitter and adhesive) may not exceed 6% of the bat's body weight. The lightest package (both transmitter and adhesive) capable of accomplishing the required task should be used, especially with pregnant females and newly volant juveniles. Bats carrying transmitters must be monitored daily for at least three days, or until the transmitter falls off, whichever occurs first.

H.6. No trapping activities shall occur within 20 meters of a known Indiana bat maternity roost site, either natural or artificial roosts, unless Permittee receives prior written approval from the USFWS Field Supervisor for the state in which the activities are proposed to occur.

H.7. Equipment used to capture and handle bats shall be cleaned and decontaminated, including personal gear such as boots and gloves, using products cited in decontamination guidelines and in compliance with label directions. The most recent decontamination guidance is found on the web at: https://www.whitenosesyndrome.org/topics/decontamination.

H.8. Regarding any Permittee who is not authorized to take Ozark big-eared bat (OZBB) and Virginia big-eared bat (VABB), the USFWS acknowledges that incidental (unintentional) capture of these co-occurring listed bat species may potentially occur while conducting lawful survey activities directed at authorized bat species. Permittee shall be observant and cautious to eliminate or minimize "take" of co-occurring listed species to the maximum extent practicable. In the event of incidental (unintentional) capture of OZBB or VABB, Permittee shall immediately remove the bat(s) from the net/trap after capture, document with a photograph and release at the capture site. Do not put these bat species in holding cages, bags, or containers. Within 48 hours, you must notify the USFWS in the state in which you are working of the incidental capture (see https://www.fws.gov/media/region-3-recovery-permit-contact-information (https://www.fws.gov/media/region-3-recovery-permit-contact-information)).

H.9. Regarding any Permittee who is authorized, you shall immediately remove Ozark big-eared bats and Virginia big-eared bats from the net/trap after capture, then process and release each individual. When there are multiple bats in the net, OZBBs and VABBs shall be removed first and processed as quickly as possible. If this is not possible, the species shall be placed into a HOLDING CAGE and held no longer than 10 minutes. Place the cage in a dark, quiet location, and process all as soon as possible. Do not put these bat species in holding bags, nor in an individual holding bag or container (*C. t. ingens* and *C. t. virginianus* are highly social and being held individually in a bag increases stress and can lead to mortality). Holding cage options include small rubber/plastic/vinyl coated soft-sided (mesh) pet carriers or modified standard minnow traps with rubber coated mesh where the top of the trap is either a plastic bucket or flower pot with a hole in the center (contact the OZBB or VABB Lead Recovery Biologist for further information on acceptable enclosures – see Condition P for contact information). A holding cage shall contain only multiple OZBBs, or only multiple VABBs (avoid overcrowding). Do not place other species/subspecies in either cage(s). Holding cages shall be decontaminated using the most current White-nose Syndrome decontamination guidance after a night of use (https://www.whitenosesyndrome.org/topics/decontamination). Do not decontaminate holding cages within a single net night.

When an OZBB or VABB appear to be going into shock (i.e., becomes limp and unresponsive), place the bat in a dark, quiet location either on a rock or other flat surface considered the safest option for the bat in that situation to recover (removed from capture activities and predators) and monitor it periodically. Do not continue to handle the bat, nor place it in a holding cage or in a holding cage with other OZBBs or VABBs. If the stressed bat recovers, release it immediately without an attempt to gather additional data, collect samples, apply a band or a transmitter, etc.

H.10. When carrying out mist-netting and handling of bats under this permit, Permittee must use COVID-specific Personal Protective Equipment (PPE) in addition to the PPE already identified by the USFWS and states for mitigating the risk of spread of the fungus that causes white-nose syndrome, which includes the use of disposable gloves, disposable or site-dedicated clothing, and adherence to decontamination procedures. COVID-specific PPE is a non-vented N95 respirator (no exhalation valve) or any respirator or mask that provides a similar level of protection filtering exhaled air (https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/respsource1quest3.html#half).

I. Upon determination that endangered or threatened bats are present at previously undocumented sites, Permittee shall notify the following within 48 hours: the USFWS Regional Recovery Permit Coordinator, the Species Recovery Lead (See below), and the USFWS Field Office within the geographic location of study areas at https://www.fws.gov/media/region-3-recovery-permit-contact-information

J. Accidental injury or mortality may not exceed two (2) specimens. In the event that any accidental injury or mortality occurs, all activities must cease. The Permittee must report any bat mortality or serious injury within 24 hours to the applicable USFWS Field Office in the state in which the incident occurred (contact information provided at: https://www.fws.gov/media/region-3-recovery-permit-contact-information. Written notification must also be made within 48 hours to the Minnesota office Regional Recovery Permit Coordinator and the Species Recovery Lead (See below). The Permittee's statement must document the cause of the injury or mortality, and identify all remedial measures employed by the Permittee to eliminate future mortality or injury events. Based on consultation between the USFWS offices, decisions will be made regarding remedial measures that will be implemented and whether and/or when any of the authorized activities may continue. The Species Recovery Lead Office will provide a decision within five (5) business days concerning the disposition of any injured or dead specimen. Dead or moribund bats may be retained for further study only with the written permission of the USFWS. Any bats that are not authorized for retention are to be chilled and promptly transferred to the USFWS Species Recovery Lead for potential necropsy and/or contaminants analysis. Permitted activities may resume upon receipt of written approval from the Species Recovery Lead Office.

K. This permit is non-transferable.

L. Permittee must carry a copy of this permit at all times when conducting the authorized activities. Shipments of collected biological materials should also be accompanied by a copy of this permit. Note that this permit is limited to the above activities and identified species.

M. Issuance of this permit does not constitute permission to conduct these activities on National Wildlife Refuges or any other public or private lands; such permission must be obtained separately from the appropriate landowner or land manager before beginning these authorized activities. This permit, neither directly nor by implication, grants the right of trespass.

N. Upon locating a dead, injured, or sick federally listed species, under circumstances not addressed in this authorization, initial notification must be made immediately to the USFWS Field Office in the State in which the specimen is found at https://www.fws.gov/media/region-3-recovery-permit-contact-information (https://www.fws.gov/media/region-3-recovery-permit-contact-information). Notification should also be made by the next business day to the USFWS' Regional Minnesota Office Recovery Permit Coordinator identified below. Those offices will confer with the USFWS' Division of Law Enforcement as appropriate and determine next steps. Care should be taken in handling sick, injured, or dead specimens to ensure effective treatment or to preserve biological materials for later analysis. In conjunction with the care of sick or injured endangered or threatened species, and the preservation of biological materials from a dead individual, the finder should take responsible steps to ensure that the site is not unnecessarily disturbed.

O. An Annual Report of all activities conducted under the authority of this permit is due by January 31 following **each year** this permit is in effect. When assisting with netting, the permit number of the individual responsible for each capture should be recorded on the data collection form. Reports shall be sent electronically and your transmittal email must cite your Federal permit number, Permittee name, and the Annual Report year in the subject line (***Note: thumb drives/flash drives and links to documents cannot be accepted***). In addition, copies of all publications and reports resulting from work conducted under this permit must be submitted as they become available. Failure to furnish any reports required by this permit is cause for permit revocation and/or denial of future permit applications. At a minimum, your report shall include:

O.1. The "Bat Reporting Spreadsheet" is required for reporting data and can be found on the FWS website (https://fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines). Prior to reporting, check the permits website to ensure you are using the most up to date form. Using the reporting form will help standardize data collection and increase efficiency in reporting.

O.2. The date, time, geographic locations (including datum and projection information), species, age, sex, and weight of all bats encountered.

O.3. A description of locations surveyed where no bats were encountered.

O.4. Band numbers of all bats banded.

O.5. Information on any injuries and/or mortalities and disposition of specimens.

O.6. Location and characteristics of roost trees and bat colonies.

O.7. Copies of any separate reports and/or publications resulting from work conducted under the authority of this permit.

O.8. A completed data collection sheet as found in the Survey Guidelines, cited in Condition H.1.

O.9. Data shall be submitted for all bats captured and include, but not be limited to, the data requested in any automated or species-specific data sheet provided by the USFWS (e.g., the reporting spreadsheets found on the current Range-wide Indiana Bat Summer Survey Guidelines website cited in Condition H.1. or other species-specific data sheets). Photographs of the identifying characteristics for each individual federally listed species captured are encouraged. The Permittee may be requested to provide individual photographs after submittal of annual reporting data.

O.10. Copies of all site-specific authorization letters required under Condition G.

IF NO ACTIVITIES OCCURRED OVER THE COURSE OF THE YEAR, INDICATION OF SUCH SHALL BE SUBMITTED AS AN ANNUAL REPORT.

P. Copies of your reports shall be sent to **all offices** indicated below. Your transmittal letter (or email) must cite your Federal permit number, Permittee name, and the Annual Report year in the subject line. Electronic copies shall be submitted in MS Word, Portable Document Format, Rich Text Format, or other file format that is compatible with the receiving office (**thumb drives/flash drives and links to documents cannot be accepted**).

P.1. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service – Midwest Region (Region 3)
Ecological Services – Endangered Species
5600 American Blvd. W., Suite 990
Bloomington, Minnesota 55437-1458
(612/713-5343; fax 612/713-5292)
permitsR3ES@fws.gov

P.2. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service – Southwest Region (Region 2)
Endangered Species Permits Office
P.O. Box 1306
Albuquerque, New Mexico 87103-1306
(505/248-6420; fax 505/248-6788)
permitsR2ES@fws.gov

P.3. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service – Southeast Region (Region 4)
Endangered Species Permits Office
1875 Century Blvd.
Atlanta, Georgia 30345-3301
(404/679-7097; fax 404/679-7081)
permitsR4ES@fws.gov

P.4. Regional Recovery Permits Coordinator
U.S. Fish and Wildlife Service – Northeast Region (Region 5)
Endangered Species Division
300 Westgate Center Drive
Hadley, Massachusetts 01035-9589
(413/253-8212; fax 413/253-8482)
permitsR5ES@fws.gov

P.5. ESA Assistant Recovery Coordinator & Permits Coordinator
U.S. Fish and Wildlife Service – Mountain-Prairie Region (Region 6)
Endangered Species Permits Office
Denver Federal Center, P.O. Box 25486
Denver, Colorado 80225-0489
(303/236-4224; fax 303/236-0027)
permitsR6ES@fws.gov

P.6. Keith Lott
U.S. Fish and Wildlife Service Ohio Field Office
4625 Morse Road, Suite 104 Columbus, Ohio 43230

(614/416-8993; fax 614/416-8994)
Keith_Lott@fws.gov

Additionally, based on species, reports and publications shall be submitted to the following:

P.7. ***For studies involving gray bat:***
Vona Kuczynska
U.S. Fish and Wildlife Service
Missouri Field Office
101 Park DeVille Drive, Suite A
Columbia, Missouri 65203-0007
(573/234-2132; fax 573/234-2181)

P.8. ***For studies involving Indiana bat:***
Lori Pruitt
U.S. Fish and Wildlife Service
Indiana Field Office
620 S. Walker Street
Bloomington, Indiana 47403-2121
(812/334-4261; fax 812/334-4273)

P.9. ***For studies involving northern long-eared bat:***
Jill Utrup
U.S. Fish and Wildlife Service
Minnesota-Wisconsin Field Office
4101 American Blvd. E.
Bloomington, Minnesota 55425-1665
(952/252-0092; fax 952/646-2873)

P.10. ***For studies involving Ozark big-eared bat:***
Richard Stark
U.S. Fish and Wildlife Service
Ozark Plateau National Wildlife Refuge
9014 East 21st Street
Tulsa, Oklahoma 74129

(918/382-4520; fax 918/581-7467)

P.11. ***For studies involving Virginia big-eared bat:***

Liz Stout
U.S. Fish and Wildlife Service
West Virginia Field Office
6263 Appalachian Highway
Davis, West Virginia 26260
elizabeth_stout@fws.gov (https://mail.google.com/mail/?view=cm&fs=1&tf=1&to=elizabeth_stout@fws.gov)
FW5_WVFO@fws.gov (https://mail.google.com/mail/?view=cm&fs=1&tf=1&to=FW5_WVFO@fws.gov)

P.12. Additionally, based on geographic area, reports and publications shall be submitted to the applicable offices found at https://www.fws.gov/service/3-200-59-scientific-purposes-enhancement-propagation-or-survival-permits-recovery-permits.

cc: FWS/Regional Offices –Region 2, 3, 4, 5 and 6 (Attn: Regional Recovery Permit Coordinator)
FWS, TE Coordinator: Illinois-Iowa, Indiana, Michigan, Minnesota-Wisconsin, Missouri, Ohio
DNR/DOC, TE Coordinator: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin

END

TENNESSEE WILDLIFE RESOURCES AGENCY

ELLINGTON AGRICULTURAL CENTER
P. O. BOX 40747
NASHVILLE, TENNESSEE 37204

Scientific Collection Permit : 1487 **Issue date:** 2/23/2023 **Expiration date:** 2/23/2024

Pursuant to authority of T.C.A. 70-2-213: J.D. Wilhide

and the following additional permittees:
Tim Nehus, Chris Catron, John Nunley, Jose Garcia, Matthew Skelton, Casey Hertwig, Cole Liggett, Caleb Duke, Jedidiah Scott, Jackie Rocky, Ryan Slack, Will Methvin, Dan Spradlin, Scott Goodfellow, Ryan Kelso

are granted permission to take the following species:
Collect fishes, crayfish and mussels at project sites. , Hairy-tailed mole (using small mammal traps)., Bats, including listed species following USFWS requirements., Animals will be released at site of capture or relocated within the same waterway. Streamside Salamander (Ambystoma barbouri)

TENNESSEE WILDLIFE RESOURCES AGENCY

ELLINGTON AGRICULTURAL CENTER
P. O. BOX 40747
NASHVILLE, TENNESSEE 37204

Scientific Collection Permit : 1487 **Issue date:** 2/23/2023 **Expiration date:** 2/23/2024

Pursuant to authority of T.C.A. 70-2-213: J.D. Wilhide

and the following additional permittees:
Tim Nehus, Chris Catron, John Nunley, Jose Garcia, Matthew Skelton, Casey Hertwig, Cole Liggett, Caleb Duke, Jedidiah Scott, Jackie Rocky, Ryan Slack, Will Methvin, Dan Spradlin, Scott Goodfellow, Ryan Kelso

Restricted to the following locations:
Statewide, depending on contract. Must have TWRA Regional approval prior to any field work.

TENNESSEE WILDLIFE RESOURCES AGENCY

ELLINGTON AGRICULTURAL CENTER
P. O. BOX 40747
NASHVILLE, TENNESSEE 37204

Scientific Collection Permit: 1487 **Issue date:** 2/23/2023 **Expiration date:** 2/23/2024

Pursuant to authority of T.C.A. 70-2-213:
J.D. Wilhide

and the following additional permittees:
Tim Nehus, Chris Catron, John Nunley, Jose Garcia, Matthew Skelton, Casey Hertwig, Cole Liggett, Caleb Duke, Jedidiah Scott, Jackie Rocky, Ryan Slack, Will Methvin, Dan Spradlin, Scott Goodfellow, Ryan Kelso

Restricted to the following collection methods:
Electrofishing, Gillnets & Seines, Hand and Dipnets, SCUBA, Small Mammal traps (No snap traps), Mist nets, Harp traps

Subject to the following rules:

Wildlife may not be held longer than 24 hours without prior approval. All containers and equipment utilized in the collection of amphibians and reptiles shall be decontaminated and disinfected for ranavirus and other pathogens. This permit is invalid unless accompanied by all applicable federal permits.

No species listed by TWRA as endangered, threatened, in need of management, or of greatest conservation need may be taken without approval; release these species immediately. Report the occurance of endangered or threatened species to TWRA within five days.

Prior to collecting in the field, you are required to notify the TWRA Regional Dispatcher with the name(s) of person(s) doing the collecting, where, when and what species you will be collecting. Contact information is attached.

Executive Director, Tennessee Wildlife Resources Agency

2/23/2023
Date

The State of Tennessee

AN EQUAL OPPORTUNITY EMPLOYER

Appendix E

Agency Study Plan Approval

From: Sykes, Robbie <robbie_sykes@fws.gov>
Sent: Friday, May 12, 2023 6:26 PM
To: Jeremy Jackson; Tennessee ES, FWS
Cc: Kris.Thoemke@bargedesign.com; Hamrick, Elizabeth Burton
Subject:RE: FWS 2023-0080010. Proposed Bart Survey Plan for the Puryear Solar Farm in Puryear, Henry County, TN

Jeremy,
We have reviewed the mist net survey proposal for the proposed Puryear Solar Project property in Henry County, and the plan appears to be appropriate in terms of documenting presence/probable absence of the Indiana bat, northern long-eared bat, and tricolored bat. We approve the survey plan, and look forward to reviewing the results of the survey.

Sincerely,
Robbie Sykes
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
446 Neal Street
Cookeville, TN 38501
(tele. 931/525-4979)

From: Jeremy Jackson <jjackson@jacksongroupco.com>
Sent: Tuesday, May 9, 2023 4:44 PM
To: Tennessee ES, FWS <tennesseeES@fws.gov>
Cc: Sykes, Robbie <robbie_sykes@fws.gov>; Kris.Thoemke@bargedesign.com; Hamrick, Elizabeth Burton <ecburton@tva.gov>
Subject: [EXTERNAL] Project Code: 2023-0080010_Project Name_Puryear Solar Farm

Robbie,
Per our conversation, please see the attached proposal and IPAC Code.
Robbie, please also cc Kris with Barge Design and Liz Hamrick with TVA so project codes are not duplicated.

Thanks, JJ

Jeremy L. Jackson AWB, CE

A Service-Disabled Veteran-Owned Small Business
3925 Simpson Lane
Richmond, Kentucky 40475
www.jacksongroupco.com
(501)339-3580

Appendix C

Puryear Solar Site HD Concurrence Letter

Any alterations to jurisdictional streams, wetlands, or open water features may only be performed under the coverage of, and conformance to, a valid Aquatic Resource Alteration Permit (ARAP) issued by the Division. ARAP applications and provisions are available on-line at https://www.tn.gov/environment/permit-permits/water-permits1/aquatic-resource-alteration-permit--arap-.html. Alterations to Wet Weather Conveyances typically may be performed without application or notification to the Division, provided they conform to the provisions found under Tennessee Code Annotated § 69-3-108 (q).

Please note that coverage under the General NPDES Permit for Stormwater Discharges from Construction Activities (CGP) will be needed if the proposed land disturbance activity for this project is one acre or more in size. Information and applications regarding the Division's construction storm water program can be found online. A completed Notice of Intent form, an application fee, and a storm water pollution prevention plan should be submitted to the above address for review and coverage under this permit prior to any land disturbance.

Discharges and alterations to sinkholes may require the submittal of an application and written authorization under the provisions of TDEC Rules. Information and applications regarding the Underground Injection Control program may be seen online at https://www.tn.gov/environment/permit-permits/water-permits1/underground-injection-control-permit.html. Physical alterations or re-routing of surface hydrology to a sinkhole may require coverage under the Class V Injection Control Permit.

Hydrologic determinations are advised and governed by Tennessee Department of Environment and Conservation (TDEC) rules and regulations, and therefore only apply to the State's permitting process. Because these and other various water features on-site may potentially also be considered jurisdictional Waters of the United States, any alterations to them should only be performed after consultation with the U.S. Army Corps of Engineers.

We appreciate the opportunity to assess the jurisdictional status of these water features prior to site plan finalization and initiation of construction activities. Because natural variation and human activities can alter hydrologic conditions, the Division reserves the right to reassess the status of the water features in the future.

Thank you for your interest in water quality in Tennessee. Please contact me at 731-388-3950 or by email at amy.fritz@tn.gov if you have any questions.

Respectfully,

Amy Fritz

TN Department of Environment & Conservation

Amy Fritz, Environmental Consultant 1
Division of Water Resources
Jackson Environmental Field Office

Cc: File copy
USACE District Memphis: CEMVMRegulatory@usace.army.mil

Appendix D

USFWS ESA Concurrence Letter

Tennessee Ecological Services Field Office

FWS Log No: 2023-0080010

The Service concurs with your effect determination(s) for resources protected by the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). This finding fulfills the requirements of the Act. If project design changes are made or new information becomes available, please submit new plans for review.

DANIEL ELBERT
Digitally signed by DANIEL ELBERT
Date: 2023.12.19 15:31:04 -06'00'

Field Supervisor Date

TVA TENNESSEE VALLEY AUTHORITY

400 West Summit Hill Drive, Knoxville, Tennessee 37902

October 4, 2023

Mr. Daniel Elbert
U.S. Fish and Wildlife Service
Tennessee Field Office
446 Neal Street
Cookeville, Tennessee 38501

Dear Mr. Elbert:

TENNESSEE VALLEY AUTHORITY (TVA) – PURYEAR SOLAR PROJECT – REQUEST FOR CONCURRENCE – PROJECT CODE: 2023-0080010

TVA has entered into a power purchase agreement (PPA) with SR Puryear, LLC (Puryear Solar), a wholly owned subsidiary of Silicon Ranch Corporation (SRC), to purchase the power generated by Puryear Solar (Project) in Henry County, Tennessee. The Project is anticipated to provide up to 50 megawatts (MW) alternating current (AC) in generating capacity at the Point of Interconnection (POI). The proposed solar facility would be constructed and operated by Puryear Solar. TVA would purchase the electric output generated by the proposed solar facility for an initial term of 20 years, subject to satisfactory completion of all applicable environmental reviews. The POI would be a new substation built by SRC within the Project Site along the southern boundary. The SRC substation would transfer the electricity to a new Paris Board of Public Utilities (PBPU) single breaker switchyard (switchyard), also built on the Project Site. This switchyard transfers the power through a 69 kilovolt (kV) feeder transmission line (TL) to be built and connected to a future substation, then transferring power into the TVA grid. Construction of the feeder TL is not part of the Puryear Solar project as it is being pursued regardless of the execution of the proposed solar project. The Project Site is a 611-acre property although 235 acres of this would not be disturbed. Impacts would occur to approximately 375 acres. Specific details about the scope of this project can be found in the draft Environmental Assessment (EA) available online at: https://www.tva.com/environment/environmental-stewardship/environmental-reviews/nepa-detail/sr-puryear-solar-project . Threatened and endangered species survey reports can also be found in the appendices at the link provided.

Review of the TVA Regional Natural Heritage database and the U.S. Fish and Wildlife Service Information for Planning and Consultation (IPaC) website identified six species listed as federally endangered, threatened, candidate, or delisted and monitored under the Endangered Species Act (ESA) that have the potential to occur within the project area in Henry County, Tennessee. These species include one insect (monarch butterfly), four mammals (gray bat, northern long-eared bat (NLEB), Indiana bat, and tricolored bat), one bird (whooping crane), and one reptile (alligator snapping turtle) that have the potential to occur within the project boundary based on historic range, proximity to known occurrence records, biological characteristics, and/or physiographic characteristics. No federally designated critical habitats for these species are present within or adjacent to the project action area, therefore no adverse modification of critical habitats would occur.

Field-based delineation identified eight wetlands (5.23 acres) and 13 open water bodies (4.05 acres) within the Project Site. A total of 10 ephemeral stream reaches (5,448 linear feet), nine intermittent streams (7,471 linear feet), and two perennial stream reaches (3,010 linear feet) were also identified. Final site design has not yet been determined, but the preliminary design indicates that direct impacts to surface water features would be minimal. The current design estimates up to 0.2 acres of forested wetland would be converted to emergent or scrub/shrub wetland however SRC is working to avoid all impacts to wetlands. With the use of proper best management practices (BMPs), Clean Water Act (CWA) Sections 404 and 401 permitting, and compliance with all federal, state, and local regulations, surface water and wetland impacts are expected to be minor.

Barge Design Solutions, Inc. conducted Phase 1 Habitat Assessments on May 19-22, 2023, according to the 2023 Range-Wide Indiana Bat and Northern Long-eared Survey Guidelines (USFWS, 2023) to determine presence of habitat for Indiana bat, NLEB, and tricolored bat. No suitable caves or potential winter roosting hibernacula sites were identified within the Project Site. The quality of summer roosting bat habitat within the Project Site was based on the presence of potential bat roost trees, solar exposure of those roost trees, density and maturity of the woodland, as well as proximity to aquatic foraging habitat. There are approximately 73 acres of forested land within the Project Site. Summer roosting habitat ranged from poor to good quality. Forested vegetative communities found within the project site include mature oak-hickory forest, mature and semi-mature riparian forest, mixed growth hardwood forest, and successional forest. A total of 17 potential Indiana bat and NLEB bat roost trees were identified within and immediately adjacent to the project study area. Identified potential Indiana bat and NLEB roost trees were live shagbark hickory trees, or other live and dead trees with exfoliating bark, cracks, or crevices. Approximately 10 acres of the total forested habitat was determined to be “good” quality summer roosting habitat and was comprised of mature riparian forests and mature oak-hickory forests. Approximately 23 acres was determined to be “marginal” quality habitat and was comprised of younger hardwood forest with a variety of age classes throughout the canopy and midstory as well as areas of dense vines and saplings and shrubs. Approximately 40 acres are considered “poor” habitat and were comprised of early successional forests that were too dense for bat travel. Of the forested habitat identified, only the habitat characterized as “good” and “marginal” quality would be considered suitable for summer roosting Indiana bats, NLEB, and tricolored bats. The wetlands and streams on site offer suitable foraging habitat for all bat species. The proposed project could remove approximately one acre of “marginal” quality summer roosting habitat and would avoid all of the “good” quality roosting habitat. In addition, nine acres of “poor” quality habitat for would be cleared within the Project Site. See Appendix H at the aforementioned link for the Bat Habitat Assessment.

Phase 2 Presence/Absence Mist Net Surveys were conducted by Jackson Group from May 19-22, 2023, according to the 2023 Range-Wide Indiana Bat and Northern Long-eared Survey Guidelines (USFWS, 2023). Based on the amount of forested habitat within the Project Area two net sites were established. Net site locations were selected by a permitted bat biologist in the field and were based on the best possible net locations (e.g., streams, trails, corridors) that are typically the most effective places to survey. The surveys were conducted at two net sites for two nights with two net sets being surveyed on the first night and three net sets on the second night at each net site with total of 10 net-nights of survey effort. Proposed netting plans were approved by USFWS, Cookeville on May 12, 2023. A total of three bats were captured during the survey effort. Bat species captured included two eastern red bats (*Lasiurus borealis*) and one silver-haired bat (*Lasionycteris noctivagans*). No threatened or endangered bats were captured during survey efforts. See Appendix I at the aforementioned link for the Bat Survey Report. In addition, there are no known hibernacula or maternity roosts for federally listed bats withing 10 miles of the project and mist net surveys determined that the Indiana bats, NLEBs, and tricolored bats are likely absent from the project site. The closest known record of tricolored bat is a mist net capture from 2014, approximately seven miles away. Captures during that year may be considered to be “pre-white nose syndrome” in the sense that populations of tricolored bats were still high enough to be commonly caught on the landscape. At the time of this consultation, remnant populations of tricolored bat are thought to be less common across the state. Surveys on this Project Site indicated they were not present in this action area. The USFWS has also determined that neither Indiana bat, nor northern long-eared bat are likely to occur at this location per the Endangered Bats of Tennessee map. Therefore, ***TVA has determined that proposed actions may affect but are not likely to adversely affect Indiana bat and northern long-eared bat. TVA also has determined that proposed actions would not jeopardize the continued existence of the tricolored bat.***

According to the USFWS map of Endangered Bats of Tennessee, the Project Site falls within an area where they consider gray bats likely to be present. However, there are no known hibernacula for gray bats withing ten miles of the project and mist net surveys did not capture any gray bats in the Project Site. No caves are known within 10 miles of the Project Site and none were found within the Project Site during field surveys. The closest known record of gray bat is from a mist net survey approximately 9.72 miles away. Due to the lack of impacts to hibernacula and minimal impacts to surface water, ***TVA has determined that proposed actions may affect but are not likely to adversely affect gray bat.***

Whooping cranes themselves were not observed on site during the September 2022 sites inspections. However, suitable stop-over migration foraging habitat was present in agricultural fields, pasture and ponds on site. Fields and pasture lands would be converted to solar arrays; however, the ponds on site would not to be impacted. Loss of this relatively small amount of suitable migration habitat would not result in significant impacts to the experimental population of whooping cranes that could migrate through the area. In addition, there is an abundance of similarly suitable agricultural land in the immediate surround area. Therefore, ***TVA has determined that the proposed actions would not jeopardize the continued existence of the whooping crane.***

The alligator snapping turtle was not observed on site. The project site lacks the preferred habitat of deep water of rivers, sloughs, oxbows, swamps, and lakes and this species is not found in isolated ponds or wetlands. One record of this species is known from Kentucky Lake, approximately 11.5 miles away. The record is from 1965. Potential project impacts to surface waters are expected to be minimal (up to 0.2 acres of wetlands that may converted from forest to emergent or scrub-shrub wetland to reduce panel shading). Buffers around streams and wetlands as well as other BMPs would be used to protect these features during construction. Due to a low likelihood of presence and minimal impacts to marginal habitat, ***TVA has determined that the proposed actions would not jeopardize the continued existence of the alligator snapping turtle.***

Adult monarch butterflies were observed across the site during field reviews in September. No caterpillars or eggs were observed; however, milkweed was observed along the margins of agricultural fields and farm ponds. Proposed impacts may remove small amounts of habitat for this species. Similarly suitable habitat is available across the area, thus loss of the small amounts of habitat on the project site would not be significant. Therefore, ***TVA has determined that the proposed actions would not jeopardize the continued existence of monarch butterfly.***

We respectfully request concurrence with our determinations. Should you have any questions or wish to discuss the project in more detail, please contact Elizabeth Hamrick by email, ecburton@tva.gov.

Sincerely,

W. Douglas White
Manager
Biological Compliance

EKM:ABM
Enclosures

Appendix E

Cultural Resources Consultation Information

Kris Thoemke

From: Harle, Michaelyn S <mharle@tva.gov>
Sent: Tuesday, September 12, 2023 3:11 PM
To: Kris Thoemke
Subject: FW: Silicon Ranch Solar Photovoltaic Generating Facility, CRMS 32367691962 - Project # SHPO0001743

Concurrence below.

From: TN Help <tnhelp@service-now.com>
Sent: Wednesday, July 12, 2023 12:48 PM
To: Beliles, Emily <ebeliles@tva.gov>
Cc: Harle, Michaelyn S <mharle@tva.gov>
Subject: Silicon Ranch Solar Photovoltaic Generating Facility, CRMS 32367691962 - Project # SHPO0001743

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

2023-07-12 11:24:19 CDT

Michaelyn Harle
TVA

RE: Tennessee Valley Authority (TVA), Silicon Ranch Solar Photovoltaic Generating Facility, CRMS 32367691962, Project#: SHPO0001743, Henry County, TN

Dear Michaelyn Harle:

In response to your request, we have reviewed the cultural resources survey report and accompanying documentation submitted by you regarding the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Considering the information provided, we concur that no historic properties eligible for listing in the National Register of Historic Places will be affected by this undertaking. If project plans are changed or archaeological remains are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Please provide your Project # when submitting any additional information regarding this undertaking. Questions or comments may be directed to Casey Lee, who drafted this response, at Casey.Lee@tn.gov, +16152533163.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

Ref:MSG9008314_nebZj5tHXNmg4FMl9yKO